

วิทยาลัยวิทยาศาสตร์สาธารณสุข จุฬาลงกรณ์มหาวิทยาลัย COLLEGE OF PUBLIC HEALTH SCIENCES CHULALONGKORN UNIVERSITY



The 11<sup>th</sup> International Graduate Students Conference on Population and Public Health Sciences (IGSCPP)

July 14, 2020

The College of Public Health Sciences, Chulalongkorn Universit



**Prof. Sathirakorn Pongpanich, Ph.D.** Chairperson, Executive Committee, 11<sup>th</sup> IGSCPP Dean The College of Public Health Sciences, Chulalongkorn University, Thailand www.cphs.chula.ac.th

#### **Dear Colleagues:**

On behalf of the College of Public Health Sciences, Chulalongkorn University and Scientific Committees of the 11<sup>th</sup> International Graduate Students Conference on Population and Public Health Sciences, I would like to welcome all of you to the College of Public Health Sciences. There will be a number of student presentations reflecting the broad diversity of public health issues. We hope you will take the advantage of this opportunity to participate in interesting discussions as well as to meet with new colleagues.

I would like to thank the conference co-chair Associate Prof. Dr. Aree Jampaklay, Director of Institute for Population and Social Research, Mahidol University and Asst. Prof. Dr. Phudit Tejativaddhana, MD, Director of ASEAN Institute of Health Development, Mahidol University as well as the members of the Organizing and Scientific Committees, colleagues and staff for their tireless efforts to organize this conference. I, as well, would also like to acknowledge significant support of Chulalongkorn University for this conference.

The success of the conference now rests upon your collective shoulders, in your presentations and participation. I encourage all of you to take in the experience as much as you can, to meet colleagues, to debate scientific perspectives, and of course, to take some time to enjoy the surroundings and Chulalongkorn University Campus.

Once again, welcome all of you to The 11<sup>th</sup> International Graduate Students Conference on Population and Public Health Sciences.



### WELCOME MESSAGE



Asst. Prof. Dr. Phudit Tejativaddhana Co-Chairperson, Executive Committee, 11<sup>th</sup> IGSCPP Director ASEAN Institute for Health Development, MahidolUniversity, Thailand www.aihd.mahidol.ac.th

Dear Colleagues,

On behalf of the organizing committee, I am honored to welcome you to the 11<sup>th</sup> International Graduate Students Conference on Population and Public Health Sciences (IGSCPP). This international conference is jointly organized by the College of Public Health Sciences, Chulalongkorn University, Institute for Social and Population Studies and ASEAN Institute for Health Development of Mahidol University. The collaboration between these three organizations has been strengthened for several years. I wish for further achievements, and hope for continued cooperation.

This annual conference is served as a platform for graduate students to exchange their ideas, broaden their knowledge, meet new friends and do networking, and also strengthen academic collaboration among three partnering organizations.

The success of the conference depends on our colleagues who have worked with us in planning and organizing this international conference. Recognition should go to the College of Public Health Sciences, Chulalongkorn University for utmost dedication in organizing this impressive and memorable conference. I also thank the Institute for Social and Population Studies for jointly organizing and supporting this outstanding conference. I sincerely congratulate you on the success of the conference, which is well-organized.

I would like to thank all participants for their contributions to the conference. I hope that you would have a productive and pleasurable time at this very special conference. I hope that you find the conference stimulating, fulfilling and enjoyable.



Associate Professor Dr.Aree Jampaklay Co-Chairperson, Executive Committee, 11th IGSCPP Director Institute for Population and Social Research, Mahidol University

#### My dear colleagues,

The International Graduate Students Conference on Population and Public Health Sciences (IGSCPP) has been held annually since 2010. Now in its 11th year, the conference continues to be a sustainable success because of the ongoing academic collaboration between three Institutes: The College of Public Health Sciences (CPHS), Chulalongkorn University, and the ASEAN Institute for Health Development (AIHD), and the Institute for Population and Social Research (IPSR), Mahidol University. The continued success of the conference proves that even faced with a considerable challenge, such as with COVID-19, nothing will prevent us from working together to make this conference happen.

On behalf of the Institute for Population and Social Research (IPSR), Mahidol University, it is my honor to extend a warm welcome to everyone participating in this special event. I believe what we will learn from each other in this conference will enrich our knowledge of diverse aspects of population and public health. This opportunity will provide an invaluable experience for all of us. Sharing our research with other colleagues for feedback and comments in such an international setting, like this conference, is a critical process of learning in becoming a qualified and competent academic.

Now, without hesitation, I would like to sincerely congratulate, and extend my gratitude to, the two cochairs of our organizing institutes, the College of Public Health Sciences (CPHS), Chulalongkorn University, and the ASEAN Institute for Health Development (AIHD), Mahidol University, for putting forth a great deal of effort to make this conference possible. My heartfelt appreciation also goes out to all students and presenters who will be presenting their research at this conference. Your contribution is key to this collaboration and networking event.

Once more, welcome everyone to the International Graduate Students Conference on Population and Public Health Sciences (IGSCPP). I hope you find this experience to be truly invaluable.

Thank you.



July 14, 2020 The College of Public Health Sciences, Chulalongkorn University

#### Time Program

- 8.30-8.45 VDO Presentation & Welcome
- 8.45-9.00 Conference Welcome Report

#### Welcome keynote:

Professor Sathirakorn Pongpanich, Ph.D. Dean, College of Public Health Sciences, Chulalongkorn University

Asst. Prof. Phudit Tejativaddhana, Ph.D., MD Director, ASEAN Institute of Health Development, Mahidol University

Associate Professor Aree Jampaklay, Ph.D. Director, Institute for Population and Social Research, Mahidol University

#### **Conference Opening Keynote**

Professor Bundhit Eua-arporn, Ph.D. President of Chulalongkorn University

MC: Assoc. Prof. Chitlada Areesantichai, Ph.D.

**9.00-9.30** Special Lecture: Putting the Breaks on COVID-19: How to Safeguard the Health and Rights of Women and Girls Now?

Wassana Im-em

Acting Head of Office UNFPA Thailand

Chairperson & Co-chairperson: Assoc. Prof. Wattasit Siriwong, Ph.D.

#### 9.30-9.40 Short Break

#### 9.40-12.00 Oral Presentation



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Room 1 (Host by CPHS)	<b>Track 4:</b> Communicable Diseases (CD) and Non-Communicable Diseases (NCD), Sexual and Reproductive Health and Rights, Gender and Sexuality, Violence Against Women and Children, STIs and HIV/AIDS, Health Promotion, Health Behaviours
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	2) Individual factors associated with fertility in former Soviet Union: A case study in Armenia and Tajikistan (#02) <i>by Chung Gum Choe</i>
	3) Prevalence and Associating Factors of Infertility among Married Women in Vietnam (#03) by Kim Nam Il
	4) Factors Associated with Parental Attitudes towards Condom Education for Children Aged 12-14 Years (#04) by Su Myat Lwin
	5) Stigma as a Barrier to Uptake of HIV Counselling and Testing among Sexual-Minor Men in Bangkok, Thailand (#05) <i>by Zu Zu Kyaw Sein Win</i>
	6) Households Risk Evidence on Dengue Fever among Households in the Endemic Are of Central Region, Thailand (#06) by Aye Ays San
	7) Food Choice Behaviour among High School Students in Depok, Indonesia (#07) <i>by Syarifah Aqilah</i>
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	Chairperson & Co-Chairperson: Asst. Prof. Malee Sunpuwan, Ph.D. / Tepanata Pumpaibool, Ph.D.
	<i>Committee:</i> Asst. Prof. Nate Hongkrailert, Ph.D.
	1) Perception of the Risk of Drowning among Adults in Dili City-Timor-Leste (#08) by Mariano da Silva Marques



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	2) An Assessment of Management Competencies of Community Health Nurses of the Gambia (#09) <i>by Lamin A</i>
	3) Patient Safety Culture among Nurses Working in a Tertiary Government Hospital in Malawi (#10) by Macwilliam Kalua
	4) Heart Screening Program among School Children in Nepal: Improving Rheumatic Heart Disease Evidence from Field (#11) <i>by Satya Narayan Yadav</i>
	5) Factors Influencing the Receiving of Postpartum Care among the Reproductive Agec Group (15-49 Years) Women in Rakhine State, Myanmar (#12) by Thiri Thazin Khine
	6) Association between Betel Quid Consumption Levels, Socio-demographic Factors a Tobacco use among Adults Aged 18-49 Years Old in Myanmar (#13) by Yin Min Aye
	7) Effect of Post-Operative Exercise Training on Arteriovenous Fistula Maturation in Chronic Kidney Disease Patients: a Preliminary Study (#14) by Sothida Nantakool
Room 3 (Host by AIHD)	<ul> <li>Track 2: Public Health, Public Health Sciences and Health Social Science, Digital Hea and Technology</li> <li>Track 5: Environmental and Occupational Health, Sustainable Development Goal, Glo warming, Disaster management, Resilience</li> </ul>
	Chairperson & Co-Chairperson: Asst. Prof. Nutta Taneepanichskul, Ph.D. / Asst.Prof. Aroonsri MongkolChati, Ph.D. Committee: Assoc. Prof. Sudarat Musikawong, Ph.D.
	1) Performance Evaluation of Sahar Food Industries Company (SFIC) in the Managemand Control of COVID-19 Using GIS (#15) <i>by Mahdi Ryahi-Khoram</i>
	2) Household Preparedness in the Flood-Prone Communities of Kayin State, Southern Myanmar (#16) <i>by Shun Lae Lae Aung</i>
	3) Influence of Caregiving Resources on Child Growth Status in Myanmar (#17) by Zar Chi Lwin



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	5) Knowledge and Attitude to the Effect of Solid Waste on Community Health among Community Health Students in Magway, Myanmar (#19) <i>by Nant Yee Mon Thwin</i>
	6) Factors Influencing Early Initiation of Breastfeeding Practice in Myanmar: The Analysis of Myanmar Demographic Health Survey (2015-2016) (#20) <i>by Kaung Myat Thu</i>
	7) Women's Empowerment and Modern Contraceptive Use: Analysis of Indonesia Demographic Health Survey (IDHS) 2017 (#21) <i>by Yaumil Chairiah Muzakir</i>
12.00-13.00 (Host by CPHS)	<b>Poster Presentation</b> Poster committees: Assoc. Prof. Ratana Somrongthong, Ph.D. / Kriangkrai Lerdthusnee, Ph.D. Nipunporn Voramongkol, M.D. MPH. / Napaphan Viriyautsahakul, Ph.D. M.D. Asst.Prof. Kanchana Tangchonlatip, Ph.D / Asst.Prof.Dr. Doungjai Buntup Onuma Zongram, Ph.D. / Pokkate Wongsasuluk, Ph.D / Assoc. Prof. Chaweewon Boonshuyar
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	Chairperson & Co-Chairperson: Asst. Prof. Dr. Thunwadee Suksaroj / Assoc. Prof. Kanchana Rungsihirunrat, Ph.D. Committee: Pramon Viwattanakulvanid, Ph.D.
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	Chairperson & Co-Chairperson: Asst. Prof. Isareethika Jayasvasti, Ph.D. / Asst. Prof. Jongjit Rittirong, Ph.D. Committee: Asst. Prof. Orapin Laosee, Ph.D
	8) Factors Associated with Adolescent Childbearing in Myanmar: The Analysis of the 2015-2016 Myanmar Demographic Health Survey (#28) <i>By May Zin Hein</i>
	9) Technical and Scale Efficiency of the Public Hospitals in Papua New Guinea (#29) by James Noah
	10) Association of Disability and Quality of Life among Thai Elderly with Chronic Lov Back Pain, Thailand (#30) by Aung Than Tun
	11) Prevalence of complementary foods practice among children aged 0-24 Months, in Municipality Dili, Timor –Leste (#31) by Elisa Ximenes dos Santos



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### COMMUNICATION BETWEEN PREGNANT WOMEN AND HEALTH CARE PROVIDERS: BARRIERS IN ANC HIV TESTING

#### Desty Pratiwi Marlisman\*, Mark Stephan Felix and Natthani Meemon

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### ABSTRACT

ANC HIV testing is an entry point for prevention of mother-to-child (PMTC) of HIV transmission, however, the uptake of this testing remains low in Tangerang Regency, Indonesia. Prior research revealed that health care providers' play an important role in increasing the uptake of ANC HIV testing. However, there is a limited amount of in-depth qualitative research on pregnant women's and health care providers' symbolic interpretation of ANC HIV testing and interaction, which influences pregnant women's decision to uptake ANC HIV testing in an Indonesian setting. Therefore, this research explores the interaction, symbolic meaning, and the interpretation of ANC HIV testing among pregnant women and health care providers. In-depth interviews of 16 pregnant women and 5 midwives were conducted. Purposive and snowball sampling was used to recruit the respondents. Interviews were transcribed verbatim and analyzed for themes that emerged from the data. There were differences in interaction between pregnant women with midwives that influenced their decision to uptake ANC HIV testing. Differences of the interaction were based on trust in the information given by midwives, received HIV testing information from midwives, and the adequacy of information about HIV testing given by midwives. The symbolic meaning of ANC HIV testing as the result of their interaction was more positive among the women who did uptake ANC HIV testing, with ANC HIV testing having the symbolic meanings of prevention of HIV and caring for the unborn baby. The symbolic meaning of ANC HIV testing for the women who did not uptake ANC HIV were dishonesty, fear, and engaging in moral misconduct. Pregnant mothers need to be communicated with regarding the benefits of ANC HIV testing to manage their fears of HIV testing. Midwives need to receive training in counseling to improve skills in performing ANC HIV testing. Relevant information about ANC HIV testing have to be integrated within the cultural, social, and religious context in Tangerang Regency.

**Keywords**: ANC HIV testing, PMTC, communication, interpretation of symbolic meaning, Indonesia

### **INTRODUCTION**

In developing countries, HIV infection among pregnant women affects maternal and children's health. More than fifty-thousand maternal deaths are related to HIV infection during pregnancy.<sup>1</sup> HIV infection during pregnancy also affects vertical transmission to newborn babies,<sup>2</sup> low birth weight, and preterm birth.<sup>3</sup> To deal with this situation, strengthening Antenatal Care (ANC) services



to prevent mother-to-child (PMTC) of HIV transmission through ANC HIV testing is needed. ANC HIV testing is an entry point for early detection for HIV-infected mothers and increased access to ARV treatment for PMTCT. It is expected that high uptake of ANC HIV testing will decrease the Mother-to-Child Transmission (MTCT) rate of HIV.<sup>4</sup> However, in Indonesia, the percentage of HIV testing among pregnant women was 28%. Moreover, only 13% of them received ARV treatment from PMTCT in 2017. This situation made the MTCT rate in Indonesia as high as 26.6 of 3,600 new HIV infections among children (0-14), and <500 new HIV infections were averted due to PMTCT in 2017.<sup>5</sup> The current regulation in Indonesia is targeting100% of pregnant women to go for ANC services and have HIV testing to achieve a decrease of  $\leq 50$  new HIV infections per 100,000 live births.<sup>6</sup> Therefore, increased uptake of HIV testing is needed to achieve the target and communication between pregnant women and healthcare providers is essential in achieving this target as communication has been found to be a major component in the success of health-related programs.<sup>7</sup> Additionally, prior research indicated that health care providers influenced pregnant women's uptake on ANC HIV testing. Past studies showed that low provider-initiated testing during ANC visit influenced pregnant women's uptake of this testing.<sup>8-10</sup> The lack of effective communication and counseling between health care providers and pregnant women were identified as the reasons for pregnant women not uptaking ANC HIV testing during their ANC visit in India and Ghana.<sup>11,12</sup> It also found their role is needed in increasing ANC HIV testing uptake.<sup>13</sup> However, there is a limited amount of in-depth qualitative research on pregnant women's and health care providers' interpretation and pregnant interaction, which influences women's decision to uptake ANC HIV testing in an Indonesian setting. The objective of this qualitative study is to explore how pregnant women interact with the health care providers with regard to ANC HIV testing and the role of interpretation of symbolic meaning of ANC HIV testing in the choice to uptake this health service.

### **METHODS**

This qualitative study was conducted between August-December 2019 in Tangerang Regency, Indonesia. This Regency in Indonesia reported the low uptake level of ANC HIV testing of 6.9% when compared to the areas of West Jakarta 57.4%.<sup>14</sup>

### Study Population and Sample size

The respondents of this study are women and health care providers who live in Tangerang Regency. The inclusion criteria for women were: age >18<sup>th</sup>< 52<sup>th</sup>, have utilized ANC services, and were due to deliver their baby at least six weeks prior to the data gathering date and not more than two years ago. The cut-off age of 52 was utilized as it is approximately the average age for women to be past childbearing capabilities.<sup>15</sup> Inclusion criteria for health care providers were: certified as midwives with the degree/diploma of Midwifery and have experience in providing ANC services for three years in midwives clinics in Tangerang Regency or in other parts of Indonesia, and could be at the working team level or higher at the administrative level.

Respondents were recruited utilizing the snowball sampling technique as well as via referral from the health cadres in Tangerang Regency. A total of 21 in-depth interviews were conducted using a semi structured interview guideline with 16 pregnant women, and 5 health care providers. All interviews were conducted in semi-natural settings (such as their homes or in the midwife clinics) and were recorded using cell phone and transcribed verbatim.

### Data Analysis



All interview transcription was translated from Bahasa Indonesia to the English Language and analyzed using a content analysis. The steps of data analysis used in this research were: selection of the meaning unit of data that contains interaction of pregnant women with health care providers with regard to ANC HIV testing. Then, the researcher defined codes in each of the meaning units of the data and categories were developed. After that, themes were defined in the interaction with regard to ANC HIV testing. Lastly the researcher symbolic identified meanings and interpretation of it as the result of the interaction.

### Ethical Approval

This research was approved by the Institutional Review Board of Faculty of Social Science and Humanities, Mahidol University in August 2019. The certificate of MUSSIRB approval is No. 2019/166.0608. The researcher has explained the study to the respondents and obtained written consent from the respondents before the interview.

### RESULTS

The data revealed that ANC services are given by midwives to pregnant women based on each trimester of pregnancy. The midwives shared that ANC HIV testing should be offered to pregnant women during their first trimester of pregnancy or their first visit to ANC clinic with pre-counseling and post-counseling. In the counseling about HIV testing, the pregnant women are advised that they will be given a consent form to sign during ANC HIV testing. However, the data revealed that there still a lack of information, counseling, and consentedservices with regard to ANC HIV testing in the interaction between the pregnant women and midwives that still needs to be addressed.

Table 1 shows the characteristics of the respondents who were pregnant women. Among these respondents, eight of them reported the uptake of ANC HIV testing and the other eight reported no uptake of ANC HIV testing. Their occupation was reported as housewife. The respondents were more likely than not to have a low educational background. Most of them had a second pregnancy.

Table 2 shows the characteristics of the respondents who were midwives. The midwives who participated in this study had a position as regular midwives, village midwives, and midwife coordinator. They have midwifery educational qualifications. They had been working as midwives in ANC from 4 up to 19 years.

Pseudonym	ANC HIV	Age	Occupation	Education	Years of marriage	Number of children
	test					
Viola	No	25	Housewife	Junior High School	9	2
Vika	No	30	Housewife	Diploma	8	3
Ica	No	25	Housewife	Senior High School	1	1
Linah	No	30	Housewife	Elementary School	13	2
Eni	No	33	Housewife	Elementary School	19	3
Amel	No	29	Housewife	Vocational High School	8	2

Table 1 Demographic Characteristics of Pregnant women



Pseudonym	ANC	Age	Occupation	Education	Years of	Number of
	HIV				marriage	children
	test					
Yuni	No	25	Housewife	Junior High School	7	2
Idah	No	35	Laborer	Junior High School	15	3
Mika	Yes	21	Housewife	Vocational High School	1	1
Nur	Yes	32	Laborer	Junior High School	9	2
Dian	Yes	24	Laborer	Senior High School	1	1
Ega	Yes	27	Housewife	Junior High School	8	2
Pipit	Yes	29	Housewife	Elementary School	11	2
Anah	Yes	27	Housewife	Elementary School	7	2
Ade	Yes	32	Housewife	Junior High School	14	2
Yanti	Yes	26	Housewife	Senior High School	7	2

 Table 2 Demographic Characteristics of Midwives

Pseudonym	Age	Position	Education	Years of	Organization
	(Years)			been	
				working	
Meli	27	Village Midwife	D3 Midwifery	5	PUSKESMAS
Rifah	27	Village Midwife	D3 Midwifery	4	PUSKESMAS
Mina	46	Midwife	D4 Midwifery	19	PUSKESMAS
Nurul	25	Midwife	D3 Midwifery	4	PUSKESMAS
Asmi	51	Midwife coordinator	D4 Midwifery	9	PUSKESMAS

There were five themes of the interaction between the women with health care providers with regard to ANC HIV testing during their pregnancy that emerged from the analyses of the data. These were: trust, power imbalance, dependence, fear, and importance of happy family.

#### Trust

The comments by some of the respondents provide evidence that trust in the information given by the midwife about HIV testing had resulted in mothers' adherence and acceptance of being tested. The data revealed that trust in the midwife's recommendation to go for HIV testing increased the uptake of ANC HIV Testing. However, lack of trust in information given by midwives had resulted in the mother not being tested.

"I joined the pregnant women's class only once here. Then I also got the information that HIV testing could be received in the PUSKESMAS (from the village midwife in the pregnancy class). However, I was really busy and it was a



little bit far to go there. Moreover, my midwife (in the private clinic) never told me to do it (HIV testing) or to go for testing (HIV testing) in the PUSKESMAS." (Vika, housewife). **Power imbalance** 

The data revealed that the midwives still did not share their power by giving enough information about HIV testing to their patients. Lack of information about HIV testing led mothers to feel the absence of the importance and goal of this testing during their pregnancy. This resulted in un-tested mothers.

"The midwife did not give me detailed information about the function or the benefit of the testing (HIV testing), that was why I felt I am okay not to have HIV testing at that time, why would I do it (HIV testing)? (Vika, housewife)

However, some of pregnant women who did receive HIV testing at PUSKESMAS also reported not getting enough counseling and information about the dangers of HIV in pregnancy, the benefits of HIV testing, HIV prevention, and the availability of HIV treatment if the test result was positive. This indicated lack of counseling given during ANC HIV testing services by midwives that reflected that they still did not share their power. The data also revealed some of the mothers in this study did not receive information about HIV testing before they did the testing. Mothers being uninformed of the existence of HIV testing indicated a lack of informed care decisions on the HIV testing program during pregnancy.

The midwife shared there should be informed consent given before pregnant women take HIV testing. This data indicated that pregnant women's involvement in shared decision making actually could be applied when the midwife requested informed consent before conducting HIV testing. However, the data revealed one of the ANC clinics that provided ANC HIV testing still did not provide an informed consent form for ANC HIV testing services. Other midwives shared the limitation of time, low number of health care providers with numerous numbers of pregnant women were the barriers in giving enough ANC HIV testing counseling to pregnant women.

#### Dependence

The comments from respondents provided evidence that mothers depend on the ANC HIV testing information from the midwives for being tested. The data revealed that the majority of respondents who went for HIV testing received advice from the midwife to have ANC HIV testing during their pregnancy. Half of the respondents who did not go for HIV testing who participated in this study identified that they never received HIV testing information or got the recommendation from the midwife to go for HIV testing.

"It (HIV Testing) was not important because the midwife did not inform me about it (HIV testing). I never received information about HIV testing from the midwife" (Linah, housewife)

The route of the communication identified between pregnant women and midwives was through face to face interaction in the ANC clinic, pregnancy group in POSYANDU, and through a WhatsApp<sup>TM</sup> group. The midwives shared challenges in ANC HIV testing, that is not all of the midwives had informed the pregnant women about HIV testing during ANC visits. It was due to the capability of midwives to deliver this information and midwife's time limitation in giving services. The other midwives added that the low educational background of the pregnant women also could be the barrier in the communication about ANC HIV testing.

### Fear

The data revealed in general pregnant women still had fear and outdated beliefs about HIV.



One of the mothers was reluctant to go for HIV testing because she feared being seen by her neighbors as a bad person who had many sex partners and a drug user. This indicated the false belief people still had by associating HIV with behavior that some of people disapprove of. This could indicate a lack of information of HIV and HIV testing received by respondents from the health care practitioner and the outdated beliefs that led them to the fear of HIV.

"Yes, if I did HIV testing during pregnancy, it will be seen as a negative thing by the people around here because the people here knew that someone who is infected with HIV is a person who has many sex partners, is a drug user, and certainly yes, later people will see it like that; it is not good. Yes, and if they knew I have HIV, oh surely they will think bad things about me." (Viola, housewife)

#### Importance of Happy Family

The data revealed the concept of a good mother in the family are women who take care of their children. Some of the respondents revealed the importance of taking care of children in the family. Therefore, when they received HIV testing information from the midwife, they decided to go to have HIV testing to protect their baby from the HIV infection during pregnancy.

"Yes, when we were told by the midwife to do HIV testing, we talk to each other like "okay just go for testing and do not much think about HIV, if you told me to go for testing, then I will just go for the testing. I do not know much about it." The important thing is that we can keep our baby healthy when we did the testing (HIV testing)." (Ana, housewife) Symbolic meaning of ANC HIV testing

There are six symbolic meanings with regard to ANC HIV testing that emerged from the data including: dishonesty, fear, moral misconduct, cleanliness, prevention, and caring for an unborn baby.

### Dishonesty

HIV had the meaning of dishonesty in both groups of women in this study. The interpretation of dishonesty was one of the partners was unfaithful during marriage. As well as HIV, HIV testing also was a symbol of dishonesty. It meant the wife was someone untrustworthy. This negative meaning was a hurdle to the women to do HIV testing during pregnancy. This indicated a lack of education and information given by midwives during ANC visits to reduce the negative meaning of HIV and HIV testing.

#### Fear

The data revealed that HIV was a symbol of fear. This meant the respondents were afraid of discussing HIV with other people because of fear of judgment, fear of death of having HIV, and fear of isolation. Some mothers in both groups interpreted the meaning of fear of HIV as representative of their fear of death. It implied that bad people who get HIV infection would pass away. This meaning made the women afraid to find out their HIV status during pregnancy. This indicated a lack of education given by midwives to manage their fear of HIV and HIV testing during ANC visits.

#### Moral misconduct

The meaning of HIV for the majority of the respondents in both groups was of moral misconduct. The examples of moral misconduct found in the data were: people with multiple sex partners, commercial sex worker, having sex before marriage, and drug user. This meaning was connected to the meaning of HIV testing, which influenced the mothers' decision to not take HIV testing during their pregnancy. They interpreted that if they had HIV testing, it meant that they were identifying themselves as



people with multiple sex partners, drug users, and involved in promiscuity. This negative meaning indicated a lack of information from midwives to reduce the judgment for people living with HIV.

#### Cleanliness

HIV is a symbol of uncleanliness since the people living with HIV were involved in promiscuity and were considered as dirty men or dirty women. Also, they interpreted the people living with HIV as having multiple sex partners, this was considered as a "dirty relationship" in the social and cultural context of Tangerang Regency. This meaning was connected with the meaning of HIV testing. One of mothers interpreted going for HIV testing as she had to identify herself as a person with multiple sex partners. This meant she was considered a "dirty person" and had "dirty relationships". This indicates the lack of information she received from midwives during ANC visits.

Another respondent interpreted HIV as dirty because the married couple did not clean their genital area after having sex and this caused them to be infected with HIV. This meaning was connected with the meaning of HIV testing. She went for HIV testing because she interpreted that going for HIV testing was the way to identify her cleanliness with her husband during their sexual relations. This interpretation encouraged her to go for HIV testing.

#### **Prevention of HIV**

HIV testing is a symbol of prevention. It symbolized prevention because by having HIV testing, the mother and health worker could know a mother's HIV status during pregnancy. Moreover, it could also prevent HIV transmission to children, family, and health workers. One of the mothers who went for HIV testing interpreted the meaning of prevention of HIV testing. She stated that if a mother went for HIV testing she could find out her HIV status and prevent infecting her baby if she was infected.

#### Caring for the unborn baby

Some midwives gave HIV testing when giving a recommendation for pregnant women to go for HIV testing. It was aimed at creating the meaning of a healthy baby. Therefore, after mothers had communicated with the midwife about HIV testing, she interpreted to be tested for HIV is the way to care for the baby's health and prevent HIV infection. In addition, it also alleviated the hardship of cost of HIV treatment in hospital.

### DISCUSSION

Past research supports the findings of this study that the pregnant women trust and follow the HIV testing recommendations of their ANC providers, this influences the ANC HIV testing uptake among the pregnant women.<sup>16</sup>

The findings of this research also highlight the power imbalance between pregnant mothers and midwives, where the midwives did not share enough information about HIV testing. Therefore, it is necessary to increase health promotion that could make the pregnant women more willing to uptake HIV testing.<sup>17,18</sup> Also, it is highlights the lack of informed care decision of HIV testing programs. Lack of accurate information and consented services possibly led to HIV positive women discontinuing the comprehensive PMTCT program and the uninfected pregnant women remaining unknowledgeable about HIV prevention and have the risk to be infected with HIV in the future.<sup>19,20</sup> Therefore, increasing the quality of health services to become more patient-oriented is needed to increase the uptake of ANC HIV testing and this can be done through specific actions such as training on interpersonal communication skills, actions taken in improving customer service through training and workshops and actions such as skills building through utilization of customer



feedback as training materials. These should be done for all healthcare workers who provide ANC HIV services to pregnant women by the management of midwife clinics, as well as the Indonesian Ministry of Public Health.<sup>21</sup> Also, this research suggests that the capacity building among midwives include training and education in counseling and communication with regards to ANC. Improvement of midwives by training has been studied in other studies and shows that it not only increases their knowledge but also improves their skills to perform rapid HIV testing.<sup>22</sup> Also, it could address the challenge of providing consented services and patient-oriented care for the success of a comprehensive PMTCT program.

The findings of this study also support previous research that lack of information given by the midwives during pregnancy influences the decision to uptake ANC HIV testing.8-10,23 Education given to pregnant women is crucial in increasing the uptake of ANC HIV testing and supports the comprehensive PMTCT program.<sup>12,22</sup> Furthermore, pregnant women, in general, are not well informed about HIV and have false beliefs about HIV. The findings also show the fear and outdated beliefs about HIV found among the respondents. This indicates a lack of information about HIV from a medical practitioner. Another research found that fear, shame, and reluctance to go to re-use ANC services in the clinic could cause loss of follow up was the outcome of lack of information about HIV during ANC visit.20 Therefore, increasing information access is needed as an important step in improving the implementation and quality of ANC HIV testing in PMTCT programs.

This study is supported by symbolic interactionism,<sup>24</sup> where the symbolic meaning of HIV testing is different between the pregnant women in both groups. This is because of the different interaction they have with the midwives. The findings show the symbolic meaning of HIV testing among pregnant women who did ANC HIV testing is more

positive. It is due to midwives effectively communicating the value of ANC HIV testing that meets the desire of pregnant women to protect their babies and their loved ones, symbolizing the good mother of their culture in Tangerang Regency. The positive meaning that ANC HIV testing reduces risk to the family is better communicated by communicating frequently in the routine of ANC. The meaning of HIV is still negative in general among the respondents. This research suggests more communication about the benefits of ANC HIV testing be communicated and to have counseling to decrease or manage their fears about going for HIV testing and HIV could be more understood in general by the respondents. Also, the findings point out the need to consider the cultural context of Tangerang Regency and educational background of pregnant women as a joint effort for PMTCT.

# **STUDY LIMITATIONS**

The limitations of this research included a lack of time for the interview by the respondents and discomfort of the respondents at the length of the interview. Additionally, HIV is a sensitive topic of discussion in Indonesia; there were some respondents who rejected the invitation for a follow-up interview.

# **FUTURE RESEARCH**

Future research is needed to assess the process and compliance of midwives to ANC HIV testing guidelines to increase ANC HIV testing. Also, social and cultural context factors, for example language preference in the communication about ANC HIV testing, is needed.

# RECOMMENDATIONS

This finding of this study showed the need for communicating more about the benefit of ANC HIV testing, provision of consented services, and delivering counseling regarding HIV. This shortcoming could be overcome by building the capacity of midwives through providing



communications and counseling training to midwives to improve their skills in performing ANC HIV testing to become more clientoriented and provide accurate information and consented services.

To manage the negative meaning of ANC HIV testing, education and communication about HIV prevention and treatment, the social and cultural context of Tangerang Regency has to be taken into consideration. The midwives should inform, educate, and engage religious leaders and community leaders regarding the availability and the importance of ANC HIV testing for pregnant women. Religious leaders and community leaders are the persons who have the social standing to influence the community, therefore, their support could promote ANC HIV testing related information to be better accessible by the grassroots communities.

### CONCLUSION

The findings of this research show that the negative meanings of HIV testing held by respondents have resulted in women not getting tested for HIV during their pregnancy. However, the meaning of ANC HIV testing could be changed to be more positive with the interaction with health care providers. The challenges facing the ANC HIV testing program includes improving the dissemination of ANC HIV testing and counseling information to all pregnant women, building trust in the health worker-pregnant women relationship to go for HIV testing, to better manage their fear and uncertainty of ANC HIV testing during their pregnancy and increase the uptake of ANC HIV testing as part of ANC services. The counseling training for midwives to perform ANC HIV testing and counseling is needed to improve their skills in performing ANC HIV testing and counseling with more patient-oriented and consented care services. The information and education about ANC HIV testing have to be integrated within the cultural, social, and religious context in Tangerang Regency. Religious leaders and community leaders could be the key collaborator for midwives for successful prevention of mother-to-child of HIV transmission.

As the objectives of the study were to explore how pregnant women interact with health care providers with regard to ANC testing, it can be inferred from the data that the interaction is based on the subjective meaning ascribed to ANC HIV testing by pregnant women. It can therefore be plausible to state that these subjective meanings ascribed to ANC HIV testing can be changed through the communication of positive subjective meanings by healthcare workers. It may also be plausible that continued trust in healthcare workers by the pregnant women and further actions in training and workshops for the healthcare workers by their superiors may further add to the making these subjective meanings of ANC HIV testing more positive.

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### INDIVIDUAL FACTORS ASSOCIATED WITH FERTILITY IN FORMER SOVIET UNION: A CASE STUDY IN ARMENIA AND TAJIKISTAN

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### ABSTRACT

Unlike globally declining fertility trend, fertility among former Soviet Union countries has been increasing since the transition to independent republics in 2000s. During 2005-2015, one-third among 39 countries with increasing total fertility rates (TFR) was located in this region. This study aimed to examine individual factors including women's demographic and socio-economic status (SES) associated with fertility in Armenia and Tajikistan, which were former Soviet Union countries. Using 2015-2016 Armenia Demographic and Health Survey (DHS) and 2017 Tajikistan DHS, women aged 15-49 who ever had sexual activity were studied (4,377 for Armenia; 8,251 for Tajikistan). Poisson regression model was employed to examine the association between fertility (children ever born - CEB) and related factors including age, marital status, education and employment, household wealth index (HWI), children demand, contraceptive use, and husband's working abroad experience. This study found that age, marriage, and children demand were positively related to CEB, while employment, higher education, and better-off HWI were negatively related in both countries, yet different pace. Women with secondary (Incidence Rate Ratio - IRR=0.75, 95% CI=0.58-0.96) or higher education (IRR 0.68, 95%CI=0.53-0.87) in Armenia and women with higher education (IRR=0.88, 95%CI=0.82-0.96) in Tajikistan were significantly related to CEB. Compared to the poorest, poorer to richest (IRR=0.94, 95%CI=0.91-0.98; IRR=0.90, 95%CI=0.86-0.95; IRR=0.87, 95%CI=0.83-0.90; IRR=0.88, 95%CI=0.85-0.92) in Armenia and richer to richest (IRR=0.95, 95%CI=0.92-0.99; IRR=0.92, 95%CI=0.88-0.96) in Tajikistan were less likely to have children. Although SES (employment, higher education, and better-off HWI) is negatively associated with fertility in both countries, the larger proportion of women in Tajikistan engaged in higher CEB resulting higher TFR. Since marriage and children demand were strongly related to larger number of CEB, reducing delayed marriage and remaining positive attitude towards children would help to maintain TRF level.

Keywords: fertility, children ever born, socio-economic status

### **INTRODUCTION**

Until dissolution in 1991, the Soviet Union was known as one of the biggest and powerful republic in the world. The Soviet Union consisted of 15 independent republics which were Armenia, Azerbaijan, Belarus, Estonia, Georgia, Kazakhstan, Kyrgyzstan, Latvia, Lithuania, Moldova, Russia, Tajikistan, Turkmenistan, Ukraine and Uzbekistan.<sup>1</sup> All the independent republics faced painful experiences of socio economic anomies and conflicts between fractions and ethnicities. In the aftermath, overall economic development





was stagnated or declined, as well demographic aspect with overall fertility declines across the region.<sup>2</sup> Following the socio-economical wane and conflicts in 2000s, the fertility returned to increase unanimously across the region.<sup>3</sup> Analysis of the global data on total fertility rate (TFR) during the period 2005 to 2015 showed that one-third among 39 countries with increasing TFR was located in this region.<sup>4</sup> It, therefore, would behoove to explore factors affected the fertility among those countries.

Geographically, the Soviet Union region can be divided into largely two parts, which are European part and Central Asia part. The countries in the European part are more economically developed and have the lower fertility level than those in Central Asia part.<sup>2</sup> Armenia located in European part while Tajikistan in Central Asia part. In addition, the most recent data were available for Armenia and Tajikistan in European part and Central Asia part respectively. A study on fertility in two countries can contribute to the better understanding the factors influenced fertility, providing some implications in formulating population policy for the countries with similar context.

Regarding the fertility changes during and after the transition period in former Soviet Union countries including Armenia and Tajikistan, there were some studies conducted to explore the influenced factors.<sup>2,3,5,6</sup> Clifford et al.<sup>2</sup> explained the fertility decline during the transition period in Tajikistan with the parity progress decline and marriage postponement. Spoorenberg<sup>5</sup> proved that the fertility recovery after the transition was associated with economic growth and reduction of childbearing postponement in Central Asia countries. Iwajaki and Kumo<sup>6</sup> revealed that economic recovery and improved social infrastructure served to increase the fertility in Russia.

When it comes to individual factors associated to fertility, Friedman et al.<sup>7</sup> stated that women's age and fecundity was the first determinant of biological category in fertility changes. The children ever born (CEB) was reported in World Population Data 2008 which was showing that the CEB increased slowly by women's age in Armenia but sharply in Tajikistan.<sup>8</sup> Marriage, as demographic factor, is closely related to fertility. Bonggarts<sup>9</sup> indicated marriage was one of primary proximate causes in fluctuation of fertility, with positive effects to fertility increase.

There were some studies reporting the negative effect women's employment of to fertility.<sup>10,11,12</sup> Becker et al.<sup>10</sup> and Easterlin<sup>11</sup> explained the female's participation in work force made employed women not spend more time for children, resulting in later childbearing and consequently fertility decline. Some literature reported negative effect of women's education to fertility.<sup>3,7,13</sup> The positive effect to fertility of living condition was reported by some authors.<sup>2,6,11</sup> Easterlin<sup>11</sup> argued that couples with lower living condition would have less children because they wanted to spend more in living condition rather than childbirth and child care.

Nedoluzhok<sup>13</sup> revealed that children demand decreased during the transition period contributed to fertility decline in Central Asia countries.

Sevoyan et al.<sup>16</sup> revealed that the contraceptive use was higher among women with higher living condition, leading to low fertility in Armenia.

Although some studies were conducted to explain the fertility change in former Soviet Union countries at macro level, few studies has been made at micro level, namely at individual level. This paper aims to explore the individual factors associated fertility in Armenia and Tajikistan, providing some implications to understand the fertility in the former Soviet Union countries.

# METHODS

This study used secondary data from Armenia DHS 2015-2016 and Tajikistan DHS 2017. The





study employed the cross-sectional approach to identify the factors associated with fertility in Armenia and Tajikistan. The Armenia DHS 2015-2016 and the Tajikistan DHS 2017 were nationally representative surveys. The study population was all women in reproductive age (15-49 years), of which the sample was extracted from women who ever had sexual activity. Sampling was conducted at 2 stages by using probability proportionate to size method in region and residential area (urban and rural). As the result, 6,116 women were interviewed from 8,764 households in Armenia. With the eligible criteria of women who ever had sexual 4,377 women were extracted, activity. excluding women who never had sexual activity from Armenia DHS 2015-2016. Through similar sampling method, 10,718 interviewed women were from 8.052 households, resulting in 8,251 women who ever had sexual activity extracted in Tajikistan.

The dependent variable was CEB and independent variables were categorized in 4 groups: 1) demographic variables (age and marital status), 2) socio-economic variables (educational level, household wealth index and employment status), 3) children demand variable (ideal number of children), 4) fertility barrier variables (contraceptive use and husband's working abroad experience).

In analysis, the study deployed Poisson regression model for multivariate analysis for both countries. The investigation of relation between CEB and independent variables was conducted in two stages. The first stage of bivariate analysis was employed to investigate the relation between CEB and independent variables by using chi-square test with cross tabulation. In order to cross-tabulate, CEB was re-coded into 3 groups of no children, 1-3 children and, four more children. Those variables significantly associated with CEB were taken in building the regression model in second stage. The second stage employed the multivariate analysis, using Poisson model, to investigate the relationship between CEB and independent variables. The correlation between independent variables was tested with threshold of r > 0.65 before building the regression model. Incidence Rate Ratio (IRR) with 95% CI was reported to assess the relationship between CEB and independent variables. Both bivariate and multivariate analysis were employed svy function to minimize sampling error by using variables of sampling weights, primary sampling unit, sample strata for sampling error. The software used in the study was Stata (version 14).

### RESULTS

The sample characteristics were described in table 1 for both Armenia and Tajikistan. The mean of CEB was 2.0 for Armenia and 2.7 for Tajikistan. The CEB was concentrated in group of 1-3 children (87.9%) in Armenia while less concentrated (61.0%) in Tajikistan. The most proportioned women were in the age group of 30-34 years in Armenia (20.2%) while the age group of 25-29 years in Tajikistan (21.3%). In countries. almost samples both were concentrated in the group of currently married/cohabitating with the proportions of 91.3% in Armenian and 91.4% in Tajikistan respectively. In the view of education level, 94.5% of samples were in secondary level (44.6%) and higher level (49.6%) in Armenia. Similarly, most samples (93.9%) were in the same groups but much higher proportion in secondary level (73.1%) than higher level (20.8%) in Tajikistan. No employed women were more than employed one in both countries but different extent which were 64.2% in Armenia and 73.9% in Tajikistan. As to ideal number of children demand variable, most sample were focused in group of 1-3 children (83.0%) in Armenia while group of 4+ children (61.7%) in Tajikistan. The proportions of women who do not use contraceptive (47.7%)were lower than those who use (52.3%) in Armenia while vice versa (73.0% vs. 27.0%) in Tajikistan (Table 1).

The result of bivariate analysis showed that all independent variables were significant related to CEB in Armenia and Tajikistan except the variables of employment (p=0.667) and



husband abroad employed experience (p=0.453) in Armenia (Table 2).

The result of multivariate analysis was shown in table 6. In demographic variables, age was strongly associated with CEB in both countries. But the slop was sharper in Tajikistan than in Armenia. Especially, the IRR were 4.98 (95% 95% CI= 1.82-56.32) while not much strong in Tajikistan (IRR=1.58, 95% CI=1.25-2.01). CI: 3.87-6.43), 8.58 (95% CI: 6.65-11.06), and 10.99 (95% CI: 8.55-14.13) respectively for women in age groups of 15-19, 20-24, and 25-29 in Tajikistan, comparing to women in age group of 15-19. Currently married or cohabiting women had substantial association with CEB in Armenia (IRR=10.12,

**Table1** Characteristics of women aged 15-49 who ever had sexual activity in the 2015-2016 Armenia DHS and the 2017 Tajikistan DHS

Variables		Percentage	and number
		Armenia	Tajikistan
		(n=4,377)	(n=8,251)
Children ever born	$(Mean \pm SD)$	$2.0 \pm 1.0$	$2.7 \pm 1.7$
	0 child	6.7 (295)	9.8 (812)
	1-3 children	87.9 (3,849)	61.0 (5,032)
	4+ children	5.3 (233)	29.2 (2,407)
<b>Demographic variables</b>			
Age group	15-19	0.9 (37)	2.7 (225)
	20-24	9.3 (406)	17.8 (1,465)
	25-29	18.4 (807)	21.3 (1,755)
	30-34	20.2 (883)	17.9 (1,473)
	35-39	18.6 (815)	14.5 (1,200)
	40-44	17.0 (745)	13.3 (1,101)
	45-49	15.6 (684)	12.5 (1,032)
Marital status	Never married/cohabiting	0.2 (8)	0.6 (53)
	Currently married/cohabiting	91.3 (3,998)	91.4 (7,539)
	Formerly married/cohabiting	8.5 (371)	8.0 (659)
Socio economic variable	es		
Educational level	No education	0.1 (3)	1.8 (148)
	Basic	5.4 (236)	4.3 (354)
	Secondary	44.6 (1,952)	73.1 (6,030)
	Higher	49.9 (2,186)	20.8 (1,719)
Household wealth index	Poorest	18.8 (825)	18.0 (1,483)
	Poorer	22.0 (961)	16.0 (1,325)
	Middle	22.0 (962)	17.0 (1,402)
	Richer	20.9 (916)	18.9 (1,559)
	Richest	16.3 (713)	30.1 (2,482)
Employment	Unemployed	64.2 (2,809)	73.9 (6,097)
	Employed	35.8 (1,567)	26.1 (2,154)



Variables		Percentage and number				
		Armenia (n=4,377)	Tajikistan (n=8,251)			
Children demand						
Ideal number of children demand	0 child	0.3 (12)	0.4 (31)			
	1-3 children	83.0 (3,632)	37.9 (3,131)			
	4+ children	16.7 (733)	61.7 (5,089)			
Fertility barrier						
Current contraceptive	No use	47.7 (2,086)	73.0 (6,020)			
use	Use	52 3 (2 291)	27.0 (2.231)			
Husband's employed	No	77.5 (3,089)	64.9 (4,889)			
abroad experience*	Yes	22.5 (896)	35.1 (2,650)			

Note: \* Husband's abroad employed experience; Armenia n=3, 985, Tajikistan n=7,539



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**Table2** Relationship between CEB and independent variables in women aged 15-49 who ever had sexual activity in the 2015-2016 Armenia DHS and the 2017 Tajikistan DHS

Independent variables	Percentage of number of children ever born (%) 95% CI							
	Armenia (n=4.377) Tajikistan (n=8.251)							
	No Child	1-3 Children	4+ Children	p-value	No Child	1-3 Children	4+ Children	p-value
Age								
15-19	47.23	52.77	0.00	Chi2 =444.2	75.30	24.70	0	Chi2
	(47.20~47.25)	(52.75~52.79)	-		(75.29~75.30)	(24.68~24.71)	-	=3,391.6
20-24	23.97	76.03	0.00	P<0.001	21.71	77.97	0.32	
	(23.96~23.98)	(76.02~76.03)	-		$(21.70 \sim 21.71)$	(77.96~77.97)	(0.31~0.33)	P<0.001
25-29	10.86	87.28	1.85		7.42	81.67	10.91	
	(10.85~10.87)	(87.27~87.28)	(1.85~1.87)		(7.41~7.42)	(81.66~81.67)	(10.90~10.91)	
30-34	4.98	92.68	2.34		5.13	60.07	34.80	
	(4.97~4.98)	(92.67~92.68)	$(2.33 \sim 2.35)$		(5.13~5.14)	(60.06~60.07)	(34.79~34.80)	
35-39	1.69	91.80	6.51		3.81	43.02	53.17	
	(1.68~1.69)	(91.79~91.80)	(6.50~6.52)		(3.80~3.81)	(43.02~43.03)	(53.16~53.17)	
40-44	4.87	87.49	7.64		2.43	43.18	54.39	
	(4.86~4.87)	(87.48~87.49)	$(7.64 \sim 7.65)$		$(2.42 \sim 2.43)$	(43.17~43.18)	(47.6~55.8)	
45-49	2.03	87.34	10.63		1.42	40.01	58.57	
	$(2.02 \sim 2.04)$	(87.33~87.34)	(10.62~10.64)		$(1.41 \sim 1.42)$	(40.00~40.01)	(58.56~58.57)	
Marital status		``````````````````````````````````````	``````````````````````````````````````		× ,	``````````````````````````````````````		
Never in union	91.16	8.84	0.00	Chi2=134.5	34.45	56.53	9.02	Chi2
	(91.14~91.17)	$(8.78 \sim 8.89)$	-		(34.41~34.46)	(56.51~56.54)	(8.99~9.05)	=173.5
Currently in	6.66	88.34	5.00	P<0.001	9.08	59.62	31.30	
union / living	(6.66~6.67)	(88.33~88.34)	$(4.99 \sim 5.00)$		(9.07~9.08)	(59.61~59.62)	(31.29~31.30)	P<0.001
with a man			· · · ·		× ,			
Formerly in	7.53	87.29	5.17		19.57	69.03	11.40	
union / living with a man	(7.52~7.54)	(87.28~87.29)	(5.16~5.18)		(19.56~19.57)	(69.02~69.03)	(11.39~11.40)	

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Independent variables	Percentage of number of children ever born (%) 95% CI								
		Armenia (	(n=4,377)						
-	No Child	1-3 Children	4+ Children	p-value	No Child	1-3 Children	4+ Children	p-value	
<b>Educational level</b>									
No education	0.00	67.22	32.78	Chi2= 98.59	10.26	65.27	24.47	Chi2	
	-	(67.16~67.28)	(32.69~32.86)		(10.25~10.26)	(65.26~65.29)	(24.46~24.47)	=103.43	
Basic	4.20	82.33	13.47	P<0.001	8.77	60.33	30.90		
	(4.18~4.21)	(82.32~82.33)	(13.45~13.48)		(8.75~8.77)	(60.32~60.33)	(30.89~30.91)	P<0.001	
Secondary	5.49	87.64	6.87		9.58	58.09	32.33		
	(5.48~5.49)	(87.63~87.64)	(6.86~6.87)		(9.57~9.58)	(58.08~58.09)	(32.32~32.33)		
Higher	8.51	88.97	2.52		11.89	69.17	18.94		
	(8.50~8.51)	(88.96~88.97)	(2.52~2.53)		(11.88~11.89)	(69.16~69.17)	(18.93~18.94)		
Household wealth	index								
Poorest	5.24	84.10	10.66	Chi2=95.31	9.71	50.27	40.02	Chi2=	
	(5.23~5.24)	(84.09~84.10)	(10.65~10.67)		(9.70~9.71)	(50.26~50.27)	(40.01~40.02)	129.91	
Poorer	5.35	88.97	5.67	P<0.001	10.31	58.21	31.48		
	(5.34~5.36)	(88.96~88.97)	(5.66~5.68)		(10.30~10.31)	(58.20~58.21)	(31.47~31.48)	P<0.001	
Middle	7.70	87.62	4.68		10.27	61.53	28.20		
	(7.69~7.70)	(87.61~87.62)	(4.67~4.68)		(10.26~10.27)	(61.52~61.53)	(28.19~28.20)		
Richer	9.56	88.22	2.22		10.25	63.72	26.03		
	(9.55~9.56)	(88.21~88.22)	(2.21~2.23)		(10.24~10.25)	(63.71~63.72)	(26.02~26.03)		
Richest	6.92	90.53	2.55		9.23	66.81	23.96		
	(6.91~6.92)	(90.52~90.53)	(2.55~2.56)		(9.22~9.23)	(66.80~66.81)	(23.95~23.96)		
Working status									
No working	6.73	88.43	4.84	Chi2=	10.67	60.18	29.15	Chi2=	
	(6.72~6.73)	(88.42~88.43)	(4.83~4.84	1.248	(10.66~10.67)	(60.17~60.1	(29.14~29.15)	14.97	
			)			8)			
Working	7.42	87.29	5.29	P=0.667	7.95	60.47	31.57	P<0.001	
	(7.41~7.42)	(87.28~87.29)	(5.28~5.29)		(7.94~7.95)	(60.46~60.47)	(31.56~31.57)		



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Independent variables	Percentage of number of children ever born (%) 95% CI							
	Armenia (n=4,377)				Tajikistan (n=8,251)			
	No Child	1-3 Children	4+ Children	p-value	No Child	1-3 Children	4+ Children	p-value
Children demand								
No children	14.52	85.48	0.00	Chi2= 363.73	18.78	51.14	30.08	Chi2=
	(14.46~14.58)	(85.45~85.50)	-		(18.74~18.81)	(51.11~51.16)	(30.04~30.11)	1,140.14
1~3 Children	7.39	90.41	2.20	P<0.001	13.38	78.63	7.99	
	(7.38~7.39)	(90.40~90.41)	(2.19~2.20)		(13.37~13.38)	(78.62~78.63)	(7.98~7.99)	P<0.001
4+	4.85	76.16	18.99		7.83	49.12	43.05	
Children	(4.84~4.86)	(76.15~76.16)	(18.98~18.99)		(7.82~7.83)	(49.11~49.12)	(43.04~43.05)	
<b>Current contrac</b>	eptive use							
No	13.87	80.68	5.45	Chi2= 298.21	13.65	60.46	25.89	Chi2=
	(13.86~13.87)	(80.67~80.68)	(5.44~5.45)		(13.64~13.65)	(60.45~60.46)	(25.88~25.89)	414.41
Use	0.68	94.73	4.59	P<0.001	0.09	59.72	40.19	
	(0.67~0.68)	(93.6~95.5)	(4.58~4.59)		(0.08~0.09)	(59.71~59.72)	(40.18~40.19)	P<0.001
Husband's work	ing abroad							
No	6.93	87.96	5.10	Chi2=1.977	9.29	57.05	33.66	Chi2=
	(6.93~6.94)	(87.95~87.96)	(5.09~5.10)		(9.28~9.29)	(57.04~57.05)	(33.65~33.65)	35.37
Yes	5.70	89.57	4.72	P=0.453	8.75	63.72	27.53	
	(5.69~5.70)	(89.56~89.57)	(4.71~4.73)		(8.75~8.76)	(63.71~63.72)	(27.52~27.53)	P<0.001



**Table 3** Explanatory factors of CEB among women aged 15-19 who ever had sexual activity in the2015-2016 Armenia DHS and the2017 Tajikistan DHS

	Variable		ia(n=4,376)	Tajikistan (n=8,251)		
		IRR	95% CI	IRR	95% CI	
Demographic fa	ictors					
Age group	15-19	1.00		1.00		
	20-24	1.99***	[1.40-2.40]	4.98***	[3.87-6.43]	
	25-29	2.93***	[2.08-4.13]	8.58***	[6.65-11.06]	
	30-34	3.67***	[2.61- 5.17]	10.99***	[8.55-14.13]	
	35-39	4.13***	[2.95- 5.78]	12.50***	[9.68- 16.14]	
	40-44	4.29***	[3.05-6.04]	13.04***	[10.12-16.81]	
	45-49	4.67***	[3.32-6.55]	14.28***	[11.06- 18.43]	
Marital status	Never married /cohabiting	1.00		1.00		
	Currently	10.12**	[1.82-56.32]	1.58***	[1.25, 2.01]	
	married/cohabiting					
	Formerly	8.85*	[1.58- 49.65]	1.09	[0.85- 1.39]	
	married/cohabiting					
Socio-economic	factors					
Educational	No education	1.00		1.00		
level	Basic	0.79	[0.61-1.03]	1.02	[0.93-1.12]	
	Secondary	0.75*	[0.58- 0.96]	0.99	[0.92-1.06]	
	Higher	0.68 **	[0.53- 0.87]	0.88*	[0.82- 0.96]	
Household	Poorest	1.00		1.00		
wealth index	Poorer	0.94*	[0.91- 0.98]	0.97	[0.93- 1.01]	
	Middle	0.90***	[0.86- 0.95]	0.98	[0.94- 1.02]	
	Richer	0.87***	[0.83- 0.90]	0.95*	[0.92- 0.99]	
	Richest	0.88***	[0.85- 0.92]	0.92***	[0.88- 0.96]	
Employment	Unemployed	1.00		1.00		
status	Employed	0.96*	[0.93- 0.99]	0.96*	[0.94- 0.99]	
Children deman	d factor					
Ideal number of children demand		1.13***	[1.11- 1.15]	1.16***	[1.14- 1.18]	
Fertility barrier	s factor					
Current	No	1.00		1.00		
contraceptive	Use	1.22***	[1.18- 1.26]	1.19***	[1.17-1.22]	
use						

Note \* *p*-value < 0.05, \*\* *p*-value < 0.01, \*\*\* *p*-value < 0.001

Education was negatively associated with fertility level in both countries. Women with secondary level and higher-level education were likely to have less children (IRR=0.75, 95% CI=0.58-0.96 and IRR=0.68, 95% CI=0.53-0.87, respectively) in Armenia while women with higher level did so (IRR=0.88, 95% CI=0.82-0.96) in Tajikistan. Also, the better-off household wealth was associated with lower CEB in both countries, having IRRs of 0.94 (95% CI=0.91-0.98), 0.90 (95%CI=0.86-0.95), 0.87 (95% CI=0.83-0.90), and 0.88 (95% CI=0.85-0.92) for women in poorer, middle, richer and richest groups respectively in Armenia while IRRs of 0.95 (95%CI=0.92-0.99) and 0.92 (95%CI=0.88-0.96) in groups of richer and richest in Tajikistan compared to women in the poorest group. Employment was associated with lower CEB in both countries, having same IRR of



0.96 (95% CI=0.93-0.99 for Armenia and 95% CI=0.94-0.99 for Tajikistan).

Children demand was positively associated with CEB in both countries (IRR=1.13, 95% CI=1.11-1.15 for Armenia and IRR=1.16, 95% CI=1.14-1.18 for Tajikistan).

Unexpectedly, the women who use contraception were likely to have more CEB in both countries with IRR of 1.22 (95% CI=1.18-1.26) in Armenia and with IRR of 1.19 (95%CI=1.17-1.22) in Tajikistan, compared to those who did not use contraception.

### DISCUSSION

The mean of CEB was 2.0 in Armenia and 2.7 in Tajikistan. The CEB was higher among women in older age group in both countries, especially more rapidly in Tajikistan. As long as the CEB was cumulative fertility indicator, it is taken for granted to increase with age<sup>8</sup>. Compared between two countries, the CEB increased gradually with women's age in Armenia but it sharply increased in Tajikistan, implying later childbirth and lower CEB in Armenia. Timaeus<sup>17</sup> stressed the current fertility decline was attributed to delayed childbirth and space over 5 years, resulted in finished reproductive age with low CEB. The CEB among women currently married or cohabiting was most attributed to total CEB, representing 91.3% in Armenia and 91.4% in Tajikistan. Bonggarts<sup>9</sup> indicated marriage was one of positive determinants of fertility. Friedman et al.7 argued marriage played positive role of fertility increase or maintain because married couples were more likely to sacrifice their economic wealth for children in order to consolidate the marriage bond. Therefore, the higher CEB in Tajikistan than Armenia was not considered as the demographic reason such as marriage rate.

Women's education level was negatively associated with CEB in both countries. Many literatures revealed that negative relation

between fertility and women's education.<sup>3,7,13</sup> Analyzing the proportion of women showed significant association with lower CEB, the much more women was associated in Armenia (94.5% in secondary and higher level education) than in Tajikistan (20.8% in higher level education). In addition, Household wealth index was associated with lower CEB in both countries. The positive effect to fertility of living condition was reported by some authors.<sup>2,6,11</sup> Since the study used household wealth index as proxy of living condition, the study findings did not support previous literature explained positive relation of living condition to fertility. Similarly, with education, the proportion of women showed significance was different between two countries, the proportion in Armenia (81.2%-poorer, middle, richer and richest) was almost double of those (49%-richer and richest) in Tajikistan. Combining of findings from educational level and household wealth index, the consideration would be more women engaged in low fertility in Armenia than Tajikistan. Employment was associated with the lower CEB for both countries in the study. In literature, there were lots of evidences reported the negative effect of women's employment to fertility.<sup>10,11,12</sup> Seeing the negative effect of women's employment to fertility, the encouragement of women's participation in work force would contribute to reducing fertility in Tajikistan.

Number of children demand was positively associated with CEB in both countries. Also, many evidences were reported on positive relationship between the number of children demand and fertility.<sup>3,5,7</sup> The actual fertility was not matched with number of children demand due to other variables such as cost of fertility regulation and potential output of children<sup>7</sup>. In both countries, the number of children demand was higher than CEB. Easterlin<sup>15</sup> stated that historically, the demand for children has been decreased while potential fertility increased as individual natural socio-economic women's status become higher. He illustrated that the actual fertility increased until the gaps between children





demand and potential natural fertility disappeared. In this view, the actual fertility would have possibility to increase in both countries in the future.

The current contraceptive use showed the association with higher CEB in both countries. Higher contraceptive use contradicts higher fertility. The 2015-2016 Armenia DHS report and the 2017 Tajikistan DHS report stated that contraceptive prevalence rate (57% in 2016) in Armenia was higher than that of Tajikistan (21% in 2017), which are consistent with this study's result (52.3% for Armenia and 27.0% for Tajikistan).<sup>18,19</sup> Regarding the possible reason of contradictive association between contraceptive use and CEB in this study, women with more children may be more interested in use of contraception than those with lesser children.

Although the socio-cultural factors were not included in this study, different fertility level would be derived from mainly different sociocultural norms, encouraging large family in Central Asia countries such as Tajikistan while being influenced from European countries which are more advanced demographic transition.<sup>13</sup>

The limitation of this study, since the study was cross sectional study, the causality between contraceptive use and fertility could not be found out. Further study on contraceptive use needs to be made in the future. As migration related variable, the husband's working abroad experience was not significantly associated with CEB in neither country. Although significant migration reported in both countries, due to limited data on migration in DHS, the study did not involve many variables on migration which is one the limitation in this study.

### CONCLUSION

This study investigated individual factors associated with fertility in Armenia and Tajikistan. Although socio economic status (employment, higher education, and better-off HWI) is negatively associated with fertility, the larger proportion of women in Tajikistan engaged in higher CEB resulting higher TFR. Since marriage and children demand were strongly related to larger number of CEB, reducing delayed marriage and remaining positive attitude towards children would help to maintain TRF level.

### RECOMMENDATIONS

Policy and programme favorable for married couples should be introduced for more marriage in Armenia and similar settings.

Policy and programme to increase the awareness of the benefit of reduced family size should be introduced in Tajikistan and similar settings.

Contextualization of programme or project to women in different socio economic groups should be applied. For instance, programme or project for promoting positive attitude towards children should be targeted on women with higher socio-economic status while providing subsidies for childbearing and child caring on women with lower socio economic status.

The further study should be conducted to investigate the unexpected finding between using contraception and higher CEB.

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# PREVALENCE AND ASSOCIATING FACTORS OF INFERTILITY AMONG MARRIED WOMEN IN VIETNAM

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## ABSTRACT

Infertility has been less interested in Vietnam with its unclear prevalence and a lack of studies to identify associating social factors even though infertility has a significant social meaning in Vietnamese society due to the strong conservative norms related to childbearing. This study aimed to measure the infertility prevalence in 2011 and 2014 and identify the associating social factors for infertility in Vietnam.

A total of 11,715 married women aged between 20 and 44 years were selected from two rounds of Vietnam Multiple Indicator Cluster Survey in 2011 and 2014. The study applied a demographic definition of infertility; refers to an absence of live birth in the past 24 months among married women having desire of child and not using any contraceptive method. Binary logistic regression analysis was performed to examine the association between each type of infertility and related social factors including age of women, age of husband, education, wealth index, place of residence, age at first marriage and ethnicity.

Primary infertility prevalence was decreased from 1.6% in 2011 to 1.1% in 2014, while secondary infertility increased from 3.5% to 3.8% during the same period. The multivariate analysis showed that age of women, education and age at first marriage were significantly associated with primary infertility, while education, wealth index and age at first marriage were significantly associated with secondary infertility. Meanwhile, age of husband, place of residence and ethnicity were not significantly associated with any type of infertility.

Despite some limitations, infertility prevalence estimated in this study is supportive for better understanding about its dynamics in Vietnam. This study emphasized the age of women, age at first marriage, education and wealth index with their significant effects on infertility in social context in Vietnam. It also recommends further study using a specific survey applying appropriate methodology to measure infertility prevalence rate.

Keywords: primary infertility, secondary infertility, prevalence, social factor

## **INTRODUCTION**

Infertility is a disability to have a child and it emphasizes not only biological condition to be able to get pregnancy among couples but it also implicates social condition with their reproductive health rights.<sup>1</sup> According to the presence of ever birth,





infertility is concretized into primary and secondary infertility; primary infertility requires never-given birth to be defined, while ever-given birth status for secondary infertility.<sup>2</sup> Infertility has been often ignored especially developing countries since high fertility trend has been a priority task to be addressed in the regions. Especially, South Asian countries including Vietnam have been recognized to have more social issues derived from.<sup>3,4</sup> In Vietnam, infertility prevalence is not clear since there has not been an attempt in recent years to measure the prevalence at the national level. The World Health Organization (WHO) reported that infertility prevalence rate was 7.7% in married 2002 among ever women accounting for more than one million infertile women in Vietnam.<sup>5</sup> In 2011, Vietnam developed the National Population and Reproductive Health Strategy, targeting to achieve universal reproductive health to access care including infertility treatment service among residents.<sup>6</sup> It is clearly important to have a more up-to-date measure and baseline information of infertility dynamics in the initial stage of strategy implementation. Furthermore, there is a lack of studies to identify associating social factors even though infertility has a significant social meaning in Vietnamese society due to the strong conservative childbearing. norms related to In particular, Vietnamese women in marital union are often pressured to have children within the first year of marriage, to result in severe psychological burdens on married women.<sup>7</sup> From our knowledge, only a few studies of infertility were conducted in Vietnam, however they were hospital-based targeting mostly only infertile couples visiting health facilities. Moreover, a population-based study of infertility which is designed to not only measure prevalence but also investigate

the associating factors influencing on infertility, has not been done so far in Vietnam. The majority of studies found that not only biomedical conditions but also social factors including age of couples, urban residence, late marriage, poor economic status and low education, were increasing the risk of infertility.<sup>8–11</sup> This study aimed to measure the infertility prevalence in 2011 and 2014 and identify the associating social factors for infertility in Vietnam.

# METHODS

## Study design

This study is based on the secondary data derived from two rounds of the Vietnam Multiple Indicator Cluster Surveys in 2011 and 2014, which were most recently conducted household surveys on the nationally-representative basis, to provide the most updated measures of infertility prevalence and its trend in Vietnam. Two datasets were pooled to examine the effects of associating social factors among infertile women compared to non-infertile women under controlling of time effect. The use of the MICS datasets for Vietnam was officially permitted by UNICEF MICS Team.

This study applied the conceptual framework, in which the social characteristics of women were used as independent variables into three domains; while primary and secondary infertile infertility were proposed as dependent variables. (Figure 1)

Two binary logistic regression models were separately developed for each type of infertility, in which the social factors were examined for their effect on infertility.





#### Independent variables



Figure 1 Conceptual framework

#### Target population

This study is focusing on the infertility among only women who are exposed to practicable childbearing. This study did not consider age group of 15-19 years in which childbearing is not encouraged and the age group of 45-49 years in which most women completed reproduction activities already. Therefore, the target population is women aged between 20 and 44 who have been married for at least 24 months at the time of interview. The sample size was totally 11,715, of which 6,402 and 5,313women were selected from 2011 and 2014 MICS.

## **Defining infertility**

The WHO clinically defined infertility as an inability of getting pregnancy after 12 or 24 months of sexual intercourse with no contraception.<sup>12</sup> Meanwhile, demographers defined it as the absence of live birth instead of pregnancy because of difficulties to measure ever-experienced pregnancy in population-based studies.<sup>13</sup> This study applied the demographic definition; refers to an absence of live birth during the past 24 months among women who have been married for at least 24 months, not currently pregnant or using contraception, and having desire of child. women classified Among as being infertile, those who have never given birth were primary infertile; while those who have ever given at least one live birth were secondary infertile. The figure 2 shows the diagram for defining primary and secondary infertile women and noninfertile women.





Figure 2 Diagram for defining primary and secondary infertile women

#### Ethical consideration

The datasets of 2011 and 2014 MICS for Vietnam were officially permitted to use by UNICEF MICS Team. This study will be reviewed for ethical issues by the Institutional Review Board of the Institute for Population and Social Research at Mahidol University (IPSR-IRB) with number COE No. 2020/05-244.

## RESULTS

# Description of women by key component for defining infertility

The percentage of women who have never given birth was 27.4%; refers to primary infertile women, meanwhile it was 72.6% for those who have ever given birth; refers to secondary infertile women. (Table 1)



Component	2011		2014		Total		
	n	%	n	%	n	%	
Given birth in the past 24 months							
Yes	1,134	17.7	1,226	23.1	2,360	20.2	
No	5,268	82.3	4,087	76.9	9,355	79.8	
Total	6,402	100.0	5,313	100.0	11,715	100.0	
Currently pre	gnant (those not	given bir	th in the past 24	months)	)		
Yes	189	3.6	167	4.1	356	3.8	
No	5,079	96.4	3,920	95.9	8,999	96.2	
Total	5,268	100.0	4,087	100.0	9,355	100.0	
Current contr	aception (those n	ot curre	ntly pregnant)				
Yes	4,516	88.9	3,463	88.3	7,979	88.7	
No	563	11.1	457	11.7	1,020	11.3	
Total	5,079	100.0	3,920	100.0	8,999	100.0	
Desire of child	l (those not using	contrac	eption)				
Yes	326	57.9	257	56.2	583	57.2	
No	237	42.1	200	43.8	437	42.8	
Total	563	100.0	457	100.0	1,020	100.0	
Ever given bir	th (those having	desire of	child)				
Yes	224	68.7	199	77.4	423	72.6	
No	102	31.3	58	22.6	160	27.4	
Total	326	100.0	257	100.0	583	100.0	

Table 1 Distribution of women by components for defining infertility

#### Socio-characteristics of women

Table 2 present the frequency and percentage of women selected as sample by each sociocharacteristic and year. Age of women and age at first marriage were presented as mean value with its standard deviation.



Characteristics	2011		2014		Total	
	n	%	n	%	n	%
Age						
20-24	561	8.8	475	8.9	1,036	8.8
25-29	1,346	21.0	978	18.4	2,324	19.8
30-34	1,535	24.0	1,365	25.7	2,900	24.8
35-39	1,493	23.3	1,252	23.6	2,745	23.4
40-44	1,467	22.9	1,243	23.4	2,710	23.1
Average age (Mean±s.d.(min-max))	$33.6 \pm 6$	5.4 )	$33.8 \pm 6$ (20-44)	.4	33.7 ±6	5.4 (20-
Age of husband	(,	,	()	,		
Less than 4 years older	3,734	58.3	3,065	57.7	6,799	58.0
4-9 years older	2,312	36.1	1,940	36.5	4,252	36.3
10 years and over older	356	5.6	308	5.8	664	5.7
Educational level						
Primary or no education	1,659	25.9	1,320	24.8	2,979	25.4
Lower Secondary	2,708	42.3	2,076	39.1	4,784	40.8
Upper Secondary	1,056	16.5	991	18.7	2,047	17.5
Tertiary	979	15.3	926	17.4	1,905	16.3
Place of residence						
Urban	2,648	41.4	2,150	40.5	4,798	41.0
Rural	3,754	58.6	3,163	59.5	6,917	59.0
Wealth index quintiles						
Poorest	1,259	19.7	1,128	21.2	2,387	20.4
Second	1,088	17.0	893	16.8	1,981	16.9
Middle	1,201	18.8	970	18.3	2,171	18.5
Fourth	1,389	21.7	1,130	21.3	2,519	21.5
Richest	1,465	22.9	1,192	22.4	2,657	22.7
Ethnicity						
Kinh	5,367	83.8	4,296	80.9	9,663	82.5

## Table 2 Socio-characteristics of women by year



Characteristics		2011		2014		Total	
		n	%	n	%	n	%
Non-Kinh		1,035	16.2	1,017	19.1	2,052	17.5
Age at first (Mean±s.d.(min-max)) Total	marriage	20.9±3 (10-42 6,402	.6 ) 100.0	21.2±3.3 (7-40) 5,313	8 100.0	21.0±3.7 (7-42) 11,715	100.0

#### Prevalence of infertility

The prevalence rate of infertility was expressed by percentage of infertile women among total married women who have been in union for 24 months or longer. As shown in the table, primary and secondary infertility prevalence rate was 1.6% and 3.5% respectively in 2011; while it was estimated as 1.1% and 3.7% in 2014. The overall infertility rate that is expressed by summation of primary and secondary infertility was 5.1% and 4.8% respectively in 2011 and 2014. The results from this study implicates that secondary infertility may become a major concern rather than primary infertility in Vietnam, and infertility treatment services should be more focused on secondary infertility. The low and declining primary infertility rate was firstly attributed to the recent efforts

of the Vietnamese government to increase the number of Assisted Reproductive Technology (ART) health centers.<sup>14</sup> The second possible reason is that the majority of patients who visit the ART centers are couples with primary infertility, since they tend to have greater motivation to have a child than secondary-infertile couples. A successful pregnancy within first year of marriage is perceived as women's duty in Vietnam.<sup>7</sup> This conservative norm towards childbearing also encourages more often primary-infertile couples to seek ART service. The reason for increase of secondary infertility was not clear but various authors like Inhorn et al., 2015 and Mascarenhas et al., 2012 suggested that high prevalence of STI and unsafe abortion could contributed to high prevalence of secondary infertility among Southeast Asian countries including Vietnam.<sup>15,16</sup>

**Table 3** Prevalence rates by infertility type in 2011 and 2014 in Vietnam

Infertile status	2011		2014		Total		
	n	%	n	%	n	%	
Primary infertile							
Yes	102	1.6	58	1.1	160	1.4	
No	6,300	98.4	5,255	98.9	11,555	98.6	
Secondary infertile	<u>e</u>						
Yes	224	3.5	199	3.7	423	3.6	
No	6,178	96.5	5,114	96.3	11,292	96.4	



Infertile status	20	11	2014		Total		
	n	%	n	%	n	%	
<b>Overall infertile</b> Yes	326	5.1	257	4.8	583	5.0	
No	6,076	94.9	5,056	95.2	11,132	95.0	
Total	6,402	100.0	5,313	100.0	11,715	100.0	

#### Social factors associated with primary infertility

Table 4 shows the results from binary logistic regression analysis by each type of infertility. The probability of being primary infertile among women was decreased by 34% (AOR=0.66, 95% CI=0.47-0.92) in 2014 compared to 2011 after controlling other independent variables. When compared with women aged between 20 and 24 years, women aged between 25 and 29 years were less likely to have primary infertility by 59% (AOR=0.41, 95%CI=0.24-0.70). By other age groups, women were less likely to be primary infertile by 85% (AOR=0.15, 95%CI=0.08-0.27), 88% (AOR=0.12, 95%CI=0.06-0.22) and 92% (AOR=0.08, 95% CI=0.04-0.15) respectively in age groups of 30-34, 35-39 and 40-44 years. Regarding educational level, women who were graduated from upper secondary school were less likely to have primary infertility by 48% (AOR=0.52, 95%CI=0.29-0.93) compared to those who graduated from primary school or not educated at all. A delay in one year of age at first marriage among women was strongly associated with an increase in probability of becoming primary infertile by 1.3 times (AOR=1.30, 95% CI=1.25-1.36).

Factors	Model 1 for Primary infertility			Model 2 for Secondary infertility		
	AOR	95% CI		AOR	95% CI	•
Year (ref:2011)						
2014	0.66*	0.47	0.92	1.05	0.86	1.28
Age of women (ref: 20-24)						
25-29	0.41***	0.24	0.70	1.17	0.76	1.80
30-34	0.15***	0.08	0.27	1.05	0.68	1.62
35-39	0.12***	0.06	0.22	1.01	0.65	1.57
40-44	0.08***	0.04	0.15	1.10	0.71	1.71
Age of husband (ref: Less than	4 years old	er)				
Older 4-9 years	0.92	0.65	1.32	0.93	0.75	1.16
Older 10 years and over	1.51	0.86	2.64	1.12	0.75	1.68

Table 4 Binary logistic regression models for each type of infertility



Factors	N Prim	Model 1 for Primary infertility		N Secor	or ertility	
	AOR	95% (	CI	AOR	95% C	I
Educational level (ref: Prima	ary or no edu	cation)				
Lower secondary	0.75	0.47	1.21	0.66**	0.51	0.87
Upper secondary	0.52*	0.29	0.93	0.90	0.66	1.25
Tertiary	0.99	0.57	1.74	0.70	0.48	1.00
Place of residence (ref: Urba	n)					
Rural	1.04	0.71	1.51	1.05	0.83	1.32
Wealth index (ref: Poorest)						
Second	1.54	0.79	3.00	1.08	0.73	1.58
Middle	1.91	0.99	3.68	1.28	0.86	1.88
Fourth	1.50	0.75	3.01	1.65*	1.11	2.44
Richest	1.18	0.55	2.55	1.57*	1.01	2.44
Age at first marriage	1.30***	1.25	1.36	1.06***	1.04	1.09
Ethnicity (ref: Kinh)						
Non-Kinh	0.80	0.44	1.48	1.36	0.98	1.88

# Social factors associated with secondary infertility

Binary logistic regression model for secondary infertility showed that educational level, wealth index quintile and age at first marriage were found to be significantly associated with secondary infertility. As shown in the above table, lower secondary educational decreased the probability of being secondary infertile by 33.7% (AOR=0.66, 95%CI=0.51-0.87) when compared to no education or primary school, after adjusted other independent variables. The "Fourth" and "Richest" wealth index significantly increased the chance of being secondary infertility by 1.6 times respectively, compared to poorest wealth index quintile. When women got married by one year later, they were more likely to be secondary infertile

by 1.1 times (AOR=1.06, 95% CI=1.04-1.09).

## DISCUSSION

#### Social factors and Primary infertility

The capability of reproduction is biologically decreased with increasing age because of a less sexual contacts and increased vulnerability of chromosomal abnormalities.<sup>17</sup> However. this study provided the opposite result that women at early age (20-24 years) were found to be exposed to the highest probability of primary infertility among women aged between 20 and 44 years. This might be attributed to the fact that Vietnamese women in their younger age are more often exposed to the reproductive health problems including induced abortion, STI and irregular menstrual cycle due to the





cultural barriers and wrong perception towards the access to reproductive healthcare including contraception use, which may lead to the consequent risk of infertility.<sup>18,19</sup> Some researchers found that younger women have possibly more sexual dysfunction and ovulatory disorders. which were widely recognized as major infertility.<sup>20,21</sup> Furthermore. risks of younger women may not have a plenty of health reproductive knowledge and experiences regarding childbearing-related problems such as infertility compared to elder women, which may influence on their poor response to the negative health issues related to the development of infertility.

Women graduated from upper secondary school were less likely to have primary infertility compared to those graduated from primary school or not educated. According to the education system in Vietnam, it will take 12 years until graduation from secondary school.<sup>22</sup> Thus, the previous result would be interpreted that women who were educated for 12 years were less likely to be exposed at the risk of primary infertility. Previous studies also found that longer education attainment for more than 11 years was significantly associated with decreased risk of primary infertility.<sup>23</sup> This could be firstly related to the fact that low education in poor knowledge mav result of reproductive health and a less contact to the information about healthier lifestyle and appropriate healthcare for infertility treatment.<sup>11,24</sup> Secondly, this can be explained by low attainment of secondary education in Vietnam. There are some barriers to get access to secondary education attainment such as extra fees and expenses; secondary education is mostly covered by private schools along with high cost, and especially upper secondary education still remained difficult to complete in Vietnam.<sup>22</sup>

This study found that age at first marriage has clear impact on risks of primary infertility. A delay in first marriage has been widely recognized a major risk factor of infertility in the majority of previous studies. A recent study in Pakistan showed a similar result from this study that later marriage increased the risk of infertility by 1.41 times<sup>25</sup>; while other study in Iran found that it increased the risk of infertility by 4 times.<sup>26</sup> The main reason of negative effect of age at first marriage is that the ovarian reverse capacity of was biologically decreasing with increase in women's age.<sup>27</sup> It reaches the peak at the age between 18 and 24 years and starts to decrease at the age of 27 years.<sup>28</sup> Furthermore, infertility treatments are also often failed among elder women who were married at late age over 30.27,29 It implicates that there should be taken knowledge management activities in different levels of society to inform women consequences of late marriage.

## Social factors and Secondary infertility

The negative effect of low education on secondary infertility, which was found in this study, was consistent with many studies.<sup>1,24,30</sup> previous However. the opposite results were also found by some authors. They provide the results that secondary infertility was common among highly educated women,<sup>29,31</sup> however it is rather attributable to the indirect impact of late initiation of childbearing practice due to the longer duration of education attainment. The results from this study highly implicates that the establishment of universal of secondary education at the national level could prevent development of secondary infertility as well as primary infertility in Vietnam.

The result from this study contradicts the previous studies that high level of wealth index was significantly associated with increased risk of suffering from secondary







infertility. One study conducted in India showed that high wealth index was highly associated with health seeking behavior for infertility treatment<sup>32</sup>, which indicated that better economic condition may positively affect the accessibility of infertility care, contributing to reduced risk of infertility. One qualitative study in Vietnam provided the findings that poor economic condition was a major financial barrier to receive infertility service among infertile couples.<sup>4</sup> This adverse effect of higher wealth status may not related with direct influence of economic conditions but it possibly show its effect on later marriage. It has been well recognized that age at first marriage was often postponed among women who had high wealth condition.<sup>33</sup> This could be explainable by the fact that age at first marriage has been rising in Vietnam especially it considerably higher among women in rich class than in poor class.<sup>34</sup>

# CONCLUSIONS

During 2011 and 2014, primary infertility rate was decreased from 1.6% to 1.1%; while the secondary infertility rate was increased from 3.5% to 3.8% among Vietnamese married women aged between 20 and 44 years.

Age at first marriage and educational level were significantly associated with both primary and secondary infertility. Lower secondary education was significantly associated with decreased probability of secondary infertility: while upper secondary education was rather decreasing the chances to get primary infertility. Early found to be significantly age was associated with high probability of primary infertility; while it was not associated with secondary infertility, High wealth status more than middle class was significantly associated with more chance of getting secondary infertility.

Overall, secondary infertility is more often to be issued in Vietnam with its trend of high prevalence rather than primary infertility, highlighting that more scientific interest and focuses should be paid to further study on dynamics and potential risk factor for secondary infertility.

This study has some limitations. Firstly, the MICS datasets was not available with data of continuous contraception use and regular sexual intercourse during the past 24 months. Secondly, some important social, biological and lifestyle-related factors were not able to be included in the analysis due to the limited variables in the MICS datasets.

## RECOMMENDATIONS

There should be taken practical measures at policy level to strengthen the existing education secondary system with increasing number of public secondary schools, to ensure universal access to secondary education supported bv government. In addition, the curriculum secondary education for should be amended and modified in order to improve literacy level related to sexual and reproductive health including infertility, to contribute to the appropriate knowledge, attitude and practice for their better SRH status and prevention of infertility among voung women. Education system throughout vocational schools should be also considered an effective proxy measure to improve secondary education system in Vietnam.

Information, education and communication activities and health education system using a various communication channels including mass media should be further strengthened to inform persistent hazard of postponed age of marriage and encourage women to start with childbearing in right fertility timing.





Reproductive healthcare for young women should be strengthened with promotion of health education to provide them with sufficient knowledge related to reproductive health problems including potential risk factors to develop primary infertility. Additionally, there should be developed a specific health policy to focus on the support for infertile couples to promote better access to infertility diagnosis and treatment service.

National surveys like DHS and MICS should be updated with specific section for infertility, which includes some key questions related to infertility such as continuous use of contraception, regular sexual intercourse and desire of child during a certain exposure period. There should be also designed and conducted research applying with a specific survey focusing on infertility, which is equipped with feasible methodology and inclusion of some potential predictors in social, biological and environmental perspectives such as occupation, family income, BMI, history of STI, induced abortion and other complications, diet habit. exercise. smoking and alcohol use.

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# FACTORS ASSOCIATED WITH PARENTAL ATTITUDES TOWARDS CONDOM EDUCATION FOR CHILDREN AGED 12-14 YEARS IN MYANMAR

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## ABSTRACT

Condom education involves lessons on negotiating, motivating and demonstrating condom use which is an important part of sexuality education because it can reduce risk of unwanted pregnancy, HIV and sexually transmitted infections <sup>1</sup>. Although children are recommended to be taught condom education since 12-14 years, it has been a controversy among parents, teachers and the general public. Parents play an important role in providing condom education because they can influence and help adolescents to get access to information and education. Therefore, this study will explore factors associated with parental attitudes towards the provision of condom education for children aged 12-14 years. The objective of the study is to examine the parental attitudes and to identify factors associated with parental attitudes towards condom education for children aged 12-14 years. The study used secondary data from the Myanmar Demographic and Health Survey (2015-2016). and the sample includes mothers (N=1128) and fathers (N=1145) who have an adolescent child (10-19 years) and responded to the question "should children aged 12-14 be taught about condom use to prevent AIDS". The answers yes, no and unsure were used as proxy for the parental attitudes. Using multinomial logistic regression, socio-demographic characteristics of parents, current age and sex of children, HIV knowledge and belief in condom effectiveness of parents were analyzed. Less than half of the parents (43.29%) agreed to provide condom education for the young children. Parental knowledge of HIV, belief in condom effectiveness and education were found to be significant determinants of parental attitudes. Parents without comprehensive knowledge of HIV were 64% more likely to disagree (AOR= 1.64, P-value <0.000) and parents who did not believe in effectiveness of condoms were 50% more likely to disagree (AOR=1.50, P-value<0.000) to provide condom education for children aged 12-14 years. Similarly, parents who have no education (AOR=5.36, P-value<0.01) and completed primary education (AOR=1.64, P-value<0.05) are more likely to be unsure. Therefore, parent's education program for knowledge of HIV and condom effectivenss should be implemented focusing particularly on low-educated parents.

Keywords: condom education, adolescents, parental attitudes, Myanmar



# INTRODUCTION

Adolescents refer to the age range between 10-19 years old (early adolescence from 10-14 years and late adolescence from 15-19 years.<sup>2</sup> According to the World Health Organization (WHO), the adolescent period from age of 10 to 19 is the most important developmental period of life.<sup>3</sup> This period is the transitional period from childhood to adulthood and adolescents are curious about everything around them.<sup>3</sup> Many studies found that adolsescents experiment sexual activity since early adolsecence at 10-14 years.<sup>4, 5</sup> Although sexually active, adolescents have no proper knowledge on how to use condom and have wrong perceptions or little knowledge about prevention of pregnancy.<sup>3</sup> This increases their risk of HIV, other sexually transmitted infections (STIs) and unwanted pregnancy. Adolescent sexual and reproductive health (ASRH) is an important component of the global burden of disease. Many international agencies work on ASRH. As an example, the Convention on the Elimination of All Forms of Discrimination Against Women<sup>6</sup> recommends to reduce teen pregnancy, increase their knowledge of HIV and reduce HIV transmission among them.<sup>7</sup> Therefore, many goverments are committed to provide ageappropriate sexuality education for children to prevent SRH issues affecting them.

Condom education or lessons on using condoms have been part of many sexuality education programs to reduce therisk of unwanted pregnancy and STI among young people.<sup>8</sup> Condom education normally includes lessons about how to negotiate condom use, how to build motivation to use, demonstration of condom use by teachers and practice by students themselves using a penis model.<sup>8</sup> Condom education is often a controversial issue and opposed and prohibited by school administrators, teachers and parents which reduces the overall effectiveness of sexuality education.<sup>8</sup> The main reason for opposing condom education includes that parent think condom education will increase sexual activity among children.<sup>9</sup> In Myanmar, most people think condom education is not suitable for childern 12-14 years old based on MDHS results.<sup>10</sup> However, there is no previous study which assessed Myanmar parent's attitudes towards condom education for 12-14 years old.

Parents play an important part in delivering condom education for children. Parents are primary sex educators of their children and therefore they transfer their attitudes and knowledge to their childern.<sup>11</sup> Moreover, parents can influence the knowledge, attiude and behavior of their teenage children. Therefore, it is crucial to assess their attitudes towards condom education for young childern.

Previous studies in other countries showed widespread parental support for sexuality education including condom education at schools by parents and teacher.<sup>9, 12-14</sup> However. the opinion regarding the appropriate age of the child to be taught sexuality education and the content of sex education differs among parents.9, 14-16 Although there are many studies focusing on parental attitudes towards sexuality education, only a few studies focused on condom eudcation specifically. Similarly, in Myanmar, there was no previous study which assessed parental attitudes towards condom education for young childern aged 12-14 years. Currently, the Myanmar government is promoting sexuality education program at schools, the findings from this study will be useful for increasing parental support for sexuality education.

# **METHODS**

## Data Source

The source of data is the 2015-2016 Myanmar Demographic and Health Survey (MDHS) which is a nationally representative survey that provides information related to HIV/AIDS and STIs, family planning, reproductive health, fertility, maternal and child health, child survival and nutrition. <sup>10</sup> The survey respondents are men and women between (15-





49) years of age. This study obtained permission to use data from the DHS program and the ethical approval from Institutional Review Board of IPSR, Mahidol University. The variables are constructed based on the theories and literature reviews. The operational definitons are defined and used consistently acorss the study. The data is checked and cleaned for missing values, inconsitencies and errors. The correlation between dependent and independent variables are checked before multivariate analysis.

#### Study Population and Sample size

The sample was selected from total sample of male and female repondents of the MDHS (2015-2016). The study population of this study includes fathers and mothers of 15-49 years of age who have had at least one living adolescent child (10-19 years) and who answered the question regarding "should children be taught about condom use to prevent AIDS". The fathers and mothers were couples living in the same household with same children. The sample was obtained by combining women and men datases by matching men's ID with husbands' ID from the dataset. The resulting women sample population is total 2273 parents with 1145 fathers and 1128 mothers .

#### Statistical analysis

TData cleaning was done to check the quality of the data such as missing values, inconsistencies in data and presence of outliers before analysis. The data analysis was performed by using STATA application, version 14. Two stages of data analysis were performed to identify the factors associated with parental attitudes. They are a bivariate analysis to figure out the relationship between each independent variable and outcome variable and multivariate analysis to examine the association between each independent variable and parental attitude while controlling for other independent variables. The multinomial logistic regression model was used to predict the association between three categories of the dependent variable and independent variables.

Table 1 describes the distribution of the sample based on the dependent variable. Among all parents, only 984 (43.29 %) of parents agreed to the provision of condom education. The remaining 44.87 % of parents (N=1020) did not agree and 11.83 % (N=269) did not give an exact answer to the question

## RESULTS

**Table 1** Parental attitudes towards the provision of condom education for children aged 12-14 years

Parental attitudes	n	%
Agree	984	43.3
Disagree	1020	44.9
Do not know/unsure/depends	269	11.8
Total	2273	100.00



Table 2 Distribution of factors associated with parental attitudes towards condom education for children

Variable	Parental attitudes towards condom education					Total	Total	p- value	
	for children aged 12-14 years							%	
	Ag	gree	Disa	agree	Do not	t know			
	n	%	n	%	n	%			
Age of respondent	s (10-ye	ear age g	group)						
20-29	29	53.7	21	38.9	4	7.4	54	100	0.088
30-39	394	40.5	464	47.7	115	11.8	973	100	
40-49	561	45.0	535	42.9	150	12.0	1246	100	
Sex									
Male	544	47.5	509	44.5	92	8.0	1145	100	0.000***
Female	440	39.0	511	45.3	177	15.7	1128	100	
Place of residence									
Urban	262	47.9	247	45.2	38	6.95	547	100	0.000***
Rural	722	41.8	773	44.8	231	13.4	1726	100	
<b>Education level</b>									
No education	123	35.7	142	41.2	80	23.2	345	100	0.000***
Incomplete	259	38.8	305	45.7	104	15.6	668	100	
primary									
Complete	225	44.3	234	46.1	49	9.7	508	100	
primary									
Incomplete	296	48.3	283	46.2	34	5.6	613	100	
secondary									
Complete	23	57.5	17	42.5	0	0.0	40	100	
secondary									
Higher than	58	58.6	39	39.4	2	2.0	99	100	
secondary			<b>.</b> .						
Socio-economic fa	ctor (W	ealth in	dex)						
Poorest	188	39.4	209	43.8	80	16.8	477	100	0.000***
Poor	231	42.0	249	45.3	70	12.7	550	100	
Moderate	201	41.5	224	46.3	59	12.2	484	100	
Rich	173	44.1	180	45.9	39	9.9	392	100	
Richest	191	51.6	158	42.7	21	5.7	370	100	
Region									
Kachin	74	54.8	52	38.5	9	6.7	135	100	0.000***
Kayah	67	45.9	63	43.2	16	10.9	146	100	
Kayin	48	31.4	91	59.5	14	9.2	153	100	
Chin	61	49.6	48	39.1	14	11.4	123	100	
Sagaing	112	48.7	89	38.7	29	12.6	230	100	
Taninthayi	41	34.5	61	51.3	17	14.3	119	100	
Bago	62	36.3	100	58.5	9	5.3	171	100	
Magway	92	56.8	58	35.8	12	7.4	162	100	
Mandalay	58	34.9	75	45.2	33	19.9	166	100	
Mon	46	38.0	54	44.6	21	17.4	121	100	



Variable	Parental attitudes towards condom education for children aged 12-14 years					Total	Total %	p- value	
	Ag	ree	Disa	gree	Do not	know			
	n	%	n	%	n	%			
Rakhine	43	45.7	38	40.4	13	13.8	94	100	
Yangon	86	44.3	85	43.8	23	11.9	194	100	
Shan	28	30.1	47	50.5	18	19.4	93	100	
Ayeyarwaddy	91	42.1	105	48.6	20	9.3	216	100	
Naypyidaw	75	50.0	54	36.0	21	14.0	150	100	
Age of adolescent	child								
10-14	793	42.5	849	45.5	223	11.9	1865	100	0.485
15-16	111	46.6	103	43.3	24	10.1	238	100	
17-19	80	47.1	68	40.0	22	12.9	170	100	
Sex of children									
Both sons and	681	42.9	703	44.3	203	12.8	1587	100	0.027*
daughters									
Only sons	169	43.9	176	45.7	40	10.7	385	100	
Only daughters	134	44.5	141	46.8	26	8.6	301	100	
Comprehensive k	nowledg	e of HIV	7						
No	734	39.9	853	46.4	253	13.8	1840	100	0.000***
Yes	250	57.7	167	38.6	16	3.7	433	100	
Belief in condom	effective	ness							
No belief in	197	27.6	318	44.6	198	27.8	713	100	0.000***
condom									
efficiency									
Belief in condom	786	50.5	702	45.1	70	4.5	1558	100	
efficiency									

\*\*\* *P* value <0.001, \*\* *P* value <0.01, \* *P* value <0.05

#### Factors associated with parental attitudes towards the provision of condom education for 12-14 years old children

Table 1 describes the distribution of the sample based on the dependent variable. Among all Bivariate analysis (Table 2) shows that sex of parents, place of residence, education level, household wealth index, states and regions of residence, comprehensive knowledge of HIV and belief in condom effectiveness are highly associated with parental attitudes with significant level P –value <0.001. Similarly, sex of children is also significant at P-value <0.05 level. However, age of parents and age of adolescent child have no significant association with parental attitudes. parents, only 984 (43.29 %) of parents agreed to the provision of condom education. The remaining 44.87 % of parents (N=1020) did not agree and 11.83 % (N=269) did not give an exact answer to the question.

Before building experimental models for multivariate analysis, correlation matrix was used to decide if there is multicollinearity among the independent variables. The standard cut-point of 0.65 is used and there is no problematic correlation between independent variables. Table 5 shows the correlation matrix of the variables. The multivariate model was built by adding all the independent variables step by step, observing pseudo R2 value change. The experimental models are tested with likelihood ratio test to determine the best





fit model. The final model is used to determine between the associations outcome and independent variables. There are three categories of dependent variable as "agree" "disagree" and "do not know/unsure/depends" whereas agree is used as reference category and all independent variables are categorical. Model 1 compares between agree and disagree attiutdes (Table 3) and model 2 compares between agree and unsure attitude (Table 4). The results of the models are interpreted using adjusted odd ratio and at significant level Pearson chi-square value of < 0.05 . The adjusted odd ratio shows negative or positive association of parental attitudes and associated factors compared to reference outcome variable category and explanatory variable reference categories. The comparison between agree outcome and disagree outcome will be regarded as model 1 and the comparison between agree outcome and unsure outcome will be regarded as model 2.

The results established that belief in condom effectivenss and region are statistically significant factors affecting the parental attitudes in both models (Table 3 and 4). Parents who do not believe in condom effectiveness are 50% more likely to disagree than agree compared to parents who did believe in condom effectiveness (AOR = 1.50, 95% CI = 1.20-1.89). Similarly, parents who do not believe in condom effectiveness are 8 times more likely to be unsure about condom education than agree for 12-14 years old compared to parents who have the belief (AOR=8.33, 95% CI= 5.82-11.92). Parents who reside in Shan region also has less favorable attitudes towards condom education for 12-14 years old. They are 55% more likely disagree than agree (AOR=1.55, to 95%CI=1.01-2.39) and 94% more likely to be unsure (AOR=1.94,95%CI=1.01-3.75). On the contrary, parents in Magway region are 39% less likely to be disagree (AOR=0.61,95%CI=0.40-0.92) and 54% less like to be unsure (AOR=0.46,95%CI=0.22-0.95).

In addition to this, Bago region, age of child and comprehensive knowledge of HIV are associated with the parental attitudes in model 1. On the other hand, sex, education and Mandalay region are associated with the parental attitudes in model 2.

In model 1, parents without comprehensive knowledge of HIV are 64% more likely to disagree than agree compared to parents who have comprehensive knowledge of HIV (AOR = 1.64,95% CI = 1.27-2.12). Similarly, parents who have childern aged 12-14 years of age are 48% more likely to disagree to condom education when compared with parents who have older children at 17-19 years of age (AOR=1.48, 95%CI=1.05-2.08). Regarding parents who live in Bago region, they are 66% more likely to disagree compared to parents who live in Yangon region (AOR=1.66,95%CI=1.13-2.45).

In model 2, fathers are 58% less likely to be unsure about condom education for children aged 12-14 years compared to mothers (AOR=0.42,95%CI=0.31-0.58). Interestingly, parents who have low level education have much higher chance of being unsure about condom education compared to parents who obtained higher than secondary education. The finding shows that parents who have no education are 5 times more likely to be unsure about condom education than agree compared to parents who have higher than secondary education (AOR=5.36, 95%CI=1.54-18.63). Similarly, parents who have incomplete primary education are nearly 4 times more likely to be unsure about condom education (AOR=3.70,95%CI=1.09-12.57). Lastly, parents in Mandalay region are 2 times more likely to be unsure about condom education compared to parents in Yangon region (AOR=2.34, 95%CI=1.34-4.06).

Similarly, The results are similar in model 2 in which parents who believed in condom effectiveness were 88% less likely to be unsure than agree to condom education (AOR = 0.12, 95% CI = 0.08-0.17).



Apart from these factors, other factors are not significantly associated with parental attitudes

towards condom education for children aged 12-14 years.

**Table 3** Multivariate analysis of factors associated with parental attitudes towards provision of condom education for 12-14 years old children (n = 2271) (Model 1: comparison between Agree and Disagree)

Attitudes towards condom education	AOR		95% CI
		Lower	Upper
Agree (Reference category)			
Disagree			
Age of respondent			
20-29 (Ref)			
30-39	1.19	0.64	2.19
40-49	1.11	0.60	2.06
Sex			
Female (Ref)			
Male	0.84	0.69	1.01
Place of residence			
Urban (Ref)			
Rural	0.90	0.69	1.18
Education level			
Higher secondary(Ref)			
No education	1.03	0.60	4.78
Incomplete primary	1.24	0.75	2.04
Complete primary	1.09	0.66	1.81
Incomplete secondary	1.22	0.76	1.96
Complete secondary	0.79	0.38	1.67
Wealth index			
Richest (Ref)			
Poorest	1.11	0.75	1.63
Poor	1.08	0.75	1.55
Moderate	1.26	0.89	1.79
Rich	1.09	0.78	1.52
Region			
Yangon (Ref)			
Kachin	0.78	0.43	1.39
Kayah	0.89	0.27	2.99
Kayin	1.73	0.93	3.20
Chin	0.65	0.22	1.94
Sagaing	0.75	0.52	1.08
Taninthayi	1.51	0.76	2.99
Bago	1.66*	1.13	2.45
Magway	0.68*	0.40	0.92
Mandalay	1.28	0.89	1.86
Mon	1.16	0.65	2.06
Rakhine	0.85	0.49	1.49
Shan	1.55*	1.01	2.39



Attitudes towards condom education	AOR	95% CI	
		Lower	Upper
Ayeyarwaddy	1.10	0.79	1.56
Naypyidaw	0.63	0.34	1.18
Age of adolescent child			
17-19 (Ref)			
10-14	1.48**	1.05	2.08
15-16	1.38	0.91	2.08
Sex of children			
Both sons and daughters (Ref)			
Only sons	1.11	0.88	1.40
Only daughters	0.85	0.65	1.10
Comprehensive knowledge of HIV			
Have knowledge (Ref)			
No knowledge	1.64***	1.27	2.11
Belief in condom effectiveness			
Have belief (Ref)			
No belief	1.50***	1.19	1.89

**Table 4** Multivariate analysis of factors associated with parental attitudes towards provision of condom education for 12-14 years old children (n = 2271) (Model 2: comparison between Agree and Unsure)

Attitudes towards condom education	AOR	95% CI		
		Lower	Upper	
Agree (Reference category) Do not know/unsure/ depends				
Age of respondent				
20-29 (Ref)				
30-39	1.76	0.56	5.54	
40-49	1.935	0.613	6.11	
Sex				
Female (Ref)				
Male	0.42***	0.31	0.58	
Place of residence				
Urban (Ref)				
Rural	1.16	0.73	1.85	
Education level				
More than secondary (Ref)				
No education	5.36**	1.54	18.63	
Incomplete primary	3.70	0.79	9.33	
Complete primary	2.36*	0.70	7.93	
Incomplete secondary	0.440*	0.262	0.739	
Complete secondary	0.000	0.000		
Wealth index				
Richest (Ref)				
Poorest	1.26	0.66	2.39	
Poor	0.76*	0.41	1.41	



Attitudes towards condom education	AOR	95% CI	
		Lower	Upper
Moderate	0.89	0.48	1.63
Rich	0.86	0.47	1.58
Region			
Yangon (Ref)			
Kachin	0.58	0.19	1.79
Kayah	1.07	0.14	8.44
Kayin	0.67	0.23	2.01
Chin	0.56	0.095	3.26
Sagaing	0.89	0.50	1.59
Taninthayi	1.84	0.63	5.35
Bago	0.67	0.31	1.43
Magway	0.46*	0.22	0.95
Mandalay	2.34*	1.34	4.06
Mon	1.45	0.61	3.46
Rakhine	0.77	0.31	1.91
Shan	1.95*	1.01	3.75
Ayeyarwaddy	0.99	0.55	1.78
Naypyidaw	0.96	0.37	2.49
Age of adolescent child			
17-19 (Ref)			
10-14	0.99	0.58	1.69
15-16	0.93	0.48	1.81
Sex of children			
Both sons and daughters (Ref)			
Only sons	1.09	0.73	1.62
Only daughters	0.69	0.42	1.14
Comprehensive knowledge of HIV			
Have knowledge (Ref)			
No knowledge	1.05	0.58	1.90
Belief in condom effectiveness			
Have belief (Ref)			
No belief	8.33***	5.81	11.93

\*\*\* *P* value <0.001, \*\* *P* value <0.01, \* *P* value <0.05

n = 2,271,  $AOR = Adjusted \ odd \ ratio$ ,  $Ref = Reference \ category$ ,  $SE = Standard \ Error$ Chi square = 452.56, Prob > chi2 = 0.0000,  $Pseudo \ R2 = 0.1016$ 

## DISCUSSION

This study investigated the parental support for condom education for children and its association with parents' socio-demographic factors, knowledge of HIV, belief in condom effectiveness, age and sex of their children. The findings of this study indicate that parental support for teaching condom education for 1214 years old children was not very strong. The result is not consistent with findings from other studies in which parents showed strong support for sex education including condom education for 12-14 years old children.<sup>9, 12, 17</sup> This is most probably due to poor knowledge about HIV and STI, awareness about adolescents' sexual and reproductive health problems and condom education because the findings showed that





only 19% of parents had comprehensive knowledge of HIV.

Among the socio-demographic factors of parents, education is found to have strongest association with the parental attitudes. Parents who have low levels of education are highly indecisive about condom education than parents who have higher than secondary education. This is probably due to that fact that education improves people's decision making ability. Parents with low education may not have enough information and health knowledge to decide if condom education is relevant for 12-14 years old. This finding is supported by other studies.<sup>15, 18</sup> Fathers were less likely to feel unsure about condom education than mothers. This finding is inconsistent with findings from other studies.<sup>19</sup> <sup>14</sup> This is probably because fathers are main decision makers in a family than mothers in Myanmar context.20

Apart from that, parents who have one adolescent child at 10-14 years of age were less supportive of condom education than parents who have older adolescent child at 17-19 years of age. The possible explanation is parents who have 12-14 years old adolescent might think their child is too young to have condom education while parents who have older adolescent child 17-19 years old think otherwise.

Lastly, Shan State and Bago, Magway and Mandalay regions are associated with the parental attitudes towards condom education for children aged 12-14 years old. In Myanmar, there are 15 states and divisions and there are 8 major ethnicities. The majority of people are of Bamar ethnicity and reside in divisions and most of other 7 ethnicities reside in states. Yangon region is the former capital of Myanmar and all ethnicities have migrated to Yangon for economic opportunities. Therefore, Yangon is used as reference region to compare with other states and regions. Mandalay region is the second most developed region after Yangon. However, Yangon region is more

urbanized much more than Mandalay region based on the data of census reports.<sup>21</sup> Parents in Mandalay region has highly unsure attitudes towards condom education for 12-14 years old due to lack of enough health information and condom education awareness but this statement is just an assumption and needed to be investigated in future studies. Shan ethnic group lives in hilly areas and highly ruralized areas. Health services and information are very poor and inaccessible compared to developed region like Yangon.<sup>22, 23</sup> This might contribute to a lack of health awareness regarding HIV and condom use among Shan people. Apart from that, mostly Burmese ethnic region - Bago is found to be less supportive of condom education. On the contrary to this, Magway region (Bamar ethnicity) was found to be highly supportive of condom education.

Parents who have comprehensive knowledge of HIV and belief in condom effectiveness showed strong support for condom education. Presence of comprehensive knowledge is decided by having correct answers for five questions related to prevention, transmission and local misconceptions of HIV. This finding is supported by the findings of another study which found that parents who were knowledgeable about sexual and reproductive including HIV/STI health were more supportive of sex education for children.<sup>24</sup> Similarly, parents who have belief in condom effectiveness were more supportive of condom education. This finding was also consistent with another study in which the authors concluded that support in condom education may be related to belief in condom effectiveness.<sup>25</sup> It can be concluded that parents who have knowledge about risks of HIV and prevention by condoms wish their adolescents to receive accurate information and education about condoms to be able to protect themselves from risks.

# CONCLUSION

In conclusion, overall support of Myanmar parents towards condom education for children



aged 12-14 years is poor. This is most likely due to their lack of knowledge of HIV, STI and effectiveness of condoms and it is also highly related to low education level of parents.

## RECOMMENDATIONS

Therefore, it is important to promote knowledge and awareness of HIV and condoms among parents especially focusing on adolescent's sexual behavior and risks. Parents' education programs should be introduced to promote parental support for condom education for children and these programs. These programs should focus on low-educated parent, States and regions such as Mandalay region, Shan State and Bago region, mothers and parents with younger adolescents aged 12-14 years.

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# STIGMA AS A BARRIER TO UPTAKE OF HIV COUNSELLING AND TESTING AMONG SEXUAL-MINORITY MEN IN BANGKOK, THAILAND

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## ABSTRACT

HIV counselling and testing (HCT) is a reliable way for individuals to determine if they are infected with HIV. In 2018, Thailand reached the first of the UNAIDS "90-90-90" targets, as 94% of PLHIV knew their serostatus in that year. However, only 43% of men who have sex with men (MSM) are estimated to have had an HIV test, and there remain many reasons why people are reluctant to access HCT. This study explored the barriers to uptake of HCT services among MSM in Bangkok, Thailand. This study was a secondary analysis from the Behavioral Surveillance Survey (BSS) in Bangkok, Thailand, conducted in the major hotspot areas where MSM congregate. The dependent variable is HCT uptake in the last 12 months. Logistic regression analysis was employed to examine the association between stigma and discrimination (S&D) and the uptake of HCT. Odds ratios were analyzed with a 95% confidence interval. Of the total sample of MSM (n=409), 32.5% had received HCT in the past 12 months. Logistic regression analysis found that good HIV knowledge (OR 1.72, 95%CI 1.123 – 2.627) was significantly associated with increased uptake of HCT service. No discrimination by family members was associated with increased uptake of HCT service compared those with family discrimination (OR 1.70, 95%CI 1.119 – 2.587). No self-stigma (i.e., ashamed of being an MSM) was strongly associated with history of HCT, compared to those who selfstigmatized (OR = 2.34, 95% CI = 1.499 - 3.665). This study indicates that S&D are still a deterrent to HCT service uptake. The more HIV-related knowledge and the more accessibility of the access to services they have, the higher uptake of HCT were found. To reduce S&D among MSM, a stronger policy commitment is needed for more effective engagement of MSM in the prevention.

**Keywords:** HIV counselling and testing (HCT), men who have sex with men (MSM), Stigma and discrimination, Bangkok



# **INTRODUCTION**

According to data from UNAIDS for Thailand, it was estimated that there were 480,000 persons living with HIV (PLHIV) in 2018, and 18,000 had an HIV-related illness.<sup>1</sup> The most affected key population (KP) groups are men who have with men (MSM), sex workers (SW), transgender (TG) people, and persons who inject drugs (PWID). Because of increased access to prevention services, new infections were declining among certain groups between 1995 and 2015. However, HIV incidence among MSM has been on the rise.<sup>2</sup> The estimated the size of the population of MSM in Thailand was 528,000 in 2016, while female sex workers (FSW), male sex workers (MSW), and TG totaled 129,000, 26,000, and 63,000, respectively. The population of MSM is the highest among KP in Thailand.<sup>3</sup>

Among cities in Thailand, Bangkok has the highest HIV prevalence among MSM. The MSM population in Bangkok is estimated to be 120,000-250,000, with 33.5% considered to be at high risk of HIV. The higher-risk MSM are characterized by having multiple sex partners, are younger age, prefer unprotected anal sex, and congregate to meet new sex partners near HIV-transmission hotspots. Between 2000 and 2012, HIV prevalence among MSM increased from 21.0% to 28.0% in metropolitan Bangkok. Based on the AIDS Epidemic Model (AEM) (2013), it was estimated that, during 2012-2016, nearly 40,000 new HIV infections occurred in Thailand.<sup>4</sup> Data for 2016 show that 44.0% of new infections occurred among MSM, and that is higher than for other KP. From 25.0-30.0% of these infections occurred in Bangkok.5

HIV counselling and testing (HCT) is a reliable way for individuals to determine if they are infected with HIV, and HCT is a significant prevention tool that is easily accessible and utilized. The US CDC states that it is important for everyone to know their HIV status, and recommends HIV screening for adults, adolescents, and pregnant women. About 40.0% of new HIV infections in the US in 2016 were transmitted by undiagnosed PLHIV.<sup>6</sup> The CDC suggests that every individual between 13 and 64 years of age be tested for HIV at least once.<sup>6</sup> Annual testing is recommended for individuals having sex with a PLHIV, individuals who have multiple sexual partners, and sexually-active gay or bisexual men. In 2108, Thailand reached the first target of the UNAIDS "90-90-90" indicators, as 94% of PLHIV were aware of their HIV+ status.<sup>1</sup> However, only 43.0% of MSM had HCT in the previous 12 months, and that is lower than other KP.<sup>7</sup> There remain many reasons why people are reluctant to access HCT.

HIV/AIDS stigma is still a major issue for PLHIV, with detrimental consequences.<sup>8</sup> In the UNAIDS Report for 2017, stigma was highlighted as a factor that was impeding progress toward reducing HIV in KP. Most PLHIV have faced stigma and discrimination (S&D) at some point during their infection. As a result, some PLHIV are being pushed to the margins of society, where poverty and fear make them reluctant to access essential health care services.<sup>9</sup> When people fear S&D they hesitate to go for HCT, and that is the main reason why people are reluctant to disclose their sexual orientation or let others see that they are taking antiretroviral drugs (ARVs).<sup>10</sup>

In one study in Pattaya and Chiang Mai, HIVrelated stigma and uptake of HCT were strongly inversely associated; i.e., the more stigma the lower the uptake. In addition, MSM with self-stigma are more likely to be pressured into receptive anal sex, and have lower use of a rectal microbicides.<sup>11</sup> In Thailand, a study found that MSM with HIV-related stigma faced accessing rectal microbicides.<sup>12</sup> barriers Individuals who are at high HIV risk and have experienced S&D, are also individuals who marginalized, have been mentally or physically, by society.<sup>13</sup> One study in 2013 found that adult MSM had less uptake of HCT in the previous six months because of fear of HIV stigma.<sup>14</sup> However, there are sufficient numbers of HIV/ AIDS research in Thailand especially on ART, PrEP and testing among



HIV key populations, it is still needed more evidences to prove that stigma and discrimination may be the barrier and there may have other contributing factors to access the uptake of HCT that is only targeted for MSM key population in Bangkok, Thailand.

## **METHODS**

## Data Source

Data for this study are from the Bangkok Behavioral Surveillance Survey (BBSS), collected between August and October 2019. The BBSS is a cross-sectional study with an anonymous, venue-based, self-completed, paper-based questionnaire conducted in the major hotspot areas where MSM congregate.

#### Study Area and Study Population

Bangkok, which is divided into 50 districts and more than 100 sub-districts, is also one of the HIV-risk hotspot areas for all Thai KP, but especially for MSM. Among 50 districts of Bangkok, Bang Rak, Phra Nakhon, Chatuchak, and Lat Phrao Districts are the major areas with venues that cater to MSM, e.g., clubs, bars, and saunas.<sup>15</sup> In this research, the study population was all MSM, age 18 years or above, who disclosed their sexual orientation, who had had anal sex within the past 12 months at least once, and who were at a sampled venue on the day of data collection in Bangkok, Thailand. Participation was confidential and voluntary.

## Sample size and Sampling Technique

According to the data of Thailand country profile from AIDS Data Hub, HIV testing coverage among MSM is 43.0%. For this study, the calculated sample size was 414, including additional 10% for dropout and total sample size to analyze from the data set was 409 when it was extracting with the percentage to get the calculated sample size. Participants were recruited by an MSM research assistant with venue-based outreach method. All participants who disclosed their sexual status as MSM were purposively selected. All venues were also purposively selected according to predesignated hotspot areas of MSM. Among these purposively selected venues, only 116 venues (55.5%) allowed to enter to the venues and collect the data and these venues were purposively selected to recruit the required sample size. Participants were also purposively recruited who were willing to participate and who were met with the inclusion criteria of the study.

### **Research Instruments**

A self-administered questionnaire asked respondents about their age, their completed education, employment status, and marital status.

The prevalence HCT utilization was defined as participants who had had HIV testing during the past 12 months, and the response was yes/no.

Self-stigma was measured by response to the following question: "*How much shame do you feel because of you are a gay or transsexual?*" Response options include the following: 1 = No shame at all, 2 = Feel a little ashamed, 3 = Feel ashamed, 4 = Feel very ashamed. Response was also grouped into a binary variable: having selfstigma and no self-stigma. Respondents were asked if they ever hesitated to go for HIV testing, with potential response being yes/no.

Discrimination by family members was measured by response to the question: "Do family members appear averse to you (i.e., ignore you, speak sarcastically about you, scold you, or gossip negatively about you) because you are gay or transsexual?" There are five response options for this question including: 1 = Family members have never been averse to me; 2 = Family members have never been averse to me; 2 = Family members have shown aversion to me in the past and that continues until the present; 3 = Familymembers have been averse to me in the past but not now; 4 = Family members do not know I am an MSM; 5 = Unknown/ uncertain.



Response was then grouped into a binary variable: Yes = ever discriminated against by family, and No = not ever discriminated against by family.

The questionnaire included the five UNGASS HIV knowledge questions as follows: (1) "Having a single partner who does not have HIV can reduce the risk of being infected with HIV; "(2) "Using a condom every time when vou have sex can reduce the risk of being infected with HIV;" (3) "People who look healthy and strong may have HIV;" (4) "People can be infected with HIV from mosquito bites;" and (5) "People can be infected with HIV by eating food together with a PLHIV." This indicator was used to ensure that pre-existing high levels of knowledge are maintained. Response was scored for each question, and grouped into "5-score" (who correct all answer) and "0-4-score" (who reported incorrect answers).<sup>3</sup>

Self-perceived risk for HIV was measured with the question "*How much do you think you are at risk of being infected with HIV*?" Response was binary: no risk/risk.

Condom use at the first anal sex and anal sex during the past 12 months had a dichotomous response of yes/no. Respondents were asked about the types of partners at first sex and sex during the past 12 months.

Access to services was measured by response to the following questions: "Do you know the available services centers for distribution of free condoms?"; "Do you know the available service centers for distribution of free lubricant gel?"; and "Have you ever received prevention education about HIV and sexually transmitted disease?"

## Statistical Analysis

The data were analyzed using Statistical Package for Social Science (SPSS) version 21. Socio-demographic factors, UNGASS HIV knowledge, perception of benefits and treatment for HIV, access to services, and experience of S&D were analyzed using descriptive statistics. Total extracted sample 409 was used for all analyses, with including missing variables. Logistic regression was employed to examine the factors associated with HCT utilization. Odds ratios were analyzed with a 95% confidence interval.

### Ethical considerations

The protocol for the 2019 round of the BBSS has already been reviewed and approved by the University Social Mahidol Science Independent Review Board (MUSSIRB), with approval number 2019/059.1503. Permission to use the data was obtained from the principal investigator of the BBSS Project, and there were no identifiers to the individuals who participated in the BBSS. This secondary data analysis of the BBBS was also approved (#2020/071; B2) from the MUSSIBR, Faculty of Social Science and Humanities, Mahidol University.

## RESULTS

# Prevalence of HCT utilization within the past 12 months

About one-third of the sample (32.5%) of MSM had received HCT in the past year.



HCT utilization within the past 12 months

# Socio-demographic characteristics of the respondents

The results of the descriptive statistics and tests of association with dependent variables are shown in Table 1. Half of all MSM were in the



age group of 25 to 34 years (52.1%) and onefourth were age 15 to 24 (24.9%). About onefifth (21.3%) were age 35 years or older, and the older MSM were more likely to have had HCT in the past year than their younger counterparts. Nearly half of MSM had some post-secondary education (46.0%) and were more likely to have HCT than the less-educated MSM. Regarding the employment situation, 80.4% of MSM were currently working and were more likely to have had HCT in the past year than the unemployed. Logistic regression (Table 2) found that MSM who were 35 years or older (OR 2.58, 95%CI 1.380 - 4.189) and post-secondary education had were significantly more likely to have had HCT in the past year (OR 1.54, 95%CI 1.013 – 2.330).

#### Stigma and discrimination

About half the sample (49.4%) of MSM reported a history of being discriminated against by one or more family members. MSM who had been discriminated against by family were less like to have HCT. About two in five MSM (41.1%) were ashamed of being an MSM. Half (50.9%) of this sample of MSM hesitated to go for HCT because of stigma, described in table 1. No history of S&D against the MSM by family members was associated with increased uptake of HCT compared those with a history of family S&D (OR 1.70, 95%CI 1.119 - 2.587). No self-stigma (i.e., not ashamed of being an MSM) was strongly associated with uptake of HCT in the past 12 months, compared who to those who had selfstigma (OR = 2.34, 95% CI = 1.499 – 3.665).

## HIV Knowledge

Over one-third (36.2%) of the sample answered all five UNGASS HIV knowledge questions correctly. Those MSM who answered all five questions correctly were more likely to have had HCT than those with less-than-perfect scores. In the logistic regression (Table 2), higher HIV knowledge (OR 1.72, 95%CI 1.123 – 2.627) was significantly associated with increased uptake of HCT. Nearly 60% perceived no risk to themselves of HIV (57.7%) while 42.3% acknowledged that they had risk for HIV (Table 1). Those MSM who perceived themselves at risk (Table 2) were more likely to have had HCT (OR 1.89, 95%CI 1.239 – 2.866).

### Access to services

Respondents were asked if they received free condoms and lubricant in the past year. About half (48.9%) received free condoms, while over one-third (37.7%) received free lubricant. The majority (64.8%) of MSM received HIV prevention education in the past year. Those MSM who received free condoms, lubricant, and prevention education were more likely to have had HCT in the past year. (Table 1) In the logistic regression analysis, received free condoms, free lubricant gels and HIV prevention education were strongly associated with the uptake of HCT in the past year. (Table 2)



**Table 1** Bivariate association between independent variables and uptake of HCT

Independent Variables	Total	Uptake of HCT	
-	(n = 409)	Yes	No
	n (%)	n (%)	n (%)
Socio-demographic factors			
Age (years)			
15-24	102 (24.9)	22 (21.6)	80 (78.4)
25-34	213 (52.1)	72 (33.8)	141 (66.2)
35 or older	94 (21.3)	39 (41.5)	55 (58.5)
Mean (SD) = 29.7 (6.90), Min = 15, Max = 50			
Highest Education			
Secondary school or less	219 (53.5)	62 (28.3)	157 (71.7)
Post-secondary	188 (46.0)	71 (37.8)	117 (62.2)
Currently employed			
Yes	329 (80.4)	114 (34.7)	215 (65.3)
No	75 (18.3)	15 (20.0)	60 (80.0)
Stigma and discrimination			
Discriminated against by family			
Yes	202 (49.4)	51 (25.2)	151 (74.8)
No	203 (49.6)	78 (38.4)	125 (61.6)
Self-stigma (ashamed of being an MSM)			
Yes	168 (41.1)	36 (22.4)	125 (77.6)
No	241 (58.9)	96 (39.8)	145 (60.2)
Hesitated to go for HIV testing			
Yes	208 (50.9)	43 (20.7)	165 (79.3)
No	199 (48.7)	90 (45.2)	109 (54.8)
HIV knowledge (no. correct)			
Knowledge Score			
(5)	148 (36.2)	58 (39.2)	90 (60.8)
(0-4)	259 (63.3)	75 (29.0)	184 (71.0)
Perceived risk of HIV			
No risk	236 (57.7)	63 (26.7)	173 (73.3)
At risk	173 (42.3)	70 (40.5)	103 (59.5)
Access to services			~ /
Received free condoms in past 12 months			
Yes	200 (48.9)	121 (60.5)	79 (39.5)
No	209 (51.1)	12 (5.7)	197 (94.3)
<b>Received free lubricant gel in past 12 months</b>			~ /
Yes	154 (37.7)	121 (78.6)	33 (21.4)
No	255 (62.3)	12 (4.7)	243 (95.3)
Received HIV prevention education in past 12	months	× /	× /
Yes	256 (64.8)	126 (47.5)	139 (52.5)
No	143 (35.0)	7 (4.9)	136 (95.1)



Independent Variables	Uptake of HCT			
-	COR	95%CI	AOR	95%CI
Socio-demographic factors				
Age (years)				
15-24 (Ref.)	1	-	1	-
25-34	1.39	0.843 - 2.287	1.098	0.449 - 2.688
35 or older	2.58	1.380 - 4.189	2.06	0.507 - 8.376
Highest Education				
Secondary school or less (Ref.)	1	-	1	-
Post-secondary	1.54	1.013 - 2.330	2.76	1.189 - 6.398
Currently Employed				
Yes	2.12	1.153 - 3.902	1.22	0.335 - 4.435
No (Ref.)	1	-	1	-
Stigma and discrimination				
Discriminated against by family				
Yes (Ref.)	1	-	1	-
No	1.70	1.119 – 2.587	1.31	0.583 - 2.939
Self-stigma (ashamed of being an MSM	M)			
Yes (Ref.)	1	-	1	-
No	2.34	1.499 - 3.665	2.20	0.977 - 4.933
Hesitated to go for HIV testing				
Yes (Ref.)	1	-	1	-
No	3.17	2.048 - 4.902	1.78	0.843 - 3.72
HIV knowledge (no. correct)				
Knowledge Score				
(5)	1.72	1.123 - 2.627	0.95	0.436 - 2.045
(0-4) (Ref.)	1	-	1	-
Perceived risk of HIV				
No risk (Ref.)	1	-	1	-
At risk	1.89	1.239 - 2.866	0.43	0.190 - 0.960
Access to services				
Received free condoms in past 12 mon	ths			
Yes	25.15	13.152 - 48.072	0.28	0.053 - 1.432
No (Ref.)	1	-	1	-
Received free lubricant gel in past 12	months			
Yes	74.25	37.028 - 148.889	209.04	37.697 -
No (Ref.)	1	-	1	-
Received HIV prevention education in past 12 months				
Yes	17.61	7.937 - 39.076	11.59	3.918 - 34.273
No (Ref.)	1	-	1	-
	-			1 **

Table 2. Multivariate association between independent variables and uptake of HCT

Note: COR = Crude Odds ratio, AOR = Adjusted Odds ratio, CI = Confidence interval, Use enter method



# DISCUSSION

This study of MSM in Bangkok found than only one-third (32.5%) had received HCT in the past year. However, Thailand already met with the first target of the UNAIDS 90-90-90 indicators with 94% in 2018.16 Therefore, more work is needed to achieve the 90-90-90 targets among MSM. The findings of this research are consistent with the results of a 2015 study of MSM in Bangkok which found a low rate of HCT, and multiple impediments to testing and treatment. However, Bangkok has more options for HCT than any other city in Thailand, so availability is certainly not the main obstacle.<sup>15</sup> Other similar studies of MSM in Thailand (Pattaya and Chiang Mai) and Myanmar found that just under half the samples (48.1% and 49.6%) of MSM had ever been tested for HIV, respectively.<sup>11</sup> Similarly, only 43% of MSM had had HCT and knew their test results, and that was lower than other KP. However, Thais can get free HIV testing two times per year through the national health insurance scheme.<sup>17</sup> and, as noted, a high percentage of PLHIV know their serostatus.7 Thus, the relatively low uptake for HCT among MSM may indicate that the Thai national AIDS program is not reaching enough young MSM and/or MSM have a negative attitude toward traditional HCT outlets or have low perceived risk for HIV.18

The findings of this study showed that S&D is still a barrier for uptake of HCT services among MSM. Having a history of being shunned or scorned by family members was about evenly split among this sample of Bangkok MSM. Regarding the logistic regression analysis, an absence of discrimination by family members was associated with higher uptake of HCT (OR 1.70, 95%CI 1.119 – 2.587). MSM who have self-stigma (i.e., are ashamed of being gay) were less likely to have received HCT in the past year. Conversely, self-stigma was strongly associated with HCT uptake (OR = 2.34, 95%CI = 1.499 - 3.665). A study in Jordan found that stigma was a major obstacle to HCT.<sup>19</sup> This study reaffirms the fact that family condemnation and self-stigma among MSM is still common, and S&D remains a barrier to HCT uptake, even though Thailand has implemented improved laws and policies for protection of PLHIV. It is plausible that MSM may also be concerned about confidentiality of their test results and sexual orientation. Studies have shown that S&D is the most formidable barrier to expanded coverage of HCT.<sup>11, 14, 15, 20, 21</sup>

Thailand is aware of this, and the Ministry of Public Health is implementing nationwide awareness and training on HIV S&D in the health care setting as part of its strategy to reach the goal of "ending AIDS" by 2030.<sup>22</sup>

This study showed that higher knowledge and perceived risk of HIV infection were significantly associated with higher uptake of HCT. MSM who answered all five UNGASS HIV knowledge questions correctly had higher uptake of HIV testing within the past 12 months (OR 1.72, 95%CI 1.123 - 2.627) than those with less-than-perfect knowledge scores. This finding is consistent with a recent study in Myanmar showing that individuals with good HIV-related knowledge had a higher rate of HCT.<sup>23</sup> Thus, more HIV prevention education among KP, and MSM in particular, should help to boost HCT uptake. Studies in low- and middle-incomes countries found that MSM who had greater HIV knowledge had higher lifetime HCT.<sup>24, 25</sup>

This study also found that HCT uptake in the past year was significantly associated with perceived for HIV. MSM risk who acknowledged their risk for HIV had a higher lifetime use of HCT. These findings for perceived risk are consistent with other studies conducted in western Asia and southern Africa.<sup>19, 26</sup> The important point about HIV self-risk assessment is that the assessment needs to be accurate. In other words, the population most in need of education and outreach are those MSM who still have risk for HIV but are in denial about their risk and, hence, do not seek HCT. Conversely, those MSM who know they are HIV-negative and



always practice safe sex have less need for *HCT*. Therefore, it is important to aware of their risky behaviors by themselves and to improve the knowledge of HIV/STIs infections in order to accept themselves as actual.

Access to services was strongly associated with the uptake of HCT in this study. MSM who access free condoms. free lubricant and free HIV prevention were significantly associated with the higher uptake of HCT. In the previous study which accessed the effectiveness of national HIV prevention education program on behavioral changes for MSM, MSM who reported "they can easily access and received information/ intervention friendly" were more likely to report ever tested for HIV testing.<sup>27</sup> It was consistent with the findings from previous studies, MSM who had proper health care accesses would be more likely to have the uptake of HCT.28, 29 Therefore, integrated information/intervention programs should be implemented at the primary healthcare setting with community approach.

## CONCLUSIONS

This study indicates that older MSM are more likely to seek HCT in the past year than their younger counterparts. There is evidence that stigma and discrimination are still a deterrent to HCT service uptake. The more HIV-related knowledge they have the higher uptake of HCT were found. The accessibility of the access to services can lead to the higher uptake of HCT. To reduce HIV and MSM stigma, a stronger policy commitment is needed for more effective engagement of MSM in the prevention and control of HIV infection.

# RECOMMENDATIONS

Although Thailand has laws and policies to protect PLHIV from S&D, this study found that S&D is still a barrier to HCT, as other research has found. Self-stigma was inversely associated with HCT and, therefore, programs need to help combat this barrier to HCT and selfesteem. In particular, sexual diversity and gender dimensions that are out of the mainstream of society need to be normalized.

The data for this study came from a crosssectional survey and, thus, the correlations that were found do not imply causality. In addition, future studies should include qualitative data collection methods to explore in more depth how barriers are obstructing uptake of HCT, and how these can be reduced. It will be helpful for strategic planning for reducing S&D among MSM, by exploring more. Finally, this study was limited to MSM who were purposively sampled in hot-spot areas of Bangkok. Thus, sample is almost certainly the not representative of the entire population of MSM in Bangkok.

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# FOOD CHOICE BEHAVIOUR AMONG HIGH SCHOOL STUDENTS IN DEPOK, INDONESIA

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## ABSTRACT

Diet behaviour during adolescence will affect to the health status in adulthood. At present, overnutrition issue in adolescents particularly in unusual food choice behaviour possibly is caused from their hurry-up lifestyle. Food choice behaviour of high school students was studied to provide preliminary data for further investigation in overnutrition issue. A descriptive cross-sectional study was conducted from April to May 2020 by using online Food Choice Questionnaire (FCQ). Responses from 433 high school students were collected with female (71.4%) and 16-years old students (43.2%) as predominant. The prevalence of overweight and obese students (z-score > 1 SD) were 14.1% which was higher than national average. According to nine food choice behaviours, students emphasised on their health when choosing their foods (mean=  $3.10 \pm 0.76$ ). Food choice based on mood (mean=  $2.85 \pm 0.78$ ) and sensory appeal (mean=  $2.85 \pm 0.74$ ) seemed more attentive than weight control (mean=  $2.74 \pm 0.76$ ) in students' opinion. Even so, they looked on convenience (mean=  $2.68 \pm 0.72$ ) after weight control on their food choice. It somehow reflected by their perception toward body image. Students' satisfaction with their body image was only 38.8% whilst 40% of the students were wishing to be thinner. These suggested further understanding on how far food choice in adolescents are influenced by their characteristics. Therefore, it may picture the necessary intervention afterward.

Keywords: food choice behaviour, adolescents, body image, health, nutritional status

#### **INTRODUCTION**

Health status throughout the life cycle is determined by nutritional status on the previous phase of one particular life cycle.<sup>1</sup> Accordingly, healthy adulthood will be reached when we are having healthy adolescence. However. adolescents around the globe are now facing more overnutrition issues by which may increase the risk for non-communicable diseases (NCDs). In Indonesia, overnutrition was rising from 7.3 to 13.5% over past five years.<sup>2, 3</sup> Besides, Depok City was quite prevalent, reaching 20.8% compared to the other areas<sup>4</sup>. Depok is tagged along with Jakarta, under the title of Jabodetabek Area or Jakarta, Bogor, Depok, Tangerang, and Bekasi, as the area where major developments are made. However, whilst the other Jabodetabek Areas are prone to negative health outcome, the majority of health initiatives are taken place in Jakarta.

One of the causes of overnutrition is unhealthy diet. During adolescence stage, a big change in nutrition needs occurs due to biological development compared to a childhood. Adolescents require more energies by consuming a large portion of foods than children. Besides, psychological state seems to



rule more in actions including food-related practice.<sup>5</sup> A peer acceptance, including body image consideration, may change adolescents' usual behaviour to fit into particular group. It also leads them to spend more time with friends than family. Meals skipping and more snacking are their ways to possibly interact with each other. Besides, snacks that they choose tend to be greasy foods and empty foods which contain high contents of fat and carbohydrate.<sup>1, 6</sup> These kinds of foods can only fulfil energy needs and lead to overnutrition, by getting either overweight or obese.

Health practitioners are advised to attach adolescents on improving their food choices rather than forcefully ask them to stop snacking. Food choice demands health practitioners to deeply explore adolescents' thought and value towards food, and assist them to think about health consequences. This approach is believed resulting in a behavioural change over dietary practice only.<sup>7</sup>

Based on aforementioned conditions, the study of food choice in adolescents is considered necessary. This study will explain characteristics and food choice of high school students in Depok. The result can be used as a reference for further cross-sectional analysis or a baseline for the relevant intervention study.

# **METHODS**

This study was a descriptive cross-sectional study focusing on food choice behaviour among high school students in Depok, Indonesia. General characteristics, nutrition knowledge, body image perception, and media engagement of the students were obtained during the study. This study was conducted from mid of April until mid of May 2020 through an online questionnaire. Inclusion criteria were high school students in Depok who were able to access the internet, agreed to participate, and completed the online questionnaires accordingly. These criteria allowed high schools students to participate regardless schools of type of

(public/private/general/religion/vocational school), grades, and majors. Snow-ball sampling technique was used to reach 433 high-school students.

A unique link to access research questionnaires was spread via instant messaging. Informed consent was displayed on the first part of the questionnaires and became a condition for the respondents in order to continue to the next part. Only respondents who agreed to participate in this study could access the real questionnaires.

Food choice of the students were obtained using Food Choice Questionnaire (FCQ) as studied by Maulida et al.<sup>8</sup> It contains thirtythree questions covering nine subscales: Health, Mood, Convenience, Sensory Appeal, Natural Content, Price, Weight Control, Familiarity, and Religion. It has also previously tested for validity and reliability. Internal consistency of the FCQ considered as highly reliable with Cronbach's  $\alpha$  value ranged between 0.70 - 0.87.<sup>9, 10</sup>

Forward and backward translation was done for Physical Activity **Ouestionnaire** the Adolescent (PAQ-A) and Stunkard's assessment scale for body image perception. Also, face validity has previously done when deciding to use modified Stunkard's assessment scale<sup>11</sup>. The validity of general characteristics, nutrition knowledge, and media engagement questionnaires were measured by Item-Objective Congruence (IOC). Nutrition, public health, and general sectors were involved in the validity test. Items questionnaire with IOC score > 0.5 were used in the survey.

All the questionnaires were also tested by 30 high-school students for evaluating the reliability. Internal consistency for nutrition knowledge questionnaire were acceptable<sup>12</sup> ( $\alpha = 0.684$ ) which consisted of 25 questions. Also, PAQ – A which was translated to Bahasa has a high reliability ( $\alpha = 0.755$ ).



The descriptive statistics was performed using SPSS version 22.<sup>13</sup> The results are presented in numbers, percentages, means, standard deviations, minimum and maximum values. The protocol of the study was approved by Institutional Review Board of Fakultas Kesehatan Masyarakat Universitas Muhammadiyah Jakarta No. 10.003.B/KEPK-FKMUMJ/TV/2020.

## RESULTS

This study collected 433 responses from high school students in Depok, Indonesia. In Table 1, female students were over two-third of the respondents (71.4%). It also showed that students with age 16 years old were the majority (43.2%), and followed by age 17 years old which were 25.6%. Parents of the students were dominated with high-educated father 52.7% although less-educated mother was also the majority (56.1%). This classification set diploma as a threshold. High-educated parents were either mothers or fathers who completed at least diploma degree. Stipend or allowance of the students were varied, ranging from Rp5.000,00 to Rp500.000,00. On average, parents gave their children about Rp87.600,00 for student's expenses in а week (approximately USD 6.13).

**Table 1** General characteristics of the respondents (n = 433)

	n	%
Sex		
Male	124	28.6
Female	309	71.4
Age (year)		
14	1	0.2
15	90	20.8
16	187	43.2
17	111	25.6
18	44	10.2
Mother's education		
Less-educated	243	56.1
High-educated	190	43.9
Fathers's education		
Less-educated	205	47.3
High-educated	228	52.7
Stipend (IDR)		
Mean $\pm$ SD	87.	$6K \pm 83.1K$
Minimum - maximum	5	K – 500K

**Table 2** Nutrition-related characteristics of the students (n = 433)

	n	%
Nutritional status (BMI for age)		
Underweight (z-score < -2 SD)	36	8.3
Normal (-2 SD $\leq$ z-score $\leq$ 1 SD)	336	77.6
Overweight (1 SD $\leq$ z-score $\leq$ 2 SD)	47	10.9
Obese (z-score $> 2$ SD)	14	3.2



	n	%
z-score, mean $\pm$ SD		$-0.30 \pm 1.26$
z-score, minimum - maximum		-4.99 – 3.61

In this study, students' nutritional status was assessed through Body Mass Index (BMI) for age criteria. BMI for age assessment indicator was used because students were children with age range from 5 years old to 18 years old. Researcher used World Health Organization Anthroplus (WHO Anthroplus) software as suggested by WHO for nutritional survey, and it is the copyright for all non-commercial users. BMI for age criteria followed its z-score (BAZ) that was obtained from students' body weight, body height, and age data. According to Table 2, it showed that overweight students were 10.9% and obese students were 3.2%. These numbers representing overnutrition in students were as much as 14.1% although most of the students were having a normal nutritional status (77.6%). BAZ was ranged from -4.99 to 3.61 and BAZ mean score laid on z-score  $-0.30 \pm 1.26$  SD.

**Table 3** Body image perception of the students (n = 433)

	n	%
Satisfied	168	38.8
Wishing to be thinner	173	40.0
Wishing to be fatter	92	21.2

In Table 3, it showed that majority of the students were wishing to be thinner (40%). Only 38.8% students satisfied with their body image. The other 21.2% students were wishing to be fatter. In Table 4, it provided further details on the comparison between body image perception and the actual BMI for age of the students. It can be noted that student's perception regarding their body image was somehow resonated with their actual BMI for age. About 58.3% underweight students were wishing to be fatter, most of normal weight students satisfied with their body image (43.2%), 80.9% overweight students and 85.7% obese students were wishing to be thinner respectively. Also, none of obese students were wishing to be fatter. However, despite their weight status, there were 5.6% underweight students wishing to be thinner

**Table 4** BMI for age towards body image perception (n = 433)

Body image	BMI for age					Τ	<b>`otal</b>			
perception	Unde	erweight	N	ormal	Ove	erweight	C	)bese	_	
	n	%	n	%	n	%	n	%		
Satisfied	13	(36.1)	145	(43.2)	8	(17.0)	2	(14.3)	168	(38.8)
Wishing to be thinner	2	(5.6)	121	(36.0)	38	(80.9)	12	(85.7)	173	(40.0)
Wishing to be fatter	21	(58.3)	70	(20.8)	1	(2.1)	0	(0.0)	92	(21.2)



Referring to Table 5, more than a half of the students were frequently accessed food-related information (59.8%). They trusted health workers (40.9%), celebrities (35.8%), and researchers (17.8%) as their key informant. It was found that over 50% students had ever participated in activities related to food such as a cooking club, traditional food exhibition, cooking demo, etc.

**Table 5** Food-related media engagement of the students (n = 433)

	n	%
Frequency		
Moderate (< 3 times a week)	174	40.2
Frequent ( $\geq$ 3 times a week)	259	59.8
Key informant		
Researchers	77	17.8
Celebrities	155	35.8
Health workers	177	40.9
Other	24	5.5
Food-related events participation		
Ever	254	58.7
Never	179	41.3

Physical activity of the students scored from 1.03 to 4.54 (Table 6). In general, they scored 2.20 which were lower than the recommended value of 2.75. Only 12.5% of the students were included in the physically active category.

**Table 6** Physical activity of the students (n = 433)

Physical Activity Questionnaire – Adolescents (PAQ-A) score		
Mean $\pm$ SD	2.20 :	$\pm 0.54$
Minimum - maximum	1.03 -	- 4.54
Physical activity level	n	%
Physically inactive (score $< 2.75$ )	379	87.5
Physically active (score $\geq 2.75$ )	54	12.5

In Table 7, it showed students' nutrition knowledge score ranging between 32 and 96. Their average score was 66.95. Referring to the recommendation<sup>14</sup>, only 19.4% students had a good nutrition knowledge which scored more than 80.

**Table 7** Nutrition knowledge of the students (n = 433)

Nutrition knowledge score				
Mean $\pm$ SD	66.95 ±	= 12.82		
Minimum - maximum	32 - 96			
Nutrition knowledge level	n	%		
Poor (< 80)	349	80.6		
Good ( $\geq 80$ )	84	19.4		



According to Table 8, it presented the mean score distribution in every subscales and items of Food Choice Questionnaires (FCQ). The lists showed ranks on students' food choice based on subscales' mean scores. A 4-scale of Likert was applied in these FCQs with scores from 1 as "not important" to 4 as "very important". Religion subscales had the highest mean score  $(3.40 \pm 0.82 \text{ SD})$  following with Health subscale  $(3.10 \pm 0.76 \text{ SD})$ . Mood and Sensory subscales seemed having rather an equal mean score as much as  $2.85 \pm 0.78 \text{ SD}$  and  $2.85 \pm 0.74 \text{ SD}$  respectively. Familiarity, on the other hand, had the least means score  $(2.38 \pm 0.70)$  in this study.

**Table 8** Food choice behaviour and items (n = 433)

	Mean*	± SD
Subscales and items	Items	Subscale
Religion		$\textbf{3.40} \pm \textbf{0.82}$
Is in harmony with my religious views	$3.47\pm0.91$	
Is not forbidden in my religion	$3.33\pm0.88$	
Health		$3.10 \pm 0.76$
Contains lots of vitamins and minerals	$3.17\pm0.87$	
Keeps me healthy	$3.22\pm0.87$	
Is nutritious	$3.28\pm0.86$	
Is high in protein	$3.11\pm0.85$	
Is good for my skin/teeth/hair/nails etc.	$2.91\pm0.98$	
Is high in fibre	$2.89\pm0.86$	
Natural content		$\textbf{2.94} \pm \textbf{0.77}$
Contains no artificial ingredients	$2.81\pm0.94$	
Contains natural ingredients	$3.02\pm0.89$	
Contains no additives	$2.99\pm0.95$	
Mood		$\boldsymbol{2.85 \pm 0.78}$
Helps me cope with stress	$2.92\pm0.96$	
Cheers me up	$2.84\pm0.98$	
Helps me relax	$2.71\pm0.93$	
Keeps me awake and alert	$2.83\pm0.94$	
Makes me feel good	$2.96\pm0.90$	
Sensory appeal		$\textbf{2.85} \pm \textbf{0.74}$
Tastes good	$3.19\pm0.87$	
Smells nice	$2.95\pm0.93$	
Looks nice	$2.50\pm0.95$	
Has a pleasant texture	$2.75\pm0.97$	
Price		$\textbf{2.82} \pm \textbf{0.85}$
Is not expensive	$2.82\pm0.96$	
Is cheap	$2.74\pm0.98$	
Is good value for money	$2.89\pm0.91$	
Weight control		$2.74 \pm 0.76$
Is low in calories	$2.59\pm0.85$	
Is low in fat	$2.74\pm0.89$	
Helps me control my weight	$2.89 \pm 1.00$	
Convenience		$\textbf{2.68} \pm \textbf{0.72}$



Subseales and items	Mean	* ± SD
Subscales and items	Items	Subscale
Is easily available in shops and supermarkets	$2.77\pm0.91$	
Can be bought in shops close to where I live or work	$2.67\pm0.92$	
Is easy to prepare	$2.60\pm0.84$	
Takes no time to prepare	$2.67\pm0.95$	
Familiarity		$\textbf{2.38} \pm \textbf{0.70}$
Is familiar to me	$2.57\pm0.96$	
Is what I usually eat	$2.60\pm0.90$	
Is like the food I ate when I was a child	$1.97\pm0.91$	
*1:1		

\*Likert's scale was applied and ranged from 1 - 4.

## DISCUSSION

Food Choice Ouestionnaire (FCO) is acknowledged and applicable to measure food choice in different age groups, particular setting, single- or multi- national and ethnics.8-<sup>10, 15-20</sup> It is common for adolescents putting health as the most important one compared to the other food choices.<sup>8, 10, 19</sup> Adolescence is a period that children start to carefully behave considering consequences that may be resulted.<sup>1</sup> Therefore, in adolescent's food choice, health was suggested to be combined with natural content<sup>19, 20</sup> and weight control<sup>20</sup> since adolescent saw health as one broad matter. They were different from adults who rather value health after the other food choices such as sensory appeal, price, and mood while choosing their food.<sup>9, 10, 15, 16, 18</sup>

The previous studies<sup>8-10, 15-20</sup>, religion subscale has rarely been included since it was complementary suggested<sup>10</sup>. Even so, the result of this present study also considered unusual since adolescents placed slightly more importance on religion than health when choosing the foods. Irish adolescents had food choice on religion motive, but it turned out as the least important of all the food choices.<sup>20</sup> Similar findings also applied in adults.<sup>10</sup> Inclusion of the participants in this study allowed students regardless of the type of school including religion-based school. It was assumed that this condition taking part for the result. Mood and sensory appeal were placed almost equally important. Some argued that adolescents have least understanding on their feeling toward food.<sup>20</sup> A high mean score on mood subscale ( $2.85 \pm 0.78$  SD) might be due to the stress experienced by high school students. They tended to balance school, friend, peer group, and family whilst also try to be more independent on their way.<sup>1, 6</sup> Their busy lifestyle also seemed to be reflected on their food choice related to convenience.

The previous studies often explained price and convenience among food choices altogether. It was to some extent related to each other on adolescents' daily life.<sup>8, 20</sup> However, in this present study, the importance of adolescents' food choice motivated by weight control stood between price and convenience. Domination of female subjects in the study is noteworthy. Females are often considered to be more attentive in weight control.<sup>10, 21</sup> Also, considering students' body image perception in general, most of them were wishing to be thinner.

Adolescents' familiarity food choice in this present study showed similar findings which were found in both younger people and adults.<sup>9,</sup> <sup>15, 17, 19</sup> They were assumed having desires to try new things.<sup>19</sup> This aligns with adolescence characteristics as adolescents start to be more independent from family and allocate more time with peers over family.<sup>1, 6</sup>



This present study was conducted during the outbreak of Corona Virus Diseases 2019 (COVID-19). Consequently, some results might be affected by that condition. Physical activity, for example, was measured by PAQ-A which explored adolescents' activities in the past week including physical education at school. With social distancing rule being applied, school and outdoor activities were restricted. It explained 87% of the students who included in physically inactive measurement. Even so, the result showed some students who were quite active. It might also imply that physical activity was still possible to do in spite of the rule, because physical activity recommendation in adolescent is simple. It suggests adolescent to do either physical game, household chore, or other activity that require muscle movement in a minimum duration of 60-minutes per day.<sup>22</sup>

Another affected result was nutritional status. Due to an online approach in this present study, data regarding body weight and height of the students were collected as self-reported data. It relied on their memories on the last time of physical measurement. So, it might be either under- or over-reported as well as the result on nutritional status which was calculated using those data. Accordingly, this is considered as the limitation of this study.

On the other hand, this study was successfully conducted during the outbreak and enrolled numbers of participants. Apart from the result, data collection method of this study may also become a reference for further research, especially one that conducted during pandemic situation.

# CONCLUSION

Students emphasised on health when choosing their foods. Interestingly, religion practice seemed taking the major part on adolescents' food choice. Their perception towards body image reflected on modest weight control behaviour. It also was placed as more important than convenience in foods choice although price, food sensory, and mood still took more consideration. Adolescents rather similar with adults when choosing the foods based on familiarity. On the characteristics, physical activity of the students was mostly included as physically inactive due to social distancing measure.

#### RECOMMENDATIONS

These findings suggest further understanding on how far food choice in adolescents are influenced by their characteristics. It may be useful for health practitioners to encourage adolescents to have better nutritional status through a better food choice. As to some extent students' body image complied with their actual weight status, the further study is advised to measure anthropometrics accordingly and complete with statistical analysis.

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# MOTHER'S KNOWLEDGE TOWARDS HUMAN PAPILLOMAVIRUS(HPV) AND THE HPV VACCINE IN INDIGENOUS COMMUNITIES IN ST. VINCENT AND THE GRENADINES

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# ABSTRACT

Issues have been raised that mothers may be hesitant to permit their daughter to receive the Human Papillomavirus Vaccine (HPV), because they may have little knowledge of HPV infection and the HPV vaccine. Human papillomavirus infection causes several types of cancer including cervical cancer which can be prevented by vaccination. The study aimed to identify factors associated with mothers' knowledge towards HPV and the HPV vaccine in Indigenous Communities in St. Vincent and the Grenadines. An online-based community cross-sectional survey was conducted in the six main villages in the Indigenous Community from April to May 2020. A simple random sampling was used to select mothers with a daughter age 7-11 years old who has not yet received the HPV vaccine. A structured questionnaire was administered to 265 eligible respondents by google e form and a self-reported questionnaire. Bivariate analyses and multiple logistics regression were performed to determine factors associated with knowledge. The result showed that 61.9% of the mothers had a high level of knowledge while 38.1% had low knowledge towards HPV and HPV Vaccine and 82% had heard of the HPV vaccine. In multiple logistic regression analysis, the findings showed that occupation (employed mothers) (AOR=2.50, 95% CI =1.32- 5.09), income (low monthly household <800 EC\$) (AOR=1.95, 95% CI =1.04-3.65), and high health beliefs (AOR=5.56, 95% CI =1.98-15.56) were significantly associated with mothers' knowledge towards HPV and HPV vaccine (P-value <0.05). The results revealed that more than half of the respondents had high knowledge of HPV and HPV vaccine. The findings also highlight the need for more educational interventions about HPV and the HPV vaccine, using a multifaceted and culturally sensitive approach to improve knowledge not just among mothers but the community and societal level.

Keywords: mother's knowledge, human papillomavirus vaccine, Indigenous communities

#### **INTRODUCTION**

Human Papillomavirus (HPV) is a known common sexually transmitted infection (STI) among men and women with many types and is considered a well-established cause of cervical cancer.<sup>1</sup> The global prevalence of HPV in asymptomatic women is approximately 11-12%, with higher prevalence in Latin America (16%) and the Caribbean (35.4%) and maximum rates in women younger than 25 years old.<sup>2</sup> Most HPV infection clears up on its own without intervention, however, there remains the risk that HPV infection can develop chronic and precancerous lesions can progress to cervical cancer. The two types of HPV that origin pre-



cancerous cervical lesions and about 70% of cervical cancer are 16 and 18.<sup>1</sup> Deaths from cervical cancer are approximately 311,000 globally with more than 85% occurring in low and middle- income countries.<sup>1</sup> In Latin America and the Caribbean, more than 56,000 women are diagnosed yearly, with more than 28,000 deaths.<sup>3</sup>

In St. Vincent and the Grenadines high-risk HPV infections were detected in 29.6% of women who are sexually active <sup>4</sup>, and cervical cancer ranks second as the most frequent cancer among women.<sup>5</sup> Data from the Ministry of Health, Wellness, and the Environment revealed that cervical cancer is the second frequent cancer among women. During the period 2012-2016, it accounted for 6.8% of all cancer morbidity and the third leading cancer mortality from 2011 to 2016 in the country.<sup>5</sup> This is high when compared to other Caribbean countries like Barbados and Curacao.<sup>6</sup> Diseases related to HPV can be prevented through a comprehensive cervical cancer control program which includes primary prevention by the vaccination of girls 9-14 years.<sup>1</sup> Globally, countries have implemented the HPV vaccine into the national Immunization program which targets both girls and boys.<sup>7, 8</sup> In St. Vincent and the Grenadines, the program was introduced in 2017 in the Expanded Program of Immunization (EPI) for girls in grade 6. Since its inception low island coverage was noted.9

The Ministry of Health, Wellness, and the Environment is responsible for the overall management of the health system with services that include providing comprehensive health care delivery services at the primary, secondary and tertiary levels and to develop programs and establish appropriate delivery

Since the license of the HPV vaccine studies has been conducted in different countries relating to mothers' knowledge towards HPV and HPV vaccine. However, no such study was conducted in St. Vincent and the Grenadines. It is, therefore, necessary to understand the local systems to the health care needs of the population.<sup>10</sup> Access to health care services is almost universal with a minimal fee for secondary care and free at the primary level. Forty (40) health centers offered primary care and one main hospital for secondary care. A diagnostics center also provides some tertiary care services for the population. Like most Caribbean countries, there has been an epidemiological transition to chronic noncommunicable diseases. In 2015 neoplasm accounted for 21% of all deaths, during 2014 deaths in the 20-59 yeas age group were also due to malignant neoplasm.<sup>11</sup> According to the Monetary International Fund, the unemployment rate remained high at 25.8% in  $2017.^{12}$ 

The Indigenous communities consist of six main villages and the indigenous people make up the third-largest population group.<sup>11</sup> These communities are all vulnerable to the country's La Soufriere volcano as they are located in the red zone.<sup>13</sup> Four health centers throughout the Indigenous communities provide primary care services. These Communities was selected to conduct this study due to persistent low HPV vaccine coverage.

The acceptance of the HPV vaccine in the future is dependent on the mother's knowledge of HPV infections and the HPV vaccine. However, knowledge among mothers has been poor in some studies around the world.<sup>14-16</sup> Factors in previous studies revealed that female gender, high education. and employment were associated with a high level of knowledge of HPV and the HPV vaccine.<sup>14,</sup> <sup>17</sup> The understanding, therefore, of mothers' knowledge regarding HPV vaccination is imperative.

circumstances so that appropriate interventions can be designed and implemented. This study aimed to determine factors related to mothers' knowledge towards HPV and the HPV vaccine.



# **METHODS**

A community-based cross-sectional survey was conducted on 265 mothers with a daughter age 7-11 years in the Indigenous Communities in St. Vincent and the Grenadines from April to May 2020. Purposive sampling was used at the Indigenous communities' level and to reduce selection bias simple random sampling was done to select mothers to participate. Firstly, a list of all households with girls age 7-11years was collected, then a number was given to each household and then sampling was done. The inclusion criteria were mothers who had a daughter age 7-11 years old who has not yet received the HPV vaccine and the youngest daughter if the mother has more than one daughter aged 7-11 years.

The sample size was calculated using a single proportion formula in estimating the population proportion (P). The formula used was:

n= 
$$\frac{Z^2 P(1-P)}{d^2}$$
  
where:  
n= estimated sample size  
d= the probability that desire sample  
size not representative of study population  
= (0.05)  
Z = Standard normal deviation at the  
95% confident interval =1.96  
P= The prevalence of intention to  
vaccinate with HPV vaccine is =0.78  
utilize from Taiwan study.<sup>18</sup>

$$n = (1.96) (1.96) (0.78) (0.22) (0.05) (0.05) n = 0.6592 0.0025 n = 263.687 / 264$$

The questionnaire consisted of 3 parts and was adapted and modified from previous relevant published studies and survey instruments.<sup>19-21</sup> The content validity of the instrument was validated by three public health experts who are university lecturers. The first part: sociodemographic characteristics and included childhood recommended vaccine and

importance of religion (11 items), the second: internal characteristics such as health beliefs (14 items), intention (1item), and attitudes towards HPV and HPV vaccine (11 items), and the third part external characteristics such as preventive services utilization and source of information consisted of 6 questions. A 5 point Likert scale was used for questions regarding health beliefs about HPV and the HPV vaccine using the Health Belief Model, answers ranged from 1 "strongly disagree to 5 strongly agree". A 7 point Likert scale was also used for attitude towards HPV and HP vaccine from 1 "strongly disagree to 5 strongly agree".

Concerning knowledge, there were 11 questions the possible answers were true, false, and don't know. The response for knowledge was coded so that each "correct" answer received a score of '1' and "incorrect" and "don't know" answers will be coded as '0'. The total possible scores ranged from 0-11. The mean score was the cut point to determine the knowledge level and divided into two categories namely high and low. For health beliefs and attitudes, the cut point was established using the mean score to determine high and low health beliefs and positive and negative attitudes. Intention to vaccinate with the HPV vaccine was answered as either Yes or No. Yes, indicated a positive intention regarding vaccination, while an answer of no indicated a negative intention. Preventive service utilization and source of information were all multiple-choice questions.

The reliability of the questionnaire was calculated using Cronbach's alpha coefficient. The reliability test for knowledge was 0.802, health beliefs 0.833, and attitude 0.802 respectively.

Data collection was through a well-developed and pilot tested structured questionnaire by google e form and self-reported questionnaire due to the covid 19 situation in the country by selected two research assistants. The households were contacted by a research assistant and the mother invited to participate in the study. Both verbal and written consent was obtained from each mother and clear

is =0.78



instruction given regarding the questionnaire. The questionnaire was sent to the respondents by the research assistants. On completion of the form, each mother was asked to select submit for automatic return of the answered questionnaire. The assistants interviewed the mothers who had no access to the internet or mobile phone using social distancing. The data obtained 100% responses.

Statistical Package for Social Science (SPSS) version 21 was used for statistical analysis. Descriptive statistics were used to compute frequency, mean, median, standard deviation, percentage, and interquartile range for describing the distribution. Variables such as mother and daughter age were divided into two groups based on the mean cut point. For income, the median was used as a cut point.

Bivariate analysis was used to assess the association between independent variables and knowledge towards HPV and HPV vaccine. Finally, multiple logistic regression was used to find the most predictors by adjusting confounding factors. To ensure that ethical principles were maintained, the study was conducted after approval was obtained from the Ethical Committee Faculty of Graduate Studies, Mahidol University (approval code 2020/ 064.2503, dated March 25). The participants were informed that their anonymity would be preserved and they could withdraw from the study at any time.

## RESULTS

A total of 265 mothers with a daughter age 7-11 years completed the questionnaire and table 1 presented the findings. The sociodemographic information showed that the mean age of the mothers was 34 years (range 20 to 50 years) with a standard deviation of 6.1 years. The mean age of the daughters was 9 years (range 7 to 11 years) with a standard deviation of 3 years. Almost all (98.1%) of the mothers reported that their daughter had obtained all or some of the recommended childhood vaccines. The majority, (78.5%) of the respondents were not married during the time of the study. In terms of the number of children 38.9% had 3 children, 36.7% had two and the remainder 23.4% had only one child. Among the mothers surveyed 77% of them are employed, 60.4% of them obtained a secondary education, 21.1% primary, and 18.5% college. All (100%) of the respondents were Christians and 57.4% considered religion as important to decision making. The distribution into ethnic groups revealed 54.3% of Non- Indigenous and 45.7% of Indigenous. In terms of monthly income just over half (51.7%) of the mothers obtained a high income (≥800EC\$ ≥US\$296) while the other participants had low income as is shown in table1.

In terms of intention to vaccinate the majority (95.8%) of the mothers had a positive intention to vaccinate their daughter. Regarding attitude, 63.8% of the mothers had a positive attitude towards vaccination and 75.8% had high health beliefs of HPV and the HPV vaccine. The majority (77.7%) of the mothers' source of information on HPV and HPV vaccine were from health professionals as shown in table 2. Concerning attitude. most of the respondents(86.8%) disagree with opposing the HPV vaccine and agreeing (89.5%)that preventing HPV infection is important for their daughter.

Table1 Distribution of respondents by socio-demographic characteristics (n = 265)

Socio-demographic/ socioeconomic characteristics n=265	n	%
Mother age		
<34	120	45.3
>34	145	54.7
Mean(SD)=34(6.1), Min=20, Max=50		



Socio-demographic/ socioeconomic characteristics n=265	n	%
Daughter age		
7-9	173	65.3
10-11	92	34.7
Mean(SD)=9(3), Min=7, Max=11		
Marital status		
Married	57	21.5
Not Married	208	78.5
Occupation		
Unemployed	64	23
Employed	204	77
Religion		
Non-Traditional Christian	156	58.9
Traditional Christian	109	41.1
Importance of religion ( Christianity)		
Important	152	57.4
Not important	113	42.6
Education		
Primary	56	21.1
Secondary	160	60.4
College or higher	49	18.5
Ethnicity		
Indigenous	121	45.7
Not Indigenous	144	54.3
Childhood vaccine for daughter		
Yes	261	98.5
No	4	1.5
†Income		
< 800( low monthly income)	128	48.3
$\geq$ 800 (high monthly income)	137	51.7
Median(IQR)=800EC\$(1000), Min=100EC\$, Max=5000EC\$		
Number of children		
1	62	23.4
2	100	37.7
3	103	38.9

*†1US\$=2.67EC\$* 

Table 2 Distribution of the respondents by internal and external characteristics. (n = 265)

Internal and External characteristics	n	%
Internal characteristics		
Intention to vaccinate		
Negative	11	4.2
Positive	254	95.8
Attitude		
Negative	96	36.2



Internal and External characteristics	n	%
Positive	169	63.8
Health Belief		
High	201	75.8
Low	64	24.2
External characteristics		
Source of information		
Health professional	206	77.7
Non- health professional	59	22.3
Last medical check-up		
1-2 year	159	60
2-5 years	68	25.7
More than 5 years	38	14.3
Last Pap-smear		
1-2 years	108	40.8
2-5 years	96	36.2
5 and more	61	23
Diagnosis with cervical cancer		
No	261	98.5
Yes	3	1.1
Abnormal pap smear		
Yes	39	10.9
No	236	89.1
Knowing someone with cervical cancer		
Yes	203	76.6
No	62	23.4
Female relative with cervical cancer		
No	190	71.7
Yes	75	28.3

Concerning mothers' knowledge level towards HPV and HPV vaccine, more than half (61.9%) of the mothers had high knowledge while 38.1% had low knowledge as shown in table 3.

Knowledge Level	n	%	
High knowledge ≥ 80% score	164	61.9	
Low knowledge < 80% score	101	38.1	
Total	265	100	

Table 3 Mothers' knowledge towards HPV and HPV vaccine (n =265)

In the bivariate logistic regression analysis of knowledge level, there was a negative association between the importance of religion and knowledge level. Mothers who considered religion as important were 0.1 times less likely to have high knowledge. The results also showed an association between attitudes, health beliefs, intention, source of information, knowing someone with cervical cancer, abnormal pap smear, and mothers' knowledge level with P-value 0.05. Mothers with a positive



attitude were nearly 2 times more likely to have high knowledge when compared to mothers with a negative attitude. Mothers with high health beliefs were 3 times more likely to have high knowledge, likewise, mothers with positive intention to vaccinate also had high knowledge. In the same way, the mothers who received information from health professionals were 2 times more likely to have high knowledge when compared to mothers who got information from Non-health professionals.

Additionally, mothers who knew someone with cervical cancer were 2 times more likely to have high knowledge compared with mothers who did not know someone with a cervical cancer diagnosis. Lastly, the mothers who had an abnormal pap smear were also 2 times more likely to have high knowledge.

Factors	H	ligh	Low		COR	<b>P-value</b>
	n	%	n	%	(95%)	
Importance of Religion						
Not important	81	(49.4)	32	(31.7)	1	
Important	83	(50.6)	69	(68.3)	0.47 (0.28-0.79)	0.005**
Attitude						
Negative	50	(30.5)	55	(54.5)	1	
Positive	114	(69.5)	46	(45.5)	1.90 (1.14-3.18)	0.014*
Health Beliefs						
Low	139	(84.8)	62	(61.4)	1	
High	25	(15.2)	39	(38.6)	3.49 (1.94-6.27)	<0.001***
Intention to vaccinate						
Negative	2	(1.2)	9	(8.9)	1	
Positive	162	(98.8)	92	(91.1)	7.92(1.76-37.46)	0.009**
Source of information						
Non-health professionals	28	(17.1)	31	(30.7)	1	
Health professionals	136	(82.9)	70	(69.3)	2.15 (1.19-3.86)	0.011**
Knowing someone with cervica	l canc	er				
No	136	(82.9)	67	(66.3)	1	
Yes	28	(17.1)	34	(33.7)	2.46( 1.38-4.40	0.002*
Abnormal Pap smear						
No	151	(92.1)	16	(15.8)	1	
Yes	13	(7.9)	85	(84.2)	2.18 (1.00-4.76)	0.049*
Occupation						
Unemployed	32	(19.5)	29	(28.7)	1	
Employed	132	(80.5)	72	(71.3)	1.66 (0.93-2.96)	0.086
Income						
$\geq$ 800(high monthly income)	79	(48.2)	58	(57.4)	1	
<800 (low monthly income)	85	(51.8)	43	(42.6)	1.45(0.88-2.39)	0.144

Table 4 Association between study factors and mothers' knowledge towards HPV and HPV vaccine

\*P- value< 0.05, \*\* P- value < 0.01, \*\*\*P-value < 0.001



The predictors of knowledge towards HPV and HPV vaccine after adjusting the other variables is shown in table 5. The significant predictors of mothers' knowledge were: occupation, income, and health belief of HPV and the HPV vaccine. Employed mothers were 2 times (AOR= 2.51, 95% CI, 1.24-5.09) more likely to have high knowledge than unemployed mothers. Similarly, mothers with a low-income were 1 times more likely to have high knowledge than mothers with high income (AOR= 1.95, 95% CI, 1.04-3.65). In the same way, mothers with high beliefs were nearly 6 times (AOR= 5.56, 95% CI, 1.98-15.56) more likely to have higher knowledge than mothers with low health beliefs.

**Table 4** Predictive factors associated with Knowledge towards HPV and HPV vaccine using multiple logistic regression (Final Model)

Factors	Knowledge				
	AOR	95%	ό CI	p-value	
Occupation					
Unemployed	1				
Employed	2.51	1.24	5.09	0.011**	
Knowing someone with cervical cancer					
No	1				
Yes	1.90	0.98	3.68	0.057	
†Income					
< 800( low monthly income)	1.95	1.04	3.65	0.035*	
≥800 (high monthly income)	1				
Attitude					
Negative	1				
Positive	0.44	0.16	1.14	0.091	
Health Belief					
High	5.56	1.98	15.56	0.001***	
low	1				
Abnormal pap smear					
Yes	2.13	0.89	5.11	0.088	
No	1				

\*P- value< 0.05, \*\* P- value <0.01, \*\*\*P-value <0.001 †1US\$= 2.67 EC\$



# DISCUSSION

Since the introduction of the HPV vaccine in St. Vincent and the Grenadines in 2017, the knowledge level of HPV and the HPV vaccine among mothers has not been explored. This is the first study to the best of the investigators' knowledge to be done. Parents who were more knowledgeable about HPV were more likely to intend to have their daughter vaccinated compared with those who were not knowledgeable.<sup>22</sup> The results of this study have enhanced the understanding of mothers' knowledge towards HPV and the HPV vaccine in Indigenous communities in St. Vincent and the Grenadines.

HPV vaccine awareness among the mothers was 82%, which was higher than previous studies in which varying results were noted. In Nigeria, a study reported 19.7% among mothers <sup>23</sup>, in Turkey a study mentioned 24.5% <sup>15</sup>, in the United States of America (USA) a study in Los Angeles mentioned 61% among adolescent girls mothers <sup>24</sup> while another study among Central American Immigrants parents in the USA reported 75% of them hearing about the HPV vaccine.<sup>25</sup>

In this study, the findings showed that more than half of the respondents (61.9%) had a high level of knowledge towards HPV and the HPV vaccine. This is also higher than in previous studies. In China <sup>14</sup> and Turkey <sup>15</sup>, the knowledge level was generally poor among mothers. In Romania however, there was an average level of knowledge based on an assessment scale of 1 insufficient to 5 excellent <sup>26</sup>, while in Brazil high levels of the knowledge were found in parents.<sup>27</sup> Comparatively, the respondents in our study probably had some awareness of HPV and the HPV vaccine due to sensitizations and media campaigns in the country before the implementation of the vaccine and the inclusion of women only in the study. Women tend to have better health information-seeking behaviour than men, together with the presence of available pap smear screening programs, and the association of the HPV virus with cervical cancer which affects only women could play a role also in bringing awareness about the virus.

There was an association between income and mothers' knowledge level. The mothers in the low -income bracket had more knowledge about HPV and the HPV vaccine compared to mothers in the high- income bracket. The HPV vaccine is free of charge in St. Vincent and the Grenadines and this could be the reason why high-income mothers may not want to know about it. This result is in contrast to previous studies. A study in Syria mentioned good knowledge was reflective with high monthly income.<sup>28</sup> Another study in Thailand, also reported parents with higher knowledge were also found within the high-income bracket.<sup>20</sup>

Additionally, the majority of the respondents (77%) in this study were employed and employed mothers were found to have high knowledge than unemployed mothers. This finding is congruent with this study.<sup>28</sup> Furthermore, health beliefs were found to be positively associated with high knowledge. Our result showed that mothers with high knowledge of HPV and the HPV vaccine perceived a high susceptibility to contracting HPV infection, saw HPV as severe, and can cause cervical cancer and perceived more benefits of the HPV vaccine than barriers. This finding is similar to a study in Thailand.<sup>20</sup> There were, however, limitations to the study. A casual conclusion cannot be made as the study was a cross-sectional one and did not explore the causes and effects of mothers' knowledge. The study was also for mothers with girls age 7-11 in primary schools and therefore, the results cannot be generalized for mothers with younger or older girls.

# CONCLUSION

The findings of this study found that high knowledge of HPV and HPV vaccine was associated with income, high health beliefs and being employed. Based on the findings of the study more than half of the mothers had high



knowledge about HPV and HPV vaccine. There is, however, a need to conduct an effective educational program to strengthened awareness, improved knowledge of HPV and HPV related associated diseases, and influence behavior change. These findings reinforce the need for more educational programs on HPV and the HPV vaccine to improve knowledge base not just among mothers but all levels of influence–individual, family, community, and country. This should be done using a multifaceted culturally sensitive approach.

# RECOMMENDATIONS

For future research, a mixed method of approach is recommended with focus group discussion or an in-depth interview with mothers in Indigenous communities and by extension the general population. The educational interventions must be coordinated by the Ministry of Health, Wellness, and the Environment in the country.

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# GENDER DIFFERENCE OF KNOWLEDGE, ATTITUDE, AND PREVENTIVE PRACTICE OF PARENTS ABOUT CHILD SEXUAL HARASSMENT IN TOURISM DESTINATION, LOMBOK, INDONESIA

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## ABSTRACT

Child sexual harassment (CSH) is one of the seriously concerned issue. Lombok island is a place of interest where plenty tourists visit, but high increasing number of visitors affect to increasing sexual harassment of local children. Parents are the best position with high potential to prevent CSH. They can act as a strong external obstacle for the offender when approaching the children. There are limited studies that assess parent's gender differences in Knowledge, Attitude and Preventive Practice (KAPP) about CSH especially in a tourism destination, in Indonesia. Therefore, the objective of this study was to compare the gender differences in KAPP about CSH of parents in tourism destination Lombok, Indonesia. A cross-sectional study was conducted using an online questionnaire that was shared through social media and messenger applications. Participants were 199 parents who live in tourism destination, Gili Indah village, Lombok, Indonesia, and have children aged 5-17 years old. Chi Square and Mann Whitney U-test was used to examine the difference characteristic and KAPP score between male and female parents. Gender of the respondents in this study were 59.8% male and 40.2% female. The results revealed characteristic male and female mostly similar (p-value  $\geq 0.05$ ), only 5 characteristics that had p-value less than 0.05 which were age, education, occupation, religion, and support from the government. No significant difference was found for knowledge and attitude between gender although the result showed median score of males' attitudes was higher than female. But preventive practice score, on the other hand, showed a significant difference where female got higher score than male (pvalue=0.039). Accordingly, male and female should have same role to protect children from the offender and promoting child sexual harassment prevention in tourism destinations and it should involve cross-sectoral collaborating. Because the CSH problem is multi-agency responsibility.

Keywords: child sexual harassment, KAP, parent, tourism, Indonesia

#### INTRODUCTION

Tourism is known as a promoter for economic growth in local tourism destination. This happens in almost all parts of the world including in Southeast Asia. In 2015, Southeast Asia attracted 104 million international visitors, and this is the biggest growth increase in the tourism sector. Indonesia is part of Southeast Asia and one of the world's major tourist destinations. However, the increase in the growth of international visitors has an impact on increasing sexual harassment of children in the tourist destination.<sup>1</sup> This can be ironic when foreign exchange from the tourism sector increases, but Indonesian children who experience sexual harassment also increase.<sup>2</sup>



End Child Prostitution and Trafficking (ECPAT) organization mention that Indonesia is known as one of the countries that has become a kind of 'paradise' for pedophiles because of 30% of women working as a sex worker in Indonesia are under eighteen, with an estimated 40,000 to 70,000 Indonesian children victims of commercial being sexual exploitation each year.<sup>3</sup> There are two children sexual harassment cases revealed in Indonesia. Robert Andrew Fiddes Ellis case from Victoria that alleged sexual abused of 11 girls between eight and 17 years at his boarding house in Bali between 2014 and 2015.<sup>4</sup> The other case is Peter Dundas Walbran. He was jailed for three years in Lombok prison for doing sexual abuse to three boys aged between 8 and 12.5

Lombok island, part of West Nusa Tenggara Province, is one of the famous tourist destinations in Indonesia. The location is near to Bali. It can attract up to million tourists per vear. Data revealed the number of foreign and domestic tourists that came to visit West Nusa Tenggara increase more than 100% of visitors from 619.370 in 2009 become 3.094.437 in 2016.<sup>6</sup> On the other hand, in 2009, a rapid assessment study was carried out in seven major locations in Indonesia, including Lombok, found that children who were victims of harassment between the ages of 12 and 18 were victims of sexual harassment through child sex tourism and the others were sex worker, pornography, child trafficking for sexual goals, and child marriage.<sup>1</sup> Another assessment was doing around 2016-2017 by The Ministry of Women Empowerment and Protection (MoWECP) of Indonesia Child collaborating with ECPAT in 10 tourism destination in Indonesia. Based on that assessment, Lombok is area showed that the harassment of children is occurs and it is carried out by tourists, but measures of prevention and control and law enforcement have not been taken.<sup>7</sup>

Study by Indonesia government with activist institutions conclude that cases of sexual violence against children still occur in tourist

destination because of parents, communities and local authorities pursue economic benefits rather than understanding child-friendly tourism.<sup>3</sup> Parents are the best position to be able to prevent sexual harassment of children, because parents can act as a strong external obstacle for the offender when approaching children. Finkelhor identified four preconditions that would facilitate the occurrence of Children Sexual Abuse (CSA). The first is the motivation of the offender to sexually abuse a child. The second is actors who can expertly overcome internal barriers to being able to access children. Third, the offender does not have external barriers to CSA (such as parental supervision, strong parent / child relations). The fourth prerequisite is that the offender can overcome the rejection made by the child. He highlighted in his theoretical model that a guardian, including parents, who is absent or sick and inadequate supervision of a child is a condition that makes it easy for the offender to overcome external barriers in sexual abuse of children.<sup>8</sup> Parents play a very important role in preventing sexual harassment of children by creating a safer environment for their children and by helping their children feel safe and confident to avoid being targeted by sexual offenders.9 But mostly the literature relating to parent's knowledge, attitude, and preventive practice (KAPP) only focused on mother. For example, in a study that looked at the risk of negative parenting to CSH events, the study only used mother as participants. In fact, both fathers and mothers have the same role in raising children and preventing CSH in children.10

Child sexual harassment in tourist areas continues to increase throughout the world. Child sexual harassment is a serious crime against children's rights that can be committed by both men and women. It is a serious violation of children's rights. But that is a global reality in all countries and social groups. It is cross-culturally understood that children are vulnerable and need adult protection to ensure their physical and psychological wellbeing.<sup>11</sup> Knowledge, attitude, and preventive



practice (KAPP) of parents can protect the children from sexual harassment. But limited studies were conducted on parent's gender differences in KAPP about child sexual harassment, especially in a tourism destination. Therefore, the objectives of this study were to compare the gender differences in KAPP about CSH of parents in tourism destination Lombok, Indonesia.

# METHODS

A cross-sectional study was conducted in Gili Indah Village as one of the most visited destination in Lombok Island. The inclusion criteria are parents age 20-60 years old (adult age), have census registration in Lombok Island, have children in age 5-17 years old, can read, and have access to smartphone/computer with internet connection. And the exclusion criteria are parents who their child/children not permanently living together or living in the short period and move out and have child/children with disability.

This study used a convenience sampling with total 199 parents. The data were collected using online questionnaire. The link was shared to local people in the study area through social media and messenger application. The local villager also help researcher informing the link to another villager. Informed consent was included before questions section. If participants agree to answer the questionnaire, they will press next button and answer the screening question to make sure that the participant meets with the inclusion and exclusion criteria. The online questionnaire was set to give access for participants that pass the screening only.

The questionnaire was developed in English version from various literature, and then translated into Indonesia language. And back translate again to English by 3 native Indonesia who fluent in English as well.

Item-Objective Congruence (IOC) content validity tested using Rovinelli and Hambleton

developed in 1977.<sup>12</sup> Content validity of the questionnaire performed by 4 experts with result is 0.99. And the questionnaire divided into 4 parts:

Part 1) sociodemographic, consisted of 7 questions with modification by researcher for the choices in occupation, religion, and education level variables.<sup>13-16</sup>

Part 2) family factors, consisted of 13 questions with questions "Number of wives, Number of male and female children "from Mlekwa et al., 2016, questions "Number of family member live together and caregiver" added by researcher.<sup>15</sup> Nine questions of gender bias with 4 questions "Husband takes part dominant in major household decisions in my family, Husband takes most decisions regarding time allocation/activities of the family members (for example, going to schools, going to work, going outside), Wife must always obey the husband, Educated male-child is more responsible than educated female-child" from Begum, Grossman, & Islam, 2018, and the rest of that was developed by researcher. <sup>17</sup> The maximum score for gender bias was 45 and minimum score was 9. The smaller score for gender bias it meant the gender bias does not exist in this family.

Part 3) community factors, consisted of 8 questions. This part was added by researcher after consult with experts.

Part 4) collected data about KAPP of parents. Knowledge consisted of 26 questions. The scale was modified from Chen & Chen, 2005, for general knowledge of child sexual harassment, item numbers 1, 5, 6, 7, 9, 10, 11, 12 and based on two-point scale, Yes or No, the original Cronbach's Alpha was 0.42.18 Item number 2 and 3 about child protection with original response true and false and Cronbach's alpha score was 0,51 and items number 24 and 26 about knowledge sign and symptoms of children that were harassed with Cronbach alpha was 0.82 were developed by Alzoubi et al., 2018.<sup>16</sup> Item number 18, 19, 21, 22, 23, knowledge about sign and symptoms children that got harassment, were based on Salvagni & Wagner, 2006, with Cronbach's alpha was 0.71.19 The rest of question were modified from





literature Finkelhor, 1984, and for question related to child sexual harassment in tourism destination was added by modified report and fact from ECPAT.<sup>8,20</sup> The final internal consistency in current study using KR20 for knowledge scale was 0.68. Attitude scale was modified from some literature. Item number 2, 3, 4, and 5 about the important of CSH prevention for children were developed by Chen & Chen, 2005, with Cronbach's alpha score was 0.81.<sup>18</sup> Item number 6, 8, and 9 about parents and community support to prevent CSH were originally from Mlekwa et al., 2016.<sup>15</sup> The rest of that, item number 1, 7, and 10 about CSH prevention in tourism area were added by researcher based on suggestion from ECPAT Indonesia. The present Cronbach's alpha of attitude scale result in this study was 0.81. **Preventive practice** scale was consisted of 10 questions. Items number 1, 2, 3, 4, and 5 about parents' practice by talk to children to not go or accept gift by people they did not familiar, or even familiar without parents' permission and not getting touch in their private area, were originally from Chen & Chen, 2005, with modification to the context tourism area.<sup>18</sup> The internal reliability was 0.61. Items number 6, 7, 8, and 9 about practice to give explanation to children about child sexual harassment prevention, were developed by Guo et al., 2019, with Cronbach's alpha was 0.82.<sup>14</sup> Item number 10 was added based on expert's suggestion about parents' practice in observe the children environment. The Cronbach's alpha for preventive practice in current study was 0.93.

This research used SPSS-22 for Windows to analyze the result.<sup>21</sup> The analysis used Chi Square analysis to compare characteristic between male and female and used Mann Whitney U-test analysis to compare characteristic and KAPP between male and female with variable numeric and categoric.

The ethical issue was approved by The Research Ethics Review Committee for Research Involving Human Research Participants, Health Sciences Group, Chulalongkorn University with certificate of approval number 118/2020.

## RESULTS

Gender of respondents in this study were 59.8% (119) male and 40.2% (80) female. As shown in Table 1, socio-demographic characteristic between male and female had significant different in age with male had higher median age (38.0) than female (36.0), education with female more educate based on percentage of female that had percentage of last education in undergraduate and graduate higher than male, occupation with mostly female not working (51.3%), and religion with the majority was Islam. Table 2 shows that both male and female had similar family characteristic. The majority wife in the family was only 1, but there are 1.7% male revealed that they had more than 1 wife in their family while female answer 0. Both male and female answer that mother was the most person who taking care children (93.3% and 88.8%).

Table 1	Socio-demog	graphic chai	acteristics	of male ar	nd female parents
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Characteristics	Ν	Iale	Female		p-value
	n	%	n	%	
Total	119	100.0	80	100.0	
Age <sup>1</sup>					
Median ± SD (Range)	$38.0 \pm 0.0$	.73 (31-44)	$36.0 \pm 5$	5.9 (26-50)	0.014*
Education					
Elementary School	4	3.4	10	12.5	0.040*
Junior High school	47	39.5	23	28.8	
Senior High school	53	44.5	30	37.5	



	Male		Female		p-value
Characteristics	n	%	n	%	
Undergraduate	14	11.8	16	20.0	
Graduate	1	0.8	1	1.3	
Occupation					
Employee in Lodging/Hotel,	25	21.0	7	8.8	0.001***
Employee in Restaurant/Cafe	14	11.8	9	11.3	
Employee in Bar	3	2.5	0	-	
Diving Instructor	3	2.5	1	1.3	
Tour Guide	5	4.2	2	2.5	
Civil Servant	2	1.7	6	7.5	
Seller	4	3.4	8	10.0	
Fisherman	41	34.5	3	3.8	
Not Working	2	1.7	41	51.3	
Other	20	16.8	3	3.8	
Marital status					
Married	113	95.0	73	91.3	0.399
Divorced	2	1.7	4	5.0	
Widowed	4	3.4	3	3.8	
Income (IDR) <sup>1</sup>					
Median $\pm$ SD	2,000,00	$00 \pm 324390$	2,000,000	$0 \pm 340442$	0.832
(Range)	(500,000-25,000,000)		(100,000-15,000,000)		
Religion					
Islam	103	86.6	79	98.8	0.010**
Hinduism	4	3.4	0	-	
Buddhism	12	10.1	1	1.3	

<sup>1</sup>Mann Whitney U-test

\* *p*-value < 0.05 \*\* *p*-value < 0.01 \*\*\* *p*-value < 0.001

Table 3 shows community characteristic was similar between male and female except support from government (p-value <0.001). Male tended to think that government already gave support to them (95.8%) while female had lower percentage than male (72.5%) to think that government already gave support to them to prevent child sexual harassment. Characteristic community to prevent child sexual harassment in this study shown a good result, both male and female tended to answer they got support from traditional leader, religious leader, and community. Most of them also revealed that they already heard or got information about the incident of CSH (90.8% and 86.3%) and the prevention (89.1% and 81.3%).

Table 2 Family characteristics of male and female parents.

	М	ale	Fen	Female	
Characteristics	n	%	n	%	
Total	119	100.0	80	100.0	
Number of wives					
0	8	6.7	11	13.8	0.137
1	109	91.6	69	86.3	
2	2	1.7	0	0.0	



	-vuine
characteristics n %	
Child(ren) gender	
Only Female         23         19.3         13         16.3	0.347
Only Male         33         27.7         30         37.5	
Female and Male         63         52.9         37         46.3	
Child(ren) age (younger child: only between 5-17) <sup>1</sup> Median $\pm$ SD (Range) $9.0 \pm 3.1 (5.0-17.0)$ $8.0 \pm 2.9 (5.0-17.0)$	0.429
Child(ren) age (older child: only between $5-17$ ) <sup>1</sup>	
Median $\pm$ SD (Range) 12.0 $\pm$ 3.9 (5.0-17.0) 11.5 $\pm$ 3.6 (5.0-17.0)	0.234
Number of male child(ren)	
0 23 19.3 13 16.3	0.532
1 48 40.3 42 52.5	
2 42 35.3 21 26.3	
3 5 4.2 3 3.8	
4 1 0.8 1 1.3	
Number of female child(ren)	
0 33 27.7 30 37.5	0.241
1 65 54.6 33 41.3	
2 19 16.0 13 16.3	
3 2 1.7 3 3.8	
4 1 1.3	
Number of family member	
$\frac{1}{2}$ 1 0.8 2 2.5	0.424
3 22 18.5 14 17.5	
4 44 37.0 35 43.8	
5 40 33.6 17 21.3	
6 10 8.4 10 12.5	
7 1 0.8 1 1.3	
9 1 0.8 0 0.0	
10  0  0.0  1  1.3	
Caregiver	
Mother 111 93.3 71 88.8	0.153
Father 5 4.2 1 1.3	
Grandparents 2 1.7 5 6.3	
Babysitter $0$ $0.0$ $1$ $1.3$	
Other Family 1 0.8 2 2.5	
Gender bias score <sup>1</sup>	
Median $\pm$ SD (Range) 29.0 $\pm$ 3.0 (15.0-33.0) 29.0 $\pm$ 4.2 (13.0-37.0)	0.821

<sup>1</sup>Mann Whitney U-test





Figure 1 Sources of information incidents of child sexual harassment

Figure 1 and 2 shows the source of their information about incident and prevention of CSH. Both male and female mostly knew about the incident of CSH from social media (62.1% and 71.3%). For the information of prevention of CSH, mostly male got information from television (58.8%), while female from social media (63.8%).

	Table 3 Community	characteristics	of male and	female parents
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N	lale	Female		,
n	%	n	%	p-value
119	100.0	80	100.0	
5	4.2	22	27.5	0.001***
114	95.8	58	72.5	
eader				
21	17.6	14	17.5	1.000
98	82.4	66	82.5	
ders				
13	10.9	7	8.8	0.795
106	89.1	73	91.3	
10	8.4	6	7.5	1.000
109	91.6	74	92.5	
bout the inc	ident of CSH			
11	9.2	11	13.8	0.445
108	90.8	69	86.3	
bout preven	tion of CSH			
13	10.9	15	18.8	0.177
106	89.1	65	81.3	
	n           119           5           114           eader           21           98           ders           13           106           10           109           about the incomposition           11           108           about preven           13           106	Male           n         %           119         100.0           5         4.2           114         95.8           cader         21           21         17.6           98         82.4           ders         13           106         89.1           10         8.4           109         91.6           chout the incident of CSH           11         9.2           108         90.8           chout prevention of CSH           13         10.9           106         89.1	Male         Fen           n         %         n           119         100.0         80           5         4.2         22           114         95.8         58           eader         21         17.6         14           98         82.4         66           ders         13         10.9         7           106         89.1         73           10         8.4         6           109         91.6         74           About the incident of CSH         11           11         9.2         11           108         90.8         69           About prevention of CSH         13         10.9           13         10.9         15           106         89.1         65	MaleFemalen $%$ n $%$ 119100.080100.054.22227.511495.85872.5eader $21$ 17.61417.59882.46682.5ders $31$ 10.978.810689.17391.3108.467.510991.67492.5obout the incident of CSH $11$ 13.810890.86986.3obout prevention of CSH $13$ 10.9151310.91518.810689.16581.3

\*\*\* *p*-value < 0.001



Regarding Table 4 knowledge and attitude of parents about child sexual harassment prevention in tourism destination was not significantly different between male and female parents (p-value= 0.902 and p-value=0.072). But, for the preventive practice, female and male parents score was significantly difference (p-value=0.039).



Figure 2 Sources of information prevention of child sexual harassment

Characteristics	Male (Median ± SD (Range))	<b>Female</b> (Median ± SD (Range))	p-value
Knowledge	17.0±2.7 (12.0-26.0)	17.0±3.2 (10.0-26.0)	0.902
Attitude	43.0±4.2 (26.0-50.0)	39.0±4.2 (27.0-50.0)	0.072
Preventive Practice	16.0±4.2 (2.0-20.0)	16.0±3.3 (1.0-20.0)	0.039*

Table 4 Comparison level of KAPP between male and	female parents
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\* p-value < 0.05 by Mann Whitney U-test

# DISCUSSION

Although, male and female showed there was no significant difference of knowledge score between male and female parents, this study revealed that there were 7 out of 26 knowledge statement that male had percentage more than 50% in wrong answer and female only had wrong answer in 4 out of 7 items. First statement with wrong answer in both male (79.0%) and female (76.2%) was "there will usually be no obvious physical evidence on sexually harassment children". The answer for that statement was true. Children who have been become a victim of sexual harassment will be very likely to show mental disorders such as depression and psychological trauma and soon maybe will lead to suicidal and also show bad sexual behavior such as masturbation and even they are able to become offenders for other children.<sup>22</sup> Second statement, 74.8% male and 51.3% female, was "female tourist will not sexually harassment children". This result is in line with the previous study in Eastern Province of Saudi Arabia, the study found that the majority of parents, male and female incorrectly believed that females cannot harm the child<sup>13</sup>. Knowledge like this is stereotypically in community. While in fact, female is a part of offender of child sexual harassment, known as female child sexual offenders (FCSO), and well established by scientific knowledge since 1980s.<sup>23</sup> The third statement, male (84.9%) and female (76.3%), was "tourist that kind to local people will not do sexual harassment to children" and the fourth statement, 80.7% male and 55.0% female, was "tourist that providing goods and assisting your children financially will not do child sexual harassment". However, child sexual harassment in tourism and travel can happen because the offender attracts the attention of children to be able to commit sexual acts in their tourist destinations while they are on a trip by giving children money,



food, gifts, travel or other things. The offender is known as a Traveling Child Sex Offender (TCSO).<sup>24</sup> Thus, tourist that look kind to local people and even provide goods or assisting children financially can be offender.

There was no significant difference in term of attitude score between male and female parents. Forty-six per cent female parents agree if "children got education about prevention of sexual harassment it may induce child to know too much about sex". On the other statement, most of male (44.5%) parents tended to agree with statement "CSH cases are rare, so it is unnecessary for children to learn how to prevent CSH". While, in fact the previous cross-sectional study in the United Stated revealed that education program about prevention of child sexual harassment may decrease the prevalence of CSH.<sup>25</sup>

In this study, female had better good preventive practice than male. The main reason might be because of in this study the one who most taking care of the children was mother. Thus, female parents had more time to spent with children compared with male parents. Previous studies explain that mother and father had differences in quantitative and qualitative features of communication with children. There was some evidence that mothers talk more to their children compared with fathers.<sup>26</sup> That reason lead to the result of male parents that never did preventive practice to "told children not to go with others, even familiar grown-ups, unless they had parental permission" and "told children that everyone can be offenders including person you familiar, famous or favorite may also do sexual harassment to children". This result is similar with the research result by Finkelhor (1984). The study found that parents that told their children that the abuser might be a family member is only 6% or an adult known to the child is only 15%.9

# CONCLUSION

Overall, there was no significant difference in knowledge and attitude about child sexual

harassment in tourism destinations between males and females. Both male and female parents had a similar wrong answer about the physical evidence in children, female tourist cannot be offender and tourists were kind to local people might not do sexual harassment to children. Most females tended to think that there is no need to conduct CSH prevention education because the children will acquire such knowledge as they grow up, while males thought that learns of CSH prevention is unnecessary because the cases are rare. But, for the preventive practice female and male parents had a significant difference. Most male parents never practice telling children not to go with other people they are not familiar or even familiar without parents' permission and told children that everyone can be an offender.

# RECOMMENDATIONS

Accordingly, for parents, male and female should have same role to protect the children from the offender. For community, increasing knowledge improve attitude and preventive practice about CSH of parents can reduce CSH. It can be done by promoting child sexual harassment prevention in tourism destinations based on the result of this study and it should involve cross-sectoral collaborating. Because problem is multi-agency the CSH responsibility. Government should concern to make the law about tourism destination based on child-friendly concept. This result also can be a baseline to develop further study about the child sexual harassment in tourism destination.

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# COHORT ANALYSIS OF PROGRAM DATA TO EXAMINE HIV TESTING UPTAKE AMONG FEMALE SEX WORKERS IN BANGKOK

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#### ABSTRACT

Since the beginning of Thailand's HIV epidemic, the female sex workers (FSW) were always one of the key populations that was considered vulnerable to contracting and transmitting the AIDS virus. While HIV testing remains an important tool in controlling the HIV transmission among the FSW and their clients, the 'reach' intervention to recruit them into the HIV testing and treatment are important. This study describes the level and pattern of the HIV prevention service utilization and predicts the probability of having the HIV test among the FSW served by the HIV prevention programs in Bangkok. This study analyzed the cohort data from the monitoring system called the Routinely Integrated HIV Information System (RIHIS). The sample were the FSW who were reached by the prevention programs through the "Stop TB and AIDS through Reach-Recruit-Test-Treat-Retain (RRTTR)" (STAR) project during 2015-2017 in Bangkok. The sample size was unduplicated 21,896 cases. The relationship between the type of FSW and the 'reach' service utilization was statically significant (p<0.001). FSWs who work in establishment areas were more likely to utilize the 'reach' service. Also, the more FSW received the 'reach' services, the greater HIV testing uptake. Moreover, the FSW came for the repeated testing for multiple times after the first test. The Cox-proportional survival analysis showed that the opportunity to encourage FSW (both venue-based and non-venue-based) to get HIV testing and repeated HIV testing were within the first 100 days after they initial reach contact. After that point, the probability of repeat testing was quite low. Based on the findings of this study, a renewed emphasis on the 'reach' services for the FSW is necessary. 'Reach' services should target every group of FSW continuously to retain them in the system to change to or maintain their safe sex behaviors.

Keywords: female sex worker, HIV, HIV testing, prevention, Bangkok

#### **INTRODUCTION**

Since the beginning of Thailand's HIV epidemic, the female sex workers (FSW) were always one of the key populations that was considered vulnerable to contracting and transmitting the AIDS virus. HIV prevalence among Thai FSW peaked in the early 1990s and then decreased rapidly after the mid-1990s. This reversal of HIV spread was attributed to the impact of the 100% condom program which was implemented nationwide by focusing on commercial sex establishments. HIV prevalence among venue-based FSW decreased from 33.2% in 1994 to 5.6% in 2007.<sup>1</sup> The Bangkok Metropolis Administration (BMA) reported 4% HIV prevalence and 2% syphilis prevalence among FSW in Bangkok in 2006.



Currently the HIV prevalence is now quite low, FSWs are still considered as a population with elevated risk for infection, and their male clients remain a bridge population to the general population of wives and girlfriends<sup>1,2</sup> Because of this fact, HIV prevention for FSW should remain a priority for the national AIDS program, particularly given the fact that commercial sex is illegal and stigmatized in Thailand.

The 1996 Prostitution Act criminalizes acts of solicitation "for the purpose of prostitution" and prohibits persons associating with one another in a "prostitution establishment". The 1966 Entertainment Places Act (1966), and No. 4, (2003) regulates entertainment places such as nightclubs, massage parlors, 'coyote dancer' bars, karaoke bars, and other establishments where commercial transactions may take place. A study pointed out the contradictions in the two laws, in that, while the Prostitution Act criminalizes prostitution, the Entertainment Act has provided loop holes for establishments to operate as fronts for commercial sex. In other words, professional sex workers are practicing an illegal activity, while 'others' are not.<sup>1</sup>

The effect of the laws was not to reduce the number of sex workers, but pushing sex work underground, i.e., from venue-based to non-venue-based transactions instead. An analysis of the changing pattern of sex work in Thailand during 2005 - 2014 by the Bureau of AIDS, TB, and STIs (BATS) of the Department of Disease Control (unpublished) documented the significant increase in the number of FSW at karaoke bars during the ten-year period.

Due to these changes in pattern of sex work and sex establishments, BATS categorized the FSW in Thailand into four types<sup>1</sup>: (1) Explicit venue-based FSW are defined as FSWs who work in venues such as entertainment establishments which have rooms expressly for commercial sex, i.e., brothels, karaoke bars (with separate rooms, etc.); (2) Explicit nonvenue based FSW are defined as FSWs who meet clients outside of an establishment in public, e.g., streets, parks, etc., but who can be clearly identified; (3) Non-explicit venue-based FSW are defined as persons who work in entertainment establishments such as brothels, massage parlours, karaoke bars, and beer bars, and may or may not engage in sex work; and (4) Non-explicit, non-venue based FSW are defined as FSW who meet clients via online applications, (e.g., dating websites) and smart phone applications. This categorization in declining order. ease presents. of identification or access to FSW by prevention programs.

In 2007, Thailand adopted a three-year strategic plan that focused on scaling up HIV prevention efforts, particularly for people most likely to be exposed to HIV and for difficult-to-reach populations. Thailand has set the goal to End AIDS, and launched a strategy to achieve.

The strategy focuses and expedites an effective and inclusive package of services for populations with highest risk for HIV called Reach-Recruit-Test-Treat-Retain (RRTTR). The RRTTR approach aims to fill gaps between HIV testing and access to treatment as a cascade.<sup>1</sup>

While HIV testing remains important in controlling HIV transmission to and from FSW, the Reach intervention is the only way to achieve increased coverage of HIV Voluntary Counselling Testing (HIV VCT) for this population. This study was conducted to provide evidence for the significant effect of the Reach intervention, with a focus on the uptake of HIV testing among FSW. The results evidence could provide for concrete recommendations on how to improve coverage of HIV VCT for FSW.

## METHODOLOGY

#### Data source

This study conducted a secondary analysis of data from a system that monitors key populations called the Routinely Integrated


HIV Information System (RIHIS). The data were used to explain the level of HIV prevention and HIV testing (HIV VCT) uptake among FSWs who were reached by the prevention program called Stop TB and AIDS through RRTTR (STAR) during 2015-2017 in Bangkok. The analysis describes the probability of HIV testing uptake and the effect of the HIV prevention program.

#### Sample population and sample size

The sample of this cohort study includes FSWs recorded in RIHIS Reach receiving HIV outreach services and HIV VCT in Bangkok from 2015 to 2017. The new cases from each year were 3,025 (2015), 10,807 (2016) and 7,884 (2017). There were a number of duplicates in each year. The total number of unduplicated FSWs recorded in the system from 2015 to 2017 was 21,896 cases.

#### Statistical Analysis

To examine the level and pattern of HIV prevention service utilization among FSWs in Bangkok. Bivariate analysis was conducted using the Chi-square test to examine the relationships between having HIV VCT or repeat HIV VCT and type of work (venue- and non-venue-based), as well as the relationship between type of service delivery point for the first and subsequent HIV test.

To predict the probability of FSW uptake of HIV VCT services by the HIV prevention program in Bangkok. The survival analysis (or time-to-event analysis) tracked FSW from the time they received the first HIV prevention service (or first contact in 2015) until they experienced the event of interest or received HIV VCT. If FSW did not have HIV VCT but continued receiving other HIV prevention services until the end of 2017, the analysis classified them as an 'unsuccessful case'.

The hazard rate was the probability that each subject experienced an event of interest at the

time, or the risk for having such an event. In this study, the survival analysis used the Cox proportional hazard ratio test to describe the probability of receiving an HIV prevention intervention, duration since the first HIV intervention until HIV VCT.

#### RESULTS

#### Characteristics of FSWs

The majority of the sample was venue-based FSW. The proportion of FSW by type throughout the three years was approximately equal: 80% were venue-based and 20% were non-venue-based FSW. These proportions are also consistent with general profile of FSW in Thailand based on surveys.

Virtually all the FSW in the sample are Thai nationals.

The majority of the sample was age 20-39 years, accounting for 80%, with 18-20% in the 20-24, 25-29, and 30-34 year age groups, and then declining in the 35-39-year age group (15-17%). Young FSW (age 15-19 years) accounted for 4-6% of the sample in all three years (Y1: 5.1%, Y2: 5.5%, Y3: 4.4%). By law, FSW age less than 16 years are considered to be involuntarily working in prostitution, thus, a victim of human trafficking. However, providing HIV prevention services to underage FSW is not illegal, and those cases are included in the RIHIS database. It is noteworthy that women over age 50 years were still working as FSW (about 3% of the sample each year).

# Level and pattern of reach services (HIV prevention services) and HIV VCT utilization

The majority of reach services received were single-contact (Y1: 86.2%, Y2: 87.7% and Y3: 75.5%). The mean values of the number of reach episodes for 2015, 2016 and 2017 were 1.2, 1.2, and 1.6, respectively.



Number Y1 - 2015					Y2- 2016				<b>Y3-2017</b>			
of reach contacts	Ver (2,3	nue 874)	Non- (6	venue 51)	Ver (2,3	nue 874)	Non- (65	venue 51)	Ver (2,3	nue 674)	Non-v (65	venue 51)
	n	%	n	%	n	%	n	%	n	%	n	%
1	2,014	84.8	593	91.1	8,050	87.3	2,039	89.3	6,067	77.2	1,304	68.2
2	251	10.6	46	7.1	702	7.6	178	7.8	930	11.8	389	20.3
3	80	3.4	11	1.7	206	2.2	46	2.0	313	4.0	124	6.5
4+	29	1.2	1	0.2	258	2.8	20	0.9	544	6.9	96	5.0
p-value*	< 0.001				< 0.001				< 0.001			

Table 1 Relationships between the type of sex work and the number of reach contacts

\* by Chi-square test

According to Table 1, the relationship between the type of sex work and the number of reach contacts, based on the results of the Chi-square analysis, venue-based FSW had more reach contacts than non-venue-based FSW. The type of sex work was significantly associated with reach services utilization (p<0.001) every year. The proportion of FSW receiving services throughout the three years was approximately 80% for venue-based and 20% for non-venue-based. This finding implies that it is easier for programs to reach FSW if they work out of an entertainment establishment (rather than somewhere in a public space). Furthermore, venue-based FSWs were more likely to receive more than one reach contact each year than their non-venue-based counterparts. Although the trend shows improvement each year, the proportion of service contacts for the non-venue-based FSW was still small, especially for repeat service.

In HIV prevention services, the continuation of the service is very important. That is because sustained behavior change takes time. Also, once reached, it appears that venue-based FSW are more likely to stay in the service system. In other words, the non-venue-based FSW are more easily lost to follow-up and/or are more highly mobile.

Number of		2015			2016		20	17	
contacts	Total	HIV	VCT	Total	HIV	VCT	Total sample	HIV	VCT
	sample	n	%	sample	n	%		n	%
Total	3,025	435	14.4	11,499	1002	8.7	9,767	1,198	12.3
Venue- based FSW	2,374	334	14.1	9,216	829	9.0	7,854	1,014	12.9
1	2,014	242	12.0	8,050	595	7.4	6,067	685	11.3
2	251	70	27.9	702	159	22.6	930	165	17.7
3	80	16	20.0	206	43	20.9	313	73	23.3
4+	29	6	20.7	258	32	12.4	544	91	16.7
p-value*		<0.(	001		<0.0	001		<0.0	01
Non-Venue- based FSW	651	100	15.4	2,283	173	7.6	1,913	184	9.6

Table 2 Relationship between the number of reach contacts and HIV VCT at least once in the year



Number of		2015		2016			2017		
contacts	Total	HIV	VCT	Total	HIV	VCT	Total sample	HIV	VCT
	sample	n	%	sample	n	%		n	%
1	593	85	14.3	2,039	133	6.5	1,304	111	8.5
2	46	10	21.7	178	28	15.7	389	33	8.5
3	11	5	45.5	46	7	15.2	124	16	12.9
4+	1	0	0.0	20	5	25.0	96	24	25.0
p-value*		0.002			<0.0	001		<0.0	001
* by chi-squa	are test								

Table 2 shows the relationships between the number of reach contacts and HIV VCT. The relationship is positive (for up to three contacts) and statistically significant for both venue-based and non-venue-based FSW (p=0.002 and <0.001). In 2015, venue-based FSW who received a reach service contact for the first time and elected to have HIV VCT was 12% which was lower than FSW who received a reach service more than two times. (27.9% two times, 20% three times and 20.7% more than four times). The proportion having HIV VCT increased as the number of reach contacts increased to two times. Also, in non venue-based FSW, FSW who received a reach service contact for the first time and elected to have HIV VCT was lower than FSW who received a reach service more than two times. (21.7% two times and 45.5% three times). This relationship is more pronounced in Years 2 and 3 for both venue-based and non-venue-based FSW with statistically significant (p<0.001).

In general, it can be concluded that receiving more than one reach service contact contributes to more HIV VCT episodes for FSW, especially for non-venue FSW. The result confirms the importance of reach services for FSW in terms of motivating them for HIV VCT uptake.

### The probability of uptake of HIV VCT among FSW

This study analyzed the probability of uptake of HIV VCT among FSW by cohort year. Year 1 was the first year of the project, and there were only nine months of observations in the database. Accordingly, the cohort analysis in this study used the data of Years 2 and 3 to reduce bias. The cohort analysis observes a FSW from the point of first reach contact (within Years 2 and 3) until she received HIV VCT, at which time she was classified as a 'successful case'. If an FSW did not receive HIV VCT but continued to receive other reach services from Year 2 until the end of Year 3, she was classified as an 'unsuccessful case'.







Figure 1 The probability of uptake of HIV VCT among FSW in the cohort year (Years 2-3)

According to Figure 1, the Cox-proportional survival analysis showed that the opportunity to encourage FSW (both venue-based and non-venue-based) to obtain HIV VCT is within the first 100 days after initial reach contact. After that, the probability of successful recruitment drops sharply. Indeed, the day they were first reached is the day when the FSW were most likely to receive VCT. Thus, the testing service should be provided in the same place and at the same time as the reach contact was made.

From the results, it could be seen that venue-based FSW took more time to get tested for HIV, and were less likely to receive VCT within the first day of reach, compared to their non-venue-based counterparts. This could be due to the supposition that they had more options for HIV testing services because the NGO community clinics (which provide VCT) are usually located in the proximity of where the venue-based FSW work. Conversely, non-venue-based FSW may have had fewer (convenient) options for HIV testing at the time of first contact. Thus, if that contact was a mobile VCT unit, then the FSW might have decided on impulse to be tested since they could do it right away.

Most of the FSW who received HIV VCT were tested on the same day as the reach contact in each year (Y1: 405 of 435 cases; Y2: 905 of 1,002 cases; and Y3: 1,030 of 1,198 cases). Case follow-up was still needed for FSW who decided not to be tested for HIV at the first reach contact.

As noted earlier, there is a statistical relationship between the number of reach contacts and HIV testing (see Table 2). FSW who received at least two contacts were more likely to have also received HIV VCT than FSW who had only one reach contact. The higher number of reach contacts, the more likely testing would occur. The reach services not only provide prevention education and commodities resupply, but they also serve to keep FSW in the system and provide continuous motivation to go for VCT if they have not done so recently.





Figure 2 The probability of repeated HIV VCT among FSW in the cohort year (Years 2-3)

Figure 2 shows that, at about 100 days, there is the same probability of receiving repeat HIV testing for venue-based and non-venue-based FSW in this sample. This is consistent with the guidance of Thailand's NAP that FSW should go for HIV VCT every 90 days. However, after the first 100 days the probability of another test decreased sharply in both types of FSW. At 200 days the probability of repeat VCT was only 0.50 and, after that, the probability dropped to 0.25 at about 250 days before approaching zero at 500 days. The mean duration after getting the first HIV test until repeat testing was 227.9 days, with a range of 2-783 days.

In conclusion, the Cox-proportional survival analysis shows that the opportunity to encourage FSW (both venue-based and nonvenue-based) to get repeated HIV testing is within the first 100 days after they initial reach contact. After that point, the probability of repeat testing is quite low. Repeat VCT cannot happen if FSW do not remain in the HIV prevention system. Thus, the reach service must be viewed as a continuous requirement of the NAP until the Ending AIDS goal is achieved.

# DISCUSSION

In this study, the age of FSW the mean age of unduplicated FSW 21,896 cases is 31-32 years, with the youngest being 15 years and the oldest is 70 years of age. Most cases of the project are FSW aged 20-39 years, accounting for 80% of the total FSW. However, the findings in the dataset show that there is a special FSW group in age issue, the younger group aged 15-19 years, accounting for 4-6%.

The study in Bengal, India showed that the younger age of FSW was significantly associated with HIV transmission compared to older age group.<sup>1</sup>Also, the study in Thailand showed that younger FSWs worked at baes/clubs reported a higher number of STIs, and more likely to have had sex with customers.<sup>2</sup> So, the HIV prevention should design for the young age group FSW's specific needs.

The elderly group (who aged over 50 years) are the age group who are not expected to continue these careers, but from the data showing that 2.5-4% of FSW. Although it was not a very high proportion, the project sees that to provide services for this age group is also necessary. To avoid overlooking this group of people in designing service packages.



In this study, it was found that FSW who received services both reach and HIV testing was equal, approximately 80% venue-based FSW and 20% non-venue-based. These proportions are also consistent with general profile of FSW in Thailand based on surveys. However, the study in Bangkok, Thailand showed that there was a higher venue-based FSW to get HIV testing than non-venue based FSW. <sup>2</sup>The study in Bangkok, Thailand also showed the prevalence of HIV 21% and syphilis 3.7% among street-based sex worker which was higher prevalence than other sex workers.<sup>2</sup> The study in China, found that the street-based FSW are at high risk of HIV and syphilis infections<sup>2</sup> So, the non-venue-based FSWs are still the important group to provide services.

While the HIV testing remains believed to be important in controlling HIV transmission among and from FSW, the reach intervention, that could help to bring them to get the test is needed to be considered to expand the coverage to FSW who were not in the system, especially non-venue FSW. In addition, the result of bivariate analysis, the number of time of reach services have a relationship with having an HIV test among FSW.

The study in Thailand showed that having someone urge FSW to go for VCT was the one of factors enabling access to HIV VCT.<sup>12</sup> Also, in Benin, West-Africa found that the outreach strategy run by community workers or peer educator help to increase the HIV testing uptake.<sup>1</sup> The study in Mombasa, Kenya showed that the peer-educator intervention were associated with the increasing of protected sex.<sup>2</sup> Reach service is not just to provide the knowledge of HIV/AIDS/STI and the service delivery points to FSW. Reach service is also to retain FSW to be with the service system and safe behavior whether they are ready for HIV testing or not. In case, they do not know their HIV status yet, to encourage them to get HIV testing is good for them. But if they do not want to get testing because they have already known their status. Even though their status was

positive, be in the system (or received reach service) can help them to protect themselves and others (i.e., their clients, their intimate partners).

### **Conclusion and recommendations**

This study confirmed the important of reach services for FSWs in term of motivating HIV uptake. Reach services should respond to every group of FSW continuously to keep them in the system to change or contain their safety behaviors

The study showed that the probability of FSWs to get HIV testing was in about first hundred days. To reach non venue based FSWs and to encourage them to get testing in the first contact is necessary. So, one stop services such as mobile HIV testing and self-testing should provide to them (especially in non-venue based FSWs). Repeated HIV testing in FSWs is also important to keep them in the system to contain their HIV negative status is needed.

With all above necessary services for FSWs, the budget for HIV prevention intervention should consider these services and allocate them properly.

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### FACTORS AFFECTING STIGMATIZING ATTITUDES TOWARDS PEOPLE LIVING WITH HIV AMONG UNMARRIED INDONESIAN YOUTH

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### ABSTRACT

HIV-related stigma is a marker of shame that contributes to discrimination against people living with HIV (PLHIV) in myriad ways. It has limited attempts to contain the HIV epidemic worldwide. Indonesia is a developing country in South East Asia, where the number of new HIV infections among young people aged 15-24 years is rising. Indonesia also has high levels of stigmas and discrimination against PLHIV. Researching HIV-related stigma among young people is critical for finding ways to reduce stigma and discrimination against PLHIV. This study using quantitative method by using univariate, bivariate and multivariate analysis. This study drew data from the 2017 Indonesia Demographic and Health Survey to examine factors affecting HIV-related stigmatizing attitudes among unmarried Indonesian youth. Samples of 20,799 unmarried youth aged 15-24 years old were analyzed by using logistic regression. The results show that sex, age, knowledge of HIV, descriptive norms, mass media exposure, educational level, household wealth status, and place of residence are associated with youth's stigmatizing attitudes towards PLHIV. Thus, this study suggests that providing accurate knowledge of HIV and changing descriptive norms of young people are essential to reduce their stigmatizing attitudes towards PLHIV.

Key words: HIV-related stigma, stigmatizing attitudes, HIV/AIDS, PLHIV

### INTRODUCTION

Stigma is considered a marker of shame that society uses to discredit a person or a group due to his or her unacceptable trait or identity.<sup>1</sup> In terms of stigma, people living with HIV (PLHIV) are more likely to experience stigma and discrimination when compared to people living with other chronic diseases.<sup>2</sup> In the Dominican Republic, a study found that 27% of PLHIV were discriminated against by their family members and more than half of PLHIV experienced feeling depressed and hopeless because of stigma and discrimination.<sup>3</sup> Over 70% of PLHIV in Pacific countries internalize self-stigma, i.e., they showed a tendency to feel ashamed of their infection and had low self-esteem. In South Korea, 21% of PLHIV decided to keep their HIV-positive status a secret due to fear of discrimination and negative attitudes in society, and 75% of PLHIV reported self-blaming relating to their HIV-positive status.<sup>4</sup>

HIV-related stigma was widely believed as an essential barrier hindering not only HIV prevention but also the treatment and social support for PLHIV.<sup>5</sup> HIV stigma and discrimination adversely affects physical and psychological health outcomes of PLHIV as well as social well-being. The impact on physical health is often associated with lower adherence to antiretroviral (ARV) drugs and





an access to treatment and care, whereas erosion of mental health is linked to lower self-esteem, self-blaming, and depression. Reduced social well-being is related to a lack of social support from families and communities.<sup>6-8</sup>

To end HIV in 2030, it is crucial to paying attention to the elimination of HIV-related stigma and discrimination. Understanding factors that influence stigmatizing attitudes towards PLHIV is essential to create supportive environments and interventions for removing stigma and discrimination from communities.<sup>9</sup> In the Southeast Asian region, including Myanmar, Philipines, Thailand, and Indonesia, youth age 15-24 years face the burden of the HIV epidemic.<sup>10</sup> They account for approximately a quarter of new HIV infection, an even more significant proportion of new infections in some countries. For instance, in Indonesia, the estimation of new HIV infection was 69,000 in 2010, rising to 73,000 in 2015, indeed more than half of the new HIV infections in Indonesia in 2018 were youth age 15-24 years.<sup>11</sup> Despite the relatively high prevalence of HIV among the youth population in Indonesia, there is still very little known about the prevalence and context of HIV-related stigma in Indonesia.

Various anecdotal case confirm that stigma and discrimination towards PLHIV still do exist among Indonesian people. In 2018, a student in Samosir and Tulung Agung were expelled from their school due to their HIV positive status.<sup>12</sup> In 2019, parents demanded that their children's school expel HIV positive students.<sup>13</sup> Previous research documented misconceptions regarding HIV knowledge led people to have a negative perception of PLHIV.<sup>14-16</sup> In the Indonesia context, based on the 2012 Indonesia Demographic and Health Survey's analysis, it was found that approximately 66.2% of people had low knowledge in terms of HIV knowledge.<sup>17</sup>

Moreover, among adolescents aged 15-19 years old, it was found that approximately 41

% of adolescents had insufficient knowledge regarding HIV issue.<sup>18</sup> While lack of proper knowledge of HIV fuels stigma and discrimination towards PLHIV, the data related stigma index is still unavailable in Indonesia, so there is very little known about the prevalence of HIV-related stigma in Indonesia context. Thus, having understanding of HIV-related stigma prevalence among youth is crucial, since youth are facing burden of HIV epidemic and also to help global goals ending HIV epidemic by 2030. This study's objective is to examine the factors associated with stigmatizing attitudes towards PLHIV among unmarried youth in the Indonesian context.

# METHODS

### Data source

This study conducted a secondary data analysis of the 2017 Indonesia Demographic and Health Survey (IDHS). The total of all household of IDHS are 49,250 households. The IDHS sample was selected in two-stage process by used master sample from 2010 Population Census. In the first stage, selection process to a number of census blocks was done with systematic proportional to size. In the second stage, 25 ordinary household were selected from each selected census block with systematic sampling method. From this method, about 47,963 households were successfully interviewed out of 49,261 households.

### Sample selection and inclusive criteria

This study focused on youth, both males and females. In terms of sample selection, the inclusion criteria for this study is focused on the participants who have ever heard of HIV/AIDS. Thus, this study only focused on never-married youth who have ever heard of HIV/AIDS. The reason why these inclusive criteria are applied because the questions related to HIV stigma was only asked for those participants who have ever heard of HIV/AIDS. After used these inclusive criteria,



the final sample that was eligible for this study was 20,799 participants.

#### Variables and measurement

The dependent variable used in this study was stigmatizing attitudes. Stigmatizing attitudes refers to a negative attitude that might lead to discrimination against PLHIV. This variable was assessed using four questions from DHS: "Would you buy fresh vegetables from a shopkeeper or vendor if you knew that this person had the HIV-AIDS virus?" "If a member of your family got infected with the HIV-AIDS virus, would you want it to remain a secret or not?", "If a member of your family became sick with HIV-AIDS, would you be willing to care for her or him in your own household?", and "Do you think children living with HIV-AIDS should be allowed to attend school with children who do not have HIV?". Every answer which indicates stigmatizing attitudes was scored with two and scored 0 for the response, which demonstrates positive attitudes. Thus, the range of points from thus variable was ranged from 0 to 8. Moreover, based on the scoring mechanism, this variable was classified into three categories: low, medium, and high. The low categories are comes from score 0 to 2, medium categories comes from score 3 to 5, and high categories comes from score 6 to 8.

In terms of independent variables, by using Stangl's Health Stigma and Discrimination framework, this study classified independent variables into three factors.<sup>19</sup> Individual factors variables consisted of age, sex, educational level, and HIV knowledge. Interpersonal factors included household wealth status, and community-level factors consisted of mass media exposure, place of residence, and descriptive norms. In individual factors, age variables grouped into two categories; 15-19 years old and 20-24 years old, educational level variable was categorized into three categories; less than senior high, senior high, and higher than senior high. Regarding HIV knowledge, this variable was assessed by using seven questions from IDHS, which related to the myths and transmission regarding HIV, the categories for this variable was low, medium, and high.

In interpersonal factors, there are five categories for this variable; lowest, lower, middle, higher, and highest. Lastly, in factors, community-level the descriptive variable refers respondents' norms to perception of PLHIV based on how their community thinks about PLHIV. This variable was categorized into three; less negative, medium, and negative. For the place of residence, the classification was rural and urban, and mass media exposure refers to respondent's degree of mass media exposure in their daily life, which was categorized into three categories; low, medium, and high.

#### Data analysis

Multivariate analysis using multinomial logistic regression was used to examine the factors affecting stigmatizing attitudes towards PLHIV. Stata version 15 was used for statistical analyses.

### RESULTS

Figure 1 shows the prevalence of stigmatizing among youth in the Indonesia context. It shows highest percentage of respondents had a medium level of stigmatizing attitudes toward PLHIV (41.0%), followed by low level (35.0%), and high level of stigmatizing attitudes (24.0%).





Figure 1 HIV stigmatizing attitudes level of respondents

In terms of bivariate analysis, table 1 showed that among eight variables, only household wealth status as the variable which considered have no correlation with the stigmatizing attitudes. The table also showed that age, educational level, HIV knowledge, mass media exposure, and descriptive norms strongly correlated with stigmatizing attitudes.

Regarding age, table 1 shows that unmarried youth age 15-19 years were significantly more likely to have high stigmatizing attitudes toward PLHIV when compared with the older age group (p-value < 0.001). Females were more likely to have high stigmatizing attitudes toward PLHIV when compared with males (pvalue < 0.01). In terms of educational level, unmarried youth who completed senior high school were more likely to have stigmatizing attitudes toward PLHIV when compared to those with less than senior high school and higher than senior high school education (pvalue < 0.001). Regarding HIV knowledge, unmarried youth who had low HIV knowledge were more likely to have high stigmatizing attitudes toward PLHIV when compared with unmarried youth who had medium and high HIV knowledge (p-value < 0.001).

In terms of place of residence, urban unmarried youth are more likely to have stigmatizing attitudes toward **PLHIV** compared with rural unmarried youth (p-value < 0.05). Regarding mass media exposure, youth with low exposure to mass media are more likely to have high stigmatizing attitudes compared with youth with a medium level of mass media exposure or youth with the high level of mass media exposure (p-value < 0.001). descriptive Regarding norms, unmarried youth who lived in communities with highly negative descriptive norms are more likely to have high stigmatizing attitudes compared to those who lived in a community with a medium level of negative descriptive norms and those who lived in a community with less negative descriptive norms (p-value < 0.001).



Variables	Stigmatizing attitudes			Total	Chi-square
-	Low n (%)	Medium	High	-	
Аде	II (70)	п (70)	II ( 70)		
15-19	4 292 (33 1)	5 402 (41 7)	3 273 (25 2)	12 967 (100 0)	60 1***
20-24	2,982(38.1)	3,102(11.7) 3,132(40,0)	1,718(21.9)	7 832 (100 0)	00.1
Sex	2,902 (30.1)	5,152 (10.0)	1,710 (21.9)	7,052 (100.0)	
Female	3,314 (34,3)	3,926 (40.6)	2.424 (25.1)	9.664 (100.0)	11.1**
Male	3,960 (35.6)	4.608 (41.4)	2.567 (23.0)	11.135 (100.0)	
Educational leve	l	.,	_,,_ (, , )		
Less than	887 (30.0)	1,335 (45.1)	737 (24.9)	2,959 (100.0)	133.5***
senior high	( )	, , ,	( )	, , ,	
Senior high	4,436 (33.9)	5,346 (40.9)	3,303 (25.2)	13,085 (100.0)	
Higher than	1,951 (41.0)	1,853 (39.0)	951 (20.0)	4,755 (100.0)	
senior high					
HIV Knowledge					
Low	774 (22.4)	1,677 (48.5)	1,009 (29.1)	3,460 (100.0)	766.2***
Medium	3,037 (30.7)	4,250 (43.0)	2,602 (26.3)	9,889 (100.0)	
High	3,463 (46.5)	2,607 (35.0)	1,380 (18.5)	7,450 (100.0)	
Household wealt	h status				
Lowest	1,316 (33.3)	1,674 (42.4)	957 (24.3)	3,947 (100.0)	11.8
Lower	1,434 (34.5)	1,736 (41.7)	987 (23.7)	4,157 (100.0)	
Middle	1,558 (36.1)	1,756 (40.7)	1,003 (23.2)	4,317 (100.0)	
Higher	1,491 (35.3)	1,719 (40.6)	1,019 (24.1)	4,229 (100.0)	
Highest	1,475 (35.6)	1,649 (39.7)	1,025 (24.7)	4,149 (100.0)	
Place of residence	e				
Rural	2,829 (34.4)	3,477 (42.2)	1,924 (23.4)	8,230 (100.0)	8.4*
Urban	4,445 (35.4)	5,057 (40.2)	3,067 (24.4)	12,569 (100.0)	
Mass media expo	osure				
Low	787 (30.5)	1,136 (44.0)	659 (25.5)	2,582 (100.0)	34.0***
Medium	3,978 (34.8)	4,692 (41.1)	2,746 (24.1)	11,416 (100.)	
High	2,509 (36.9)	2,706 (39.8)	1,586 (23.3)	6,801 (100.0)	
Descriptive norn	ns				
Less	1,344 (41.2)	1,321 (40.5)	599 (18.3)	3,264 (100.0)	268.3***
Negative	1 70 ( (22.0)	0.051 (44.0)	1 1 50 (21 0)		
Medium	1,796 (33.9)	2,351 (44.3)	1,158 (21.8)	5,305 (100.0)	
Highly	4,134 (33.8)	4,862 (39.8)	3,234 (26.4)	12,230 (100.0)	
Negative					

**Table 1** Distribution of factors correlated with stigmatizing attitudes (n = 20,799)

*Note:* \**p*<0.05; \*\**p*<0.01; \*\*\**p*<0.001

The multinomial logistic regression analysis shown in table 2. In terms of age, compared to youth in younger age group, youth in the older age group were 11% less likely to have high level of stigmatizing attitudes vis a vis a low level of stigma (OR=0.89). In terms of sex, Male youth were 13% less likely to have high level of stigmatizing attitudes compared to their female counterparts (OR=0.87). Moreover, youth with higher than senior high school educational levels were 28% less likely to have a high level of stigmatizing attitudes





than those with less than senior high educational level (OR=0.72). Regarding HIV knowledge, it indicates that the higher level of HIV knowledge, there is a decreasing chance of having a higher level of stigmatizing attitudes. It showed that youth with a high level of HIV knowledge were 64% less likely to had a medium level of stigmatizing attitudes (OR=0.36) and were 70% less likely to had a high level of stigmatizing attitudes (OR=0.30).

In terms of interpersonal factors, youth who had a middle level of household wealth status were 11% less likely to had a medium level of stigmatizing attitudes compared to youth from lowest level of household wealth status (OR=0.89). In comparison, youth who had the highest level of household wealth status were 12% less likely to had a medium level of stigmatizing attitudes compared to youth with the lowest level of household wealth status (OR=0.88).

Regarding community-level factors, youth who reside in urban areas were 12% more likely to have a high level of stigmatizing attitudes compared to youth who live in the rural area (OR=1.12). In terms of descriptive norms, youth who had highly negative descriptive norms were 31% more likely to had a medium level of stigmatizing attitudes (OR=1.31) and 93% more likely to had a high level of stigmatizing attitudes (OR=1.93) compared to youth with less negative descriptive norms toward PLHIV.

Characteristics	Stigmatizing attitudes							
	Medi	um/Low	Hig	gh/Low				
	RRR	95%CI	RRR	95% CI				
Age (ref: 15-19 years old)								
20-24 years old	0.94	0.87-1.01	0.89*	0.82-0.97				
Sex (ref: Female)								
Male	0.96	0.90-1.03	0.87**	0.81-0.94				
Educational level (ref: Less th	an senior high)							
Senior high	0.88**	0.80-0.97	0.95	0.85-1.07				
Higher than senior high	0.80***	0.72-0.91	0.72***	0.63-0.83				
HIV Knowledge (ref: Low)								
Medium	0.66***	0.59-0.72	0.64***	0.57-0.72				
High	0.36***	0.32-0.40	0.30***	0.27-0.34				
Household wealth index (ref: ]	Lowest)							
Lower	0.95	0.86-1.05	0.96	0.86-1.08				
Middle	0.89*	0.80-0.98	0.90	0.80-1.01				
Higher	0.91	0.82-1.01	0.967	0.86-1.09				
Highest	0.88*	0.79-0.97	0.98	0.87-1.11				
Place of residence (ref: Rural)								
Urban	1.02	0.96-1.09	1.12**	1.04-1.21				
Descriptive norms (ref: Less n	egative)							
Medium	1.33***	1.20-1.47	1.44***	1.28-1.63				
Highly-negative	1.31***	1.20-1.43	1.93***	1.73-2.16				
Mass media exposure (ref: Lo	w)							
Medium	0.90	0.81-1.00	0.89	0.79-1.00				
High	0.88 *	0.78-0.98	0.87*	0.76-0.99				

**Table 2** Multinomial logistic regression of factors associated with stigmatizing attitudes (n=20,799)

*Note:* \**p*<0.05; \*\**p*<0.01; \*\*\**p*<0.001



# DISCUSSION

This study revealed that individual factors (age, sex, educational level, HIV knowledge) and community-level factors (place of residence, mass media exposure, descriptive norms) were significantly associated with attitudes PLHIV. stigmatizing towards Stigmatizing attitudes were associated with the age of youth; this finding was consistent from previous studies. which found that stigmatizing attitudes were concentrated in some specific age group.<sup>14, 20</sup> It indicates that youth at a younger age have more stigmatizing attitudes, which might be correlated with their educational level and also their level of HIV knowledge since previous studies showed that higher educational levels were associated with a lower level of stigmatizing attitudes.14, 15, 20 In the Indonesia context, based on the Education Ministerial Regulation number 24 of 2016, the provision of content related to the HIV issue was only given at the high school level.<sup>21</sup> Specifically, provision the of information pertaining HIV issue was given in the third grade of high school; thus, it indicates that youth who are not graduated might from senior high school have insufficient knowledge regarding HIV.

In terms of place of residence, this study found an interesting finding which contradicts previous studies. This study found that rural youth were less likely to have a high stigma, while previous studies showed contradictions result that rural people are more likely to have a high level of stigma.<sup>14, 15, 20</sup> It indicates that there might be complexity to understand on how community reacts on PLHIV due to different cultural value.<sup>22</sup> Moreover, in Indonesia context it was found that the tolerance value are still exist among rural people, thus it might contribute to their attitude towards PLHIV.<sup>23, 24</sup>

In terms of Descriptive norms toward PLHIV, this study found that descriptive norms is considered as variables with strong predictor of stigmatizing attitudes toward PLHIV. This study had similar results related to previous studies stressing how negative perception towards PLHIV in the community had a contribution in shaping negative perceptions towards PLHIV.<sup>25, 26</sup> In the Indonesia context, where religious culture plays an important role in any aspect of the society, the doctrine related to the illicit sex might place PLHIV as the person with bad behavior and deserved to be infected with HIV.27 Besides religion, cultural norms might also contribute to shaping youth perception towards PLHIV. In Indonesia, the topic and discussion related sexuality are still perceived as a taboo topics even in the school settings, which limited to the perspective that sexuality as the biological issue, controversial, taboo and dangerous.<sup>28</sup>

# CONCLUSION AND RECOMMENDATIONS

This study found that all variables in individual, interpersonal, and community-level factors were significantly associated with stigmatizing attitudes. The finding of this study could become important evidence for related institution and government to start the action which focused on the stigma reduction, especially among youth. This study found that HIV knowledge and descriptive norms as the strongest predictor of stigmatizing attitudes towards PLHIV. Thus, serious effort need to be made from the government to improve the provision of HIV knowledge since earlier stage in school institution and develop a supportive environment for PLHIV to ensure a better life for PLHIV.

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# SEXUAL BEHAVIOR OF MEN HAVING SEX WITH MEN AND THEIR PATTERNS OF GATHERING AT VOLLEYBALL-PLAYING HOT SPOTS IN BANGKOK

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# ABSTRACT

Men having sex with men (MSM) are key population for HIV prevention program as the prevalence remains higher during the past decades. Gathering at hotspot are common for MSM to cruise for sexual partners and so may increase the risk of HIV and STIs. Volleyball-playing spaces are one of the favorite hotspots for MSM. This study is to examine sexual behavior of MSM gathering at volleyball-playing MSM hotspots and explore the associations between patterns gathering at hotspots and their sexual risk behaviors. The data collection was taken 15 volleyball-playing MSM hotspots in Bangkok. The total sample is 323 MSM (weighted population). All respondents had sex with men during the past 6 months, about 68.3% had sex with regular partners and 45.3% with casual partners. On average, MSM in this study came to volleyball hotspots about 3 days a week and visited 2 volleyball hotspots per week. Over 26.2% of samples had got at least one sexual partners at volleyball hotspots, one-night stand partners 37.5%. Getting sexual partners from these hotspots were not found significantly associated with the sexual risk behavior. Pattern of gathering at hotspots and types of partners, knowledge of HIV, knowledge of condom, taking Pre-Exposure Prophylaxis (PrEP) are found significantly associated with the condom use behavior. MSM who have only casual partners are more likely to use condom than those who have only regular partners (OR 19.158, p value .001). In conclusion, this study confirmed that volleyball-playing are hotspots gathering MSM and cruising for sexual partners from these hotspots brought about sexual risk. Using condom are more likely practiced with casual partners than with regular partners. This posts MSM in a higher risk of HIV. This could be said as challenges for HIV prevention program to educate using condom every time with every types of partners should be promoted.

Keywords: men having sex with men, hotspots, sexual behavior

### **INTRODUCTION**

Men having sex with men (MSM) are key population for national HIV prevention program as the prevalence among the group is found higher than other population during the past decades. Gathering at hotspot areas are known to be common for MSM to cruise for sexual partners that could lead to risk of HIV transmission and infection.<sup>1</sup> However, the HIV prevention program has been made but the scale and coverage are not enough to reach targets and have the desired impacts particularly in MSM.<sup>2</sup>

There is not a lot studies examining sexual behaviors by specifically identified only those who gathering at any type of hotspot areas. However, most of the studies recruited them



from the hotspots, but the analysis didn't show the effect of the hotspots on their risk behaviors.<sup>3</sup> A few studies in Thailand addressed the issue of gathering at hotspot areas among MSM and defined the hotspot areas as 'locations where men congregate to socialize with other men and seek male sexual partners'.<sup>4</sup> The same study indicated that over 50% of its respondents were recruited from such hotspots as MSM remained to be hidden population. Another study successfully various types of hotspots of MSM, and volleyball playing area is one of those.<sup>5</sup> hot spots identification as gathering of men having sex with men at volleyball playing area in Bangkok.

Concerning to sexual behavior of those gathering at hotspot areas, one study in Senegal found that having sex in public area increase chances to use condom.<sup>6</sup>

The objectives of this analysis are to determine the demographic characteristics of MSM gathering at volleyball-playing hot spots in Bangkok and examine the factors associated with condom use among MSM at the hot spots.

# **METHODS**

This was quantitative analysis. This study applied two steps in data collection. The first step was to identify the places which is volleyball-playing MSM hotspots in Bangkok, and the second step was to collecting data from MSM who gathering at those identified hotspots as follow by Programmatic Mapping, it is an internationally recommended and systematic method of providing crucial data for virus human immunodeficiency (HIV) prevention programs. It identifies the "hot spots" or gathering of key population such as MSM and estimates their population size. The analysis presented in the paper applied data collected at the second step. Over 20 volleyball-playing area were listed and there were 15 hotspots that MSM could be identified as gathering in the area and asked for their informed consent to participate in this study. The self-administered questionnaire, which were adjusted from the national HIV surveillance surveys done by the Bureau of Epidemiology, was installed in mobile phone and tablets. There were screening questions to identify the characteristic of respondents – namely, age not below 18 and having sex with men in the past six month. Data collection procedure used online survey to collect the data and locations and easily to convert the data to Statistical Package for the Social Sciences (SPSS).

The sampling frame was conducted in to four parts, characteristic, sexual behavior, hotspot gathering and knowledge about HIV and condoms. The dependent variable, condom use in last sex in the past six months, is one of the key indicators to monitor HIV prevalence, risk behavior and HIV response globally.7 The reflecting independent variables sexual bahaviors and behavior of gathering at hotspot areas includes frequency of gathering at hotspots, number of hotspots, types of partners, knowledge of HIV, knowledge of condom, taking PrEP. The analysis used logistic regression to explore the associations between patterns gathering at volleyball hotspots and their condom use behavior. Logistic regression analysis models used variables from reviewed literature, using related variables with condom used in the bivariate analysis.

This study received ethical review approval from IPSR (No. 2019/06-230), dated 27<sup>th</sup> June 2019.

# RESULTS

From the 15 hotspots, 180 MSM were approached, 166 MSM participated (92.2%) and 14 MSM rejected (7.8%). The participated MSM were asked a screen question, have you had sex with men in past six months. There are 126 eligible respondents MSM had sex with men in past six months (75.9%). After weighting by the estimated number of MSM gathering at each hotspot, the total weighted sample for this analysis are 323. Determining sociodemographic characteristic, MSM



gathering at volleyball-playing hotspots aged between 18 and 47 years old, with the mean age at 29 years old. The majority of them falls in the age group of 25 and above (77%) while the rest are in the group of 18-24 years old (22.3%). As this studied conducted in Bangkok, over 93% of samples resided in Bangkok and the rest were from its vicinity. Three in fourth of samples attained bachelor degree or higher -64% attained bachelor degree, 12% higher than bachelor. Only 6% reported unemployed and 12% were students. The majoring of the samples were working, i.e. 46% at private company, 15% were government employees, 4% worked at state enterprises and the rest were business owners and daily-wage workers.

Concerning to their gathering behaviors at volleyball- playing hotspots in Bangkok, this study found that these MSM gathered at these hotspots 3 days a week on average (SD  $\pm 1.336$ , Min 1, Max 7), and went to 2.81 volleyball-playing hotspots per week on average (SD  $\pm 1.046$ , Min 1, Max 7). This information

explains patterns of gathering at the hotspots – i.e. MSM would normally going to more than one place in a week and quite often, too.

Their sexual behaviors in the past 6 months were analyzed. There are four types of sexual partners in the questionnaire, namely regular partner, casual partner, and one-night stand partner (this include non-paying, paying and paid partners). Slightly over 68% having at least one regular partner in the past 6 months, and over 45% having casual partners. For the one-night-stand type of partner, 41% reported having one-night stand sexual partners, 15% having sex with sex workers (paid partner), and 13% have sex with and get paid by someone (paying partner). Altogether, during the past 6 months, about 40% of them having only regular partners, 29% having only casual or one-night stand partners, and 31% having both regular, casual or one-night stand partners. About 26% reported they ever had sexual partners from these hotspots.

**Table 1** Relationships between behavior of gathering at hotspot and types of sexual partners and condom use at last sex in the past 6 months (Bivariate analysis)

Hotspot gathering and Sexual partners	Condom	the past 6 m	onths	
	No (%)	Yes (%)	$\chi^2$	p-value
Number of days gathering at the hotspots per			14.708	$.000^{***}$
week				
1-2 days per week	37 (32.7)	76 (67.3)		
More than 2 days per week	22 (13.5)	141 (86.5)		
Number of hotspot visited per week			10.094	.001***
1 hotspot	8 (9.5)	76 (90.5)		
More than 1 hotspot	51 (26.6)	141 (73.4)		
Having sexual partners from volleyball			1.56	.692
hotspots (n=276)				
Yes	45 (22.0)	160 (78.0)		
No	14 (19.7)	57 (80.3)		
Types of partners in the past 6 months			21.006	$.000^{***}$
(n=258)				
Only regular partners	34 (34.7)	64 (65.3)		
No regular partners, but other types of	4 (5.3)	71 (94.7)		
casual partners				
Regular partners and also other types of casual partners	21 (24.7)	64 (75.3)		



Hotspot gathering and Sexual partners	Condom use at last sex in the past 6 months					
	No (%)	Yes (%)	$\chi^2$	p-value		
Types of partner at last sex in the past 6 months (n=276)			17.966	$.000^{***}$		
Regular partner	49 (30.1)	114 (69.9)				
Casual partner	6 (10.0)	54 (90.0)				
One-night stand partners	4 (7.5)	49 (92.5)				

\* *p*-value < 0.05, if statistically significant at  $\alpha = 0.05$ 

\*\* *p*-value < 0.01, if statistically significant at  $\alpha = 0.01$ 

\*\*\* *p*-value < 0.001 if statistically significant at  $\alpha = 0.001$ 

Considering the relationships between gathering at hotspots and sexual behaviors, the bivariate analysis was done using the dependent variable of using condom at last sex in the past 6 months, as shown in Table 1. The number of days gathering at hotspots, number of hotspots visiting per week, and types of found having statistically partners are significant relationships with using condom at last sex. MSM more often gathering at volleyball playing hotspots (more than 2 days per week) used condom at last sex more than MSM who less often gathering at such hotspots. One the other hand, MSM visiting more than one hotspot a week using less than those who visited only one hotspot. This can be explained that those who go often and visited only one hotspots may be more likely to meet with same people, who might not be their sexual partners.

Also, the results showing the significant relationships of type of partners on condom use, i.e. those who have only regular partners used condom less than those who have other types of partners too or only. So, gathering at volleyball hotspot that may increase chances getting new partners, especially casual one, may be the reason why those who go often and go to more than one places used condom more.

In the multivariate analysis to examine the factors associated with condom use among MSM at the hot spots, two models, as shown in Table 2. The first model is to examine how pattern of gathering at hotspots and MSM network may be associated with condom use

behaviors. The assumption is that, based on the significant findings of the bivariate analysis, MSM often gathering at hotspots, visiting more hotspots and having larger MSM network are having higher probability to taking risk behavior, i.e. not using condom. The Model 2 was constructed with the hypothesis that particular type of partners, HIV-related knowledge, condom knowledge and taking PrEP may increase the chance of using condom at last sex.

The results revealed that MSM who gathered at volleyball playing hotspots for more than 2 days per week are 3.8 times higher chances to use condom at last sex (OR=3.83, 95%CI=1.81-7.8, p-value=.000), comparing with those gathering at hotspots for 1-2 days a week. Then, MSM who visiting more than one volleyball playing hotspot a week, comparing with those visiting only one hotspot, are less likely to use condom at last sex (OR=0.24, 95%CI=0.94-0.60, p-value=.000).

The other factor found to be significantly associated with condom use at last sex is number of known MSM in Bangkok. Those who knew more number of MSM at volleyball playing hotspots (11-20 MSM) are less likely to use condom (OR= 0.20, 95%CI=0.06-0.61, pvalue=.005), comparing to those who know 1-10 MSM at hotspots. Also it's noticeable that those who knew more than 20 MSM at hotspot are more likely to use condom, but this is not statistically significant association. It can be explained that MSM they knew at hotspots might be their sexual partners. The more MSM



they knew, the more chance of the known MSM could become their sexual partners, so it might indicate the probability of using condom, somehow.

On the other hand, those who knew 11-20 MSM at hotspots are less likely to use condom. This is needed to further explore if these MSM

are any type of their sexual partner. The less likely of using condom could lead to believe that they may be regular partners whom condom are less used with. At the same time, the number of known MSM in Bangkok showed significant effect on condom use at last sex among MSM gathering at volleyball playing hotspots.

**Table 2** Logistic Regression examining the factors associated with condom use at last sex in the past 6 months (Model 1 and 2)

Mo	del 1			
Pattern of gathering at hotspots and MSM	Adjusted	95%	o CI	P – Value
network	OR	Lower	Upper	
Number of days gathering at the hotspots per week				
1-2 days per week	1			
More than 2 days per week	3.834	1.881	7.816	$.000^{***}$
Number of hotspot visited per week				
1 hotspot	1			
More than 1 hotspot	.239	.094	.605	.003**
Number of known MSM in hotspots				
1 - 10	1			
11 - 20	.822	.270	2.500	.729
More than 20	.237	.061	.928	$.039^{*}$
Number of known MSM in Bangkok				
1 - 10	1			
11 - 20	.198	.064	.607	$.005^{**}$
More than 20	3.893	.963	15.731	.056
Constant	10.422			.000

Log Likelihood=211.471 n=109 Cox & Snell R Square = .237 Percentage Correct = 78.7

]	Model 2			
Sexual partners and HIV-related knowledge	Adjusted OR	95%	CI	P – Value
and behavior		Lower	Upper	
Types of partner at last sex in the past 6				
months				
Only regular partner	1			
Only casual partner	19.158	3.227	113.736	$.001^{***}$
Both	1.405	.587	3.363	.446
Types of partner at last sex in the past 6				
months				
Regular partner	1			
Casual partner	1.421	.412	4.894	.578
One-night stand partners	3.947	.842	18.496	.081



	Model 2				
Sexual partners and HIV-related knowledge	Adjusted OR	95%	CI	P – Value	
and behavior		Lower	Upper		
Scores of HIV knowledge					
0 - 3 scores	1				
4-5 scores	4.032	1.241	13.093	$.020^{*}$	
6 scores	2.421	.811	7.231	.113	
Scores of knowledge about condom					
0 - 3 scores	1				
4-5 scores	2.800	1.239	6.331	.013*	
6 scores	4.337	1.417	13.277	$.010^{**}$	
Currently taking Prep					
Yes	1				
No	12.608	2.941	54.050	$.001^{***}$	
Constant	.019			.000	

Log Likelihood=192.382 n=95 Cox & Snell R Square = .261 Percentage Correct = 84.7

\* *p-value* < 0.05, if statistically significant at  $\alpha = 0.05$ 

\*\* *p-value* < 0.01, if statistically significant at  $\alpha = 0.01$ 

\*\*\* *p*-value < 0.001 if statistically significant at  $\alpha = 0.001$ 

Model 2 showed the significant association between condom use at last sex and type of partners, HIV and condom knowledge and PrEP taking. MSM who have only casual partners (including one-night-stand) are much more likely to use condom (OR=19.16, 95%CI=3.23-113.74, p-value=. 0 0 1 ), comparing to MSM having only regular partners. MSM getting good scores on HOV knowledge and knowledge about condom are more likely to use condom at last sex, comparing to those with lower scores. Lastly, MSM who not currently taking PrEP are more likely to use condom (OR=19.16, 95%CI=3.23-113.74, p-value=.001), comparing to those who not currently take PrEP.

### DISCUSSION

Characteristics of MSM at these volleyball playing hotspots indicates that these are places where MSM of any socio-economic status may like to come. Though the main activity is playing volleyball and the chance of having sexual partners from these hotspot is also there as about one fourth of the sample reported they ever had sexual partners from these hotspots. Pattern of gathering at volleyball playing hotspots in this study are only about the frequency (number of day per week) and number of hotspots visited per week. However, the findings show that MSM are gathering at these hotspots quite often and many places. In addition, as many of them reported getting sexual partners from these hotspot (though it is not significant associated with condom use), this is enough to indicate some extent of their sexual risk behavior. It is very likely that the sexual partners at hotspots are casual or onenight-stand. Though this analysis found MSM with casual partners are more like to use condom, those who also have regular partners are not using.

This analysis found many factors with significant association between condom use at last sex in the past 6 months. Factors directly concerning to sexual behaviors, namely type of partners, are strongly affect the use of condom. To be more specific, MSM are less likely to use condom when having only regular partner, which were similarly found in many other studies.<sup>8, 9, 10</sup> Having casual partner are very likely to be the main factors that increase



chances of using condom as reported at last sex and this is also found in other studies.<sup>11</sup> It should be most concerned for MSM who have both regular partners and other partners as it is about the higher chance of getting HIV. However, as another piece of findings shows that MSM with non-regular partner are more likely to use condom, it may imply that MSM are well protecting themselves when having sex with casual partners including those one-nightstand. One study conducted among MSM in Korea found the other way round that is, measuring condom use at last sex, MSM with regular partners are more likely to use condom.12 However this study didn't indicate if these MSM were concurrently having other types of partners.

This present study found the significant association of knowledge on the increased chance of using condom. For HIV knowledge, it is also found in other studies that having good HIV knowledge could increase chances of using condom.<sup>13</sup> The knowledge about condom is more related to the condom use, if to compare with the HIV knowledge. This questionnaire includes question on 'whether condom should be use at every sex with any partners'. About 83% of respondents answered 'yes', which is the largest proportion of respondents with correct answers comparing to other questions in this set. This implies that the respondents are aware of using condom at every sex.

MSM taking PrEP were found in many studies less likely to use condom with any types of partners.<sup>14, 15, 16</sup> This present analysis is also with the same findings. In fact, according to HIV program providing PrEP, condom use is always promoted for those who takes PrEP even though PrEP is over 95% effective in prevention of HIV infection. The fact that MSM taking PrEP are not using condom may be because they are not concerned about other sexually transmitted infection sexually transmitted infections (STIs) or not well aware that PrEP cannot prevent other sexually transmitted infections (STIs). This finding indicate the need for the program to emphasize or give more education on sexually transmitted infections (STIs) and the risks of not using condom while taking PrEP.

### CONCLUSION

Volleyball- playing are hotspots gathering MSM and MSM gathering at volleyballplaying hotspots are young and sexually active. Majority of them are employed or having income indicating to some extent their economic power. Together with the high education level, this also revealed that MSM in these hotspot can be any one from any society.

Cruising for sexual partners from these hotspots brought about sexual risk. Using condom are more likely practiced with casual partners than with regular partners. This posts MSM in a higher risk of HIV. This could be said as challenges to educate using condom every time with every types of partners should be promoted. Sexual behaviors of MSM gathering at this type of hotspot are of concern. The more likely to use condom when having sex with casual or one-night-stand partners may be good, but less likely to use condom for those who have only regular partners or concurrent partners - i.e. having regular partners and other types of partners - keep MSM at higher risks of HIV.

### RECOMMENDATIONS

### For policy

1) From this study, the sample lacked the knowledge and understanding about using condom and lubricant: therefore, there should be an additional education on this issue for this population.

### For future study

Thailand hopes to be one of the first countries to end AIDS by 2030. However, to achieve this, significantly more key affected populations need to be reached. Further studies, therefore, can



- 1. Study population characteristics, gathering patterns and gathering objections of MSM at volleyball courts in other areas;
- 2. Provide alternative techniques of diagnosing MSM gathering at volleyball courts.

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### UTILIZATION OF MATERNAL HEALTH SERVICES AMONG WOMEN IN MYANMAR: FINDINGS FROM THE NATIONAL DEMOGRAPHIC HEALTH SURVEY 2015-2016

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### ABSTRACT

Utilization of maternal health services is promoted in Myanmar to reduce maternal mortality. The majority of maternal deaths are due to preventable causes or complications related to pregnancy and childbirth. Regular utilization of maternal health services can reduce maternal mortality by prevention, early identification and actions on maternal complications. In Myanmar, the utilization of maternal health services have not been explored broadly. Therefore, the aim of this study was to determine the levels and patterns of utilization of maternal health services in Myanmar. For this study, secondary data from Myanmar Demographic and Health Survey (2015-2016) was utilized. Participants were women aged 15-49 years who had pregnancy and childbirth experience within five years prior to survey. Information on utilization of antenatal care and delivery care services, and sociodemographic characteristics was analyzed using descriptive statistics and presented in simple frequency and percentage distributions. The proportion of women who received complete utilization of maternal health services was found only 29.4%. Complete utilization of maternal health services was significantly reduced among women who aged 45-49 years, unskilled manual, had three or more children, living in rural area, in poorest wealth index and was highest among women who completed higher education level and whose husband completed higher education level. Overall, there was low proportion of complete utilization of maternal health services among women in Myanmar due to incorrect timing of first antenatal care visit. Therefore, minimum four times antenatal care with correct timing of the first visit should still be promoted in Myanmar, along with the quality of delivery care. Further analysis of factors associated with the complete utilization is required.

Keywords: maternal health, antenatal care, delivery care

### **INTRODUCTION**

Maternal mortality was targeted to reduce in developing world as it is an indicator for the overall health status and quality of medical care in a country. From 2000 to 2017, maternal mortality has decreased globally 38% but still unacceptably high especially in developing countries.<sup>1, 2</sup> According to 2016 Myanmar Government and UNFPA joint new

census report on maternal mortality, Myanmar's maternal mortality ratio (MMR) is 282 per 100000 live births and it is the second highest in ASEAN countries. In Myanmar, average 2800 women die in each year due to complications of pregnancy and childbirth.<sup>3</sup> About majority of all maternal deaths are due complications such as hemorrhage, to septicemia, pre-eclampsia and eclampsia, complications related to delivery and complication related to unsafe abortion.<sup>4</sup>



Utilization of maternal health services has a significant role to reduce maternal mortality as most of the maternal complications develop during pregnancy, and childbirth and majority of these complications could be prevented and treated if women use maternal health services from skillful health care providers.<sup>2</sup> By taking early and regular antenatal care, women can reduce and prevent risk of pregnancy complications and causes which may lead to stillbirth. neonatal death abortion. and abnormalities by following a healthy and safe diet, healthy physical activities and avoiding exposure to potentially harmful substances such as lead and radiation and can help reduce the risk for problems during pregnancy. Controlling existing conditions, such as high blood pressure and diabetes, is important to prevent serious complications and their effects. Moreover, women can reduce and prevent serious complications and effects of preexisting disease with control by health care provider. And, women can reduce the risk of unsafe medications which can harmful to fetus bv following health care provider's instruction.5

Making ensuring every delivery is assisted by skilled birth attendants is important in reducing maternal morbidity, mortality and newborn morbidity, mortality. Persons who are not skilled birth attendants cannot recognize danger signs and cannot manage appropriately serious complications such as septicemia and severe bleeding which may lead to death of mothers during delivery and after childbirth. Improving maternal and newborn survival, deliveries should be handled safely by skilled birth attendants. Delivery with skilled birth attendants can recognize and manage appropriately danger signs and complications related to childbirth and refer to higher level care in emergency cases.6

Sociodemographic characteristics also play an important role in utilization of maternal health services. In Myanmar, there is lower utilization of maternal health services in poor and uneducated women as they have limited ability to aware complications of pregnancy and to access maternal care depends on their employment education, and income.<sup>7</sup> Utilization of maternal health services between urban and rural differs from each other and utilization of maternal health services in urban areas is higher than rural area as women has easily access to facilities that can provide the basic and emergency obstetric care for pregnancy and childbirth.<sup>7</sup>

Until now, every country still makes an effort in reducing maternal mortality. This goal can be largely achieved through prevention of maternal complications which are able to be prevented or controlled by the regular utilization of maternal health services during pregnancy, childbirth and postnatal period.<sup>8</sup> Myanmar also makes efforts to reduce maternal mortality but only a few studies had examined for Utilization of Maternal Health Services in Myanmar. Therefore, this study aimed to determine the levels and patterns of utilization of maternal health services in Myanmar.

# **METHODS**

# Study Design and Data Source

This study was the secondary data analysis of MDHS (Myanmar Demographic Health Survey 2015 - 2016). This survey was a national representative survey which includes 7 states and 7 regions, and Nay Pyi Taw union territory and estimates main demographic and health indicators in order to provide update information on fertility and childhood mortality levels. fertility preferences, awareness, approval, and use of family planning methods, maternal and child health, knowledge and attitudes toward HIV/AIDS and other sexually transmitted infections (STIs) and domestic violence.<sup>7</sup> As a sampling frame, MDHS used cartographic frame of the Myanmar Population and Housing Census 2014. The sampling frame consist of 76,990 primary sampling units (PSU) which cover the



whole country. MDHS used stratified two stage sampling design. In the first stage, 442 clusters (123 clusters in urban and 319 clusters in rural) were selected from 30 sampling strata which is achieved by separation of each state and region into urban and rural area. In the second stage, 30 households were selected using equal probability systematic sampling from each cluster and total 13,260 households were selected (3.690 households in urban and 9,570 households in rural). The survey conducted interviews only pre-selected households and replacement was not allowed for the non-response households to prevent bias and overall response rate was 98%.

The Myanmar Demographic Health Survey 2015 – 2016, DHS Program provided several data sets which are household data, household member data, couple data, women data, men data, birth related data and children related data. For the maternal health and child health data, all women (age 15 - 49 years) who stay in the selected households the night before the survey were eligible for this survey. Total 12,885 women were interviewed by using women questionnaire.9 In this study, women who had pregnancy and child born experience within five years prior to survey were eligible and the study analyzed only the most recent birth. Finally, a total of 1,633 women who had complete information on their pregnancy and birth of the last child were selected from women data set for analysis.

### Study Variables and Data Analysis

The data on utilization to maternal health care services and sociodemographic characteristics were collected by structured questionnaires and the obtained data were descriptively analyzed using SPSS software version 22. The characteristics of participants include age, education, occupation, number of children, residence, and wealth index, as well as education and occupation of their husband. The utilization to maternal health care services was defined as complete if the women had received minimum four times antenatal care service with correct timing of first antenatal care visit (within the first four months of pregnancy) by skillful health care providers, no matter whether the place of service is in public health facilities, private health facilities, or home, plus delivery care with the assistance of skilled birth attendants. The skillful health care providers and skilled birth attendants include doctor, nurse, lady health visitor, and midwife according to the World Health Organization (WHO) definition.<sup>10</sup> Descriptive statistics were used to present all data in simple frequency and percentage distributions.

### RESULTS

In table 1, complete utilization of maternal health services was described based on number of antenatal care with skillful health care providers, timing of first antenatal care and assisted persons during delivery. Although majority of respondents 66% took minimum four times antenatal care with skillful health care providers, large proportion of respondents 64.2% didn't meet minimum four times ANC with skillful health care providers with correct first ANC timing as more than half of respondents 55.2% didn't take first antenatal care with skillful health care providers within first four months of pregnancy and 34% of respondents didn't complete minimum four times antenatal care with skillful health care Nearly providers. three quarters of respondents delivered with skilled birth attendants while 28.5% of respondents didn't deliver with skilled birth attendants. Huge number of respondents 70.6% didn't have complete utilization of maternal health services.



	n	%
Received minimum four times antenatal care from skillful health care providers		
Yes	1077	66
No	556	34
Received first antenatal care visit within first four months of pregnancy from skillful health care providers		
Yes	731	44.8
No	902	55.2
Received minimum four times antenatal care with correct timing of first antenatal care visit from skillful health care providers		
Yes	585	35.8
No	1048	64.2
Received delivery care from skilled birth attendants		
Yes	1167	71.5
No	466	28.5
Received complete utilization of maternal health services		
Yes	480	29.4
No	1153	70.6

Table 1 Percentage distribution of maternal health services utilization (n = 1633)

In table 2, sociodemographic characteristics across the utilization of maternal health services was described among 1633 women with age 15-49 years who had pregnancy and childbirth experience. Most of the respondents were in age group of 30-34 years and 28.2% lied in this category and complete utilization of maternal health services was lowest (21.6%) in age group of 45-49 years. Only 11.3% of respondents completed higher level education while nearly half of respondents completed just primary level education and complete utilization of maternal health services was highest (56%) among women who completed higher education level. About one third of respondents were unskilled manual and most of the respondents 40.4% had three or more children. Complete

utilization of maternal health services was significantly reduced among these women representing 77.4% and 80.7% respectively. Majority 73.3% lived in rural area and most of respondents 23.8% were poorest in wealth index. Complete utilization of maternal health services was lowest among these women accounting for 74.5% and 82.8% respectively. Most respondent's husbands 39.6% completed just primary level education and few husbands only 8.3% completed higher level education, and complete utilization of maternal health services was highest (60.3%) among women who had husbands completed higher education level. Like respondents, most of the husbands were unskilled manual amount to 37.8% and complete utilization of maternal health services was lowest (78%) in this category.



Sociodemographic	Total	<b>Utilization of maternal health services (n = 1633)</b>				
characteristics	n (%)	Com	plete	Incon	nplete	
		n		n	%	
Age (years)						
15-19	33 (2)	8	24.2	25	75.8	
20-24	217 (13.3)	63	29	154	71	
25-29	418 (25.6)	143	34.2	275	65.8	
30-34	461 (28.2)	131	28.4	330	71.6	
35-39	317 (19.4)	84	26.5	233	73.5	
40-44	150 (9.2)	43	28.7	107	71.3	
45-49	37 (2.3)	8	21.6	29	78.4	
Woman education						
No education	191 (11.7)	31	16.2	160	83.8	
Primary	732 (44.8)	160	21.9	572	78.1	
Secondary	526 (32.2)	186	35.4	340	64.6	
Higher	184 (11.3)	103	56	81	44	
Woman Occupation						
Professional/technical/	150 (9.2)	70	46.7	80	53.3	
managerial						
Clerical	29 (1.8)	14	48.3	15	51.7	
Sales	457 (28)	149	32.6	308	67.4	
Agriculture-Self	164 (10)	36	22	128	78	
employed						
Agriculture-Employee	109 (6.7)	28	25.7	81	74.3	
Household and	6 (0.4)	0	0	6	100	
domestic						
Services	14 (0.9)	6	42.9	8	57.1	
Skilled manual	132 (8.1)	48	36.4	84	63.6	
Unskilled manual	572 (35)	129	22.6	443	77.4	
Number of Children						
Only one child	554 (33.9)	226	40.8	328	59.2	
Two children	420 (25.7)	127	30.2	293	69.8	
Three or more children	659 (40.4)	127	19.3	532	80.7	
Residence						
Urban	436 (26.7)	175	40.1	261	59.9	
Rural	1197 (73.3)	305	25.5	892	74.5	
Wealth Index						
Poorest	389 (23.8)	67	17.2	322	82.8	
Poorer	350 (21.4)	78	22.3	272	77.7	
Middle	307 (18.8)	94	30.6	213	69.4	
Richer	312 (19.1)	99	31.7	213	68.3	
Richest	275 (16.8)	142	51.6	133	48.4	

Table 2 Sociodemographic characteristics across the utilization of maternal health services

#### **Husband Education**



Sociodemographic	Total	Utilization of maternal health services (n = 1633)			
characteristics	n (%)	Complete		Incomplete	
	_	n	%	n	%
No education	187 (11.5)	29	15.5	158	84.5
Primary	646 (39.6)	148	22.9	498	77.1
Secondary	664 (40.7)	221	33.3	443	66.7
Higher	136 (8.3)	82	60.3	54	39.7
Husband Occupation					
Professional/technical/	139 (8.5)	58	41.7	81	58.3
managerial					
Clerical	24 (1.5)	9	37.5	15	62.5
Sales	111 (6.8)	50	45	61	55
Agriculture-Self	249 (15.2)	68	27.3	181	72.7
employed					
Agriculture-Employee	131 (8)	31	23.7	100	76.3
Household and	7 (0.4)	1	14.3	6	85.7
domestic					
Services	14 (0.9)	4	28.6	10	71.4
Skilled manual	340 (20.8)	123	36.2	217	63.8
Unskilled manual	618 (37.8)	136	22	482	78

# DISCUSSION

Healthy birth is strongly related to healthy pregnancy and taking early and regular antenatal care can improve the healthy pregnancy. By taking early and regular antenatal care, women can reduce and prevent risk of pregnancy complications and causes.<sup>5</sup> Taking regular antenatal care can promote the deliveries with skilled birth attendants.<sup>11</sup> In this study, minimum four times antenatal care with correct timing of first antenatal care was significantly reduced among women in Myanmar although deliveries with skilled birth attendants is relatively high. Many studies revealed that utilization of maternal health services was increased in rich women than poor and women who completed higher level education utilize maternal health services more than others.<sup>12, 13, 14</sup> In this study, complete utilization of maternal health services was in increasing trend by increasing the wealth index and the education level of both women and their husbands. A study was conducted in India by Tej Ram Jat, Nawi Ng, Miguel San Sebastian in 2011 revealed that utilization of maternal health services was decreased steadily in women with increased birth order.<sup>15</sup> In this study, there was also decreasing trends of complete utilization of maternal health services by increasing the number of children. However, there is still needed to carry out further analysis to describe the association and relationship as this study used only descriptive statistics.

# CONCLUSION AND RECOMMENDATIONS

This study revealed that minimum four times ANC with skillful health care providers in correct timing was significantly reduced among women due to incomplete numbers of antenatal care and incorrect timing of first antenatal care. With the effect of this issue, proportion of complete utilization of maternal health services became dramatically low among women. Therefore, minimum four times antenatal care and correct timing should be promoted to improve complete utilization of maternal health services.





Overall, educational level of both women and their husbands was mostly in primary level and most are unskilled manuals. To get the higher income, education and skills play an important role in employment. Moreover, women who has three or more children are common among respondents. As a result, most of women are poorest in wealth index and complete utilization of maternal health services was significantly reduced among women in these categories. To improve the utilization of maternal health services. sociodemographic characteristics of women should be noticed, and promoting education, capacity development and family planning is needed for both women and their husbands. Education can impact not only employment but also knowledge and decision making related to maternal health. Further analysis of the relationship between the utilization of maternal health services and independent variables (e.g., sociodemographic characteristics) using advanced statistics will be done in near future. These findings strengthen the need of improving maternal health services in Myanmar which benefit to the organization level (e.g., the both government) and the personal level (e.g., mothers and their families).

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# PERCEPTION OF THE RISK OF DROWNING AMONG ADULTS IN DILI CITY TIMOR-LESTE

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### ABSTRACT

Drowning is the third most significant cause in the world related to unintentional injury. Most of the drowning happens in low middle-income countries (LMIC). Timor-Leste is an island country, well known for its aquatic lifestyle, and easy access to open water categorizes as LMIC, limited study related to water safety knowledge and risk perception. This study aimed to describe drowning risk perception and predictors of drowning risk perception among Timorese adults. A community-based survey was conducted in four sub-districts of Dili City. Data were collected using e-form distributed by trained research assistants during April-May 2020. Protective motivation theory was used to assess risk perception. Crude and adjusted odds ratios (ORs) were reported for the association between exposure and drowning risk perception with 95% CIs. A p-value < 0.05 was considered statistically significant. A total of 329 adults was included in this study, 52.3% of the adults cannot swim, and 25.8% have been experienced non-fatal drowning. Nearly half (44.1%) has identified as low-risk perception. The analysis revealed that living place (AOR=2.07, 95% CI, 1.05-4.09), occupation (AOR=1.87 95% CI, 1.18-3.01), swimming skill (AOR=1.69, 95% CI, 1.06-2.70)., nonfatal drowning experienced (AOR: 2.02, 95% CI: 1.19-3.43). self-rated risk of drowning (AOR: 2.03, 95% CI: 1.26-3.26) and the level of water safety knowledge (AOR: 1.90, 95% CI: 1.17-3.09) were positive association with the level of risk perception. In order to enhance risk perception, the government organization should provide survival swimming skills and drowning risk information and education programs to the adults in the community.

Keywords: water safety knowledge, risk perception, drowning, Timor-Leste

### **INTRODUCTION**

According to World Health Organization (WHO), in the year 2014 highlights that each year, more than five million people die caused by injuries account for 9% of the world deaths resulting from a road traffic accident, burn, drowning, falls, and poisoning.<sup>1</sup> Drowning is the third most significant cause in the world related to unintentional injury, and it considers 7% of every injury-related death.<sup>2</sup> Most of the drowning happens in low middle-income

countries over 90% cases, where the total of death massive than high-income countries.<sup>2</sup> However, there is no full prevention achievement to minimize these public health challenges.<sup>2</sup>

Since the year 1990 to the year 2017 drowning mortality rate in the South-East Asia region was reduced by half; however, the WHO global report shows that the death rate from drowning in the region continues being much higher than the world average for both men and women and





in each age group. Timor-Leste situated in South-East Asia on the island of Timor<sup>3</sup>, and economically Timor-Leste classified as a lower-middle-income country with а population of 1.2 million.<sup>4</sup> Beaches are the most popular spots for recreation during public holiday and festival season in Timor-Leste. The prevalence of drowning cases in the country is undocumented. However, in the year 2019, there were 11 cases of death by drowning from 15 drowning cases and eight death from 8 cases of drowning in months January to April 2020 was reported from different mass media. Furthermore, a national survey related to injury found that females had a high percentage of near-drowning than males (1.9% vs. 1.7%) among 18-44 years old.<sup>5</sup> According to the Institute Health Assessment for and Measurement estimated drowning mortality rate in Timor-Leste is 5.5 per 100,000 population in 2017.<sup>6</sup>

Morrongiello, Sandomierski et al. defined that knowledge and physical ability affect the perception of risk.<sup>7</sup> Moreover, Moran et al. 2017, Jasper, Stewart, et al. 2017 and Willcox-Pidgeon, Kool et al. 2018 indicated that low levels of risk perception towards drowning put individuals at higher risk.8-10 Furthermore, when people perceived themselves as being more competent swimmers, they were more likely to engage in riskier acts in aquatic environments.<sup>11</sup> In conclusion, existing research suggests that disease risk perceptions are a critical determinant of health behavior.<sup>12</sup> Therefore this present study employs Rogers' Protection Motivation Theory<sup>13-15</sup> to assess the risk perception of drowning and factors associated.<sup>10</sup> The study expected to support the government in terms of drowning prevention through an established infrastructure in policy and programs.

### **METHODS**

### Study design and area

A cross-sectional survey was carried out among adults 18-59 years old, within Dili city, TimorLeste, there are 13 municipalities in the country. Dili City was chosen by purposive sampling by the researcher, Dili City composes six sub-districts, among the six-sub district, four sub-districts were chosen with purposive sampling. Dili, Timor-Leste capital, is a rather flat city, but with a tiny area, lies nestled between the mountains and the sea.<sup>16</sup> The majority of people are employed in small businesses, followed by the public sector.<sup>17, 18</sup> Most people who live in urban areas such as in Dom Aleixo, Nain Feto, Vera Cruz, and the west part of Cristo Rei depend for their daily consumption on foodstuffs sold in local supermarkets and traditional.<sup>17, 18</sup> By contrast, people in rural Dili depend on household produced food crops and livestock. Fishing and farming are the primary sources of activities of people living along with the coastal areas of Cristo rei and in the sub-districts of Metinaro and Atauro.<sup>17, 18</sup> The city has the most popular beaches in the country with rockv characteristics, with a high number of visitants during the weekend and public holidays by the community with the unreported drowning case every year.

### Sample size and technique

The sample size was calculated by using a formula for estimating a sample for proportion, with a 95% confidence interval (CI) and acceptable error (e) of 5%. The estimated proportion of risk perception among adults in the past (p) was set as 50% in reference to the previous study.<sup>19</sup> With the total number of adults (n), the required sample size was 418. From 4 sub-district in Dili City, around 418 adults were selected randomly. Adults 18-59 years old in sampled were considered as inclusion criteria for the study population.

### Survey measurement

The questionnaire was developed based on the existing drowning literature<sup>10, 20-23</sup>, and revised by an injury expert in the university and transform to google e-form for online data collection. The final version of the questionnaires included four sections.

1. The first questions sought individual factors of the adults such as age, sex, living



place, occupation, children under care, swimming skill, non-fatal drowning experienced, and self-rate risk of drowning.

- 2. The second part is about risk perception of drowning; a series of 6 statements were designed to assess perceptions of drowning risk using a 1-5 Likert-type scale ranging from strongly agree to strongly disagree. E.g. (1. If I got caught in a rip, it is likely I would need to be rescued, 2. If I were in deep water and got tired, I would be in danger of drowning, 3. If I went for a swim outside of the flags, it would not be a dangerous situation, 4. I think other people are at higher risk of drowning than I am, 5. My lack of swimming ability puts me at risk, 6. I often feel unsafe swimming when conditions are rough.
- 3. The third part was about water safety knowledge to determine water safety knowledge participant asked a series of 10 statements regarding drowning information and preventive behavior for drowning and was measured by True or False.
- 4. The last part was about environmental factors, comprises of three questions, one open question regarding the distance of the recreational beach and home (kilometers), availability of health care services near the recreational beach (yes and no).

The questionnaire was tested for reliability using the responses of 30 adults obtained in a pilot study. The item related to knowledge was calculated by Kuder Richardson (KR-20), and risk perception was calculated by using Cronbach Alpha. The knowledge part was 0.55, and the risk perception was 0.8 in pretesting. After the pretest, some words and the order of questions were adjusted following feedback from the respondents.

### Procedures

Five research assistants who were medical doctors and residents in target areas were recruited. They were trained to conduct data collection fieldwork in a one-day, explained about the e-from and their role during data

collection by the principal researcher via an online meeting with zoom application before starting the online-based community survey. Research assistants approach to the participants by visiting the community house one day before, to explain the process, objectives, and ask for permission. After participants agree to participate, research assistants applied onlinebased techniques to collect data by sending eform to their social media account. To ensure that data are consistent and accurate, research staff monitored and supervised field staff by video call during the data collection period. Data collection was conducted from April to May 2020.

### Ethical considerations

The Ethical Review Committee approved the study, Mahidol University (MUSSIRB), with certificate approval number 2020/057.2503, 2020/078 (B2). Written informed consent was sought from each adult respondent.

#### Data analysis

The analysis was performed using Statistical Packages for the Social Sciences (version 25.0). Descriptive statistics were calculated to describe the general characteristics of the subjects. The univariate logistic regression model was used for variable selection and examined the relationship between factors associated with risk perception of drowning and select significant variables at a P value of 0.25 for the multiple logistic regression model. The prediction model was established based on the significant variables in the multiple logistic regression model. High level of risk perception was selected as reference groups in logistic regression.

# RESULTS

### General characteristics of the respondents

Research assistants approached a total of 418 adults. The response rate was 79%, with 329 completed questionnaires of adults 18-56 years


with a mean age of 28.6 years, S.D 7.2. Over half of the adults were male (60.5%). Most of them live in urban areas (86.3%). The majority of adults were university or lower level (58.1%). Approximately 54.7% were working in public and private services. Over half of adults did not have children under care (61.7%). The higher number cannot swim at 52.3%, and where they learn to swim, over twothird were self-taught 66.9%, nearly one-fourth were from friends, 21.0%. Table 1 shows that one-quarter of adults have been experienced non-fatal drowning (25.8%), and concerning how they get out of difficulty during non-fatal drowning, 61.6% was saved by friends or family. The significant number of adults 53.6% visiting a recreational beach less than a month. About two-thirds (59.6%) of respondents rated themselves as a high risk of drowning. Concerning to level of knowledge over half had low level of knowledge 51.1%. The distance of recreational beach from in kilometers (km) the range was 1 to 60 km with a median 3 km, the majority of the distance was  $51.1\% \ge 3$  km, 48.9% < 3 km. The vast majority of the health facility were not available near to the recreational beach 74.8% was reported (Table 1).

Table 1 General characteristics of the respondents, water safety knowledge and environmental factors

	n	%
Age Group		
>29	171	52.0
-29	158	48.0
(Mean = 28.68, S. D = 7.20, Range: 18-56)		
Sex		
Male	199	60.5
Female	130	39.5
Living place		
Urban	284	86.3
Suburban	45	13.7
Education		
University and below	191	58.1
Bachelor and higher	138	41.9
Occupation		
Housewife, students, unemployed	180	54.7
Government staff, NGO&INGO staff	149	45.3
Adult with children		
No	203	61.7
Yes	126	38.3
Swimming skill		
No, cannot swim	172	52.3
Can swim	157	47.7
Non-fatal drowning experience		
No	244	74.2
Yes	85	25.8
Self-rate risk of drowning		
High (5-10)	196	59.6
Low (0-4)	133	40.6
Median = 5, Q. $D = 2.0$ , Min = 0 Min = 10		



	n	%
Level of water safety knowledge		
Low (2-4)	189	57.4
High (5-8)	140	42.6
Mean=5.3 S. D=1.1, Min = 2 Max = 8		
The distance of the recreational place from home		
$\geq$ 3 km	168	51.1
< 3 km	161	48.9
Median = 3, QD=5.7, range: $1 - 60$ km.		
Availability of health care services		
No	246	74.8
Yes	83	25.2

#### Risk perception of drowning

To determine the perception level of the adult was based on PMT factors, where categorized in two dimensions, first threat appraisal (perceived severity, perceived vulnerability), second coping appraisal (perceived self-efficacy and response efficacy). In this present study researcher used six statements of threat appraisal as the total score of risk perception and for the level of risk perception divided into two groups using the mean as the cut-off point. Slightly more than one-half of the respondents (56.1%) had high-risk perception, and near half of them had low-risk perception (43.9%), which presented in table 2.

#### Table 2 Level of risk perception

Level of risk perception	n	%
High (19-27)	184	56.1
Low (7-18)	144	43.9
Mean= 18.5, S. D = 3.5, Min=7, Max = 27		

The result in table 3 shown that most of the respondents stated strong positive opinion by agreeing on how they perceive themselves on the risk of drowning; however, some respondents had an unfavorable opinion by agreeing in question 3 who have a negative statement, where statements 1, 2, 3 represented perceive severity and 4, 5 and 6 (perceived vulnerability).

Table 3 Number and percentage related to the perception of the adult on drowning risk. (n=329)

Statements	SD	D	U	Α	SA
			n, %		
1. If I got caught in a rip, it is likely I	15	10	40	124	140
would need to be rescued	(4.6)	(3.0)	(12.2)	(37.7)	(42.6)
2. If I were in deep water and got tired, I	30	63	68	123	45
would be in danger of drowning	(9.1)	(19.1)	(20.7)	(37.4)	(13.7)
3. If I went for a swim outside of the	18	30	53	155	73
flags, it would not be a dangerous	(5.5)	(9.1)	(16.1)	(47.1)	(22.2)
situation					



Statements	SD	D	U	Α	SA
			n, %		
4. I think other people are at higher risk	74	104	49	81	21
of drowning than I am	(22.5)	(31.6)	(14.9)	(24.6)	(6.4)
5. My lack of swimming ability puts me	36	82	48	129	34
at risk	(10.9)	(24.9)	(14.6)	(39.2)	(10.3)
6. I often feel unsafe swimming when	40	79	44	124	42
conditions are rough	(12.2)	(24.0)	(13.4)	(37.7)	(12.8)
Note: SD-Strongly disagree D-Disagr	oo U-Unsi	ura 1-1ara	a S 1 - Stro	naly agree	

*Note: SD*=*Strongly disagree, D*=*Disagree, U*=*Unsure, A*=*Agree, SA*=*Strongly agree* 

Univariate logistic regression analysis on factor associated with Risk perceptions of drowning Table 4 provides a summary of the statistically significant results of univariate logistic regression analysis. The findings revealed that females, being housewives, students and unemployed, cannot swim, not had non-fatal drowning experienced, high self-rated risk of drowning, and the high score of water safety knowledge was significantly associated with the high-risk perception of drowning. Furthermore, there was three variables with p-value < 0.25 such as age < 29 years old, living in urban area and no children under care, was added for multiple logistic regression (Table.4).

Predictors	Total	Risk perception (n, %)		Crude OR (95%CI)
		High	Low	
Age group				
<29	158	96(60.8)	62(39.2)	1.46 (0.94-2.26)
<u>&gt; 29</u>	171	88(51.5)	83(48.5)	1
Sex				
Female	130	84(64.6)	46(35.4)	1.80** (1.14-2.85)
Male	199	100(50.3)	99(49.7)	1
Living place				
Urban	284	164(57.7)	120(42.3)	1.70 (0.91-3.22)
Sub-urban	45	20(44.4)	25(55.6)	1
Level of education				
University or below	191	113(59.2)	78(40.8)	1.36 (0.87-2.12)
Bachelor or above	138	71(51.4)	67(48.6)	1
Occupation				
Housewife, students,				
unemployed	149	95(63.8)	54 (36.2)	1.79** (1.15-2.80)
Government staff,				
NGO&INGO staff.	180	89(49.4)	91(50.8)	1
Adult with children				
No	203	120(59.1)	83(40.9)	1.40 (0.90-2.19)
Yes	126	64(50.8)	62(49.2)	1
Swimming skill				
No, cannot swim	172	109(63.3)	63(36.7)	1.89** (1.22-2.94)
Can Swim	157	75(47.8)	82(52.2)	1

Table 4 Univariate logistic regression analysis on factor associated with high-risk perceptions of drowning



Predictors	Total	Risk perception (n, %)		Crude OR (95%CI)
		High	Low	
Non-fatal drowning ex	perience			
Yes	85	37(43.5)	48(56.5)	1
No	244	147(60.2)	97(39.8)	1.96** (1.19-3.24)
Self-rate risk of drown	ing			
High	196	122(62.2)	74(37.8)	1.88** (1.21-2.95)
Low	133	62(46.6)	71(53.4)	1
The distance of the rec	reational p	olace from home		
<3 km	161	85(52.8)	76(47.2)	1
<u>&gt;</u> 3 km	168	99(58.9)	69(41.1)	1.28 (0.83-1.98)
Availability of health c	are service	es		
No	246	139(56.5)	107(43.5)	1.09 (0.67-1.81)
Yes	83	45(54.2)	38(45.8)	1
Level of knowledge				
High	140	51(36.4)	89(63.6)	1
Low	189	94(49.7)	95(50.3)	1.72** (1.10-2.70)
Level of education				
University or below	191	113(59.2)	78(40.8)	1.36 (0.87-2.12)
Bachelor or above	138	71(51.4)	67(48.6)	1

\* *p*-value < 0.05, if statistically significant at  $\alpha = 0.05$ 

\*\* *p*-value < 0.01, if statistically significant at  $\alpha = 0.01$ 

#### Multiple logistic regression model

The final model of multiple logistic regression analysis was calculated by using the Backward LR method during analysis to determine the significant predictors for the level of risk perception.

Finally, this study found that five predictors for risk perception, such as adults who lived in urban areas, were 2.0 times more likely to have high-risk perception than the adult who lives in a suburban area with the significant value (AOR=2.07, 95% CI, 1.05-4.09). The respondent who was occupation as a housewife, students, unemployed 1.8 times more likely to have high-risk perception than the respondent who was working government staff, private staff with significant value (AOR=1.87 95% CI, 1.18-3.01). Adults who cannot swim were 1.6 times more likely to have high-risk perception than the adult who can swim with the significant value (AOR=1.69, 95% CI, 1.06-2.70), not had non-fatal drowning experienced were 2.0 times more likely to have the high-risk perception (AOR: 2.02, 95% CI: 1.19-3.43), a high level of self-rate risk of drowning was 2.0 times more likely to have high-risk perception than those who have a low self-rated risk of drowning (AOR: 2.03, 95% CI: 1.26-3.26), high level of knowledge was 1.9 times more likely to have the high-risk perception (AOR: 1.90, 95% CI: 1.17-3.09) (Table 5).



Predictors	Adj. OR	95% C	95% CI of OR	
	-	Lower	Upper	
Living place				
Urban	2.07*	1.05	4.09	
Sub-urban	1			
Occupation				
Housewife, students, unemployed	1.88**	1.18	3.01	
Government staff, NGO&INGO staff.	1			
Swimming skill				
Cannot swim	1.69*	1.06	2.70	
Can Swim	1			
Non-fatal drowning experience				
No	2.02**	1.19	3.43	
Yes	1			
Self-rate risk of drowning				
High	2.03**	1.26	3.26	
Low	1			
Level of knowledge				
High	1.90**	1.17	3.09	
Low	1			

**Table 5** Multiple logistic regression analysis on the risk perception of drowning

\* *p*-value < 0.05, if statistically significant at  $\alpha = 0.05$ 

\*\* *p-value* < 0.01, if statistically significant at  $\alpha = 0.01$ 

## DISCUSSION

This study examined the risk perception of drowning and factors associated among adults in Timor-Leste in the context of the community level and found that 56 % of adults had highrisk perception towards the risk of drowning. This result supported by the study in New Zealand, which has concluded that over half of respondents had high-risk perceptions concerning to risk of drowning.<sup>24</sup> Similarly, a study by Willcox-Pidgeon, Kool et al. found that most of the respondents had a high level of perceived severity and vulnerability towards the risk of drowning.<sup>10</sup>

This study suggests that females, those who live in the urban area and as a housewife, student, unemployed may have a higher risk perception toward the risk of drowning than males, those who live in sub-urban area and working in government, NGO and INGO. The finding in relation to sex females also offers support for previous research Jp, and Moran et al. argue that females had high-risk perceptions than males  $(69.0\% \text{ vs. } 52.0\%)^{24}$  and also similar to Willcox-Pidgeon, Kool et al. described that in regards to risk perception of risk of drowning, females had higher levels than males.<sup>10</sup> This might be caused that male overestimate their self in swimming females.<sup>24</sup> than Therefore, competency drowning risk information and education should be more focused on males.

The present study concerning risk perception statement "If I went for a swim outside of the flags, it would not be a dangerous situation" almost 70% replied they agree and strongly agree, this finding differs to a study conducted by Moran, Webber et al. about the risk of drowning, and water safety perceptions of adult caregivers/parents, summarized that 24% of respondent agree and strongly agree. It might be due to the low level of water safety knowledge found in the present study.<sup>20</sup> Hence,





education toward water safety is needed in this study area.

This finding regarding respondents swimming previously experienced toward skills, drowning, self-rate risk of drowning suggests that adults who cannot swim, not had non-fatal drowning experienced, and high self-rated risk of drowning may have a high-risk perception of drowning. In regards to the majority of adults who cannot swim found in the present study were similar to the previous study.<sup>25, 26</sup> It might be caused by in Timor-Leste, there is no survival swimming training in the community. In terms of association swimming skill and level of risk of perception in the present study was similar to a study conducted by Stanley and Moran et al. argue that people perceived themselves as being more competent swimmers; they were more likely to engage in riskier acts in aquatic environments.<sup>11</sup> Similar to Jp, Moran et al. suggest that higher perceived swimming competency was associated with a lower perception of risk, which raises the possibility that some individuals (especially young males) might be overly confident about their ability to manage risky situations through overestimation of their swimming skill.24 Concerning with association between previous experienced non-fatal drowning and level of risk perception in this study was consistent with a study conducted by Ohman et al. that previous experience was the most potent predictor of high-risk perception.<sup>27</sup> It concludes that people with previous experienced can increase awareness or perception towards any threat and training on survival swimming needed in Timor-Leste.

In connection with water safety knowledge, this study suggests that a higher level of water safety knowledge may have a high level of risk perception than a low level of water safety knowledge. This is in agreement with Jp, Moran, et al., and Morrongiello, Sandomierski, et al., who postulated that people's knowledge was associated with their risk perception.<sup>7, 24</sup> In this study, most of the respondents answer knowledge regarding drowning prevention correctly (93.0%); over three-fourth answered correctly regarding the mortality rate drowning each year in children, concerning the risk of drowning knowledge statements over one-half respondent answer correctly. Therefore, with that knowledge might be increased risk perception among adults.

This study has certain limitations. First, the survey was conducted. The online survey, where sampling bias, non-response bias, response bias, and order bias, might have occurred during the process. Second, swimming skill in this study was estimated by the respondent and, therefore, may not be accurate-self-report bias, leading to overestimation of ability. Finally, our findings were based on Dili city, which may not be generalized to other parts of Timor-Leste.

# CONCLUSION

The majority of adults perceived drowning as a risk; however nearly half of them had low risk perception, over one-half of them cannot swim with a high percentage of the low level of water safety knowledge. This study suggests that living place, previous experience of non-fatal drowning, self-rated risk of drowning, was strongest predictor of risk perception than occupation, swimming skill and level of knowledge.

# RECOMMENDATIONS

The findings of the study could be useful in developing infrastructure to enhance adults drowning intervention in communities of Dili, Timor-Leste, by providing drowning risk information and education focused on community live in sub-urban areas, have swimming ability, with low level of self-rate risk of drowning is needed to enhance low risk perception. Further research should explore more on what factor related to the level of water safety knowledge among adults in Timor-Leste.



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## AN ASSESSMENT OF MANAGEMENT COMPETENCIES AMONG COMMUNITY HEALTH NURSES OF THE GAMBIA

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## ABSTRACT

Community health nurses (CHNs) have potentials to reach to a variety of communities and they are one of strong pillars of PHC and health system strengthening thus their mere availability without acquiring management competencies will contribute to PHC retardation. This study aims to assess and determine factors associated with management competencies among CHNs in The Gambia. A cross-sectional study conducted by using structured self-administered questionnaire among 179 CHNs censured. Data was collected between (April and May 2020) analyzed by IBM SPSS version 19. Descriptive statistics used to determine the level of management competencies. Crude and adjusted odds ratios (ORs) were reported for the association between sociodemographic characteristics, work related factors, life stress events and management competencies with 95% CI. A p-value less 0.05 was considered statistically significant. Total response rate was 83%. 7 management competencies assessed CHNs were not competent in only 1 financial management. Factors associated under sociodemographic characteristics marital status was a significant predictor associated with, planning and priority-setting (AOR=2.63, 95% CI=1.19-5.84), problem-solving, (AOR=2.43, 95% CI= 1.03-5.73) and professionalism, AOR=2.88, 95% CI= 1.10-7.55). Place of work was a significant predictor associated with financial (AOR=5.00, 95% CI=2.44-10.24), planning and priority-setting (AOR=5.28,95% CI=2.49-11.18) and problem-solving (AOR=2.28, 95% CI=1.07-4.87). Under work-related factors, training was a significant predictor associated with leadership (AOR=2.70, CI=1.09-6.68), planning and priority-setting AOR=2.72, 95% CI=1.32-5.60 and professionalism (AOR=2.51,95% CI=1.10-5.72). Awareness of role was a significant predictor associated with knowledge of healthcare environment (AOR=2.85, 95% CI=1.14-7.13). Under life stress events, experience personal injury (AOR=3.80, 95% CI= 1.05-13.72) and feeling easily annoyed/irritated (AOR=3.53, 95% CI=1.17-10.63) were predictors significantly associated with communication. The study suggests that CHN's financial management competence and factors associated with management competencies should be given more attention in continuing professional development and training programmes.

Keywords: management competencies, assessment, community health nurses, The Gambia

#### **INTRODUCTION**

According to World Health Organization (WHO), CHNs are essential health workforce with potentials to reach to varieties of population groups in communities and make significant contributions to meet their health care needs.<sup>1</sup> Improving health of individuals, population and organisation performance is determined by essential managerial competencies of healthcare workforce.<sup>2, 3</sup> Inadequate health systems performance over



the years has being attributed to incompetence of managers. This has potentials to cause severe health consequences on the wellbeing of individuals, communities and population. 4, 5

The failure and delay on the effective and efficient implementation of most PHC and health related programs are attributed to inadequate managerial competencies.<sup>6</sup> Lack of competence among nurses was one major health workforce challenge accounted for more medical errors in the US. than 50% Α competent nurse can reduce preventable medical errors and significantly contribute to the reduction of associated deaths.<sup>7</sup> Current demographic changes couple with increased demand for health services and health system reforms required health workforce to have management competencies in order to meet the expectations of the population.<sup>8</sup> There is complex interaction of political, economic and social issues within health systems that required reforms to have competent health workforce to continue to provide quality healthcare for the citizenry.<sup>9</sup>

Health delivery system of the Gambia is a based consisting three-tiered primary, secondary and tertiary levels. CHNs supervise Community Birth Companions (CBCs), Village Health Workers (VHWs) and Community-Based Distributors (CBDs) who are providing basic health services at community levels.<sup>10</sup> There is huge professional health workforce ratio which is 8.3/10,000 and nurses 3.2/10,000. Furthermore, there are high unacceptable Maternal Mortality Ratio 433/ 100,000 live births and Infant Mortality Ratio 34/1000 coupled with low modern contraceptive prevalence rate of 9%. The Gambia has one of the highest fertility rate of 5.6 per woman.<sup>10</sup> These statistics are a pointer as a result of a poorly functioning PHC system especially at the community level.<sup>10</sup> Competent CHNs are essential in the provision of sexual and reproductive health services in resource limited settings with potentials to reduce and prevent unintended/unwanted pregnancies,

support individuals and families to reduce undesirable health risks.<sup>11</sup> Geographically Gambia is prone to epidemic and natural disasters.<sup>10, 12</sup> PHC nurses with management competencies can contribute to strengthening professional capacity when dealing with disasters in rural areas.<sup>13</sup> More than 50% of the population are women and children, and more than 60% live in rural areas with significant regional disparity of health resources including workforce majority allocated in urban regions.<sup>14</sup> To cope with these challenges, The Gambia should have competent CHNs who are one of fundamental pillars of PHC with potentials to reach to the vulnerable, marginalized rural and remote communities.

Some researches <sup>1, 15, 16</sup> identified public health, health promotion and protection, injuries, disasters and disease prevention, offering treatment to patients, disability alleviation, managing and providing care, follow-ups and improved communication, collaborative skills, health assessment to mention but a few as core competencies for CHNs. Common management competencies studied among CHNs includes communication, professionalism, leadership, knowledge of the healthcare environment, interpersonal communication, decision making, management, resource financial management, human resources management, problem solving, planning and priority-setting, research and so on. 8, 17, 18 However, not much of the above-mentioned management competencies of CHNs have been studied in the Gambia. Globally there are varied reports and researches on competency standards for nurses working in general practice and PHC settings.<sup>19</sup> Over the years, competency standards for nurses working in PHC have received limited attention and those developed differed in quality of the development process.<sup>19</sup>

In the Gambia CHNs plays vital strategic roles including routine community diagnosis, planning and management of PHC facilities. Therefore, this study aimed to assess, and determine factors associated with management



competencies of CHNs for healthcare service and professional improvement and development.

# **METHODS**

A cross-sectional study was conducted in the 7 health regions of The Gambia. The study censured 179 CHNs who were working in the regions at the time of data collection with minimum of 6-month experience and voluntarily agreed to participate and met the inclusion criteria. The reason for the census was due to relatively small number of CHNs in the Gambia quantitatively. Research assistances were closely monitored by principal researcher through regular calls and WhatsApp group daily briefing. Local expert was available who monitored and supervised research assistants whilst in the field during data collection. Pretest completed on 30 professional nurses at least 4 per region. The overall Cronbach's alpha coefficient was .964. The Cronbach's alpha coefficient for 7 components were communication .666. leadership .811, financial .885, planning and priority-setting .834, problem-solving .821, professionalism .895 and knowledge about healthcare environment .899. The instrument was reviewed for content validity by the three thesis advisory committee members at Mahidol University and a local expert with extensive experience in research.

#### Measurements

Research questionnaire was adapted from previous studies.<sup>20, 21</sup> The instrument has four parts, sociodemographic characteristics such as age, sex, marital status, highest level of education, designation, current place of work and region (7 items).<sup>20</sup> Work-related factors such as years of experience, management competencies trainings received, experience job transfer/relocation and awareness of role expectation (4 items).<sup>22</sup> Life stress evens such as experience death of a close family, experience personal injury/illness, experience trouble with boss past six months, feeling easily

annoyed/irritated, feeling lonely and having opinion that facing daily task is a source of pleasure (6 items)<sup>23</sup>. 7 components of management competencies (47 items) they are communication (5 items), leadership (6 items), financial (6 items), planning and prioritysetting (5 items), problem-solving (6 items), professionalism (9 items) and knowledge of healthcare environment (10 items) total 64 items. Part 1-3 were measured using nominal scale and part 4 measured using 5 points summated rating Likert scale from 1=I don't do this, 2=I rarely do this, 3=I sometimes do this, 4=I often do this, 5=I always do this.<sup>20, 21, 24</sup>

#### Data collection procedure

Upon granted approval from MUSSIRB certificate reference number 2020/066.2503 researcher recruited 7 professional researcher assistants with certificate, diploma and bachelor in nursing science with data collection They were given two-day experience. orientation using WhatsApp group on the objective, study design, data collection procedure/method, instrument, data confidentiality management, and ethical principles. Adequate number of questionnaires printed for each region saved at regional offices for safety and security. CHNs who met inclusion criteria were contacted by calls and those who agreed and available to participate were given information sheet, consent form and the survey tool by trained research assistants at their workplaces and time was agreed for submission between 1-5 days. Respondents were reminded by the third day by calls and questionnaires collected by the fifth day from respondent's workplaces by trained research assistants. Completed forms were crosschecked for completeness and correctness before sending to principal researcher. Data was collected between April -May 2020 questionnaire takes about 30-45 minutes.

#### Ethical consideration

The protocol was approved by MUSSIRB approval certificate reference number



2020/066.2503 and MUSSIRB number 2020/081/(B2). Permission sought from director of health services and regional health directors and respondents. Informed written consent form was received from respondents before collecting data.

#### Data analyses

Completed forms were cross-checked entered into excel exported to SPSS version 19. Data cleaned before analyses. Likert scale items summed up to percentage and categorized into 2 not competent and competent defined as score below and above 65%. as a pass mark.<sup>38</sup> Bi-variate analysis was performed to determine the association between independent and dependent variables. The variables that were significant in bivariate analysis at 0.05 were included in the forward multivariate logistic regression analyses to explore the most predictors significant for management competencies. Descriptive statistics used to determine the level of management competencies. Crude and adjusted odds ratios (ORs) were reported for the association between sociodemographic characteristics, work related factors, life stress events and management competencies with 95% CIs. A pvalue less 0.05 was considered statistically significant.

## RESULTS

Table 1 Shows age group 19-28 years was the youngest accounted for 54.2%. The minimum and maximum age were 19 and 55, mean age was 29.4 with standard deviation 6.14. Equal sex distribution 50%. Married respondents accounted for 63.1%. Highest level of education was certificate 96.6%. CHN generals formed 95.5%. By place of work showed 48.6% at health facilities and 51.4% at PHC circuits.

Table 1 Number and percentage of respondents by sociodemographic characteristics (n=179)

Sociodemographic Charact	eristics	n	%
Age group	19-28 years	97	54.2
	29-38 years	67	37.4
Min=19, Max=55,	39-48 years	12	6.7
Mean=29.4, SD=6.14	49-58 years	3	1.7
Sex	Male	91	50.8
	Female	88	49.2
Marital Status	Married	113	63.1
	Single	61	34.1
	Divorced	5	2.8
<b>Educataional Level</b>	Certificate	173	96.6
	Diploma	6	3.4
Designation	CHN General	177	95.5
	CHN Midwife	2	4.5
Current place of work	Health facility	87	48.6
	PHC circuit	92	51.4

Table 2 shows more than two third of respondents received training on communication management competence. Work experience less than 5 years was about two third. More than half of respondents experienced job transfer/relocation. More than two third mentioned community health support and administration as their role expectation.



Trainings received on management competencies	n	%
(answered yes) multiple answers		
Communication management competence	157	83.1
Leadership management competence	112	59.3
Financial management competence	16	8.5
Planning and priority-setting management competence	110	58.2
Problem-solving management competence	133	70.4
Professionalism management competence	91	48.1
Knowledge of healthcare environment competence	151	79.9
Other management competence	9	4.8
Completed years of work experience		
Less than 5 years	125	69.8
More than 5 years	54	30.2
Experience job transfer/relocation		
None	53	29.6
One or more time	126	70.4
Aware of role or expectation		
Interpersonal health support	33	18.4
Community health support and administration	146	81.6

**Table 2** Number and percentage of work-related factors (n=179)

Table 3 shows at least 3 in 5 respondents experienced death of a close family member, 2 in 5 experienced personal injury and 1 in 5 experienced trouble with boss at least once past 3 to 6 months. 4 in 5 respondents not feeling easily annoyed/irritated at work and also 4 in 5 respondents not feeling lonely at work and about 2 in 5 respondents having opinion that facing daily task is a source of pleasure.

**Table 3** Number and percentage of life stress events (n=179)

Life stress events	n	%
Experienced death of close family member past 3 to 6 months	95	53.1
Experienced personal injury/illness in the past 3 to 6 months	58	32.4
Experienced trouble with your boss in the past 3 to 6 months	20	11.2
Feeling easily annoyed / irritated at work		
Not at all / a little bit	156	87.1
Moderately	15	8.4
Extremely	8	4.5
Feeling lonely at work place		
Not at all / a little bit	153	85.4
Moderately	17	9.5
Extremely	9	5.1
Have opinion that facing daily tasks is a source of pleasure		
Not at all / a little bit	63	35.2
Moderately	34	19.0
Extremely	82	45.8



Table 4: shows management competencies scores of CHNs as follows: Communication 157(87.7%), Leadership 155(86.6%), Financial 56(31.3%), Planning and priority-setting 125(69.8%), Problem-solving 141(78.8%), Professionalism 144(83.2%) and Knowledge of healthcare environment 153(85.5%).

**Table 4** Percentage, Pearson Chi-Square and p-values of management competence levels among CHNs (n=179)

Management competencies	Levels of management competencies n (%)		Pearson Chi-Square	p-value
	Not competent	Competent	-	
Communication	22 (12.3)	157 (87.7)	4.57	0.033
Leadership	24 (13.4)	155 (86.6)	1.37	0.242
Financial	123 (68.7)	56 (31.3)	4.79	0.029
Planning and priority- setting	54 (30.2)	125 (69.8)	7.22	0.007
Problem-solving	38 (21.2)	141 (78.8)	1.61	0.205
Professionalism	30 (16.8)	149 (83.2)	1.07	0.301
Knowledge of healthcare environment	26 (14.5)	153 (85.5)	0.07	0.787

Table 5 shows factors associated with management competencies under sociodemographic characteristics marital status was a significant predictor associated with, planning and priority-setting (AOR=2.63, 95% CI=1.19-5.84), problem-solving, (AOR=2.43, 95% CI= 1.03-5.73) and professionalism, AOR=2.88, 95% CI= 1.10-7.55) and place of work was a significant predictor associated with financial (AOR=5.00, 95% CI=2.44-10.24), planning and priority-setting (AOR=5.28,95% CI=2.49-11.18) and problem-solving (AOR=2.28, 95% CI=1.07-4.87).

Under work-related factors, training received on management competencies was a significant predictor associated with leadership (AOR=2.70, CI=1.09-6.68), planning and priority-setting AOR=2.72, 95% CI=1.32-5.60 and professionalism (AOR=2.51,95% CI=1.10-5.72) and awareness of role expectation was a significant predictor associated with knowledge of healthcare environment (AOR=2.85,95% CI=1.14-7.13).

Under life stress events, experience personal injury/illness (AOR=3.80, 95% CI= 1.05-13.72) and feeling easily annoyed/irritated (AOR=3.53, 95% CI=1.17-10.63) were predictors significantly associated with communication.

Table 5 Multiple logistic regression showing factors associated with management competencies (n=179)

Variables	Adj. OR	95% C Lower	l for OR Lower	P-value
Communication				
Experienced personal injury past 3-6 month				
No	1			
Yes	3.80	1.05	13.72	0.042



Variables	Adi.	95% CI	for OR	P-value
	<b>O</b> Ř	Lower	Lower	
Feeling easily annoyed/Irritated at workplace				
No	3.53	1.17	10.68	0.025
Yes	1			
Leadership management competence				
Trainings received on management competencies				
Low	1			
High	2.70	1.09	6.68	0.032
Financial management competence				
Place of work				
Health facility	1			
PHC circuit	5.00	2.44	10.24	0.000***
Planning and priority-setting				
Marital status				
Married	1			
Single	2.63	1.19	5.84	0.017**
Place of work				
Health facility	1			
PHC circuit	5.28	2.49	11.18	0.000***
Training received on management competencies				
Low	1			
High	2.72	1.32	5.60	0.007**
Problem-solving management competence				
Marital status				
Married	1			
Single	2.43	1.03	5.73	0.043
Place of work				
Health facility	1			
PHC circuit	2.28	1.07	4.87	0.033
Professionalism				
Marital status				
Married	1			
Single	2.88	1.10	7.55	0.032
Training received on management competencies				
Low	1			
High	2.51	1.10	5.72	0.029
Knowledge of healthcare environment				
Awareness of role expectation				
Interpersonal health support	1			
Community health support and administration	2.85	1.14	7.13	0.026
OP 11 + OI + OI + 11 + C				

OR=odd ratio, CI=confidence interval, 1=reference, \*p-value<0.05, \*\* p-value < 0.01, \*\*\*p-<0.001



## DISCUSSION

#### Management competencies levels

comparison of For the management competence levels, result indicated that CHNs rated themselves as acquired adequate communication skills. Finding like previous studies in Timor-Leste and in South African.<sup>20,</sup> <sup>21</sup> This study indicated that a good proportion of nurses are competent in leadership. Finding is in agreement with a study in South African.<sup>21</sup> However, contrary to previous studies in South African and Timor-Leste.<sup>20, 25</sup> Communication and leadership competencies are critical for healthcare managers and may positively contribute to preventive health intervention outcomes for individuals, community and population.<sup>3</sup> Adequate communication skill is critical for healthcare managers to effectively and efficiently perform.<sup>18</sup>

Finding revealed that all CHNs rated themselves incompetent in financial management. Comparatively it scored the lowest among the management competencies. Finding is consistent with two similar previous studies in South Africa and in Timor-Leste.20, 21 According to a study on financial management roles of nurse managers in selected public hospitals in South Africa revealed that nurse managers need financial management function in healthcare organization but lack the necessary knowledge and skills to function adequately in this domain.<sup>26</sup> In addition, it was highlighted in a national summary report in South Africa that nurse managers experienced similar thing.<sup>27</sup> Reported in European research on financial management on small and medium enterprises (SMEs), that lack of financial management competence is а major fundamental cause of financial management in health and other related problems organizations.<sup>28</sup> Incompetent PHC nurse managers can retard organizational performance and development in healthcare setting.<sup>29</sup>

For competent in problem-solving skills, finding consistent with one previous study in

the Gambia and two previous studies in South African and Nicaragua.<sup>21, 30, 31</sup> For planning and priority-setting, professionalism and knowledge of the healthcare environment, in this study CHNs rated themselves as competent in these three skills. The finding is not in agreement with a study in Timor-Leste<sup>20</sup>. These three management competencies are part of essential competencies requirement for CHNs in healthcare environment for service improvement <sup>8</sup>. Failure and delay of effective and efficient implementation of most PHC activities are attributed to in adequate management competence skills of managers.<sup>6</sup>

#### Factors associated with management competencies among CHNs from final models of multiple logistic regression analyzes.

Under sociodemographic, marital status was found significant predictor associated with planning and priority-setting, problem-solving and professionalism. Place of work was found significant predictor associated with financial, planning and priority-setting and problemsolving. Concerning marital status, findings similar to this study in Japan.<sup>22</sup> Furthermore, finding supported in two previous studies in Iran and Japan.<sup>32, 33</sup> This indicate that sociodemographic characteristics are important factors that may influence management competencies among CHNs.<sup>21</sup>

Under work-related, trainings received on competencies management was found significant predictor associated with leadership, planning and priority-setting and professionalism. Awareness of role expectation was found significant predictor associated with knowledge of healthcare environment. With regards to trainings, similar result was found in Jakarta Indonesia.<sup>34</sup> In addition, findings supported by two similar researches in Serbia and in South Africa.35, 36 About awareness of role expectation, a study in Japan found that it was associated with public health nurses' professional competencies.<sup>22</sup> This means work-related factors play important role in



professional competencies among healthcare workers in the drive for organizational goal achievement.<sup>22</sup>

Under life stress events, experience personal injury and feeling easily annoyed/irritated were found significant predictors associated with communication management competence. With regards to experience personal injury/illness is among the top items on life changes index scale ranks that needs greatest adaptation because it has potential to trigger illness if occurs to people more frequently within 3 to 6 months. Feeling easily annoyed/irritated is among common feelings and complaints that people experience can influence people at workplace.<sup>23</sup> Finding corroborated by result of a study by Yarker in London.<sup>37</sup> Life stress events are essential factors that needs to be considered among CHNs because they are critical for enhancing performance at workplace.<sup>23</sup>

Among CHNs factors associated with management competencies can enhance performance and incompetent manager can affect organizational goal attainment.<sup>29</sup>

# CONCLUSION

Gambia health sector is on the process of PHC revitalization with the ultimate goal of providing quality health services to all. This required CHNs to acquire adequate managerial competence skills for improvement of PHC system. The study suggest they are incompetent management and in financial required additional trainings. Their financial competence skills management and 6 predictors of management competencies should be prioritized. CHNs financial management skills and predictors of management competencies could be improved through continuous professional development trainings in a form of pre-service and in-service in line with PHC revitalization principles supported by positive environment.

#### LIMITATION

This study explains the situation of The Gambia not generalizable to other countries that have different healthcare system and policies. The results cannot be generalized to other healthcare professionals. The cut of point for management competencies was 65% and above.

## RECOMMENDATIONS

Police makers should work with CHN school to develop and incorporate financial management trainings for CHNs in a form of pre-service and in-service trainings for improved healthcare system and continuous professional development. The trainings should be in line with PHC reform goals and should be given adequate attention and support for continuity. They should develop PHC training policy focusing on PHC goal.

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## PATIENT SAFETY CULTURE AMONG NURSES WORKING IN A TERTIARY GOVERNMENT HOSPITAL IN MALAWI

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## ABSTRACT

Patient safety culture (PSC) is a vital component to improve patient safety and quality health care delivery. Nurses are gatekeeper and play an important role to improve patient safety. Despite increasing interest on PSC, there is limited information about PSC among Malawian nurses. Therefore, the purpose of this study was to describe nurse's perception of PSC in a tertiary government hospital in Malawi and explore predictors of the frequency of events reported. A hospital-based cross-sectional survey conducted among 302 nurses in April 2020. Self-administered hospital survey on patient safety culture (HSPSC) questionnaire was adopted to assess PSC among nurses. The questionnaire consisted of 44 items and 12 PSC composites. Descriptive and multivariate logistic regression statistics was used to analyze data. The survey response rate was 84.4 %. The mean age was 33 (SD = 8.8) years, majority were female (74.6%), 57 % were nurse-midwife technician, and more than half had diploma as their highest qualification. The overall average positive response rate for 12 dimensions of PSC was 44.2%. Teamwork within units scored highest positive response rate of 72.5%, while staffing scored the lowest 24.6%. Majority (76.5%) of respondents did not report any events and only 33% grade the patient safety as very good or excellent. Multivariate logistic regression analysis revealed that hospital management support for patient safety (AOR=2.0, 95% CI=1.19-3.34), and feedback and communication about error (AOR=3.5, 95% CI=2.11-5.94) dimensions were predictors of adverse events reporting. The study identified poor patient safety perception among nurses and several areas needed improvement, especially staffing level, non-punitive response to error, and frequency of event reporting. The findings suggest that good management support for patient safety and feedback and communication about error are critical components in improving patient safety culture. Therefore, healthcare policymakers and managers should consider patient safety as a top priority.

Keywords: patient safety culture, nurses, hospitals, hospital survey on patient safety culture

## **INTRODUCTION**

Patient safety is a major challenge for all health care system globally and is a critical component of healthcare quality.<sup>1, 2</sup> Patient safety is the act of avoiding and preventing the risk of harm occurring as a result of healthcare processes.<sup>3</sup> Significant number of patients harmed from health care facilities due to adverse events/medical errors resulting to permanent injury, increased hospital stay, physical and financial burden on patients, and even death.<sup>4, 5</sup> About 15% of overall healthcare institution spending is as a direct result of medical errors.<sup>6</sup> Furthermore, medical error is the 14th leading contributor to the global burden of diseases.<sup>7</sup> Therefore, the safety of patients has become a concern for health professionals and researchers worldwide.<sup>8</sup>





Previous studies have reported that the key strategy to improve patient safety and maintain quality of care delivery in healthcare system is through promotion of positive patient safety culture.<sup>9, 10</sup> Patient safety culture is described as the set of shared values, altitudes, perceptions, beliefs and behaviours that support safe practices among individuals in healthcare organization.<sup>10</sup> Studies have identified several factors that positively contribute to patient safety culture, including non-punitive response to error, effective communication, appropriate staffing, teamwork and leadership support.<sup>11, 12</sup> Healthcare organization with positive PSC can unnecessary hospital admissions reduce resulting from adverse events, and has the potential of saving countries millions of dollars annually.<sup>12, 13</sup> The first step towards developing a positive PSC is assessing organization existing safety culture among their healthcare providers.<sup>14, 15</sup> Mitchell believes that understanding the existing culture before attempting to transform it, is of utmost important.<sup>16</sup> Such, assessment allow healthcare organization to identify and address areas that need improvement in the healthcare processes.<sup>9</sup> Since nurses are the gatekeeper and play an important role to improve patient safety. Understanding their perception regarding PSC would help to ensure success in providing patients with the safest and highest quality of patient care.14

There is increasing interest in studying PSC in healthcare organizations especially in America. Asia and limited part of African Continent <sup>3, 4,</sup> <sup>12, 14, 17-21</sup>. Despite, patient safety has become a global issue and an area for research, there is limited research studies done in the Republic of Malawi. Furthermore, although nurses play a vital role-in delivering patient care and protecting patients from harm, little is known about nurse's perception regarding PSC in the Malawian healthcare facilities. Therefore, the purpose of this study was to describe nurse's perception regarding PSC and explore predictors of the frequency of events reporting in a tertiary government hospital in the central region of the Republic of Malawi. The study findings would provide an insight into the state of PSC in our government tertiary hospital. The insight gained would be beneficial to clinical practice, policy-makers, and research.

# METHODS

## Study design and setting

This hospital-based cross-sectional survey was conducted in one major government tertiary hospital in the central region, Malawi. This hospital was purposively selected based on geographical accessibility, good number of prospective respondents and being in the process of acquiring international accreditation. The hospital has five major departments and offers general and specialized care to patients referred from nine surrounding district hospitals and other private health facilities within the region.

## Population and sample

This survey targeted all nurses who were working at the study site during data collection period. The study included nurses with at least six-month work experience and voluntarily agreed to participate, and excluded nurses who were on leave. The hospital had approximately 430 nurses of which 358 met the inclusion criteria and 302 nurses participated. Convenience sampling strategy was used and sample recruitment was done by visiting all the hospital units 5 times/week.

## Measurements

Hospital survey on patient safety culture (HSPSC) questionnaire was used to assess patient safety culture among nurses.<sup>10</sup> The tool has been widely used by many researchers internationally.<sup>3, 17, 22</sup> The tool was pre-tested for reliability with 30 nurses in similar setting with the study site. The Cronbach's alpha result ranged from 0.65 to 0.89, indicating that the tool was reliable. The English version was used because all nurse working in the study site could speak and write in English and all patient care was documented in English. The HSPSC





tool focuses on patient safety and errors and events reporting, and it consisted of 44 items that are classified into 14 dimensions.<sup>10</sup> In this study, the tool categorized into eight sections as follows:

Section A had 11 questions which focused on the respondent's characteristics (age, gender, education level, staff position, work experience, and hours worked/week).

Section B comprised of 18 questions that assessed participants' perception on teamwork within units, organizational learning, staffing, non-punitive response to errors and overall perceptions of patient safety in their work area/unit. The items were assessed using a 5point Likert scale of agreement (strongly disagree=1 to disagree=2, neutron=3, agree=4, strongly agree=5)

Section C contained four questions that focused on supervisor/manager expectations and actions promoting patient safety dimension. Measured same as in section B.

Section D contained six questions that focused on communication openness and feedback and communication about error. The items were assessed using a 5-point Likert scale of agreement frequency (never=1, rarely=2, sometimes=3, most of the time=4, always=5) Section E had 3 questions on frequency of adverse events reported and measured like in section D

Section F comprised 11 questions focusing on teamwork across units in the hospital, handover and transitions, and management support for patient safety. Measured same as in section B Section G required the participants to indicate the number of events reported in the past 12 months and the item was scored using frequency (no event report, 1-2 events reported, 3-5 events reported, 6-10 events reported, 11-20 events reported and 21 above events reported) Section H also required the participants to provide an overall grade on patient safety in the hospital unit. Measured on five-point Likert scale (poor=1, fair=2, good=3, very good=4, excellent=5).

#### Data collection procedures

Researcher recruited three research assistants to conduct data collection, and closely monitored them through phone calls. Two-days training was conducted via online on the objectives, questionnaire, data collection and maintaining confidentiality. method, Paper-based self-administered method utilized and 370 questionnaires were printed. Research assistants approached nurses who met inclusion criteria in their units during working hours, and requested them to participate in the study after explaining the survey purpose. The nurses who agreed to participate were given a package comprising information sheet, consent form and the survey tool. The completed questionnaires collected from the participants in a sealed envelope after 1-2 days. Then, the research assistants cross-check and scanned the completed questionnaires, and sent them to the principle investigator (for data entry and analysis) via telegram. Data collection conducted in April 2020.

#### Ethical consideration

Ethical approval was provided by Mahidol University, Social Science Institutional Review Board, with certificate of approval number 2020/061.2503. Permission was sought from the hospital director of study hospital and written consent obtained from respondents.

#### Data analysis

The completed questionnaires were crosschecked and entered using Epi-data Version 3.0, and exported to Statistical Package for Social Science software (SPSS), version 21 for data analysis. All negatively worded items scores were reverse coded so that higher score indicates more positive response <sup>10</sup>. Univariate





analysis performed to summarize and describe the study variables.

To determine nurses' perception toward PSC dimensions, the percentage of positive responses rate were computed by adding frequency proportions of the two highest scores, strongly agree (5) and agree (4) or always (5) and most of the times (4) of the items.<sup>10</sup> The composite index for each dimension was the average of positive response rates. The dimension that score average positive response rate of 75% and above was considered as area of strength, while a positive response rate below 50% was considered as area of weakness (need improvement).<sup>10</sup>

Bi-variate analysis performed to determine the association between independent and dependent variable. Frequency of event reported was entered as an outcome variable and it was dichotomized into report (above mean score) and no report (below mean score). The variables that were significant in bivariate analysis at a significant level of 0.05 were included in the multivariate logistic regression analyses to explore the predictors of frequency of events reported.

# RESULTS

#### Respondents' characteristics

The survey had the response rate of 84.4% of the population. The majority of the respondents were female (73.8%), age ranged from 19 to 60 years old (mean= 33.2, SD = 8.8). More than half (57.3%) had diploma/certificate, 57.0% were nurse-midwife technician, and almost one-third of participants worked in obstetrics

and gynaecology department (29.1%). Almost all of the respondents had direct contact with patients, 75.5% of the respondents were not trained on patient safety. The years of worked experience ranged from 1 to 35 years (mean=7.2 SD=6.8), and more than half (n=170, 56.3%) worked five years and below. The working hours ranged from 20 to 60 hours/week (mean= 40.9 SD=3.5), 79.1% of the respondents worked 40 hours and less per week. Table 1 show more details.

# Nurses' perception on patient safety culture dimensions

Table.2 shows the nurses' response score on 12 PSC dimensions. The overall average positive response score for 12 dimensions was 44.4%. Teamwork within units scored the highest average positive response of 72.5%, while staffing scored the lowest positive response of 24.6%, followed by non-punitive response to errors (25.6%). None of the dimension scored 75% and above (strength area), however, nine dimensions scored less than 50% (weak areas) (see table 2).

Table 3 show the overall perception of patient safety among nurses. Forty-five percent had a positive response regarding the perception of patient safety. The overall frequency of reporting events was low in the respondents' work areas (29.1%) (Table 4). Figure 1, presents the number of events reported by nurses in the past 12 months. Majority of the respondents did not report any event in the past 12 months. Figure 2, presents the respondent's assessment of the overall perception of patient safety grade of their hospital units. About 33% of the nurses graded patient safety as very good/excellent.



 Table 1 Respondents' demographic characteristics (n= 302)

Variables	n	%
Age in years		
< 33 years	179	59.3
$\geq 33$ years	123	40.7
Mean= $33.2$ SD= $8.8$ Min= $19$ Max= $60$	125	10.7
Gender		
Female	223	73.8
Male	79	26.2
Education level		
Diploma/certificate	173	57.3
Bachelor/master's degree and above	129	42.7
Staff position		,
Nurse-midwife technician	172	57.0
Registered nurse/Nursing officer	100	33.1
Others	30	9.9
Area of work		
Obstetrics and Gynecology department	88	29.1
Surgery department	56	18.5
Pediatrics department	38	12.6
Medicine department	47	15.6
Emergency/ICU/Theatre	40	13.2
Oncology/Dialysis unit	20	6.6
Others	13	4.3
Years in nursing profession		
< 5 years	170	56.3
$\geq 6$ years	132	43.7
Mean = 7.2 SD= 6.8 Min= 1 Max= 35		
Years worked at the current hospital		
< 5 year	176	58.3
>5 years	126	41.7
Mean = 5.6 SD= 6.0 Min=1 Max= 35		
Years worked in the current hospital area/unit		
< 3 year	169	56.0
> 3 years	133	44.0
Mean= 3.8 SD=4.1 Min= 1 Max= 28		
Hours worked/week		
$\leq 40$ hours	239	79.1
> 40 hours	63	20.9
Mean= 40.9 SD= 3.5 Min= 20 Max= 60		
Trained on patent safety		
Yes	74	24.5
No	228	75.5



PSC Dimensions	Number of items	Strongly disagree/ Disagree	Neither	Strongly agree/ Agree	Average % positive response
1.Teamwork within units	4	10.5	14.3	75.2	72.5
2. Supervisor expectations &	4	15.8	20.4	63.8	63.8
actions promoting patient safety					
<b>3</b> .Staffing	4	55.5	20.0	24.5	24.5
4.Non-punitive response to error	3	52.4	22.0	25.6	25.6
5.Handoffs and transitions	4	39.6	26.2	34.2	34.2
<b>6</b> .Management support for patient safety	3	31.6	29.2	39.2	39.2
7.Feedback and communication about error	3	20.7	34.7	44.6	44.6
8.Communication openness	3	23.3	31.9	44.8	44.8
9. Teamwork across units	4	23.1	31.0	45.9	45.9
<b>10</b> .Organizational learning continuous improvement	3	14.5	25.1	60.4	60.4
<b>11</b> .Frequency of events reporting	3	40.1	30.8	29.1	29.1
<b>12</b> .Overall perception of patient safety	3	27.5	27.1	45.4	45.4
Overall average positive PSC	42	27.6	26.1	44.4	44.4 %

**Table 2** Nurses' response score on 12 PSC dimensions (n= 302)

#### Table 3. Percentage of nurses by perceived overall perception of patient safety

Survey items	Strongly disagree/ Disagree	Neither	Strongly agree/ Agree	% Positive response score
It is just by chance that more serious mistakes do not happen around*	41.7	26.5	31.8	41.7
Patient safety is never sacrificed to get work done	28.5	30.8	40.7	40.7
We have patient safety problems in this unit*	45.7	22.8	31.5	45.7
Our procedures and systems are good at preventing errors	18.2	28.1	53.6	53.6
Composite average positive response score				45.4%

\* Negatively worded items



Variables	Never/ rarely	sometimes	Most of the times/ always	% Positive response score
When a mistake is made but is caught and corrected before affecting the patient, how often is this reported?	36.8	32.5	30.8	30.8
When a mistake is made but has no potential to harm, how often is this reported?	43.7	28.5	27.8	27.8
When a mistake is made that could harm the patient, but does not, how often is this reported?	39.7	31.5	28.8	28.8
Composite average positive response score				29.1%

Table 4 Percentage of nurses by perceived frequency of event reported



Figure 1 Number of adverse events reported within the past 12 months.







Figure 2 Overall patient safety grade

#### Factors associated with frequency of events reporting

Table 5, present the bivariate and multivariate logistic regression analysis of factors associated with frequency of event reported. In the bivariate analysis, 10 variables (age, level of education, attending training on patient safety and 7 dimensions of PSC) were significantly associated with frequency of events reporting (Table 5). These ten variables were included in multi-variate logistic regression analysis to explore the predictors of adverse event reporting. Hospital management support for patient safety, and feedback and communication about errors were significantly associated with frequency of events reporting after adjusting other variables. A one-unit increase in the score on hospital management for patient safety increased the frequency of event reporting by 2.0(95% CI=1.19-3.34), whereas a unit increase in feedback and communication about errors increased frequency of event reporting by 3.5 (95% CI=2.11-5.94).

**Table 5** Bivariate and multivariate logistic regression analysis of factors associated with frequency of event reported.

Variables	Bivariate model			M	ultivariate m	odel
	COR	95% CI	Р	AOR	95% CI	Р
Teamwork within units	1.7	1.03-2.85	0.039*	1.0	0.54-1.77	0.937
Management support for	2.7	1.69-4.45	$0.000^{***}$	2.0	1.19-3.34	$0.009^{**}$
patient safety						
Organizational learning	2.7	1.60-4.40	$0.000^{***}$	1.7	0.90-3.07	0.079
continuous improvement						
Handoffs and transitions	1.6	1.00-2.62	$0.048^{*}$	1.0	0.55-1.85	0.987
Communication openness	2.9	1.76-4.67	$0.000^{***}$	1.3	0.69-2.44	0.418
Teamwork across units	1.9	1.17-3.03	$0.009^{**}$	1.2	0.63-2.13	0.645
Feedback and	3.8	2.31-6.34	$0.000^{***}$	2.5	1.42-4.55	$0.002^{**}$
communication about error						



Variables	Bivariate model			Multivariate model		
	COR	95% CI	Р	AOR	95% CI	Р
Age of respondents						
< 33 years (reference)						
> 33 years	1.8	1.12-1.88	$0.015^{*}$	1.4	0.79-2.35	0.270
Level of education						
Diploma and Certificate	1.7	1.06-2.82	$0.027^{*}$	1.7	0.99-2.91	0.056
Bachelor and master's						
degree (reference)						
Attended training on						
patent safety						
No (reference)						
Yes	2.1	1.20-3.50	$0.008^{**}$	1.6	0.85-2.91	0.145

\**P-value* <0.05, \*\* *P-value* <0.01, \*\*\* *P-value* < 0.001,

#### DISCUSSION

This study adopted the HSPSC tool to assess patient safety culture as perceived by nurses working in a tertiary government hospital in Malawi, and to explore predictors of the frequency of events reported. The findings of this study identified that nurses had low perception toward PSC, especially in the aspects of staffing level, non-punitive response to errors, frequency of event reporting and others, which need improvement. However, nurses gave high positive response score on teamwork within units, supervisor expectations and actions promoting patient safety, and organizational learning, although the scores were less than seventy-five percent to qualify as an area of strengths. Furthermore, the study identified management support for patient safety and feedback and communication as the predictors of the frequency of events reported.

The overall average positive score for twelve PSC dimensions was forty-four percent, which was low compared to the findings reported in Ethiopia, <sup>23</sup> Saudi Arabia, <sup>19</sup> and Philippines.<sup>14</sup> This finding suggest that nurses working in this hospital had negative perception toward PSC. However, teamwork within units composite was the best positively perceived in this study, which was similar with the result reported in Ethiopia,<sup>23</sup> and Saudi Arabia.<sup>25</sup> In contrast, the current result was lower compared to findings reported in Philippines, <sup>14</sup> Jordan <sup>15</sup> and

Oman<sup>26</sup>, in their studies, this dimension was an area of strength. In Malawi, this result maybe explained that when nurses perceived having shortage of nursing staff to handle workload, they work together as team to deal with high workload.<sup>24</sup> Moreover, this dimension is very vital to provide effective and safe care since treatment usually performed by a multidisciplinary team in a variety of clinical settings within the hospital.<sup>14</sup>

The third highest average positive responses was on organizational learning and continuous improvement, which was in consistent with the result reported in Jordan.<sup>15</sup> However, this dimension had more positive response in studies done in Philippines, <sup>14</sup> and Saudi Arabia.<sup>19</sup> The result shows that nurses are trying their best to improve patient safety, but they are less optimistic about learning from medical errors in their units. The process of learning and continuous training is essential to improve patient safety and quality of care. Therefore, the executive managers need to imitate the supportive system such as set up the safety guideline in the hospital, develop a pilot project to implement the patient safety policy and then other units can learn for improvement.

The hospital management support for patient safety composite had low positive response score compared to results reported in Kuwait,<sup>27</sup> and Philippines.<sup>14</sup> The result shows that nurses feel that management does not give priority to





patient safety. Therefore, the hospital should have patient safety policies and enhance awareness of all staff. Furthermore, this dimension was significantly associated with frequency of events reported. The findings were similar to studies done in Kuwait,<sup>27</sup> and in Oman.<sup>26</sup> The result showed that more support from hospital management for patient safety increased the frequency of event reported.

Another aspect with low positive response was feedback and communication about error. The result was low compared to findings in Kuwait,<sup>27</sup> and Philippines.<sup>14</sup> The findings indicate that strategies to learn from the frequent medical errors are needed. Learning from medical errors will prevent future errors from happening. Thus, nurses and nursing managers should regularly meet to discuss medical errors that keep happening in their units. This dimension was also associated with frequency of events reported.

There are some limitations in this study. The study recruited only nurses from one tertiary government hospital, which limits the generalizability of the results. Therefore, similar study to be conducted involving all healthcare professionals and other hospitals.

# CONCLUSION

The study identified poor patient safety perception among nurses working in the hospital. However, nurses had highest perception on teamwork within units and least perception on staffing. Furthermore, the study identified hospital management for patient safety, and feedback and communication about errors dimensions as predictors of adverse event reporting.

## RECOMMENDATIONS

The healthcare policy-makers and managers should consider patient safety as a top priority,

and focus more on improving communication openness and feedback communication by holding regular staff meetings, operating on an open-door policy that allow to listen and respond to nurses concerns and suggestions.

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## FACTORS INFLUENCING THE RECEIVING OF POSTPARTUM CARE AMONG THE REPRODUCTIVE AGED GROUP (15-49 YEARS) WOMEN IN RAKHINE STATE, MYANMAR

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# ABSTRACT

Rakhine state is located in the most western part of Myanmar and is one of the states with the highest maternal mortality ratio in Myanmar. Although the women from that state received the antenatal care from the health care providers, they tended to deliver their baby at home by the traditional birth attendants. Therefore, the home delivery rate and the unskilled birth attendant rate were still high and most of the maternal death was occurring at the post-partum period. Only (30.2%) of mothers took post-partum care from the health care providers. Therefore, this study is purposing to identify factors influencing the receiving of postpartum care among the reproductive age group women. 278 women (15-49 years) of Rakhine state from Myanmar Demographic Health Survey (2015-16) were used. Binary logistic regression was employed for the multivariate analysis. Only 20% of home delivery cases received postpartum care from the health care providers. Rather than the socioeconomic status and social structure, getting of pregnancy danger sign knowledge in women, knowledge providing persons means skilled health care providers, and delivery places are the most important factors for the promotion of postpartum care status with an odd ratio of (2.98), (4.21) and (49.76) respectively. And women who were female labor force participation as officers and clericals had 2.85 times more likely to use postpartum care service because of exposure to media and knowledge. To promote awareness of the receiving of postpartum care, providing maternal health knowledge is important. To distribute the knowledge to the community, the government have to use the media as a push factor and the role of the health care providers for sharing the information is also important.

Keywords: postpartum care, maternal death, maternal and child health program, Rakhine state, Myanmar

## **INTRODUCTION**

The maternal mortality ratio becomes the important indicator for both the social and health problems of the women as the socioeconomic condition, accessibility and availability of the health system by women's family, responsibility status of the health care system, quality of health care system can be explored by studying the underground causes of maternal death. For both millennium development goals and sustainable development goals, to reduce maternal death was involved as a part of the goals 1, 2 and the countries tried to accomplish that goal globally and also Myanmar. The common causes for





maternal death for most countries including Myanmar are the preventable causes liked hemorrhage, sepsis, increased blood pressure during the pregnant period, unwanted pregnancy, and other medical diseases. <sup>1, 3</sup> For Myanmar, most of the maternal deaths were occurring after delivery of the childbirth and the most common cause for death was due to the postpartum hemorrhage.<sup>3-5</sup>

Rakhine state is located at the most west part of Myanmar and is set up with 5 districts and 20 townships. The proportion of the total population in that state is 6.2% of the total Union population and most are living in rural areas.<sup>6</sup> The maternal death of that state was 314 per 100,000 live births and 116 per 100,000 live births respectively in 2014 and 2015 and involved as the highest death rate among states and regions of Myanmar.<sup>3, 7</sup> There were 80% of home delivery rate and 66.7% of the traditional birth attendant (TBA) rate. That TBA birth rate was the highest in Myanmar. The percent of women who received postpartum care was only 40.3% and the third-lowest rate in Union. Among them, 32% of women received care from health care providers.<sup>6</sup>

According to WHO definition, postpartum care for the facility delivery cases should be started at least 24 hours after delivery and for home delivery cases, care should be started as early as possible or within 24 hours after delivery by skilled health care providers who were doctors, nurses, midwives, or well-trained community health workers.<sup>8</sup> But the home delivery rate and traditional birth attendant rate were high in Rakhine state <sup>6</sup> and one study said that unqualified postpartum care can be occurred for home delivery cases as delaying to seek care from health persons maybe happened and causing the maternal morbidity and mortality.<sup>9</sup> Therefore, this study purposed to search the causes of delaying to obtain care after delivery from the health care persons. Apart from the MDHS survey, there was no previous study for the postpartum care status of Rakhine state. Therefore, the findings from that study findings can support the policymaker for planning and implementing the improvement of maternal and child health programs.

For this study, Andersen Newman's theory (phase-4) was used because this theory was constructed to recognize the health utilization community in the depending on the environmental factors like the health care system, population characteristics, and health behavior. Some studies used the different models of that theory for analyzing the health care usage of people.<sup>10</sup> Many factors were strongly associated with maternal health previous studies. services in Women's characteristics as age, number of children, education, working status, and also husband's education and occupation status, and then wealth status of the family was influencing the seeking care of the women.<sup>11-18</sup> Men influencing factor as decision making of the household leader for health problems and culture and traditional beliefs of the family could also decide the health care receiving status.<sup>16, 19-21</sup> Seeking the health behavior of women during their antenatal and intrapartum period, their knowledge status and their residence could also affect the obtaining of care from health persons.<sup>21-28</sup>

Depending on the theory and literature review of previous studies, the conceptual framework for this study was as follows.

To get the final result, the study was operated under four factors according to Andersen's model; predisposing factor, enabling factor, need factor, and health system factors. The respondent's current age, parity, education, and occupation status of both respondent and husband, male involvement for decision making of health problems were contained in predisposing factors. The economic status of the respondent's family was analyzed under the enabling factor. As needed factors, the history of antenatal and intrapartum care was involved and for health system factors, the analysis was run by accessibility, affordability, and availability sub-factors. For the dependent variable, the proportion of mothers who



obtained the care from health care persons after delivery regardless of the place of delivery and types of providers during the delivery process were counted as yes. <sup>8</sup>





## **METHODS**

This study was approached by a descriptive study and secondary data analysis. The data from Myanmar Demographic Health Survey (2015-16) was used for the analysis. The sampling method used for that first nationwide survey was two-staged stratified sampling. The total sample size of reproductive-aged group women nationwide in the MDHS survey was 12,885 and total children ever born women for Rakhine state was 777. The targeted population



was the reproductive-aged group women (15-49) years from Rakhine state who gave the last childbirth in the last five years before the survey and the final sample size was 278 for that quantitative study. Most of the variables used for that study were directly involved in the maternal health section of the MDHS survey. For example, to measure the wealth status of the family, the wealth index was already calculated in the survey and used it after categorized into two groups. And also, there was yes or no question for measuring the receiving of knowledge for danger signs during ANC visit. But for assessment of male involvement, there was no direct question for a reproductive health problem and so, used the question that " who is the main decision-maker for any health problem of yours?" and recategorized for social structure measurement. The problem of the distance and the cost were asked for any health problem of the respondent and those questions were used for the variables of accessibility and affordability of health system factors. Statistical Package for Social Science (SPSS) 14 was used for analysis and bivariate and binary logistic regression were applied to search the final results.

Ethical consideration – Research approval was obtained from the Ethical Committee of the Institutional Review Board of Mahidol University after explaining the research ethics. To use the data set, the Demographic Health Service Program gave recommendations.

# RESULTS

After doing the descriptive analysis for the nature of dependent and independent variables,

the results were shown in table1. Among 278 sample-sized women, only (37%) took PNC from health care providers. Most of the women for that study were between the aged range of 24-34 years. Thirty-four percent of women had two to four-count of children. More than half of women and their husbands had low education status that meant they attended primary level or no education level. Fifty-three percent of women were housewives or dependent and only (16%) worked at professional workplaces as managers, officers, clerks, teachers, or doctors. Others were agricultural or manual workers. Eighty-four percent of their husbands also worked as agricultural or manual workers. Only (19%)worked in professional workplaces. For deciding for health problems, (56%) of women did by themselves alone or with their husbands. Eighty-one percent of families from that study had poor wealth status.

For their obstetrics history, (29%) of women did not receive ANC from health care providers. The women who took ANC started their visit mostly at 1st or 2nd trimester and (30%) of them took for (1-3) times of ANC visit. Forty percent of women receive ANC for more than 4 times. Nearly all of those women wanted their pregnancy. Half of them had received information about the risk of pregnancy during their visit. Most of the women (77%) delivered their children at home and TBA provided (66%) of cases. More than half of women though that distance to health facility and money were their big problem to receive care from providers. Eighty-seven percent of them lived in rural areas.



# **Table 1** Descriptive statistics (n = 278)

No	Variable	Category	n	%
1	Receiving of post-partum care	Yes	104	37%
	from health care providers	No	174	63%
_				
2	Age of women	<24	54	19%
	Minimum = 15	24-34	148	53%
	Maximum = 46	>=35	76	27%
	Standard deviation = $6.8$ /			
3	Parity	1	94	34%
	Minimum = 1	2-4	124	45%
	Maximum = 11	>4	59	21%
	Standard deviation $= 2.25$			
Δ	Education status of women	Primary education & no	216	78%
-	Education status of women	education	210	7070
		Higher than primary	62	22%
		education		
~			106	(70)
5	Education status of husband	Primary education & no	186	6/%
		Higher than primary	92	33%
		education	2	
c.		NT 1	146	<b>50</b> 0 /
6	Occupation status of women	No work	146	53%
		Agricultural & manual	89	32%
		Workers Officer & clarical	12	160/
		Officer & ciefical	43	1070
7	Occupation status of husband	Agricultural & manual	234	84%
	-	workers		
		Officers & clerical	44	19%
8	Male involvement	Wife alone/both	157	56%
о.		Husband alone	121	14%
		Trusband alone	121	77/0
9	Wealth Status	Poor	226	81%
		Moderate & rich	52	19%
10	No: of AN visit	No AN visit	80	200/
10	NO. OF AN VISIC	1-3 times	83	30%
		>=4 times	115	41%
			113	71/0
11	Type of ANC providers	No ANC	81	29%
		Health care providers	197	71%




July 14, 2020

No	Variable	Category	n	%
12	Timing of AN visit	No ANC	81	29%
		1 <sup>st</sup> trimester	94	34%
		2 <sup>nd</sup> trimester	82	30%
		3 <sup>rd</sup> trimester	21	8%
13	Wanted status of pregnancy	Yes	259	93%
		No	19	7%
14	Knowledge of Danger signs	Yes	145	52%
	during AN visit	No	133	48%
15	Place of Delivery	Home	214	77%
		Public Sectors	64	23%
16	Types of intrapartum care	TBA	183	66%
	providers	Health care providers	95	34%
17	Mode of delivery (caesarean	No	245	88%
	section or not)	Yes	33	12%
18	Distance to health facility	No problem	94	34%
		Big problem	184	66%
19	Money problem	No problem	135	49%
	-	Big problem	143	51%
20	Type of residence	Rural	241	87%
		Urban	37	13%

### Source of data – Myanmar Demographic Health Survey (2015-16)

Bivariate analysis was done to investigate the causal relationship between the dependent variable and independent variables. Except for age of women, the wanted status of pregnancy, and distance from home to the health facility, other sociodemographic factors, social factors, enabling factors, need factors and health system factors were significantly associated to the receiving of postpartum care from health care providers at (95%) confidence interval. The analytic findings can be seen in table 2 for bivariate analysis.

Table 2 Bivariate Study for receiving of post-partum care from health care providers (n = 278)

No	Variable	Category		Yes		No	Total	X <sup>2</sup> at
			n	%	n	%		95%CI
1	Age of women	<24	21	39%	33	61%	54	0.06
		24-34	55	37%	93	63%	148	
		>=35	28	37%	48	63%	76	



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No	Variable	Category		Yes		No	Total	X <sup>2</sup> at
_			n	%	n	%		95%CI
2	Parity	1	57	60%	38	40%	94	42.46***
		2-4	42	34%	82	66%	124	
		>4	5	8%	54	92%	59	
3	Education status of women	Primary education & no education	54	25%	162	75%	216	63.70***
		Higher than primary education	50	81%	12	19%	62	
4	Education status of husband	Primary education & no education	40	22%	146	78%	186	60.71***
	nuccunu	Higher than primary education	64	70%	28	30%	92	
5	Occupation	No work	41	28%	105	72%	146	24.65***
	status of women	Manual & agricultural	33	38%	56	63%	89	
		Officer & Clerical	30	70%	13	30%	43	
6	Occupation status of	Manual &	75	32%	159	68%	234	18.13***
	husband	Officer & Clerical	29	66%	15	34%	44	
7.	Male	Wife alone/both	71	45%	86	55%	157	9.40***
	nivorvenient	Husband alone	33	27%	88	73%	121	
8	Wealth Status	Poor	63	28%	163	72%	226	46.90***
		Moderate & Rich	41	79%	11	21%	52	
9	No: of AN visit	No AN visit	3	4%	77	96%	80	90.99***
-		1-3 times	22	27%	61	73%	83	
		>=4 times	79	69%	36	31%	115	
10	Type of ANC	No ANC	3	4%	78	96%	81	55.46***
	providers	Health care providers	101	51%	96	49%	197	





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No	Variable	Category		Yes		No	Total	X <sup>2</sup> at
			n	%	n	%	_	95%CI
11	Timing of AN	No ANC	3	4%	78	96%	81	63.08***
	visit	1 <sup>st</sup> trimester	52	55%	42	45%	94	
		2 <sup>nd</sup> trimester	44	54%	38	46%	82	
		3 <sup>rd</sup> trimester	5	24%	16	76%	21	
12	Wanted status	Yes	100	39%	159	61%	259	2.33
	of pregnancy	No	4	21%	15	79%	19	
13	Knowledge of	Yes	87	60%	58	40%	145	66.05***
	Danger signs during AN visit	No	17	13%	116	87%	133	
14	Place of	Home	42	20%	172	80%	214	125.55***
	Delivery	Public Sectors	62	97%	2	3%	64	
15	Types of	TBA	16	9%	167	91%	179	187.94***
	intrapartum care providers	Health care providers	88	93%	7	7%	95	
16	Mode of	No	72	29%	173	71%	245	56.72***
	delivery (caesarean section or not)	Yes	32	97%	1	3%	33	
17	Distance to	No problem	29	31%	65	69%	94	2.60
	health facility	Big problem	75	41%	109	59%	184	
18	Money problem	No problem	36	27%	99	73%	135	12.93***
		Big problem	68	48%	75	52%	143	
19	Type of	Rural	74	31%	167	69%	241	34.76***
	residence	Urban	30	81%	7	19%	37	

Note - \*\*\* 95% confidence interval (CI)

#### Source of data – Myanmar Demographic Health Survey (2015-16)

Regarding the results from the bivariate analysis, the education status of both women and their husbands, occupation status of both of them were important for health-seeking behavior as well- educated persons with high employment status had more chance to get care. Habits of ANC taking from health care providers, place of delivery, and receiving information during ANC visits were also the necessary factors. The person who could decide on a health problem, family economic status, and residency were also involved as significant factors. Therefore, to do the multi analysis, employment status of women, place of delivery, types of ANC providers, getting of knowledge during ANC visit, male involvement, wealth status, and residency were selected for each factor while the age of women and parity were put as the control variables according to the previous studies. Two control factors were used as ratio scales and for the





employment status of women, to see the role of women labor forced participation, the two categories; no work and agricultural and manual workers were added into one category for that binary logistic regression. Another category for the officers and clerical was the same with bivariate analysis.

The following table 3 shows the results of the multi analysis. After controlling the age of women and parity, male involvement, wealth status of a family, and residency of the respondent persons were not significantly relevant to receiving the postpartum care from health care providers at 95% confidence interval. The women for facility delivery were

Table 3 Multiple binary logistic regression

more likely to receive postpartum care services compared to home delivery cases with an odds ratio of 49.76. The women who took ANC from health care providers head more probability for seeking postdelivery care than those who did not take ANC with an odds ratio of 4.21. For women labor forced participation, the women who worked as officers and clericals could get postpartum care from health care from providers with an odds ratio of 2.85. For getting knowledge of danger signs during ANC visits, the probability to receive care from providers for the women who answered yes was 2.98 than those who answered no.

	Odd ratio	<b>P-value</b>	95%CI
Postpartum care from Health c	are providers (No_ref	ference)	
Mother age	1.04	0.308	0.96-1.13
Parity	0.74	0.042	0.55-0.99
Place of Delivery (home deliver	ry_ref)		
Public sectors	49.76	0.000	10.32-239.88
ANC provider (No ANC_ref)			
Health care provider	4.21	0.059	0.95-18.73
Women forced labor participat	ion (agricultural & m	anual_ref)	
Officers & clericals	2.85	0.040	1.05-7.78
Knowledge getting during ANC	C visit (no_ref)		
Yes	2.98	0.019	1.20-7.40
Male involvement (wife alone &	& both_ref)		
Husband alone	0.52	0.115	0.23-1.17
Wealth status (poor_ref)			
Moderate & rich	0.99	0.981	0.28-3.37
<b>Residence (rural ref)</b>			
Urban	1.92	0.328	0.52-7.06
cons	0.03	0.003	0.00-0.30

## **DISCUSSION**

Regarding the final results of the multi analysis, the influencing factors for receiving postdelivery care from skilled health care providers were mostly associated with the behavior of ANC visiting from providers and facility delivery and employment status of that women and getting of health knowledge during ANC visit. The women who worked outside at high employment workplaces could get information about their health problems from their friends and work partners. Moreover, they could easily expose to media for the updated health knowledge and so they used health services more than the women who were not





involved in labor force participation. And also, they could expense the money for their health and they did not need to depend on their husband. That might be the reason for the increasing utilization of postdelivery care services in Rakhine state. The study from Bangladesh also said that the occupation status of women can control for receiving health care.<sup>29</sup>

The women who received ANC from health care providers or delivered their child at the facility could obtain the health information from that providers and the more chance for receiving the postdelivery would occur. The more increasing the number of visit times during AN period occurred, the more familiar with the health staff and the mothers believed in them. Besides, they received information about the risk of the postpartum period and they understood the importance of receiving care during that period. This finding was consistent with the result from one qualitative study <sup>30</sup> that provided that the couples who used health care providers got updated information for maternal health. As the health care facility could give both maternal and child care by health staff, the mothers would obtain postpartum care readily without delaying after childbirth. For the significant association for the place of delivery, Madagascar's study also said that home delivery cases had a reduced rate of postpartum visits and this might be due to lack of health knowledge.<sup>31</sup> By distribution of the right information correspondent to maternal health knowledge, the awareness level of the women for the risk of pregnancy, delivery, and after the delivery period was increasing. The obtaining of health knowledge was, therefore, important and significant for the utilization of health care services for women after delivery. The studies from Myanmar and Papua New Guinea<sup>32, 33</sup> also pointed out that health knowledge of women was necessary for receiving the care and for reducing the maternal and infant mortality rate.

Although one study from Ethiopia <sup>34</sup> said that male involvement was important for maternal

health services usage of women, in Rakhine state, there was no partner influence for the health-seeking behavior of women, and women could decide by their thoughts for their health problems. The studies of Botswana <sup>35</sup> and Haiti <sup>36</sup> resulted that family economic status was one of the determinants factors for maternal health care utilization. But in this study, the wealth status could not influence on the postpartum care behavior. Another different finding from the previous studies was the residency status. Most of the studies said that rural or urban residents affected the accessibility of health services. The women from rural areas of Haiti had a problem using health services due to distance <sup>36</sup> and also the same for African women as their residency harmed their care receiving behavior.<sup>37</sup> Another study also said that less utilization of maternal health cares services was occurring among women from rural areas.<sup>35</sup> But, the finding from this study was not similar to those results. Therefore, for the women from Rakhine state, rather than the partner involvement, economic status, and residency, their health-seeking behavior liked ANC taking from health care providers, their choice for place of delivery and their health knowledge status were the important factors for postpartum care receiving from health care providers. Encouraging the participation of women labor forced was also the necessary factor to promote the postpartum care status of Rakhine state.

# LIMITATION

As this study was based on the data from the MDHS survey, there was a data limitation to measure some variables. Although some studies said about the traditional beliefs, this study could not measure. As MDHS mainly targeted the community, only the supply side was available and the demand side could not be predicted. The satisfactory level of women for health care services and the quality of health staffs could not be studied due to data limitation. As this study was not the qualitative study, the perception of women for the



importance of postdelivery care could not be explored

# CONCLUSION

According to the results of the analysis, the Rakhine state had a poor socioeconomic and educational status and the health utilization rate for antenatal, intrapartum, and postpartum process of the women was low. The postpartum care utilization for the sample women was less than half and only (20%) of home delivery cases received the care from skilled providers. To improve the postpartum care status of the women, awareness of the danger signs of pregnancy and health-seeking behavior after delivery should be promoted by sharing health information. The important role of health care providers and place of delivery for the women's health should be notified by the community.

# RECOMMENDATIONS

To increase the postpartum care status, maternal health knowledge such as the importance of ANC providers and health care facilities, and, the risk of pregnancy should be sharing with the community in effective ways. As the role of providers and facilities is important, both the quality and quantity of them should be promoted. The government should also force to upgrade the occupation status of women as it is also the necessary factor.

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## FACTORS ASSOCIATED WITH ADOLESCENT CHILDBEARING IN MYANMAR: THE ANALYSIS OF THE 2015-2016 MYANMAR DEMOGRAPHIC HEALTH SURVEY

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# ABSTRACT

Adolescent childbearing is global reproductive health concerns especially among adolescents in poorer and marginalized communities. Adolescent childbearing leads adolescent mothers and their children to face negative health outcomes and socioeconomic consequences. In Myanmar, 7.4% of adolescents aged 15-19 were married. Among this number, 25% gave birth before their 20th birthday. This study aimed to examine factors associated with adolescent childbearing in Myanmar. The study used Myanmar Demographic Health Survey 2015-2016. The total sample was 817 female respondents aged 15-24 years old who reported ever have sexual experiences. Taking UNFPA's measurement, adolescent childbearing is considered as childbearing that happened when women were before ages 15 and up to 19 years of age. So, the dependent variable of adolescent childbearing was constructed as 'yes' for those who had childbearing at age 19 or below, and 'no' if otherwise. Binary logistic regression was conducted to examine the association between childbearing at adolescent ages and selected socio-demographic factors, including education, employment status, residence, household wealth, region, and a number of the household member as well as marital status, and age at first sex. Fifty-two percent of the 817 female respondents aged 15-24 years old had childbearing at adolescent ages. The probability of adolescent childbearing was significantly higher 3.75times women age at first sex under 15 years than women who have first sex at 15 years and over (OR=3.75, 95%CI=1.59-8.82, p-value=0.002). Literate women 0.61 times less likely to experience adolescent childbearing (OR=0.61, 95% CI 0.40-0.92, p-value=0.021). Women who worked for the whole year were 0.66 times less likely to experience adolescent childbearing compared with those who had no work (OR=0.66, 95%CI 0.46-0.94, pvalue< 0.023). The study identified that adolescent childbearing was significantly associated with individuallevel (literacy and employment) and interpersonal and community level (age at first sex and region). Promoting educational and occupational opportunities for girls may be a feasible measure to delay childbearing.

Keywords: adolescent childbearing, demographic and health Survey (DHS), Myanmar

## **INTRODUCTION**

global Adolescent childbearing are reproductive health concerns that are especially prevalent among adolescents in poorer and marginalized communities. Kerry Kelly Novick explained in study his that "childbearing, which includes pregnancy, birth, and the early nursing process and child rearingthat is, the bringing up and taking care of children".<sup>1</sup> In this study, adolescent childbearing means who have experience of child birth when they were adolescent age 15-19 years old and adolescent women who have currently pregnant during the age of 15-19 years old.

The childhood to adulthood transition encourages them to take crucial experiment in sexual, behavioral and social with little or no knowledge which affects their health and well-



being. <sup>2</sup> In 2018, the estimated adolescent birth rate was 44 per 1000 15-19 aged women globally while Myanmar was 36/1000 adolescent birth rate in South East Asia, 2017.<sup>3</sup> Birth rate among adolescent in South East Asia was 47/1000 higher than South Asia because of the diversity of countries context such as geographical and socioeconomic situation.<sup>3</sup> In Myanmar, 7.4 % of adolescents aged 15-19 years were married and 25% gave birth before their 20 years birthday out of total adolescent According to MDHS-2015, population.<sup>4</sup> women who have married before 18 years old among 20-24 aged group was 16% while MICS -2015 Thailand reported that 23 %. <sup>3</sup> Thailand, very similar socio-demographic characteristics country with Myanmar which was ranked 19th globally in women marriage before 18 years old.<sup>3</sup> Among adolescent aged 20-24 years aged group, studies found that around 45 percent of birth among this age group was occurred when they were before 18 years old, globally.<sup>5</sup>

Adolescent childbearing lead adolescent mothers and their children not only to the negative health outcomes but also the socioeconomic consequences. Adolescents may have been limited by educational opportunity and economic prospects for her future. One study from Sub-Saharan Africa revealed that the increased school age can reduce the age at first birth of adolescent.<sup>6</sup> In Myanmar, completion of secondary school among 15-19 adolescent age group was 45.3 percent in male and 54.7 percent in female according to the Census, 2014.7

pregnancy very Adolescent and early childbearing birth before age 15 had decreased in all regions while pregnancy and childbearing among adolescents aged 15-19 i.e. births before age 18 has remained quite the same.<sup>5</sup> The higher rate of adolescent pregnancy was occurred in rural areas and the lowest socioeconomic condition. Adolescent fertility rate 15-19 years old among region was different in Myanmar, the state area Kachin and Shan was 11.1 percent while the regional area, Mandalay was 1.8 percent.<sup>8</sup>

In developing countries, early child marriage, early sexual debut and limited access in family planning services were common in high adolescent childbearing.<sup>9</sup> The married adolescent had nine time likely to occur early childbearing than adolescent who were not in union.<sup>10</sup>

The healthy and educated adolescent can contribute their ability to country development in the future. Regarding adolescent childbearing among 15-24 years old, either little quantity of representative studies that could support comprehensive knowledge about adolescent childbearing or not too many studies that was published by English were found in Myanmar. Hence, the study result will be provided information to understand the factors associated adolescent childbearing and intended to develop effective program intervention activities for adolescent health and wellbeing in Myanmar. Hence, the study aims to examine the factors that associated adolescent childbearing in Myanmar.

# METHODS

This study was cross sectional, quantitative study that the data come from Myanmar Demographic and Health survey (2015-2016 with the permission of the DHS program. The 2014 Myanmar Census was used as sampling frame, which stratified state and region including rural and urban and then systematic sampling method was employed to select the household of the study. Data are weighted to be national representative which achieved 96 % of respondent rate.12,885 women (15-49) years old were completely interviewed in the study. Among them, women, aged 15-24 years old have sexual experiences regardless of marital status were included. Women who have never experiences and their first sexual sex experiences at above 19 years old were excluded.

The dependent variable of adolescent childbearing was constructed as 'yes' for those



who had childbearing at age 19 or below, and 'no' if otherwise. This variable was constructed from two questions of MDHS. The first one was the adolescent who was currently pregnant at the time of interview (Are you pregnant now?) and the second one was the women (15-24 years old) who have had experience of giving birth when they were under 19 years old (The respondent age at first birth). Most of independent variables were coded in the data set, however some were reclassified because of the study objectives and distribution of the data. For instance, household wealth was recoded as three categories, rich was combined with richer and richest and also poor was combined with poorer and poorest. Because, rich and poor is used to measured generally and easily understandable. Also, number of household members and number of siblings were reclassified according to the data distribution. Fourteen participants were selected first for training of trainers. Then, 148 candidates from various departments of governments and nongovernment sectors were taught about interview techniques, field procedures, detail reviewed of pretested questionnaires' contents and measuring techniques of height, weight and anemia testing. Refresher training was conducted before field interview and field supervision was carried out by the state and regional public health directors.

The data were analyzed by using Stata 15.1 version in the study. Univariate analysis described the characteristics of respondents in individual level variables (educational status, literacy, employment status, knowledge about contraceptives, residence) and interpersonal level variables (marital status, age at first sex, sex of household head, age of household head, number of siblings, number of household member, respondent's father beat mother and household wealth). The bivariate analysis, Chisquare test reported that the association between each independent variable and dependent variable. Moreover, binary logistic regression analysis stated the association between these all independent variable and adolescent childbearing. This study was approved from the IRB, the board of the Committee of the Institute of Population and Social Research, Mahidol University for ethical clearance on 11<sup>th</sup> June 2020 to conduct the study.

### RESULTS

Of 817 MDHS women respondents aged 15-24 years (ever having sexual experiences), 52 experienced percent had adolescent childbearing, i.e. currently pregnant or giving birth while they were at aged below 20. To describe characteristics of the total samples as, 44.9% had completed secondary and higher education, 81.4% were literate, 96.3% know contraceptive knowledge, 39.1% women who were not working and 78.7% lived in rural. The total women in the study represented nationally who were from 15 states and regions including rural and urban of Myanmar. MDHS selected women from all administrative area and made mathematically adjusted for making sure to represent nation-wide in Myanmar.<sup>8</sup>

Regarding interpersonal level, 91.9% of the samples were married women. The mean age at first sex was 17 years old in the study. Then, majority of the sample or 80.4% lived in male headed household; 57.0 % lived with older age household head; 68.7% of women having 1 to 5 siblings; and 54.1% having 1 to 5 household members in the same household. Concerning to experiences related to domestics' violence, 11.3 % of women reported witnessing their fathers beating their mothers. Most of women 52.5 % were from poor family. Also, 51.5 % of women were from state area where particular ethnicity area.

In the bivariate analysis, Chi-square test described in table 1.1 that variables including educational status (p-value=0.011), literacy (p-value=0.000) and employment status (p-value=0.007) had significant relationships with adolescent childbearing. In interpersonal level as demonstrated in table 1.2 age at first sex (p-value=0.000.), and household wealth (p-value=0.000) were significantly associated



with childbearing. In addition, in table 1.3 illustrated that community level, region was associated with adolescent childbearing at (pvalue= 0.000). Other variables, namely knowledge of contraceptives, residence, marital status, sex of household head, age of household head, number of siblings, number of household member and domestic violence experiences in family were not found statistically significant related with dependent variable.

The logistic regression analysis was showed in the table 2 described that literacy, those women who can read and write, were 0.61 times less likely to have adolescent childbearing in (OR=0.61, 95% CI 0.40-0.92, p-value= 0.021), as compared with illiterate women. Women who worked for the whole year was 0.66 times less likely to experience adolescent childbearing compared with who had no work (OR=0.66, 95 % CI 0.46-0.94, p-value= 0.023). Moreover, women who worked occasional was 0.56 times less likely to experience adolescent childbearing than who were not working (OR=0.56, 95% CI 0.32-0.99, p-value= 0.047). Regarding interpersonal level, only age at first sex was significantly correlated with adolescent childbearing. The probability of adolescent childbearing was significantly higher odd of 3.75 times in women age at first sex under 15 years than women who have first sex at 15 years and over (OR=3.75, 95 %CI =1.59-8.82, p-value=0.002). On one side, marital status, sex of household head, age of household head, number of siblings, number of household member, and household wealth had no relationship with adolescent childbearing in multivariate analysis.

The community level factors, region has also significant relationship with outcome variable. Women who were from state area (less ethnicity) 1.57 times more likely to experience with adolescent childbearing compared to women from region (less ethnicity) (OR=1.57, 95%CI= 1.16-2.11, p-value= 0.003).

	Adolesc				
	no =0		yes =1	1	p-value
	n	%	n	%	_
Educational status					0.011*
No education	39	37.1	66	62.7	
Primary education	158	45.8	194	54.2	
Secondary and higher education	194	52.9	175	47.1	
Literacy					0.000***
No	51	33.5	101	66.5	
Yes	340	51.1	332	48.9	
Knowledge of contraceptives					0.811
No	15	50.0	15	50.0	
Yes	376	47.8	411	52.2	

**Table 1.1** Association between Adolescent Childbearing and Individual Level (n = 817)



	Adolesc				
	no =0		yes =1	p-value	
	n	%	n	%	_
Employment status					0.007**
Not working	133	41.6	187	58.4	
Occasional	39	56.5	30	43.5	
Seasonal	86	46.2	100	53.8	
Whole year	133	55.0	109	45.0	
Residence					0.096
Urban	93	53.5	81	45.5	
Rural	298	46.3	345	53.7	

**Table 1.2** Association between Adolescent Childbearing and Interpersonal Level (n = 817)

	Α				
	No	)	Ye	S	p-value
	n	%	n	%	
Current marital status					0.164
Widowed/divorced/separated	37	56.0	29	43.9	
Married	354	47.1	397	52.9	
Age at first sex					0.000***
Age>=15 years	384	49.4	394	50.6	
Age<15 years	7	18.0	32	82.0	
Sex of household head					0.781
Male	316	48.1	341	51.9	
Female	75	46.9	85	53.1	
Age of household head					0.237
<25	34	44.2	43	55.8	
25-45	122	44.5	152	55.5	
>46	235	50.4	231	49.6	
Number of siblings					0.264
No sibling	21	61.8	13	38.2	
1-5	272	48.5	297	51.5	
6-10	93	44.0	119	56.0	
11-15	6	46.1	7	53.9	
Number of households				0.89	8
1-5	210	47.5	232	52.5	
6-10	157	47.9	171	52.1	
11-24	24	51.0	23	48.9	



	A	Adolescent Childbearing				
	No		Yes		p-value	
	n	%	n	%		
Domestic violence experiences in family					0.012	
No	85	41.9	118	58.1		
Yes	36	39.1	56	60.7		
	270	51.7	252	48.3		
Household wealth					0.000***	
Rich	131	56.0	103	44.0		
Middle	83	53.9	71	46.1		
Poor	177	41.3	252	58.7		

Table 1.3 Association between Adolescent Childbearing and Community Level (n = 817)

	Adoles				
	no	)=0	yes	=1	p-value
	n	%	n	%	-
Region					0.000***
Regional area (less ethnicity)	218	54.6	181	45.4	
State area (more ethnicity)	179	41.2	255	58.8	

Table 2 Binary Logistic Regression Result of Factors Associated with Adolescent Childbearing

Adolescent childbearing	Odds	Std.	P-value	95%	ó CI
Yes	Ratio	Err.		Lower	Upper
Literacy (ref: no)					
Yes	0.61*	0.1	0.021	0.40	0.92
Knowledge of contraceptives (ref: no) Yes	1.95	0.80	0.103	0.87	4.36
<b>Employment status</b> (ref: not working)					
Opposional	0.56*	0.2	0.047	0.32	0.99
Seasonal	0.78	0.1	0.214	0.53	1.15
Whole year	0.66*	0.1	0.023	0.46	0.94



Adolescent childbearing	Odds	Std.	P-value	95%	6 CI
Yes	Ratio	Err.		Lower	Upper
Residence (ref: urban)					
Rural	0.90	0.2	0.617	0.60	1.34
Marital status (ref: widow/divorce/separated) Married	1.29	0.3	0.357	0.74	2.23
Age at first sex (ref: >=15 years)	2 75**	1.6	0.002	1.50	0.02
age<15 years	3./3**	1.6	0.002	1.59	8.82
Sex of household head (ref: male)					
Female	1.09	0.2	0.647	0.75	1.58
Age of household head (ref:>25)					
25-45	1.06	0.3	0.814	0.62	1.82
>46	0.87	0.2	0.627	0.50	1.50
No of Siblings (ref: no siblings)					
1-5	1.44	0.5	0.327	0.69	3.02
6-10	1.66	0.7	0.200	0.76	3.63
11-24	1.45	1.0	0.595	0.36	5.78
No of household member					
(ref:1-5) 6-10	1.06	0.2	0.688	0.77	1 47
11-24	0.93	0.2	0.840	0.48	1.81
Household wealth (ref: rich)					
Middle	1.07	.2	0.774	0.68	1.65
Poor	1.48	0.3	0.051	0.99	2.18
<b>Region</b> (ref: regional area less, ethnicity)					
State area (more ethnicity)	1.57**	0.2	0.003	1.16	2.11
_cons	0.38	0.3	0.10	0.09	1.50

\*\*\*p-value<=0.001, \*\*p-value<=0.01, \*p-value<=0.05



# DISCUSSION

The present study identified the factors associated with adolescent's childbearing in Myanmar by using social ecological including five levels model which may reflect to adolescent health behavior. But, in my study only three level factors with limited variables covered examine adolescent was to childbearing experience as secondary data analysis. Because of the secondary data analysis, some variables from theoretical frame-work could not measure such as peer pressures and community norms under the interpersonal and community level that was not available in the DHS dataset. The peer pressure and cultural norm related premarital sex may limit the accessibility of contraceptives methods. And, the impacts of organizational and policy factors that the effective program for adolescent reproductive health care services were limited to study. The 9 years duration (range from 15-24 years old) was differed from current situation of women that may affect interpretation of the result of the study for instance educational status, residence of the respondents, current marital status, and household wealth could be different since they had childbearing experience. The variable, domestic violence experience in family could not examine factor association in binary logistic regression because of the large number of missing data was one limitation of the study.

Educational status of women was not correlated with adolescent childbearing in multivariate analysis while several studies revealed that higher educational status of women reduced the probability of adolescent childbearing.<sup>10-14</sup> Higher educational status was significantly associated with adolescent childbearing bivariate analysis in the current study. In Myanmar, Ministry of Education encouraged to implement the motto of "every-school-age child in school" and education for all that guided every child (5-9 years old) must accomplish primary education since 2011.<sup>15</sup> Primary education is free of charge that children are encouraged to access. This reforming process with new regulation education program promoted to access equal chance for adolescent women. It probably resulted in education status not associated with adolescent childbearing. One similar study found out that mentioned educational status was no association with adolescent childbearing.<sup>16</sup> On the other hand, there was implementing non-formal education led by local organization and monastery for young people who were out of school. According to the UNICEF data, literacy rate for youth (15-24) years old in Myanmar in 2016 was 84.7% for both sexes. The current study also revealed that illiterate women have 49% higher probability of adolescent childbearing. This may probability of the result that showed women who were not in formal school could access the reading and writing skill from nonformal education. There were studies from East Africa and Bangladesh supported that education/ literacy was strongest association with childbearing.<sup>11, 12</sup>

Regarding knowledge about contraceptive knowledge, there was no association with adolescent childbearing in my study. The MDHS asked this question that related to the respondents' knowledge at the time of the survey. So, this may be fully explained what happen to them during adolescent age or before they became pregnant. However, as this contraceptive knowledge were found significantly associated with the childbearing, it should be considered as important factor that can prevent childbearing at adolescent age.

The study confirmed that employment status was significantly correlated with adolescent childbearing when using bivariate analysis to examine the association between the dependent variable and independent variable. It still remains significantly associated with adolescent childbearing when analyzing with logistic regression. The women who worked for the whole year decreased the probability of adolescent childbearing. This finding was



proved that the hypothesis of the study that women who have no work increase the chance of adolescent childbearing. The other finding from the regional report on adolescent pregnancy and childbearing forum supported the finding that economic empowerment for women can prevent early child marriage and pregnancy which was proved by the preparation for girl empowerment project in Indonesia.<sup>3</sup>

This study found out no association between residence and childbearing although, several studies revealed that women who lived in rural area was more likely to experience adolescent childbearing than who were from urban area.<sup>6</sup>, <sup>11, 17, 18</sup> In Myanmar context, some traditional customs regarding marriage is still followed by elder aged while urbanization changed some traditional norms according to globalization. urbanization and development Also. in infrastructure affected information accessibility. It may lead to promote equal chance to prevent adolescent childbearing in both rural and urban area.

The finding was rejected that the hypothesis of the study that marital status increased the probability of childbearing. Current study was inconsistent with studies from Uganda and Ethiopia that the finding of the study being married or living together with spouse was highly significant correlated with adolescent childbearing.<sup>10, 13</sup> This study could not assess the information about whether childbearing experience was occurred before marriage or after marriage. The age of first marriage and age at first birth of women were needed to study. Current marital status was assessed in this study which has limited to reflect the situation of women who took place childbearing when she was adolescent. In Myanmar context, social and cultural norm regulated women childbearing before marriage. If the situation is happened, they give their child to relatives for protecting their family dignity. On the other hand, women who get pregnant before marriage terminated their pregnancy by doing illegal abortion. This kind of information are hidden to access for analyzing the relationship between marital status and adolescent childbearing because of social and cultural norm. In addition, the current study didn't analyze the information about abortion of adolescent women.

The finding showed that first sex at in early age (under 15 years old) was strongly associated with adolescent childbearing in the study however, sex before marriage (legal age of marriage is 18 years old) and childbirth before marriage is not allowed by the cultural norms in Myanmar .<sup>19</sup> Similar studies described early sexual intercourse in younger women who had less authority and negotiation skill lead non-use of contraceptive was associated with .<sup>20, 21</sup> Virginity adolescent childbearing concern is the one of social value in Myanmar society for women. Women should not use contraceptive methods before marriage that is the big social stigma in Myanmar society. If young women interest in the comprehensive sexual education, they will be bad women who are not respect cultural obligation. This social stigma regarding SRH education for adolescent may affect the adolescent childbearing of married or unmarried women in Myanmar who have low educational status and less knowledge of contraceptive methods. The feeling of shy limit them reluctant to ask about contraceptive methods in shops or from health care personal.

The finding of the study rejected hypothesis that probability of adolescent childbearing was decreased in female headed household. Our finding was consistent with other studies from Tanzania and Brazil supposed that sex of household head was not associated with adolescent childbearing.<sup>14</sup> There was no association between age of household head and adolescent childbearing. The hypothesis of the study was rejected and it was similar result with the study from Lesotho, no relationship between these outcome and independent variable.<sup>22</sup>

The study showed that household wealth was insignificant relationship with adolescent childbearing. The result of the study was



inconsistent with most of studies mentioned that women from poor household had more likely to experience adolescent childbearing <sup>6</sup>, <sup>18, 21, 23</sup> even though it has relationship in bivariate analysis. Besides, the study from Nicaragua was consistent with current finding that there was insignificant association between household wealth and adolescent childbearing.

The study revealed that region was significant with childbearing. adolescent Regional differentiation affected the accessibility of educational, health care services, poverty prevalence, and information exposure and marriage practice. Similar studies from Nepal, Bangladesh and Ethiopia found out the association between region and adolescent childbearing .10, 11, 21 In Myanmar, each of region has different ethnic group, cultural norms, languages and various geographical composition. Burmese language is National language and 68% of Myanmar were composited in total population. It can be limitation of the minority ethnicity to access quality education, health care services with relevance languages in state area.

## CONCLUSION

According to the research objective, there were four variables were associated with adolescent childbearing out of fourteen variables such as literacy, employment status, age at first sex and region of respondent women. For the rest variables, there may be needed to consider other related facts within Myanmar context. Also, this study only covered the three level factors with limited variables for examining adolescent childbearing that could provide partial examining for adolescent childbearing. In hypothesis one, we predicted as low educational status, illiterate, less knowledge of contraceptives, not working women may probability of adolescent increase the childbearing. The finding of the study accepted the hypothesis one partially illiterate women more likely to increase adolescent childbearing. For hypothesis two the study, women who were married, have early sexual experience aged below 15 years old, who lived in male headed household, older age of household head, high number of siblings and household members, who experience with domestic violence in family and lived in poor household wealth were more likely to report adolescent childbearing. The study found out to accept the hypothesis two partially that was women have early experience of sexual initiation age under 15 years old more likely to experience with adolescent childbearing. For hypothesis 3, women who lived in state area (more ethnicity) have higher odd of adolescent childbearing in this study.

## RECOMMENDATIONS

According to the study finding, the adolescent childbearing mostly due to early sexual initiation under 15 years. Early marriage is also supportive factor of early one sexual intercourse. Promoting educational and occupational opportunities for girls may be feasible measure to delay childbearing. First of all. to reduce adolescent pregnancy, comprehensive sexuality education in school level is needed to take action by policy encouragement. Second, delaying marriage and cohabitation should be promoted in order to major consequences reduce health for adolescent mothers and their babies. Third, promotion in accessibility of family planning services among adolescent is making ensure to access equally wherever regional or state area.

Recommendation for further study is to conduct primary data collection and explore in depth the cause of adolescent childbearing and its related factors because the current study could not provide the fact related to causal relationship.

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## ASSOCIATION OF DISABILITY AND QUALITY OF LIFE AMONG THAI ELDERLY WITH CHRONIC LOW BACK PAIN, THAILAND

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### Abstract

Low back pain was one of the major disabling health conditions among the elderly, and it ranked the first of top ten causes of years lived with disability from 2007 to 2017 in Thailand. The prevalence of disability was high among Thai elderly which negatively affected their quality of life. The objective of the study was to determine the quality of life among Thai elderly with chronic low back pain, Thailand. A cross-sectional study was conducted among 359 Thai elderly (aged 60 years and above) with chronic low back pain by using structured questionnaires. WHOQOL-BREF Thai version (26 items) was applied to measure the quality of life. Crude and adjusted odds ratios (ORs) were reported for the association between functional disability and QOL 95% CIs. A p-value < 0.05was considered statistically significant. As the results, the majority of elderly were female (72.4%), married (64.1%), and primary education (76.0%) with an age range of 60 to 93 years. Although half of the respondents had minimal disability, one-third was high QOL. Multiple logistic regression revealed that being male (AOR= 1.91, 95% CI:1.07-3.40), other causes of back pain (AOR= 2.04, 95% CI:1.19-3.50), two weeks and above pain each episode (AOR= 2.05, 95% CI: 1.17-3.60) and minimal disability (AOR= 6.96, 95% CI: 3.83-12.64) were significant predictors of QOL among Thai elderly with chronic low back pain. In conclusion, as the functional disability was the strongest predictor of QOL among the elderly, attention should be paid to chronic low back pain which leads to functional limitations and low QOL in older adults. Therefore, policymakers should prioritize the public health planning and management for the elderly population by both strategic and operational plans to minimize disability and improve their quality of life.

Keywords: disability, quality of life, elderly, chronic low back pain, Thailand.

## **INTRODUCTION**

Low back pain was the leading cause of activity limitation in daily life of older people which affected their quality of life. The prevalence of chronic low back pain was high in elderly population,<sup>1</sup> and it ranked the first rank at top ten causes of years lived with disability from 2007 to 2017 in Thailand.<sup>2</sup> Low back pain was one of the major health issues among older adults aged 60 years or older and increased the functional disability and reduced their quality of life.<sup>3</sup>

Low back pain ranked in the top ten of the years lived with disability among 328 diseases for all 195 countries and territories.<sup>4</sup> Moreover, the number of years lived with disability caused by low back pain, increased 54 % between 1990 and 2015 in the older populations of low and middle income countries.<sup>5</sup> The prevalence of chronic low back pain was high (66.1%) among elderly in Thailand.<sup>1</sup> It ranked at the first of top





ten causes of years lived with disability in 2017.<sup>2</sup> The prevalence of disability among Thai elderly was also high and the rate of disability increased with age which indicated that most of very severe and severe disabilities contributed to long term disability.<sup>6</sup> An increase of 10% in disability because of pain implied a decrease of 3.62% in quality of life which indicated the influence of disability to quality of life.<sup>7</sup> Disabilities in activity of daily living was significantly affected to quality of life among Thai elderly.<sup>8,9</sup>

Furthermore, disability status had a negative association with quality of life (QOL) among elderly. Majority of elderly had moderate level of QOL (79 %), followed by high level (10.5 %) and low level (10.5%) among elderly in 2013.9 More than two thirds of older people had also moderate level of QOL in 2015,8 and 2016.<sup>10</sup> Thus, the quality of life among Thai elderly was still moderate level which needed to improve high level. As functional disability had a strong association with quality of life among Thai elderly, the results of this study could help in the planning and management of public health for elderly population by both strategical and operational plans. Since aging people had limited financial resources to access health services, many did not get access to rehabilitation services.<sup>11</sup> Thus. the rehabilitation centers, basic health care, the community service, the chronic care facility, long term care, and the emergency service for the Thai elderly should be expanded in future.<sup>12</sup>

## **METHODS**

A cross-sectional study was conducted among older adults with chronic back pain, both genders, from four community hospitals of four regions, Thailand. The sample was selected using the multi-stage cluster sampling method. Simple random sampling technique was used to select four hospitals from four regions across four different regions of Thailand. 359 participants (aged 60 years and older) with chronic low back pain were selected according to inclusion and exclusion criteria. The inclusion criteria included older adults who were at least 60 years old or older, has central pain or be diagnosed with fibromyalgia, diagnosed with chronic low back pain (lasting more than 12 weeks) by a medical practitioner, were able to listen, speak, read and write Thai language. The exclusion criteria included older adults who had skin diseases, inflammation or infection on back, history of back fracture or back surgery, hemi/paraparesis, infectious diseases (e.g. tuberculosis or AIDS) and cancer. The samples of study were adults aged 60 years and older who visit the general outpatient department in four hospitals. The calculation of the sample size is described as follow.

$$\mathbf{n} = \frac{Z^2 \left( \left( \mu \left( 1 - \mu \right) \right)}{d^2} \right)$$

n = 
$$\frac{1.96^2 (0.35)(1-0.35)}{(0.05)^2}$$
 = 350 subjects

where, n is the sample size, Z is the standard normal score, 1.96 in case of 95% confidence interval,  $\mu$  is the estimate of 35.1 % of the person aged 60 years and older had experience of low back pain in last 12 months according the Thai survey in 2015, and d is the precision error set at 0.05 or significance level of 0.05.

In addition, ten percent was added for missing or incomplete data; finally, a total of **385** participants were enrolled.

#### Measurement

The study questionnaire was comprised of four parts. Part I contained socio-demographic items. Part II consisted of 20 questions with three main portions; causes and location of pain, Mc Gill Pain Questionnaires and Visual Analog Scale for pain. The Mc Gill Pain Questionnaire was used for severity of chronic low back pain. The score was described on a severity scale as 0 = none, 1 = mild, 2 =moderate, and 3 = severe. Pain intensity was measured by Visual Analog Scale (VAS) with the cut points as no pain (0 cm), mild pain (1-3 cm), moderate pain (4-6 cm), and severe pain (7–10 cm). Part III was composed of Oswestry





Disability Questionnaires with 10 sections. Each section was scored on a 6-point scale, with 0 representing no disability, and 5 representing maximal disability. The range of the ODI raw score (the sum of the scores from 10 sections) was from 0 to 50. If more than one box was marked in each section, take the highest score. The total score was categorized into two groups as minimal and moderate disability by cut of point. Part IV was constructed of WHOQOL-BREF-THAI which had 26 items with physical health, psychological health, social relationships, and environment health domains. Three items were negative questions (item 2, 9, 11), and 23 items were positive questions. The answers divided into five levels: not at all, a little, moderate, very much, and extreme. The respondents scored the items of the QOL on a five-point Likert response scale (range 1-5). The overall quality of life was classified into three levels such as low level (26-60 points), moderate (61-95 points), and high level (96-130 points).

The questionnaire for this study was extracted from the questionnaire of Cost-effectiveness of complementary and selected alternative medicine therapies in older adults with chronic low back pain project, 2017.<sup>13</sup> Questionnaire was revised accordingly to the objectives of the study and all questions were translated into English Language. The validity of the WHOQOL-BREF-THAI (Cronbach's alpha coefficient) was 0.84, and the reliability was 0.65. The alpha coefficient with 0.70 and above was accepted as evidence of internal consistency of each domain of WHOQOL-BREF.<sup>14</sup> Before data collection, one day training was provided to the research assistants of each hospital. They were taught the research objectives, questionnaire, ethical issues,

consent process and how to conduct a structured interview. The research assistant would read an informed consent to the older adults in their local language if the older adults were interested to participate. After getting agreement to participate, they would sign the informed consent and were interviewed by the research assistant. There were 359 elderly with chronic back pain who participated in the study.

### Ethical consideration

The current study was approved by the Committee of the Research Ethics (Social Sciences) MUSSIRB, Mahidol University (2020/017.0206).

#### Data analysis

The data were analyzed with computer software SPSS version 26. Descriptive statistics were used to examine the sociodemographic characteristics, low back pain characteristics and functional disability of the participants. Chi-square test was used to find the association between independent and dependent variables. Enter and stepwise multiple regression were applied to identify the predictors of the QOL. A p-value was set to consider as statistically significant at p < 0.05.

### RESULTS

The majority of elderly were female (72.4%), married (64.1%), primary education (76.0%), and no longer worked (51.8%) with an age range of 60 to 93 years. The elderly who do exercises (41.5%) with two times or more per a week (65.1%) as presented in table 1.



Table 1	Number	and	percentage	of	socio-demographic	characteristics	of	Thai	elderly	with	CLBP
(n=359)											

Socio-demographic characteristics	n	%
Age		
60-67	184	51.3
68-93	175	48.7
(Median = 67, S.D = 7.21, Min = 60, Max = 93)		
Gender		
Female	260	72.4
Male	99	27.6
Education		
No school	32	8.9
Primary school	273	76.0
Middle school	15	4.2
High school & above	39	10.9
Occupation		
No work	186	51.8
Farmer	103	28.7
Employee	45	12.5
Office staff	13	3.6
Own business	12	3.3
Marital status		
Single	13	3.6
Married	230	64.1
Separate	5	1.4
Divorce/ Widow	111	30.9
Exercise		
No	210	58.5
Yes	149	41.5
Exercise time per week		
1 time	52	34.9
$\geq 2$ times	97	65.1
(Mean = 2, S.D = 1.35, Min = 1, Max = 7)		

Prolong sitting or standing (39.6%) was the common cause for chronic low back pain with 3-29 months duration (50.1%) and two weeks or more pain each episode (60.7%). More than half of older adults suffered from chronic low back pain with low pain severity (51%) and low pain intensity (52.1%). Minimal disability (51.3%) and moderate disability (48.7%) were not much different among the elderly as shown in table 2.



**Table 2** Number and percentage of chronic low back pain, severity, pain intensity and functional disability among Thai elderly (n=359)

Causes and duration of low back pain	n	%
Causes		
Heavy lift	15	4.2
Wrong position	95	26.5
Prolong sitting/standing	142	39.6
Aging	73	20.3
Job characteristics	27	7.5
Illness	7	1.9
Duration		
$\leq 29$ months	180	50.1
> 29 months	179	49.9
(Median = 29, S.D = 34.79, Min = 3, Max = 99)		
Pain each episode duration		
1week	141	39.3
≥ 2weeks	218	60.7
(Median = 2, S.D = 1.57, Min = 1, Max = 5)		
Pain severity (Mc Gill Pain)		
Low	183	51.0
High	176	49.0
(Median = 6, S.D = 2.57, Min = 0, Max = 13)		
Pain intensity (Visual Analog Scale)		
Low	187	52.1
High	172	47.9
(Median = 5, S.D = 1.75, Min = 0, Max = 10)		
Functional disability (Oswestry Disability Index)		
Minimal	184	51.3
Moderate	175	48.7
(Median = 15, S.D = 8.00, Min = 0, Max = 40)		

Quality of life among 359 older adults was categorized three groups according to WHOQOL criteria. One-third of older adults were high in overall quality of life and the majority of them had moderate level of QOL. Among four domains, most of elderly had better QOL in psychological health domain while a few people were high in physical health domain (Table 3).

**Table 3** Number and percentage of four domains and overall quality of life (WHOQOL-BREF) among Thai elderly with CLBP (n=359)

		Level of QOL		
<b>QOL Domains</b>	Low	Moderate	High	
	n (%)	n (%)	n (%)	
Physical Health	13 (3.6)	319 (88.9)	27 (7.5)	
Psychological Heath	3 (0.8)	153 (42.7)	203 (56.5)	
Social Relationship	63 (17.5)	227 (63.3)	69 (19.2)	



		Level of QOL	
<b>QOL Domains</b>	Low	Moderate	High
	n (%)	n (%)	n (%)
Environmental Health	-	215 (59.9)	144 (40.1)
Overall QOL	-	259 (72.1)	100 (27.9)

When examining the association of the variables of interest and QOL, there were significantly associations among age, gender, education, marital status, exercise, exercise times per week, causes of back pain, duration of back pain, pain each episode duration, pain severity, pain intensity, functional disability and QOL. When the significant factors were entered into the stepwise multiple regression model, six predictors (gender, education, causes of low back pain, pain each episode duration and functional disability) were found as predictors of QOL among elderly with p-value < 0.05. Functional disability was the most significant predictor for getting high QOL with p-value < 0.001 (Table 4).

Independent Variables	Frequency	COR (95% CI)	AOR (95% CI)
Age (years)			
60-67	184 (51.3)	1.73 (1.08-2.77)*	2.27 (0.74-2.19)
68-93	175 (48.7)	1	1
Gender			
Female	260 (72.4)	1	1
Male	99 (27.6)	2.57 (1.57-4.21)***	1.91 (1.07-3.40)*
Education			
Primary and below	305 (85.0)	1	
Middle and above	54 (15.0)	1.82 (0.99-3.33)*	1.03 (0.48-2.20)
Marital status			
Single (separate / divorce)	129 (35.9)	1	1
Married	230 (64.1)	1.64 (0.99-2.72)*	0.87 (0.46-1.61)
Exercise			
No	210 (58.5)	1	1
Yes	149 (41.5)	1.62 (1.01-2.57)*	1.02 (0.58-1.79)
Exercise time per week			
1 time	52 (34.9)	1	1
$\geq 2$ times	97 (65.1)	2.50 (1.15-5.46)*	1.95 (0.81-4.73)
Causes			
Prolong sitting/standing	142 (39.6)	1	1
Others causes	217 (60.4)	1.62 (1.02-2.58)*	2.04 (1.19-3.50)**
Pain each episode duration			
1 week	141 (39.3)	1	1
$\geq 2$ weeks	218 (60.7)	1.99 (1.21-3.28)**	2.05 (1.17-3.60)**
Pain severity (Mc Gill Pain)			
Low	183 (51.0)	2.22 (1.38-3.58)***	1.45 (0.84-2.49)
High	176 (49.0)	1	1

**Table 4** Significant predictors of high quality of life among Thai elderly with CLBP (n=359)



Independent Variables	Frequency	COR (95% CI)	AOR (95% CI)					
Pain intensity (Visual								
Analog Scale)								
Low	187 (52.1)	2.50 (1.54-4.06)***	1.18 (0.66-2.12)					
High	172 (47.9)	1	1					
Functional disability								
Minimal	184 (51.3)	7.01 (3.97-12.37)***	6.96 (3.83-12.64)***					
Moderate	175 (48.7)	1	1					
* = p-value < 0.05, $** = p$ -value < 0.01, $*** = p$ -value < 0.001								

## DISCUSSION

In term of QOL as measured by WHOQOL-BREF, the study found that only 27.9% of elderly had high quality of life which was consistent with the previous study in Thailand.<sup>8</sup> Regarding domain scores, psychological health domains had the highest scores for QOL while the lowest was physical health domain which was consistent with previous study in Bosnia and Herzegovina.<sup>15</sup> Moreover, the physical domain had the highest score while the social domain had the lowest score of QOL among elderly.<sup>16</sup> As the current study indicated that physical health was needed to improve for elderly, health promotion programs including physical activities to improve physical functions of elderly should be provided.

Gender was a predictor of QOL among elderly. Male older adults were more likely to have a better QOL than females. The previous two studies in Kuala Lumpur, Bosnia and Herzegovina reported a significant association between gender and QOL in the elderly.<sup>15,16</sup> One reason why male older adult had a better QOL than female older adults across all of the countries because the males perceived aging more positively than the females.<sup>17,18</sup> Another reason of higher QOL among male in this study might be due to the pain threshold. The average pain threshold among females was 50% lower than in males. So, public health agencies could set up programs and activities to encourage older adults, especially females, to improve psychosocial support and perceive aging positively in the community.

This study also found that causes of back pain can predict the OOL in older adults which was consistent to previous study.<sup>19</sup> Health policies should provide health education and health promotion in the community to minimize the prevalence of low back pain and its consequences. Pain each episode duration was another predictor of the QOL in older adults which was harmonized with the previous study.<sup>20</sup> The longer pain each episode duration, the higher functional limitation with lower QOL. Thus, health expenditure, quality health care and services should be accessible and affordable for elderly with chronic low back pain to reduce functional disability for better QOL. The last predictor of QOL in this study was the functional disability which was consistent with the previous studies.<sup>21,22</sup> Functional disability had negative association with QOL among elderly. Although disability among patients with CLBP increased with advancing age, indicators of quality of life were equal or even higher in older patients. While they might still be able to perform basic daily activities, their physical health deteriorates as their age increased. Health promotion program and activities to stimulate the maintenance of functionality such as walking or cycling, dancing, gardening, sports or planned exercise could and community activities, be implemented to minimize the impact of functional disability in the everyday life of the elderly.

## CONCLUSION

This study revealed that the majority of elderly (72.15%) had moderate QOL and only 27.9%





was high QOL. Among four domains, psychological health domain was the highest for better QOL while the physical health domain was the lowest. This reflected the fact that chronic low back pain was still a public health concern which led to higher functional limitations and lower QOL for older adults in Thailand. This study highlighted that five factors were associated with QOL include gender, education, causes of back pain, duration of pain each episode and functional disability (p-value <0.05).

As the functional disability was the strongest predictor of QOL among the elderly, attention should be paid on disability as the impact of chronic low back pain. The finding of present study could help to understand current situation for targeting health promotion and set up the health care system to care the elderly then policy implementation among this vulnerable groups in the district health system of Thailand. Therefore, policymakers should prioritize chronic low back pain in public health planning and management for the elderly population by both strategic and operational plans to minimize disability and improve their quality of life.

# RECOMMENDATIONS

The findings of this study could contribute to the knowledge regarding the QOL among the older adults with chronic low back pain. Long term care strategies should be expanded to support expenditures on health system for preventive treatment, health promotion and health education to reduce chronic back pain and disability in elderly. Training programs for health care team should be provided to care low back pain and prevent functional limitation among elderly.

Moreover, health promotion projects and activities for elderly such as walking or cycling, dancing, gardening, sports or planned exercise and community activities, should be implemented to stimulate the maintenance of functionality which minimize the functional disability and improve their quality of life. The direct community setting should set family care team (multidisciplinary teams), village health volunteer and care giver for elderly with low back pain in the community setting. Further research is warranted to identify other potentially relevant functional disability in elderly with chronic low back pain and focus on type of community and health services that associate functional disability and quality of life and fine out the proper intervention to care the elderly.

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# PREVALENCE OF THE COMPLEMENTARY FOODS PRACTICE AMONG CHILDREN AGED 0-24 MONTHS, IN MUNICIPALITY DILI, TIMOR-LESTE

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## ABSTRACT

Children are regarded as an important asset for human resources. Healthy children are the future of the country. The complementary food introduction has an impact on the nutritional status of a child. A few studies conducted in Timor-Leste focusing on nutrition among the children, particularly among age 0-24 months. The aim of the study was to describe the prevalence of the complementary foods introduction and to determine the factors associated with the complementary food introduction among children aged 0-24 months in Municipality Dili Timor-Leste. The cross-sectional analytic study was conducted and data was collected from a total of 400 mothers and care taker in six sub-districts of Dili municipality in Timor-Leste. Stratified sampling and simple random sampling methods were used. The structured questionnaire and pilot study in the different area from this study was conducted. Descriptive statistic including percentage, bivariate logistic regression and multiple logistic were used for data analysis. Prevalence of giving early complementary food in our study area was 47%. Children older than 12 months was 301 (75.3%). More than half of the children (54.5%) were male. The majority (51%) of the mothers were not housewives and (89.5%) had higher than primary level education. Half of the families had monthly income of less than or equal to 150US\$. Time of introduction of complementary food among the children start at age two months and the highest frequency was age at 6 months. Multiple logistic analysis showed that breastfeeding AOR=5.39, 95%CI=2.09-13.90, completed immunization, AOR=4.39, 95%CI=2.66-7.24 and source of foods AOR=3.38, 95% CI =1.29-5.54 respectively), were significantly associated with the outcome. To increase the awareness of mothers in families and communities, health promotion and health education regarding when to start giving complementary foods among mothers and care takers is needed.

Keywords: complementary foods, children aged 0-24 months, Dili - Timor-Leste

### **INTRODUCTION**

Timor-Leste is one of the youngest countries in the 21<sup>st</sup> century, was independent in 2002, economically categorized as a low-middle income country, with 1.3

million population, which 39.6 % of the population is less than 15 years old.<sup>1</sup> Children therefore, is an important asset of human resources for the future of the country. The first 1,000 days of life of children a period of rapid growth and



development. Appropriated nutrition during this time is very important to achieve optimal development and good health in the next life.<sup>2</sup> Complementary feeding is an essential part of children's growth, development, and health. However, when children do not have enough intake in a foods given varietv of or early complementary foods it can affect the status of nutrition of the children. $^{3,4}$ 

Complementary feeding to children based on recommendation from World Health Organization starts at six months, with different types of food from soft, semi-solid, and solid. Every child must have enough intake in a variety of foods, to ensure that all nutrients are met.<sup>5, 6</sup> Giving early complementary foods to children can affect status nutrition, and leading to health problems of the children such as obesity, allergy of foods, invagination of the intestine, diarrhea, and constipation.7, 8 Based on the Demographic Health survey in 2016 in Timor-Leste showed that the prevalence of infants under five years who not received an acceptable diet was 46% and only 13% of children receive an acceptable minimum diet.<sup>9, 10</sup> From previous literature studies, few studies done in Timor-Leste about the nutrition of the children under five years.<sup>11-13</sup> Hence, children are regarded as an important asset for human resources. Healthy children are the future of the country. The complementary food introduction has an impact on the nutrition status of a child. A few studies conducted in Timor-Leste focusing on nutrition among the children, particularly among age 0-24 months.

The aim of the study was to describe the prevalence of the complementary foods introduction and to determine the factors associated with the complementary food introduction among children aged 0-24 months in Municipality Dili Timor-Leste. This study will be a benefit for the national policy and improve children health concerning the complimentary food program in Timor-Leste.

## METHODS

community-based А cross-sectional analytic study was conducted among 400 mother and care taker by well-trained research assistants in Dili Municipality Timor-Leste from 5<sup>th</sup> May to 5<sup>nd</sup> June 2020. Stratified simple random sampling was conducted in this study, data collection was collected from 6 sub-districts including Veracruz, Dom Aleixo, Nain Feto, Cristo Rei, Metinaru, and Atauro. The structured questionnaire was used covered general characteristics including sample size socioeconomic data, completion of an immunization, source of food, health care facility services and breast feeding, and to ensure the data accuracy and reduce the recall bias, time of the complementary foods introduction of the children of 24 hours recorded was conducted. Based on WHO recommendation the ages of child introduce complementary foods or the study outcome divided into 2 group, < 6 months and  $\ge 6$ months of age. The Ethical Review Committee approved the study, Mahidol University (MUSSIRB). With certificate of approval number 2020/088.2114, 2020/090(B1). Written consent was obtained from the mothers of all participants before data collection. The analysis was performed using Statistical Packages for the Social Sciences (SPSS) (version 21.0). Descriptive statistic including number and percentage, the univariate logistic regression test was used to determine the relationship between each independent variable and the outcome variable. The adjusted and crude odds ratio was used to show the strength of association with a 95% confidence interval



# RESULTS

#### Characteristics of participants

A total of 400 of mothers and care taker with their child were qualified to involve in this study. Aged of children < 12 months were 75.3%. The majority of children were male gender (54.5%). Most (94%) of the children weight at birth was  $\geq 2500$ , age of mother > 20 years was 90.5 %, and 94.5% obtain > primary level education. Concerning occupation of mothers, majority (51%) were not housewife and 49% were housewife. Low income of family  $\leq$  \$ 150 was 50%, 47% of the children started complementary feeding < 6 months as is showed in table1.

Characteristics	n	0/_
Condor	11	/0
Male	210	51 5
Female	210 187	л <del>ч</del> .л Л5 5
Rirth weight (grome)	102	<del>т</del>
22500	24	68
~2500 ~2500	24 276	0.0
<u>&lt;</u> 2JUU Child ago (months)	570	75.2
<12 cmu age (months)	201	75.2
>12 >12	301	13.3
$\leq 12$	99	24./
vioiner Ageu(years)	20	0.5
< 20 > 20	38	9.5
>20 Mathem Edge (*	362	90.5
Nother Education	~~	
≤ primary level	22	5.5
> primary Level	378	94.5
Mother Occupation		
House wife	196	49.0
Non-housewife	204	51.0
Marital status		
Married	380	95.0
Stay alone	20	5.0
Have another child in the home		
Yes	189	47.2
No	211	52.8
Family Income		
< \$150	200	50.0
$\geq$ \$150	200	50.0
Median 157.15 (SD 181.8) range \$10- \$2500		
Ages of child introduce complementary foods		
< 6 months	188	47.0
$\geq$ 6 months	212	53.0
Breastfeeding		
Yes	353	88.3
No	47	11.7

#### Table 1 Characteristics of participants (n=400)



Characteristics	n	0⁄0
Complete immunization		
Yes	239	40.2
No	161	59.8
Illness last months		
Yes	229	57.2
No	171	42.8
Main caregiver		
Parent	299	74.8
Relative family	101	25.2
Source of foods		
Buy	338	84.5
Own garden	62	15.5
How to get health facility		
Transportation	335	83.8
Walk/ on foot	65	16.2



Figure 1 showed aged introduce complementary foods, aged introduced early, most of the kind of foods giving as fruits and eggs

The relationship between factors and introduced complimentary food by Univariate Logistic regression analysis showed that marital status, another child at home, family income, breastfeeding, complete immunization, illness last month and source of foods were significantly correlated with giving early complementary food (p-value< 0.05) as shown in Table 2



		Givi	ng Com	pleme			
	<b>a b</b>		foo	ds	Crude		
Factors	Total	Ea	arly	Not	early	OR	95% CI
		n	%	n	%	-	
Gender							
Male	218	101	53.0	117	53.7	0.94	0.63 - 1.39
Female	182	87	47.0	95	52.2	1	
Birth of weight (grams)							
< 2500	27	14	51.9	13	48.1	1.22	0.56-2.67
$\geq$ 2500	372	174	46.8	198	53.2	1	
Age of mothers							
≤20	38	22	57.9	16	42.1	1.62	0.82 -3.19
>20	362	166	45.9	196	54.1	1	
Education of mothers							
$\leq$ primary Level	22	12	54.5	10	45.5	1.37	0.58-3.26
> primary Level	378	176	46.6	202	53.4	1	
<b>Occupation of mothers</b>							
House wife	196	98	50.0	98	50.0	1.26	0.85 -1.87
non house wife	204	90	44.1	114	55.9	1	
Marital status							
Married	380	185	48.7	195	51.3	5.37**	1.55 - 18.64
						*	
Stay alone	20	3	15.0	17	85.0	1	
Another child at home							
No	211	109	51.7	102	48.3	1.48*	1.00 - 2.21
Yes	189	79	41.8	110	58.2	1	
Family income							
> \$ 150	200	106	53.0	118	59.0	1.62**	1.09 -2.41
≤\$150	200	82	41.0	94	47.0	1	
Breastfeeding							
Yes	353	182	51.6	171	87.2	7.23**	3.01 -17.56
						*	
No	47	6	12.8	41	48.4	1	

### Table 2 Univariate analysis of factors associated with given complementary foods



		<b>Giving Complementary</b>					
	Tatal		foo	ds	Crude	050/ 01	
Factors	Total	<sup>1</sup> Early		Not early		OR	95% CI
		n	%	n	%	-	
Complete immunization							
No	161	106	65.8	55	34.2	3.69** *	2.42- 5.62
Yes	239	82	34.3	157	65.7	1	
Illness last months							
No	169	101	59.8	68	40.2	2.42** *	1.61 -3.64
Yes	229	87	38.0	142	62.0	1	
Source of foods							
Buy	388	173	51.2	165	48.8	3.28** *	1.76- 6.10
Own garden	62	15	24.2	47	75.8	1	
How to get Health							
Facilities							
Transportation	330	157	47.6	175	56.9	11.20	0.70-2.06
Walk/on foot	57	22	38.6	37	52.2	1	

\* *p-value* < 0.05, if statistically significant at  $\alpha = 0.05$ 

\*\* *p*-value < 0.01, if statistically significant at  $\alpha = 0.01$ 

\*\*\* *p-value* < 0.001 if statistically significant at  $\alpha = 0.001$ 

#### Multivariate logistic regression

After adjusting from confounding factors, this study found that 5 factors were associated with early complementary feeding, family income (AOR=2.043, 95% CI=1.628 -3.289), breastfeeding (AOR= 5.399, 95% CI=2.097-13.902), complete immunization (AOR= 4.392, 95% CI=2.662 -7.248), Illness last months (AOR=3.621 95% CI=1.999- 5.318), and source of foods (AOR=2.674, 95% CI=1.291-5.541 respectively), P-value < 0.05 (table 3).

Factors	Tota l	Early 6 m	give < onths	Not give early complementary		Crude	Adjuste	95% CI for
		n	%	n	%	- OK	u OK	AUK
Family in	ncome							
> \$ 150	200	106	53	118	59.0	1.62	2.04**	1.26 - 3.28
≤\$150	200	82	41	94	47.0	1	1	
Breastfe	eding							
Yes	353	182	51.6	171	87.2	7.23	5.39***	2.09-13.90
No	47	6	12.8	41	48.4	1	1	

**Table 3** Multi Regression Associated with giving early complementary foods



Factors	Tota l	Early give < 6 months		Not give early complementary		Crude	Adjuste	95% CI for
		n	%	n	%	- OK	u OK	AUK
Completed immunization								
No	161	106	65.8	55	34.2	3.69	4.39***	2.66-7.24
Yes	239	82	34.3	157	65.7	1	1	
<b>Illness la</b> No Ves	st mont 169 229	t <b>hs</b> 101 87	59.8 38	68 142	40.2	2.42	3.26***	1.99-5.31
Source o	f foods	07	50	1 12	02.0	-	1	
Buy	338	173	51.2	165	48.8	3.28	2.67**	1.29-5.54
Own garden	62	15	24.2	47	75.8	1	1	

\* *p*-value < 0.05, if statistically significant at  $\alpha = 0.05$ 

\*\* *p*-value < 0.01, if statistically significant at  $\alpha = 0.01$ 

\*\*\* *p-value* < 0.001 if statistically significant at  $\alpha = 0.001$ 

## DISCUSSION

This study highlighted the prevalence of early introduced complementary foods among children 0-24 months, and factors related. The prevalence given early complementary foods < 6 months was 47%. Many countries still had high prevalence of early introduced complementary foods. One study done in Netherland showed introduced complementary foods before 6 months was 21 %, Cohort study in Chengdu China found 94%, in Myanmar a study showed 18.6%, in Vietnam it was 40.9 %, Austria 75.3% and Poland 60.5%. 14-18 On the other hand, a cohort study in Italy showed 94% introduced complementary foods at six months.<sup>19</sup>

From bivariate analysis it was found that, the level of education of mothers was not associated with giving early complementary foods (OR =1.377, CI= 95% 0.581 -3.265), P-value 0.467. However, one study done in Sweden and another done in developed countries reported similarly resulted that low education of mothers was strongly associated with early gave complementary foods. <sup>20, 21</sup>

The resulted of the multivariate analysis also found source of foods in family associated with early introduced complementary foods to the children (AOR 2.674. 95% Cl =1.291-5.541), significantly P-value < 0.05 (table 3). Although this study not measured about breastfeeding exclusively for children 0-6 months, based on recommendation WHO. It is an important aspects for children development and wellbeing. In this study breastfeeding infants and young children were more given early complementary foods 7.2 times when compared to those who were not breastfeeding. In Timor-Leste some mothers cultures or beliefs that breastfeeding is not enough nutrition to children, therefore they must have a combination with soft foods such as fruit banana, papaya. Previous studies found that infant who had breastfeed were more likely to have complementary foods at six months.<sup>22, 23</sup>

Immunization to the children during this period 0-24 months, affected the growth of




the children and the nutrition status of children. In this study children who did not completed immunization were more likely to give early complementary foods 4.3 times when compared to children who had completed immunization. Mother and caretaker obtained information from health regarded complementary professionals foods and time introduced when children received immunization compared children who not completed immunizations. One study in India showed children who had complementary foods also have complete immunization based on the aged of children<sup>24</sup>. Several previous studies done showed that giving early complementary foods was associated with several illnesses children.<sup>25-27</sup> of Giving early complementary foods related to several illnesses happen because before six months stomach of a baby not ready to consumed foods, invagination intestine, allergy of foods, and foods poising related to practices feeding.

Family income is regarded as an important point in complementary foods for the children, in this study, family with high income were more likely to feed the children early such as showed in analysis AOR = 2.043, 95% CI= 1.268 -3.289, P-value 0.003. However, previous study done in Thailand and showed that low income family had a significant relationship with the status nutrition of children especially in complementary times.<sup>28, 29</sup> Low family income can lead to the source of food in the family, and not enough money to access foods and children therefore, not having an adequate intake of foods.

There are Limitation of this study, the unavoidable recall bias which arises because of the data collection's and which can result in participants over- or underestimating the early giving complementary foods they have implemented in the past. This cross-sectional study cannot establish causality, although it indicated possible association.

# CONCLUSION

This study found that the strongest association with giving early complementary foods, among children and significantly, were family income, breastfeeding, completed immunization, illness last month, and source of foods with P-value <0.05. Since then, to strengthening and enhance awareness of mothers and care taker in communities and families level through health promotion intervention programs in communities to prevent and reduce an early introduction complementary food consumption among childhood is needed.

# RECOMMENDATIONS

Strength and improve the health care system, to implement health promotion programs and health education to mothers in communities and families, enhanced awareness about introducing complementary feeding at six months based on WHO recommendation.

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# KNOWLEDGE, ATTITUDE AND IRON DEFICIENCY ANEMIA PREVENTION PRACTICE AMONG FEMALE HIGH SCHOOL STUDENTS IN BANJARMASIN, INDONESIA: A CROSS-SECTIONAL STUDY

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#### ABSTRACT

Based on Indonesia National Basic Health Survey in 2018, the prevalence of anemia in young women was 48.9%, along with the proportion of anemia in the age group of 15-24 years. To overcome this health problem issue, it requires the understanding the knowledge, attitude and iron deficiency anemia prevention practice among those female high school students. This study aimed to examine the influence of knowledge and attitude on practice of iron deficiency anemia prevention and to find out the reasons for not practicing anemia prevention among female high school students in Banjarmasin, Indonesia. Cross-sectional survey study (April 2020) was conducted through online survey among female students (15-18 years old). Purposive sampling were used to select three high schools with the high prevalence of anemia in Banjarmasin, Indonesia. The questionnaires covered general characteristics, knowledge, attitude on Iron deficiency anemia prevention and reason for not practicing Iron deficiency anemia prevention. Questionnaires validity and reliability were tested with Item-Objective Congruence (IOC), Cronbach's Alpha and KR20 before the data collection. Data analysis used descriptive statistics (frequency, percentage, mean and standard deviation), bivariate analysis and binary logistic regression. Total 359 students participated in the study with age range from 15 to 18 years old. The results showed 166 (46.2%) of female students had poor practice, along with 152 (42.3%) poor attitude level and 175 (48.7%) poor knowledge level towards iron deficiency anemia prevention. From bivariate analysis there were 4 significant factors with p-value < 0.25 such as age, household income, type of school and knowledge. From binary logistic regression, the study indicated that older age group of female students (17-18 years old) was 27% less likely to practice anemia prevention than younger age group of female students (15-16 years old) (AOR (95%CI): 0.630 (0.405, 0.980) p= 0.040). Female students at nonvocational school were 46% less likely to practice anemia prevention than female students at vocational school (AOR (95%CI): 0.542 (0.335, 0.877) p= 0.013). Female students with higher knowledge increased the odd of having anemia prevention practice by 7% (AOR (95%CI): 1.070 (1.009, 1.135) p=0.023). Top 3 reasons for not practicing anemia prevention among students were 1) Feeling nausea after taking iron tablets (32%); 2) Don't like the smell and color of iron tablets (21.4%); 3) Don't know the benefit of practice anemia prevention (18.9%). Main reasons for not practicing anemia prevention were related to the dislike of iron tablets and lack of effective anemia education program. Therefore, anemia prevention programs should improve the knowledge of students towards the benefit of anemia prevention practice and iron tablets compliance.

Keywords: iron deficiency anemia, knowledge, attitude, practice, female high school students



# INTRODUCTION

Anemia is a condition with the low levels of hemoglobin in the blood due to few red blood cells and / or a small amount of hemoglobin in each cell. There are many types of anemia but iron deficiency is the most common type. Iron deficiency anemia is one of the most common nutritional disorders in the world.<sup>1</sup> Adolescents (10-19 years old) are at high risk of developing iron deficiency anemia due to an increased need for accelerated but poor food intake, high infection rates, and worm attacks and the consequences of early marriage and pregnancy in adolescents. Anemia can have profound negative impact on psychological and physical development, healing capacity, work performance, and reproductive health of an individual.<sup>2</sup>

Based on Indonesia National Basic Health Survey in 2013 prevalence of anemia in young women was 37.1% which actually increased to 48.9% in 2018, with the proportion of anemia in the age group of 15-24 years and 25-34 years. These things clearly reinforce that adolescent health is crucial for the success of health development, especially in the effort to print the quality of the nation's future generations.<sup>3</sup> In 2014 in Banjarmasin city anemia prevalence among high school female students reached 42.42%. This shows that the prevalence of anemia adolescents in South Kalimantan is higher than the target set by the government in 2010 which is only 20%. The government already sets anemia reduction program among female students at schools, however the prevalence of anemia is still high. In 2018, several attempts have been made by the government through health district office to implement anemia reduction program such as checked the level of hemoglobin and iron tablets supplementation for female students in junior and senior high schools.<sup>4</sup>

However, there is a limitation from previous studies related to measure knowledge, attitude, and practice on anemia prevention among high school female students in Indonesia. According to the high prevalence of anemia in female students in Banjarmasin city, the current study aims is needed to examine the influence of knowledge and attitude on iron deficiency anemia prevention practice. The significant of the study will help us understand about knowledge, attitude and iron deficiency anemia prevention practice of female high school students then providing information to create suitable programs to school and local health district to improve awareness and participation of female high school students towards iron deficiency anemia prevention.

## METHODS

Cross-sectional survey study (April 2020) was conducted through online survey used google forms among 359 female students (15-18 years old) in 3 senior high schools in Banjarmasin city, Indonesia. The response rate in this study was 100%. Sample size in this study were 333 subjects. Female students who didn't agree to participate and didn't have smart phone excluded from this study. Purposive sampling were used to select three high schools with the high prevalence of anemia in Banjarmasin, Indonesia. The structured questionnaires covered general characteristics, knowledge, attitude, practice on Iron deficiency anemia prevention and reasons for not practicing Iron deficiency anemia prevention. Questionnaires validity and reliability were tested with Item-Objective Congruence (IOC), Cronbach's Alpha and KR20 before the data collection. The Index of Item-Objective Congruence (IOC) was conducted before pilot test. The questions with score equal or less than 0.5 were revised or deleted accordingly. Reliability score for attitude was 0.752, and reliability score for knowledge was 0.717. The study was approved by a written permission from Ethical Review Board, Faculty of Public Health - University of Muhammadiyah Jakarta: No. 10.005.B/KEPK-FKMUMJ/IV/2020. Data analysis used descriptive analysis (frequency, percentage, mean and standard deviation), bivariate analysis (simple logistic regression) and binary logistic regression through SPSS.22 licensed



by Chulalongkorn University. The data was not normal distributed, we used median cutoff point to classify practice, knowledge, and attitude into 2 levels (poor and good).

### RESULTS

Table 1 shows the general characteristics of the participants. More than half of the participants,

51.3% were age between 15-16 years old. More than half of the participants, 56.8% were have parent's income higher than district minimum wage  $\geq 2,500,000$  Indonesian Rupiah (IDR) 208pprox.. 174.5 USD. More than half of participants, 68.2% were non-vocational school's students. More than half of participants' father's education, 73.8 were less than Bachelor's degree. More than half of participants' mother's education, 80.2%.

Table 1 General	Characteristics of Participants	(n = 359)	ļ
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Characteristics	n	%
Age		
15-16 years old	184	51.3
17-18 years old	175	48.7
Grade		
Grade 10	131	36.5
Grade 11	138	38.4
Grade 12	90	25.1
Parents Income		
< 172.5 USD per month	155	43.2
$\geq$ 172.5 USD per month	204	56.8
Type of School		
Non-vocational School	245	68.2
Vocational School	114	31.8
Father Education		
< Bachelor's Degree	265	73.8
≥ Bachelor's Degree	94	26.2
Mother Education		
< Bachelor's Degree	288	80.2
$\geq$ Bachelor's Degree	71	19.8
Anemia History		
Yes	75	20.9
No	284	79.1
Family History of Anemia		
Yes	72	20.1
No	287	79.9



Table 2 shows score and proportion of practice level on anemia prevention. Among 359 respondents about 193 (53.8%) had good practice on anemia prevention followed by poor practice 166 (46.2%). Among total 359 respondents, half scored good knowledge level (51.3%) followed by poor knowledge (48.7%). Among half of respondents had good attitude (57.7%) followed by poor attitude (42.3%).

**Table 2** Score and proportion of practice, knowledge, and attitude level on anemia prevention (n = 359)

Practice, Knowledge, and Attitude Level (N=359)	%	
Poor practice (Score 0-12)	166 (46.2)	
Good practice (Score 13-22)	193 (53.8)	
Poor knowledge (Score 1-12)	175 (48.7)	
Good knowledge (Score 13-21)	184 (51.3)	
Poor attitude (Score 19-30)	152 (42.3)	
Good attitude (Score 31-44)	207 (57.7)	

Table 3 shows that top three the reasons of respondents not practicing anemia prevention were feeling nausea after taking iron tablet (32.3%), don't like the smell and color of iron tablets (21.6%), and don't know the benefit of practice anemia prevention (19.1%). Followed by anemia prevention is not important (16.0%), and lack of parent's support (11.0%).

**Table 3** Frequencies and distribution of reasons for not practicing anemia prevention (n = 359)

Reasons for not practicing anemia prevention	%
Feeling nausea after taking iron tablet	115 (32.3)
Don't like the smell and color of iron tablets	77 (21.6)
Don't know the benefit of practice anemia prevention	68 (19.1)
Anemia prevention is not important	57 (16.0)
Lack of parents support	39 (11.0)

Bivariate analysis was performed using simple logistic regression to investigate the association between all independent variables and dependent variable. Table 4 shows the results from bivariate analysis there were 4 significant factors with p-value < 0.25 such as age, household income, type of school and knowledge. Multivariate analysis was used binary logistic regression with enter method was used to analyze the associations between the multiple independent variables and dependent variable which was iron deficiency anemia prevention practice level. Four significant variables from bivariate analysis such as age, household income, type of school and knowledge scores included in the model and also attitude. Whether in bivariate analysis results found that attitude scores was not significant however we consider to put attitude as well into the model because one of objective in this study aims to find association between attitude and practice on anemia prevention.



**Table 4** Bivariate analysis to find association between socio-demographic characteristics, knowledge and attitude on practice on Iron Deficiency anemia prevention (n = 359)

Variables	Practic	e of iron	deficiency	anemia
	prevention			
	p-value <sup>6</sup>	OR <sup>®</sup>	95	% CI
			Lower	Upper
Age 17-18 year old 15-16 years old <sup>Ref</sup>	0.094*	<b>1.428</b> 1	0.941	2.167
Household income > 2,500,000 IDR ≤ 2,500,000 IDR <sup>Ref</sup>	0.016*	<b>1.681</b> 1	1.103	2.562
<b>Type of school</b> Non-vocational school Vocational school <sup>Ref</sup>	0.020*	<b>0.587</b> 1	0.375	0.919
<b>Father education</b> Bachelor's degree Lower than Bachelor's degree <sup>Ref</sup>	0.404	1.224 1	0.761	1.967
Mother education Bachelor's degree Lower than Bachelor's degree <sup>Ref</sup>	0.964	0.988 1	0.587	1.663
Anemia history Yes No <sup>Ref</sup>	0.766	0.919 1	0.525	1.607
Family history of anemia Yes No <sup>Ref</sup>	0.579	0.849 1	0.476	1.514
Knowledge	0.006*	1.077	1.021	1.136
Attitude	0.571	1.016	0.961	1.075

<sup>b</sup> Bivariate Analysis (Simple logistic regression), variables with p value < 0.25 will be included in binary logistic regression

Table 5 shows factors predicting practice of anemia prevention among respondents (N=359) adjusted for age, household income and type of school. Among five predictors, the findings of the study indicated that three predictors showed statistically significant on practice of anemia prevention after holding other variables constant. Older age group of female students (17-18 years old) was 27% less likely to practice anemia prevention than younger age group of female students (15-16 years old) (AOR



(95%CI): 0.630 (0.405, 0.980) p= 0.040). Female students at non-vocational school were 46% less likely to practice anemia prevention than female students at vocational school (AOR (95%CI): 0.542 (0.335, 0.877) p= 0.013). Female students with higher knowledge increased the odd of having anemia prevention practice by 7% (AOR (95%CI): 1.070 (1.009, 1.135) p= 0.023).

**Table 5** Factors predicting practice of anemia prevention among respondents (n = 359)

Variables	Practice of iron deficiency anemia prevention			prevention
	p-value <sup>b</sup>	<b>AOR</b> <sup>b</sup>	95%	o CI
			Lower	Upper
Age	0.040*	0.630	0.405	0.980
17-18-year-old		1		
15-16 years old Ref				
Household income	0.091	0.680	0.435	1.064
> 2,500,000 IDR		1		
$\leq$ 2,500,000 IDR <sup>Ref</sup>				
Type of school	0.013*	0.542	0.335	0.877
Non-vocational school		1		
Vocational school Ref				
Knowledge	0.023*	1.070	1.009	1.135
Attitude	0.953	1.002	0.941	1.067

<sup>b</sup>AOR (adjusted odds ratio) and p value from binary logistic regression including significant variables from bivariate analysis.

\* Significant p value < 0.05

#### DISCUSSION

Out of 359 participants, 193 (53.8%) had good practice on anemia prevention and 166 (46.2%) had poor practice on anemia prevention. Even though percentage of the good practice is higher than 50% but the percentage of poor practice is nearly 50%. From previous study found that individuals who had better nutrition knowledge had a more positive attitude towards eating healthier foods.<sup>5</sup> Conversely, poor knowledge is one of the risk factors to develop malnutrition.<sup>6</sup>

Female students at non-vocational school were 46% less likely to practice anemia prevention than female students at vocational school (AOR (95%CI): 0.542 (0.335, 0.877) p= 0.013). In Indonesia vocational school were more expensive than non-vocational school. Previous study in Brazil found that alongside the higher prevalence of anemia observed amongst the public school children, it was also found that the prevalence amongst the children

who went to less expensive private schools was almost twice as high as the prevalence amongst those who attended more expensive private schools.<sup>7</sup>

Female students with higher knowledge increased the odd of having anemia prevention practice by 7% (AOR (95%CI): 1.070 (1.009, 1.135) p= 0.023). Previous study in Iran found that there is significant relationship between knowledge and attitudes. It was found that knowledge had significant relationship with practice.<sup>8</sup> Based on findings even though attitude is not significant but it also linked to the knowledge, and female students who had good attitude tend to practice anemia prevention rather than female students who had poor attitude. However, we need to enhance because from the findings female students who had poor attitude was 42.3% nearly 50%. From previous study in Palestine found that nutrition education intervention has an impact on improving knowledge, attitude and practices of iron-deficient female adolescents compared with control. The nutrition program should be



adopted and integrated into comprehensive intervention programs to target IDA among adolescents at various levels.<sup>9</sup>

Top three the reasons of respondents not practicing anemia prevention were feeling nausea after taking iron tablet (32.3%), don't like the smell and color of iron tablets (21.6%), and don't know the benefit of practice anemia prevention (19.1%). Followed by anemia prevention is not important (16.0%), and lack of parent's support (11.0%). From previous studies dietary intake recommendations along with nutrition education programs, is essential to reduce anemia among adolescent girls.<sup>10</sup> Regarding the important role of schools in the education area, the implementation of nutrition education programs in schools is the way to intervene in order to enhance nutritional knowledge among students.<sup>11</sup>

In covid-19 situation we face many challenges, include the way to run data collection for research. Normally we conduct face to face interview for data collection and permission process. However, this study switched data collection method from face to face interview into online survey. The difficulties when we conduct the online survey is we should wait for the responses that couldn't complete faster than face to face interview. However, good management and good coordination to the teacher and leader of each class is really important. The point is we should follow up the response, and contact the key person regularly 1 time per week.

## CONCLUSION

Female students with higher knowledge scores and study from vocational school were more likely to have good practice anemia prevention. Main reasons for not practicing anemia prevention were related to the dislike of iron tablets and lack of effective anemia education program. Therefore, anemia prevention programs should improve the knowledge of students towards the benefit of anemia prevention practice and iron tablets compliance.

## RECOMMENDATIONS

For program implementation we recommend: 1) the implementers could enhance female student's knowledge and awareness through continuous education program; 2) Ministry of health should be consider about iron tablet quality, and solve the problem that iron tablets taking make students feel nausea; 3) If the iron tablets could not switch to the better one, Ministry of health should find the way to solve the side effect so it can convince the students to taking it properly without feeling scared of the side effect. For future research we recommend: 1) Future research should study about what kind of interactive activities that can involve in Iron deficiency anemia education program; 2) Future research should study about the kind of Iron deficiency anemia education program in new normal situation.

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# SERVICE QUALITY, PATIENT SATISFACTION, AND TYPES OF MEDICAL INSURANCE TOWARDS THE REVISIT INTENTION TO PRIVATE HOSPITALS AMONG OUTPATIENTS IN SOUTH TANGERANG CITY, INDONESIA

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# ABSTRACT

Organization for Economic Co-operation and Development (OECD) estimated global health care growth will be higher than 20% of Gross Domestic Product (GDP) by 2050. In Indonesia, 1,804 private hospitals are operating and develop faster than the grow of public hospitals, as it reflects the needs of excellent quality healthcare. This study assessed the association between sociodemographic characteristics, perceived service quality, patient satisfaction and types of medical insurance towards the revisit intention to private hospitals among outpatients in South Tangerang City, Indonesia. Cross-sectional survey conducted through online platform during May 2020 selected outpatients aged between 20-65 years who domiciled among 7 sub-districts of South Tangerang, and had obtained OPD treatment in one of 17 private hospitals. This study enrolled 215 new outpatients aged 20-61 years using convenience sampling, who were mostly female (75.3%) received specialist clinics treatment (24%) and chose hospitals based on its short distance to home (54%). Results indicated that the proportion of revisit intention was relatively high at 76.3%. The outpatients showed to experience good perceived service quality (51.2%), medium satisfaction (54.4%), who were mostly used Salary Beneficiary Workers (JKN-PPPU) (34.9%) insurance scheme. Binary logistic regression analysis found that age (OR (95%CI): 0.96 (0.92-1.00) p=0.041), perceived service quality (OR (95%CI): 1.05 (1.01-1.09) p=0.008), and patient satisfaction (OR (95%CI): 1.08 (1.02-1.14) p=0.005) were significant predictors of the revisit intention. It is depicted that the private hospitals in South Tangerang are suggested to enhance and sustain their excellent services to ensure its consistency and dependability to gain patients' trust and intentions to re-utilize services in their institutions.

Keywords: revisit intention, service quality, patient satisfaction, medical insurance.

#### **INTRODUCTION**

The demand for health care comes from the desire to gain health. It is a part of a system that will go through changes due to individual preferences and needs.<sup>1</sup> Numerous studies have investigated the factors affecting different kinds of individual behavioral intentions in

hospital settings. Along with the marketing theory by Philip Kotler, to target a new market (patients), the cost of health care would be higher than to maintain those have gotten.<sup>2</sup> Further, an inappropriate infrequent revisit might also compromise the clinical care performance<sup>3</sup>, such as treatment goals for diabetic patients, or regarding the cost utilization of health services itself .<sup>4</sup> Cases in



developing countries, the intention of reutilizing health care services was found to be associated and affected by the quality of medical services.<sup>5-7</sup> This adapted the concept of service quality by Parasuraman, Zeithaml & Berry<sup>8</sup> which includes 5 dimensions: tangible, reliability, responsiveness, assurance and empathy, which defines how far the difference between reality and expectations of services performed based on patients' sights or values. To determine a great significance of the services provided by physician, nurses or other health professionals, patient satisfaction could also be one considerable factor to analyze the intervenable aspect towards revisit intentions.<sup>6</sup>, <sup>7, 9, 10</sup> As the swift development of knowledge and technology, people are now more detail in observing health care to meet their needs. It results as a response by consumer when they feel fulfilled to a product or service feature as it meets their preferences and expectations in enhancing their values.<sup>6</sup> Patient satisfaction could be defined as the post-purchasing evaluation where the patient's prior feelings about the selected service they chose, results in an equal or exceed their expectation.<sup>11,12</sup>

As the third biggest populated country in Asia, Indonesia has a total of 1,804 privately managed hospitals and 1,016 public hospitals per April 2018.<sup>13</sup> However, this growth still lagged far behind its neighboring countries such as Malaysia, Singapore and Thailand based on the Global Health Observatory data in 2016.<sup>14</sup> By the establishment of widely adapted Universal Health Coverage scheme in 2014, the Indonesian National Health Security (Jaminan Kesehatan Nasional "JKN") program have covered approximately 83.9% of the total population as in May 2019, registering 27,075 health facilities including of 2,291 hospitals and largely utilized for Community Health Center.<sup>15</sup>

One of the five highest populated Province in Indonesia known as Banten province, occupied one smallest area yet rapidly developed population in South Tangerang City. After the implementation of NHS, the number of patients visit to health facilities tend to decrease gradually among low-income communities in this city, from over 25,000 patient visitation in 2011, escalated to 37,000 in 2012 and reached its peak in 2013 with over 42,000 visits, these numbers began to slide on 2015 with only 8,217 visit among low-income population group.<sup>16</sup> Right now, South Tangerang has collaborating with 28 private hospitals Type B and C and one public hospital registered in NHS program. However, the growing numbers of poor and vulnerable population, high morbidity, lack of accessibility for quality care among low income population, low awareness of hygiene and health behavior, until low participation among stakeholders towards health programs, are still being the surfacing issues within South Tangerang health system.<sup>17</sup>

Therefore, by finding the important influencing factors of patients' revisit intention, we will understand the role of perceived service quality, patient satisfaction and types of medical insurance among outpatients in South Tangerang private hospitals to recommend more structured and sustainable health care implementation at local or national level. With expectations, the hospitals could retain their existence in the middle of tough competition, gain and sustain their recognition, or secured profitability through patients' greater loyalty or even better tolerance of price escalation in the respective hospital.

## **METHODS**

Cross-sectional survey study was conducted using online survey platform (Google Forms) to the population aged 20-65 years old domiciled in one of 7 sub-districts in South Tangerang City during May 2020. The instruments of the study were adapted from the guidelines and previous studies which had been validated, including the factors of sociodemographic characteristics<sup>18-20</sup>; perceived service quality (SERVQUAL questionnaire)<sup>21,22</sup>; patient satisfaction (PSQ-



18) <sup>23,24</sup> ; types	ofm	edical insur	ance <sup>15</sup> and 1	revisit
intention <sup>25,26</sup>	in	hospital	settings.	The

#### Table 1 Measurement Tools

questionnaire consisted of 57 questions which represent each variable of study.

Variables	<i>n</i> of items	Items of variable	Data analysis
Socio- demographic characteristics <sup>20</sup>	11	<ol> <li>Age (A1)</li> <li>Sex (A2)</li> <li>Occupational status (A4)</li> <li>Educational level (A5)</li> <li>Income per month (A6)         <ul> <li>(added information)</li> <li>Sub-district (A3);</li> <li>Visited hospital (A7);</li> <li>First reason in choosing hospital (A8);</li> <li>Visited OPD service (A9);</li> <li>Number of visit (A11)</li> </ul> </li> </ol>	<ul> <li>Age (range 10 years)</li> <li>Sex (male and female)</li> <li>Occupational status (unemployed &amp; employed)</li> <li>Educational level (below &amp; above Bachelor's degree)</li> <li>Income per month (below &amp; above the wage/salary average in South Tangerang)</li> <li>[Descriptive results]</li> </ul>
Perceived service quality (SERVQUAL questionnaire) <sup>21,22</sup>	22	<ol> <li>Tangibles = B1 – B4</li> <li>Reliability = B5 – B9</li> <li>Responsiveness = B10 – B13</li> <li>Assurance = B14 – B17</li> <li>Empathy = B18 – B22</li> </ol>	<ul> <li>Descriptive statistics analysis from the Likert Scale results of <i>Strongly Disagree</i> (∑=22) to <i>Strongly Agree</i> (∑=110)<sup>27</sup> with percentile of 75%, therefore: Score ≤ 83 = Low quality Score &gt; 83 = Good quality</li> <li>Inferential statistics analysis used continuous data of SERVQUAL total score to generate the binary logistics regression.</li> </ul>
Patient satisfaction (PSQ-18) <sup>23,24</sup>	18	<ol> <li>General Satisfaction (C3 and C17);</li> <li>Technical Quality (C2, C4, C6, C14);</li> <li>Interpersonal Manner (C10 and C11);</li> <li>Communication (C1 and C13);</li> <li>Financial Aspects (C5 and C7);</li> <li>Time Spent with Doctor (C12 and C15);</li> <li>Accessibility and Convenience (C8, C9, C16, C18).</li> </ol>	<ul> <li>Descriptive statistics analysis from the Likert Scale results of <i>Strongly Disagree</i> (∑=18) to <i>Strongly Agree</i> (∑=90)<sup>28</sup>: 90 - 66 = Good Satisfaction 65 - 42 = Medium Satisfaction 41 - 18 = Poor Satisfaction</li> <li>Inferential statistics analysis used continuous data of PSQ-18 total score to generate the binary logistics regression.</li> </ul>
Types of Medical Insurance <sup>15</sup>	1	<ul><li>Based on the Indonesia-<i>JKN</i> &amp; private insurance scheme (A10):</li><li>1. Premium Support Beneficiary</li><li>2. Salary Beneficiary Workers</li><li>3. Private Insurance</li></ul>	0 = Non-insurance 1 = Premium Support Beneficiary ( <i>PBI-JKN</i> ) 2 = Salary Beneficiary Workers ( <i>PPPU-JKN</i> ) 3 = Private Insurance
Revisit Intention <sup>25,26</sup>	6	D1, D5 = attitude towards the received services and/or place; D2, D6 = to recommend others; D3, D4 = perceived behavioral towards the services they received	0 = No 1 = Yes Interpreted as <sup>25</sup> : Score $\le 4 = Not$ intend to revisit Score $> 4 = Intend$ to revisit

The study included participants who had obtained the treatment from outpatient department in one of 17 general private

hospitals operated in the city by using convenience sampling technique. This was conducted through questionnaire distribution



by using QR code and shorten link to social media platform by the support of the official account of South Tangerang communities/administrators and Student Executive Body chairman in Universities to gain responses from them and their relatives.

Based on the developing prediction models for a binary outcome, the medical literature widely used an event per variable (EPV) of  $10^{29}$ , defined by the ratio of the number of events. Thus, the formulations of this study would be<sup>30</sup>:

 $N = \frac{1}{P_{event}} \times n_{events} = \frac{(10 \times 10)}{0.541} = 185 \ (+15\%)$ missing rates=28) = 213

N = estimated number of subjects needed = 10 subjects needed

 $n_{events}$  =  $n_{\text{predictors}} \times 10$  events per variable (10 EPV = 10 x 10 = 100 events) P = 0.541 prevalence of revisit intention<sup>31</sup>

 Table 2 Pilot Study Result for Reliability

= 10\* (Note:  $n_{\text{predictors}}$  was **n**predictors calculated based on the parameters in the independent variables, (a) Perceived service quality=1; Patient (b) Satisfaction=1; (c) Types of Medical Insurance=[4-1]=3; (d) Age=1; (e) Sex=[2-1]=1; (f) Employment Status=[2-1]=1; (g) Education Level=[2-1]=1; and (h) Income Level=[2-1]=1)  $\rightarrow$  $n_{\text{predictors}} = 1 + 1 + 3 + 1 + 1 + 1 + 1 + 1$ 1 + 1 = 10.

Thus, 213 minimum participants will be required to detect the significant of this study. To see the reliability of instruments, the pilot study was conducted with cut-off point (0.7) Cronbach's Alpha. As much as 32 individuals from 7 different sub-district in South Tangerang were enrolled, with the results as below:

Variables	N of Items	Mean±SD	Cronbach's α	Reliability
Perceived service quality	22	82.50±15.48	.968	Reliable
Patient Satisfaction	18	66.44±10.75	.923	Reliable
Revisit Intention	6	7.25±1.59	.739	Reliable

The approval from University of Muhammadiyah Jakarta's Institutional Review Board (IRB) in Department of Public Health released Ethical Clearance Number: 10.004.B/KEPK-FKMUMJ/IV/2020 to conduct this study. All responses from online survey were later stored in Microsoft Excel format which went trough cleaning and coding process to be entried to SPSS 22.0 software. The descriptive statistics analysis was used to the demographic characteristics of see participants and presented in number of frequencies (n) and percentages (%), while inferential statistics using binary logistic regression was used to find important factors associated with dependent variable (with  $\alpha$ =0.05).

# RESULTS

#### Socio-Demographic Characteristics among Outpatients of Private Hospitals in South Tangerang

This study enrolled 215 outpatients from 17 private hospitals located in 7 different subdistricts of South Tangerang City with almost half of the respondents (49.8%) live in Pamulang sub-district as the largest populated sub-district of South Tangerang and the central of local government activities.<sup>32</sup> As shown in



Table 3, most of the participants were female (75.3%) around their 20-29 years (80%) with average years of 27 years old  $(26.81\pm9.66)$  and already finished the Bachelor's Degree or higher (51.6%). Other educational background

below Bachelor's degree including Secondary High School (38.6%), Diploma (8.4%) and Master Degree (6%) also participated as the subject of this study.

Characteristics	Categories	n	%
Age (26.81±9.66)	20-29	172	80.0
	30-39	12	5.6
	40-49	19	8.8
	50-59	11	5.1
	>60	1	0.5
Sex	Male	53	24.7
	Female	162	75.3
Educational Level	Below Bachelor's degree	104	48.4
	Bachelor's degree or higher	111	51.6
Occupational Status	Unemployed	13	6.0
	Employed	202	94.0
Income <sup>*</sup> per Month	≤Rp.3,500,000	109	50.7
	>Rp.3,500,000	106	49.3
Total		215	100.0

 Table 3 Socio-Demographic Characteristics of Respondents

(\*Currency rate on 25th, July 2020: Rp.10,000 = 0.69 US Dollar)

Only 6% of all respondents participated in this study were unemployed, yet the majority of participants were currently college students (34.9%), private company employee (34.4%), and the rests including businessmen or entrepreneur, civil servant, labor, or others. A slightly different proportion showed between those who earn less than Rp.3,500,000 per month (50.7%) compare to those who gets more than Rp.3,500,000 per month in this study.

#### Proportion of Revisit Intention among Outpatients of Private Hospitals in South Tangerang

According to the total score of 6 items of questionnaire regarding patient's revisit intention, 76.3% of all respondents showed their intention for future visitation to their preferable hospitals (Table 4).



**Table 4** Proportion of Revisit Intention among Outpatients of Private Hospitals in South Tangerang

 City

Characteristics	Categories	n	%
Revisit intention	Not intent to revisit	51	23.7
	Intent to revisit	164	76.3
Total		215	100.0

Most of the respondents were the first-timer visitor in the outpatient department of private hospitals in South Tangerang (35.8%). Other new outpatients claimed to have visited the mentioned hospital for their second times (29.3%), third times (21.9%), fourth and fifth times (11.6% and 1.4%) respectively, as shown on the Figure 1.



Figure 1 Number of Visit among Outpatients to Private Hospitals in South Tangerang

In addition, this study found 54% of all respondents claimed that 'short distance of the private hospitals to their living places' is their first reason to choose hospital, while the 'fast admission or administration' as the lowest chosen reason among participants (1.4%). Further, the most visited OPD treatment in South Tangerang private hospitals is 'specialist clinics' (24%) and 'other OPD clinics' (23%) including: general practitioners (10.7%), ophthalmologist (3.3%), dentist, dermatologists, and emergency unit (1.9% similarly).

#### Proportion of Perceived Service Quality, Patient Satisfaction, and Types of Medical Insurance among Outpatients of Private Hospitals in South Tangerang

Based on the total score of 22 questions that represented the perceived service quality through dimensions of tangible, reliability, responsiveness, assurance and empathy, this study found that 48.8% respondents showed to have received some lacks of perceived service quality in the private hospital they visited. Most of the respondents also experienced medium satisfaction (54.4%), and only 1 respondent experienced a low satisfaction towards the OPD services based on the adopted PSQ-18. And the majority of respondents were showed to use Salary Beneficiary Workers (*PPPU*) insurance program (34.9%), the NHS for those who works and earning constant salaries. The second most used insurance scheme were private insurance (27%), followed with those who weren't used any insurance program.



Table 5 Proportion of Perceived Serv	vice Quality, Patient Satisfac	tion and Types of Medical I	nsurance
among Outpatients to Private Hospit	als in South Tangerang		

Categories	n	%
Perceived Service Quality		
Low quality	105	48.8
Good quality	110	51.2
Patient Satisfaction		
Low satisfaction	1	00.5
Medium satisfaction	116	54.4
Good satisfaction	98	45.6
Types of Medical Insurance		
No insurance	51	23.7
Premium Support Beneficiary (PBI)	31	14.4
Salary Beneficiary Workers (PPPU)	75	34.9
Private Insurance	58	27.0
Total	215	100.0

Additionally, the distribution of each dimensions' average score, the 'empathy' showed to be the lowest aspect (19%) to represent outpatients' perceived service quality in the private hospital's OPD. Yet the 'tangible' aspect was the highest one (21%) to represent this variable among outpatients. For the patient satisfaction internal dimensions, the 'financial aspects' was the lowest aspect (13%) among seven dimensions, meanwhile 'communication' and 'interpersonal manner' were the two highest (15%) to represent patient satisfaction among outpatients in South Tangerang.

Association between Socio-Demographic Characteristics, Perceived service quality, Patient Satisfaction and Types of Medical Insurance towards The Revisit Intention to Private Hospitals among Outpatients in South Tangerang Using the binary logistics regression analysis with Enter method, the study indicated that the age, perceived service quality, and patient satisfaction as three significant predictors of the revisit intention. The younger age group among outpatients found to have increased the odds of having the revisit intention by 4% (OR (95%CI): 0.96 (0.92-1.00) p=0.041); higher perceived service quality increased the odds of having the revisit intention by 5% (OR (95%CI): 1.05 (1.01-1.09) p=0.008); and higher patient satisfaction increased the odds of having the revisit intention by 8% (OR (95%CI): 1.08 (1.02-1.14) *p*=0.005). However, there was no statistically significant association found between types of medical insurance towards the revisit intention in this study, as well as other socio-demographic characteristics educational including sex, background, occupational status and income level.



**Table 6** The Influencing Factors towards the Revisit Intention among Outpatients to Private Hospitals

 in South Tangerang City

Variables	В	SE	ÔR	<i>p</i> -value	95%CI of OR
Age	-0.04	.020	0.96	0.041*	0.92-1.00
Sex	0.43	.408	1.54	0.288	0.69-3.43
(Male <sup>ref</sup> )					
Educational background	-0.52	.393	0.59	0.181	0.27-1.28
(Low Education ref)					
Occupational status	0.06	.789	1.07	0.936	0.22-5.00
(Unemployed ref)					
Income level	0.61	.431	1.85	0.154	0.79-4.29
(Low income level ref)					
Perceived service quality	0.05	.018	1.05	0.008*	1.01-1.09
Patient satisfaction	0.08	.027	1.08	0.005*	1.02-1.14
Types of medical insurance					
PBI	-0.02	.562	0.98	0.977	0.33-2.96
PPPU	0.46	.481	1.59	0.337	0.62-4.08
Private insurance	0.10	.532	1.11	0.848	0.39-3.14
(No insurance ref)					

\*Statistically significant at p-value<0.05

## DISCUSSION

The study found a relatively high intention to revisit (76.3%) among outpatients who were mostly the first- and second-time visitors (35.8% and 29.3% respectively) to private hospitals in South Tangerang. The majority chose 'short distance with living place' (54%) as the biggest reason to visit private hospital, yet only 1.4% of them claimed that 'fast admission or administration' was the first reason to visit OPD in private hospitals. It reflected in the findings of 48.8% participants showed to experience the low perceived service quality and 54.4% medium patient satisfaction towards the services. The number of registered private hospitals by the National Health Security (NHS) program have progressively regulated in this city, it is proved that most of the respondents were using Salary Beneficiary Workers/*PPPU* insurance scheme (34.9%). These findings portrayed as most of the respondents were coming from employee group (94%), which also possible that the respondents are also differed into various groups of SBW (*PPPU*) participant, since the premium amounts are varied based on their occupation and income level. It is in line with the Local Health Department's report that the highest spent of *JKN* for outpatient treatment in South Tangerang within 2019, has



reached over 60% among high expenditure group.<sup>33</sup>

Further, this study found that the majority of respondents were female (75.3%) around their 20-29 years (80%). Thus, the younger age and female respondents have received OPD treatment in private hospitals more than the older ones. Conversely, the number of male population group (68%) was found to spend the highest use of JKN scheme for outpatient treatment in South Tangerang<sup>33</sup> and older population group were the general visitors of any OPD treatment in health care facilities in the city. These findings could be one of the study limitations which conducted during Covid-19 pandemic through online survey, thus the quality of the data was less proportioned than using primary data which collected by field study or direct survey.

Other supported factors could probably have the association between socio-demographic characteristics with the revisit intention, such as the severity factor (of illness), or treatment goals of an individual<sup>3</sup> which were not included in this study. The characteristics including sex, education, household income, and treatment modality were previously proven to highly influence the demand for health care and revisit frequency among patients, correspondingly factor.<sup>3,34</sup> severity The with disease accessibility and affordability of insurance program compared to individual income and costs of treatment could also be the other factors for why the younger population group tend to have more intention to revisit private hospitals in South Tangerang. However, the non-statistically significant association between types of medical insurance towards the revisit intention showed that this factor can't seem to predict this hypothesis.

The low increases of revisit intention in oneunit change of perceived service quality (5%) might be caused by specific differences in each hospitals' complex management in delivering or facilitating the services. As found in the proportion of its dimensions, the perceived service quality was majorly represented by 'tangibles' aspect (21%), which in reality, every hospital in South Tangerang will offer different kinds of physical facilities. personnel, appearance of medical equipment/instruments, physical or other representations of the services. Nevertheless, previous studies have also proved that service quality could affect individual behavioral intentions, including revisit, both direct or indirectly.35,36

The significant result between patient satisfaction and revisit intention with higher satisfaction showed to increase the revisit intention by 8% among outpatients, was supported by similar previous studies that overall satisfaction could give positive effects on patient behavioral intentions to visit or revisiting hospitals.<sup>37-40</sup> This study found that 'communication' and 'interpersonal manner' contributed the most to represent patient satisfaction in South Tangerang. Notwithstanding, the causal relationship between perceived service quality and satisfaction of health care environment across three different outpatient groups in South Korea still recommends further identification of discrete findings regarding patient's conditions and care situation to interpret the patient satisfaction, as to represent that repeated visits reflecting patients loyalty.<sup>41</sup>

# CONCLUSION

- 1. The proportion of revisit intention to private hospitals among outpatients in South Tangerang is approximately 76.3% among 215 respondents enrolled in this study. The majority were female around their 20-29 years old and have Bachelor's Degree education background with monthly income above the average of population earnings in the city;
- 2. Most of the outpatients in South Tangerang showed to experience good quality services and medium satisfaction from OPD services in their preferable private



hospitals. They were mostly using Salary Beneficiary Workers (*PPPU*) insurance program who were also the first-time visitors to private hospitals OPD. They were mostly obtained treatment from specialist clinics or general practitioners;

3. This study indicated that three significant predictors of the revisit intention were age, perceived service quality and patient satisfaction.

# RECOMMENDATIONS

Through these findings, the needs of enhanced and sustained excellent services among health providers were reflected. An annual team building, educational event or seminars, and quarterly or yearly training is recommended to ensure the consistency and dependability of health providers 'performances, to build trust with patients and acquire their expressed satisfaction which may as well encourage their intention for future visitation to the same preferred hospital in South Tangerang. Further, it is suggested for hospital management to provide OPD services with well-trained medical & non-medical providers who are capable to do prompt services, deliver effective communication to patients, and be integrated with other health providers, to overcome the suboptimal performances of health care services in the middle of emerging diseases in Indonesia.

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# INFLUENCE OF CAREGIVING FACTORS ON CHILD UNDERWEIGHT IN MYANMAR

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## ABSTRACT

Myanmar is one of the high prevalence of child underweight countries in East Asia and Pacific Region. According to UNICEF's model of child care, the caregiving factors are the key factors influences on child growth status. This study aimed to identify the child underweight status of 6-23 months old children in Myanmar, to explore caregiving factors affecting on child underweight, and to assess the association between them. One thousand two hundred seventy-eight Myanmar children aged 6 to 23 months with their caregivers included in the Myanmar Demographic and Health Survey 2015-2016 (MDHS) were used as samples. Child underweight was classified using WHO anthropometric indicators: weight-for-age. Descriptive analysis, simple and multiple logistic regressions were used to analyse to fill the study objectives. About 14% of children were underweight in Myanmar. Children who were boys (aOR 1.74, 95%CI 1.24-2.44), were 18-23 months old (aOR 1.83, 95%CI 1.20-2.83), were born with small birth size (aOR 2.23, 95%CI 1.46-3.40) were more likely to be underweight. Regarding caregiving resources, number of under-five children in household and maternal nutrition status were significantly associated with child underweight. Analysis revealed that underweight mothers were nearly 2 times (aOR 1.68, 95% CI 1.08-2.63) more likely to have underweight children and a higher likelihood of underweight was predicted by increasing the number of under five children in a household (aOR 2.04, 95%CI 1.24-3.34). Summarizing, most maternal and child basic factors, and number of under-five children were associated with underweight among 6-23 months old children in Myanmar. The under two child health and nutrition strategy in Myanmar needed to be revitalized focusing on initiation of complementary feeding with minimum dietary diversity and frequency. The disseminating of health education activities for maternal health and nutrition status especially ante-natal care is also required.

Keywords: child underweight, caregiving resources, Demographic and Health Survey, Myanmar

## **INTRODUCTION**

Under-nutrition caused nearly half of all underfive deaths and that puts the children more at risk to die from common infections as it can raise the severity and frequency of infection, and can cause delay to recover.<sup>1, 2</sup> Moreover, higher mortality was associated with all degrees of wasting, underweight and stunting and even a low degree of them can raise the mortality.<sup>3</sup>

Globally, 13.0% (88.2 millions) of under-five children were underweight.<sup>4</sup> In South East Asia Region, the prevalence of child underweight was 25.5% (43.4 millions) in 2019 and this was



the highest prevalence of all WHO regions.<sup>4</sup> Myanmar Demographic and Health Survey 2015-2016 showed that the prevalence of moderate and severe underweight were 19% and 4%, respectively.<sup>5</sup> During 16 years, the prevalence of underweight among under-five children dropped from 30% in 2000 <sup>6</sup> to 19% by 2016.<sup>5</sup> However, this is still quite high. Myanmar stood at the 5<sup>th</sup> highest underweight prevalence in South East Asia Region.<sup>6</sup>

Children are vulnerable to get the risk of infections and dangerous things. Therefore, if they are not taking care since young, they cannot grow up normally. Then, children have to depend on the ability of caregivers to adjust their special needs. Caregivers feed and take care of the child, give affection, communicate and respond to the child's needs. Therefore, the caregivers are the most essential persons for children to give quality care. Among all caregivers, primary caregivers are one of the important roles to give a full chance to grow very well in children's life.<sup>7, 8</sup>

Caregiving resources and behavior were taking an important role in a child's survival, growth, and development. According to UNICEF's extended model of care, child malnutrition and death do not only depend on the child's dietary intake and health but also depend on caregivers' practices and resources.9 UNICEF reported that 2 in 3 children are not recommended dietary diversity and only 2 in 5 of under-six months children are fed exclusive breastfeeding around the world.<sup>10</sup> Many studies showed that children born with small birth size,11-14 living in household with high number of under-five children<sup>12</sup> and poor household wealth quartile,<sup>15</sup> maternal nutrition status<sup>11</sup> and no/low education level of mothers<sup>11, 15</sup> were the positively associated with child underweight. Furthermore, the maternal education, family size, meal frequency, getting the exclusive breastfeeding and present of diarrhea disease in the past 12 months were also the predictors of underweight.<sup>16</sup>

In Myanmar, the research on caregiver's factors and child underweight still has a limited number. Most of the researches were done on individual factors of child underweight: feeding practice,<sup>17</sup> child immunization.<sup>18</sup> Thus, this study aimed to determine the influence of caregiving factors on undernutrition among 6-23 months old children in Myanmar. The information may support the national health plan in maternal and child health development, and reproductive health to develop evidence-based plan, policies and strategies.

## **METHODS**

This study used a nationwide cross-sectional data from Myanmar Demographic Health Survey (MDHS), collected from 2015 to 2016. MDHS is the first and latest demographic and health survey in Myanmar.<sup>5</sup> To analyse the data, approval letter for permission was obtained from the Demographic and Health Survey Program at https://dhsprogram.com/Data/. Total 1278 of 6-23 months old children who were youngest, alive and were living with their mothers were included to analyse in this study. Mother's questionnaire and household questionnaire from MDHS were used to analyse in this study. Measurement of height and weight of study children and their mothers were undertaken using measuring boards

specially made by Shorr Productions for use in survey settings and lightweight SECA scales with digital screens. For study mothers aged 15-49 years, blood specimens for anaemia testing were collected from a figure prick, collected in microcuvette and then haemoglobin analysis was carried out on site a battery-operated portable HemoCue analyser.<sup>5</sup>

The research proposal was submitted to the IRB in Mahidol University for ethical approval before the data analysis. The MDHS survey protocol was reviewed and approved by the Ethics Review Committee on Medical Research including Human Subjects in the Department of Medical Research, Ministry of



Health and Sports, and the ICF Institutional Review Board.

For data analysis, the researcher described the individual finding with the descriptive statistic and assessed the association between dependent and independents variables with simple and multiple logistic regression by using the SPSS version 21.

#### Variables

#### Dependent variable

Dependent variable in this study was underweight (Yes and No) which was classified by weight-for-age z score. Children were classified underweight if they were less than -2 standard deviation from WHO reference growth standard. The researcher excluded missing values and biologically implausible values, such as children with weight-for-age zscores below -6 SD or above +5 SD.

#### **Independent variables**

This study was done with the guidance of UNICEF's extended model of care.<sup>19</sup>

Caregiving resources in this study referred to the basic factors which could affect to caregiver's behavior and finally, child underweight. It included mother's working status, maternal empowerment, mother's BMI, anemia level, access to mass media, mother's socio-demographic characteristics, family size, number of under-five children in a household and household wealth quartile.

Caregiving behaviors in this study referred to the ability of caregivers that could affect directly on child underweight. It included children's breast feeding status/feeding practice, hygiene practice and intention to immunization. To assess the feeding practice of children, three indicators of infant young child feeding: minimum dietary diversity, minimum meal frequency and breastfeeding status, according to WHO's IYCF guideline<sup>20</sup> were used.

Furthermore, this study also included other variables, child's characteristics: health status, birth order and mother's reported birth size, environmental factors: types of toilet facilities, source of drinking water and disposal places of child's faces.

## RESULTS

#### Characteristic of the respondents

The results revealed that fourteen per cent of children were underweight in Myanmar.

The characteristics of caregiving resources were presented in Table 1. Majority of mothers were married (96.8%) with the median age of 29 years. Then, 32.3% of mothers were not in the range of normal BMI and 59.3% of them had no education or primary school level. Nearly 50% of children live in households with 5-7 family members. Then, 51.1% of children were living in poorer or poorest households. To calculate access to mass media score, frequency of reading newspaper/magazine, listening to radio, watching TV were summed and mean score (2.21) was used as a cut out point. Mean score and above were categorized as average/good media exposure, and less than mean score were categorized as poor media exposure. Majority of mothers were poor exposure to mass media (60.9%). Nearly half of respondents did not own a house and were still working. In order to classify the empowerment level, mean score (6.41) was used as a cut point. Mean score and above total score were categorized as "More empowered", and less than mean score was categorized as "Less empowered". Forty per cent of mothers were less empowered.

Regarding feeding practice, 17% of children were not still fed breastfeeding. Furthermore, 77.2% of them were not fed the minimum recommended diverse diet and 45.9% of them were not fed recommended meal frequency for



healthy growth and development. Nearly 60% of children did not get complete immunization in their respective age according to Myanmar immunization schedule.<sup>5</sup> The majority of children (71%) stayed in households that had basic sanitation facilities.

Half of study children were under 14 months old with median birth order of 2. Respondents reported their children had fever, diarrhea and acute repiratory infection (ARI) in the last 2 weeks were 25.2%, 18.2% and 10%, respectively. Twelve per cent of children were born with a birth size smaller than average.

About 20.7% of children did not access an improved source of drinking water and 37.6% of children used unimproved sanitation facilities. Moreover, half of respondents (52.4%) practiced inappropriate ways to dispose of the youngest child's stool. Majority of respondents (78.2%) live in rural areas and the rest live in urban areas.

Table 1 Caregiving resources	s of 6-23 months	old children in Myanmar
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Variables	n	%	Variables	n	%	
Maternal Empowerment			Marital status			
More empowered	719	56.3	Married	1237	96.8	
Less empowered	559	43.7	Other (Divorced/ widowed/ Separated)	41	3.2	
Mother's BMI (n= 1274)			Mother's Working Status	(n =1277)	)	
Normal (18.5 to 24.99)	862	67.7	Not Working	677	53.0	
Underweight (<18.5)	162	12.7	Working	600	47.0	
Overweight/Obese (>=25)	250	19.6	Household Wealth Quartiles			
Median = 21.7, IQ = 45.0, Min	= 12.5, Ma	x =34.1	Poorer/ Poorest	653	51.1	
Access to Mass Media <sup>a</sup>			Middle	244	19.1	
Average/good	500	39.1	Richer/ Richest	381	29.8	
Poor	778	60.9	House assets			
<b>Highest Education</b>			Does not own	552	43.2	
No Education	191	15.0	Owns	726	56.8	
Primary	568	44.4	No. of under 5 children in	househol	d	
Secondary/Higher	519	40.6	0-2	1160	90.8	
Mother's age (year)			3-5	118	9.2	
15-22	198	15.5	Median = 1.0, IQ =1, Min = 0, Max = 5			
23-30	545	42.6	Family Size			
31-38	402	31.5	2-4	360	28.2	



Variables	n	%	Variables	n	%
39-47	133	10.4	5-7	637	49.8
Median = 29, IQ = 9, Min = 15, M	Max = 47		>=8	281	22.0
			Median = 6.0, IQ = 3, Min = 2, Max = 21		

<sup>*a*</sup>Access to media was classified by mean score of total frequency of reading magazine/newspaper, frequency of listening to radio and frequency of watching television.

#### Influencing factors of underweight

Table 2 represented that simple and multiple logistic regression analysis to find the association between caregiving factors and child underweight.

Univariable analysis of each variable was done to find the association with child underweight. Based on the univariable analysis, we selected the variables p-value < 0.25 for multivariable model along with all variables of known clinical importance.<sup>21</sup> In multiple logistic regression analysis, twelve variables out of 28 variables were used to analyze to predict the influencing factors on child underweight and non-significant factors were excluded from analysis.

Children being boys, born with small birth size and being in the group of 18-23 months were positively associated with child underweight. Regarding caregiving resources, a higher likelihood of underweight was predicted by increasing the number of under five children in the household and underweight mothers. There was no significant factor between caregiving behavior, environmental factors, social context and underweight.

## DISCUSSION

This analysis showed that boys had the significant higher risk of underweight than girls. This finding was in line with many studies in Pakistan,<sup>11</sup> in Nigeria,<sup>14, 22</sup> in Africa<sup>13</sup> in Ethiopia<sup>23</sup> and Thailand.<sup>24</sup> Several studies revealed that boys were 1.24 times in

Parkistan<sup>11</sup> and 1.5 times in Thailand<sup>24</sup> more likely to have underweight than girls. A researcher showed that girls were 0.12 weightfor-age z score points higher than boys in Nigeria.<sup>22</sup> A systematic review reported that boys were a higher risk of underweight compared to girls.<sup>13</sup> In this analysis, boys were nearly 2 times more likely to have underweight compared to girls.

This study showed that 18-23 months old children were higher risk of underweight. This finding was consistent with other studies in Africa<sup>13</sup> and Ghana<sup>25</sup>. A systematic review was done in Sub-Saharan Africa reported that increasing children's age were the higher risk of being underweight.<sup>13</sup> A cross-sectional study with the data of Ghana DHS reported that 12-23 months old children were the highest risk of underweight compared to other age groups.<sup>25</sup> This finding can be attributed to the fact that the majority of younger aged children did not get minimum dietary diversity and 12% of them did not initiate recommended complementary feeding. Thus, children did not get an adequate diet at their golden stage of development. As a result, acute and chronic undernutrition has become a problem in Myanmar.

Our study found that children's birth size increased the livelihood ratio of underweight that was in accordance with previous studies.<sup>11-14, 26, 27</sup> In Pakistan, children born with small size were 1.67 times more likely to be underweight.<sup>11</sup> A systematic review was done in Africa reported that children born with small size were associated with child undernutrition.<sup>13</sup> In Nepal, a study showed that



children with normal birth size were less risk than small children.<sup>27</sup> This study found that children born with small/smaller than average birth size were 2.31 times more likely to be underweight. Although a child's birth weight depends on maternal nutrition during pregnancy, especially adequate nutrients are critical to let them grow as a normal child. In Myanmar, commercials on breast milk substitute powder and snacks for children have a big influence on mothers rather than mother's breast milk and complementary feeding. All of the influencing factors were linked to each other. Thus, a holistic approach is needed to solve the problem.

We found that the number of under-five children increased the risk of underweight. This finding was in line with a study in Tigray Region of Ethiopia,<sup>12</sup> which reported that the high number of under-five children in families was more likely to be associated with underweight.<sup>12</sup> In this study, children from households which had above 3 under-five children were above 2 times more likely to be underweight. Furthermore, we found that having 3-5 under-five children in household were less likely to get minimum dietary diversity and were 2.49 times more likely to be not currently breastfeeding. Thus, it means that the more number of under five children in a household, the child will get the least chance to be fed minimum dietary diversity and continuous breastfeeding. Therefore, these

factors may contribute to children underweight and burden of under-five children is critical for a household for food security.

The maternal nutritional status was found as a predictor of underweight. Several studies were in line with this finding.<sup>11, 13, 15</sup> An analysis was done on low and middle income countries reported that low mother's BMI were nearly 5 times more risk to have underweight child.<sup>15</sup> A study in Pakistan found that children with underweight mothers were 1.78 times more risk underweight compared with obese mothers.<sup>11</sup> A systematic review reported that underweight mothers were associated factor of underweight children.<sup>13</sup> We found that children with underweight mothers were 1.68 times more risk of underweight than having normal BMI mothers. As maternal nutrition is critical for children during pregnancy and breastfeeding to reduce the poor growth of child and strongly associated with giving birth to a low birth weight child. Thus, quality mother care and household food security are important to give adequate nutrition for mothers.

According to this analysis, it showed the importance of caregiving factors on child underweight. To improve nutritonal status at household level effectively, nutrition support needs to be given based on the exact number of malnutrition family members.

**Table 2** Bivariate and multivariable analysis between caregiving factors and underweight among 6-23 months old children in Myanmar (n = 1260)

Variables	Underweight							
	No	Yes	cOR <sup>b</sup>	p- value	aOR <sup>a</sup>	p- value		
	n (%)	n (%)	(95% CI <sup>c</sup> )		(95% CI)			
Child Factors								
Child's Sex								
Boy	563 (83.3)	113 (16.7)	1.58 (1.14-2.18)**	0.006	1.74 (1.24-2.44)**	0.001		



No         Yes         cOR <sup>b</sup> p- value         aOR <sup>a</sup> p- value           n (%)         n (%)         (95% CI <sup>c</sup> )         (95% CI)         value	lue
<u>n (%) n (%) (95% CI°) (95% CI)</u>	
GIRI 534 68 (11.3) Reference Reference	
(88.7)	
Child Age in	
Month	
6-11 387 49 (11.2) Reference Reference	
(88.8)	
12-17 388 65 (14.3) 1.32 (0.89- 0.167 1.43 (0.95-2.17) 0.090	)90
(85.7) 1.97)	
18-23       322       67 (17.2)       1.64       0.014       1.83       0.005	)05
$(82.8)  (1.10-2.44)^*  (1.20-2.83)^{**}$	
Child's Birth	
Order	
1st and 2nd child 651 91 (12.3) Reference Reference	
(87.7)	
>= 3rd child 446 90 (16.8) 1.44 0.022 1.22 0.289	289
$(83.2)  (1.05-1.98)^*  (0.85-1.76)$	
Birth Size (n=	
1277)	
Large 937 134 Reference Reference	
(87.5) (12.5)	
Don't know 40 (83.3) 8 (16.7) 1.40 (0.64- 0.400 1.35 (0.60-3.00) 0.466	166
3.05)	
Small 119 39 (24.7) 2.29 < 2.23 (1.46- <0.00	.001
(75.3) (1.53- 0.001 3.40)***	
3.43)***	
Caregiving	
Resources	
Mother's Age in	
year	
15-22 172 26 (13.1) 0.72 (0.39- 0.297	
(86.9) 1.33)	
23-30 476 69 (12.7) 0.69 (0.41- 0.164	
(87.3) 1.16)	
31-38 339 63 (15.7) 0.89 (0.53- 0.659	
(84.3) 1.50)	
39-47 110 23 (17.3) Reference	
(82.7)	



Variables	Underweight					
	No	Yes	cOR <sup>b</sup>	p- voluo	aOR <sup>a</sup> p	)- voluo
	n (%)	n (%)	(95% CI <sup>c</sup> )	value	(95% CI)	alue
Anemia (n=1263)						
No Anemia	618	95	Reference		Reference	
	(86.7)	(13.3)	1.00 (0.50		1.00 (0.70	0.0
Mild	394	62	1.02 (0.73)	- 0.894	1.00 (0.70-	0.9
	(86.7)	(13.6)	1.44)		1.44)	83
Moderate/Severe	$\frac{12}{(76.6)}$	(23.4)	1.99 (1.18	0.010	1.03 (0.94 - 2.84)	0.0
Education level	(70.0)	(23.4)	5.50)		2.04)	85
	150	41	2 09 (1 35	-	1 54 (0 91-	0.1
No Education	(78.5)	(21.5)	3.24)**	0.001	2.60)	10
	488	80	1.25 (0.88		1.06 (0.71-	0.7
Primary	(85.9)	(14.1)	1.79)	0.215	1.58)	76
Secondary/Higher	459	60	Peference		Peference	
Secondary/Ingher	(88.4)	(11.6)	Reference		Kelefellee	
Mother's BMI (n = 1274)						
Normal (18.5-4.5)	739	123	Reference		Reference	
( )	(85.7)	(14.3)	1 (0 (1 04		1 (0 (1 00	0.0
Underweight (<18.5)	128	34	1.60 (1.04	0.031	1.68 (1.08 - 2.62)*	0.0
	(79.0)	(21.0)	$2.44)^{1}$	_	$2.03)^{-1}$	0.1
Overweight (>=25)	(90.4)	24 (9.6)	1.01	0.057	1.09)	0.1
Access to Mass Media	() () ()				1.07)	00
Assessed Coord	438	62	Defense		Defense	
Average/ Good	(87.6)	(12.4)	Reference		Reference	
Poor	659	119	1.28 (0.92	- 0148	0.97 (0.67-	0.8
	(84.7)	(15.3)	1.77)	0.110	1.42)	94
House Assets	(12	114				
Own	612	114	Reference		Reference	
	(84.3) 485	(13.7) 67	0.74 (0.54		0.81 (0.57	0.2
Does not own	(87.9)	(12 1)	1.03)	0.071	1 16)	0.2 57
Number of < 5 children in	n (07.2)	(12.1)	1.05)		1.10)	57
Household	-					
0.2	1008	152	Deference		Deference	
0-2	(86.9)	(13.1)	Reference		Kelerence	
3- 5	89	29	0.46 (0.29	- 0.001	2.04 (1.24-	0.0
5.5	(75.4)	(24.6)	0.73)**	0.001	3.34)**	05



Variables	Underweig	ght				
	No	Yes	cOR	p- value	aOR	p- value
	n (%)	n (%)	95% CI		95% CI	
Mother's Working status (n = 1277)						
No	581 (85.8)	96 (14.2)	Reference			
Yes	515 (85.8)	85 (14.2)	1.00 (0.73- 1.37)	0.994		
Number of Household Member			,			
2-4	313 (86.9)	47 (13.1)	Reference			
5-7	547 (85.9)	90 (14.1)	1.10 (0.75- 1.60)	0.636		
>= 8	237 (84.3)	44 (15.7)	1.24 (0.79- 1.93)	0.349		
Wealth Quartile			,			
Poorer/ Poorest	552 (84.5)	101 (15.5)	1.16 (0.81- 1.66)	0.427		
Middle	216 (88.5)	28 (11.5)	0.82 (0.50- 1.34)	0.428		
Richer/ Richest	329 (86.4)	52 (13.6)	Reference			
Marital Status						
Married	1060 (85.7)	177 (14.3)	Reference			
Other	37 (90.2)	4 (9.8)	0.65 (0.23- 1.84)	0.414		
Maternal Empowerment Level						
More empowered	624 (86.8)	95 (13.2)	Reference			
Less empowered	473 (84.6)	86 (15.4)	1.19 (0.87- 1.64)	0.270		
Social Context			~			
Rural	243 (87.4)	35 (12.6)	Reference			
Urban	854 (85.4)	146 (14.6)	1.19 (0.80- 1.76)	0.396		



Variables	Underw	eight				
	No	Yes	cOR	p-value	aOR	p-value
	n (%)	n (%)	95% CI	-	95% CI	-
Environmental factors		i				
Type of Toilet (n =1068)						
Basic	479	83	1.12	0.558		
	(85.2)	(14.8)	(0.77 - 1.62)			
Limited	90	14	1.00	0.994		
	(86.5)	(13.5)	(0.53 - 1.89)			
Unimproved	348	54	Reference			
-	(86.6)	(13.4)				
<b>Disposal of Child's Stools</b>						
Appropriate	526	82	Reference			
	(86.5)	(13.5)				
Inappropriate	571	99	1.11	0.509		
	(85.2)	(14.8)	(0.81 - 1.53)			
Source of Drinking	. ,		. ,			
Water(n=1249)						
Improved	846	138	Reference			
-	(86.0)	(14.0)				
Unimproved	226	39	1.06	0.774		
-	(85.3)	(14.7)	(0.72 - 1.55)			
<b>Caregiving Behaviors</b>	. ,		. ,			
Facilities for Hygiene						
No Facilities	70	21	2.05	0.007	1.52	0.160
	(76.9)	(23.1)	(1.21-		(0.85 - 2.71)	
	( )		3.46)**		· · · ·	
Limited Facilities	235	44	1.28	0.201	0.93	0.724
	(84.2)	(15.8)	(0.88 - 1.86)		(0.61 - 1.41)	
<b>Basic Facilities</b>	792 ´	116	Reference		Reference	
	(87.2)	(12.8)				
<b>Minimum Dietary Diversity</b>	× ,					
Yes ( $\geq 4$ food groups)	252	40	Reference			
	(86.3)	(13.7)				
No (< 4 food groups)	845	141	1.05	0.796		
	(85.7)	(14.3)	(0.72 - 1.53)			
Vaccination Status			( )			
Complete	455	67	Reference			
1	(87.2)	(12.8)				
Not Complete	642	114	1.21	0.259		
*	(84.9)	(15.1)	(0.87-1.67)			



Variables	Underweig	ht				
	No	Yes	cOR <sup>b</sup>	p-value	aOR <sup>a</sup>	p-value
	n (%)	n (%)	(95% CI <sup>c</sup> )		(95% CI)	
Minimum Meal						
Frequency (n = 1244)						
Yes	579 (86.0)	94 (14)	Reference			
No	492 (86.2)	79 (13.8)	0.99	0.947		
			(0.72 - 1.37)			
<b>Breastfeeding Status</b>						
Still Breastfeeding	915 (86.2)	146 (13.8)	Reference			
Not Still Breastfeeding	182 (83.9)	35 (16.1)	1.21	0.362		
			(0.81 - 1.80)			
Child Health Status			× ,			
(Last 2 Weeks)						
Had Fever						
No	827 (86.5)	129 (13.5)	Reference		Reference	
Yes	270 (83.9)	52 (16.1)	1.23	0.238	1.22	0.292
			(0.87 - 1.75)		(0.84 - 1.78)	
Had Diarrhea					, ,	
No	902 (86.2)	144 (13.8)	Reference			
Yes	195 (84.1)	37 (15.9)	1.19	0.389		
	( )		(0.80 - 1.76)			
Had ARI <sup>d</sup>			× ,			
No	1026	171 (14.3)	Reference			
	(85.7)					
Yes	71 (87.7)	10 (12.3)	0.85	0.628		
	~ /	. ,	(0.43-1.67)			

<sup>*a*</sup>aOR adjusted odds ratio, <sup>*b*</sup>cOR crude odds ratio, <sup>*c*</sup>CI confidence interval, <sup>*d*</sup>ARI Acute Respiratory Infection

\* *p*-value < 0.05, if statistically significant at  $\alpha = 0.05$ , \*\* *p*-value < 0.01, if statistically significant at  $\alpha = 0.01$ , \*\*\* *p*-value < 0.001 if statistically significant at  $\alpha = 0.001$ ,

Variables with P-value < 0.25 and < 0.05 in the bivariate analysis (cOR) were included to the final model for adjustment (aOR)



# CONCLUSION AND RECOMMENDATIONS

This study found that children who were boys, the oldest age group, born with small birth size, living in a household with 3-5 of under-five children, and having underweight mothers were predictors of underweight. To reduce child underweight, most of the significant associated factors can prevent it, but it has to be done as a holistic approach to solve the problem.

According to findings of this study, the current applying nutrition strategy in Myanmar is needed to be revitalized especially in under 2 children focusing on timely initiation of complementary feeding with minimum dietary diversity and frequency. On the other hand, dissemination of health education activities for maternal health and nutrition status especially ante-natal care is required to be promoted to increase coverage and effectiveness.

Further researches are recommended to do cohort study or qualitative research including social factors which can reflect the support to caregiver, maternal autonomy, and knowledge/belief of child care.

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### FACTORS INFLUENCING EARLY INITIATION OF BREASTFEEDING PRACTICE IN MYANMAR: THE ANALYSIS OF MYANMAR DEMOGRAPHIC HEALTH SURVEY (2015-2016)

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### Abstract

Breastfeeding is one of the basic essential human needs for newborns. Early initiation of breastfeeding (EIBF) practice can reduce newborn mortality and morbidity by feeding, first milk containing of many nutrients and immunoglobin for babies for livelong immunity. EIBF can also save maternal deaths form postpartum complications. Globally, nearly 40% newborns receive early feeding practice and many factors are influencing on it to reach target goal of above 50% in 2030. Objectives of this study to examine the prevalence rate of EIBF and to identify factors associated with early initiation of breastfeeding in Myanmar. This study is a quantitative research based on secondary data from Myanmar Demographic Health Survey (MDHS) 2015-2016. Univariate analysis, Chi-square test and multiple logistic regression analysis were performed for factors association on early initiation of breastfeeding practice in Myanmar. EIBF rate was 78% and were significantly associated with maternal occupation, place of residence, mode of delivery, place of delivery and antenatal visit times, pre-lacteal feeding practice and surprisingly betel quid habits were significant. Multiple logistic regression analysis showed that respondents who had more than 5 children were almost 1.5 times more likely to have EIBF (OR=1.48; 95% CI = 1.08-2.01) than those who had 1-2 children. Mothers who had more than 4 antenatal visits were about 1.5 times more likely to have EIBF (OR=1.45; 95% CI = 1.11-1.19) than those who had none of it. There were some factors indicated less likely to have EIBF such as mothers who lived in rural area (OR=0.74; 95% CI = 0.58-0.95), those who were manual workers (OR=0.80; 95% CI = 0.64-(0.99), mothers who had pre-lacteal feeding practice (OR=0.16; 95% CI = 0.13-0.19), respondents who had betel habits (OR=0.81; 95% CI = 0.66-0.99) and mothers who had cesarean section (OR=0.50; 95%) CI = 0.38-0.66). EIBF rate in this study corresponds to good score (50%-89%) in WHO standard. Prelacteal feeding practices, ANC visit and delivery of Cesarean section were significant with EIBF in this study. In order to achieve the global target of WHO, IYCF (Infant and young child feeding practice program) should be evaluated for program effectiveness and monitoring community awareness about importance of early initiation of breastfeeding. For mode of delivery, all hospital should be Baby friendly Hospital Initiative (BFHI) with quality care staff and encourage about skin-to-skin contact and rooming in practice in hospital setting. Human resources (training of health staffs and midwives) for quality and quantity care of antenatal care (ANC) in MCH (Maternal Child Health) center is recommended and for better target goal of EIBF in Myanmar.

Keywords: early initiation, breastfeeding, Myanmar



# INTRODUCTION

One of the best sources of nutrition for newborn babies is the mother's first milk, colostrum, contains immunoglobulin, protein, fats and water and other antibodies.<sup>1</sup>World Health Organization<sup>2</sup> and the American Academy of Pediatrics recommended that every newborns should start to be breastfed within one hour of birth until 6 months exclusively.<sup>3-5</sup> Many studies found that early initiation of breastfeeding can prevent neonatal mortality than late feeding in developing countries <sup>4</sup> and can save 22% of the lives of neonates according to Jones's (2003) study.<sup>5</sup> The Lancet reported that early initiation of breastfeeding is one of survival series and highly the neonatal recommended for reduction of neonatal mortality particularly in low and middle income countries.<sup>6,7</sup>

In Southeast Asia, Myanmar had highest infant mortality, neonatal mortality and under five mortality rates from 1990 to 2015. According to 2014 Myanmar Census, Infant Mortality Rate (IMR) is 62 and under five mortality rate (U5MR) is 72.<sup>8</sup> In the Myanmar Demographic Health survey (2015), IMR decreased but there was no much changes in neonatal mortality rate and neonatal death is still high .<sup>9</sup>

Colostrum, "first milk", can save the neonate as anti-protective factors such as immune cells (lymphocyte), immunoglobulin Ig G, Ig M, Ig A and many more .8 The most important components of immunoglobulins can give passive and natural immunity in neonate.9 Feeding other than mother milk can cause adverse effects such as lactose tolerance, milk allergy, iron deficiency anemia, vomiting and diarrhea due to neonate gut are not mature and can result in damage. <sup>9</sup>Many studies are longtime debating for to give cow milk and human milk in neonatal period, finally cow milk were more likely to get dehydration by inhabiting the absorption of iron and more kidney function lead to high urine output.<sup>10</sup> Cow milk is more suitable for babies over one year of age for the previous mentioned adverse

effects. Mother milk is most appropriate biofluid to get immunity in early neonatal period.<sup>11</sup>

Myanmar government launched Infant and Young Child feeding Practice Program (IYCF) as essential health package since 2011 with UNICEF and focused on health and nutrition among under-five children and promoted breastfeeding practices and early initiation of breastfeeding practice.<sup>12</sup> Breastfeeding is affected by complex social problems and need to support and encourage as ten successful steps by WHO as baby friendly initiative steps guideline.<sup>13</sup>.Research gap in Myanmar is that focused on exclusive previous studies breastfeeding (EBF) but there is no study on early initiation of breastfeeding practice (EIBF) and it will be fundamental and essential practice to get better healthy lives of newborns and can be of benefit in prevention of neonatal deaths.

# **METHODS**

The study used the secondary data analysis of the Myanmar Demographic Health Survey (MDHS 2015-2016) and it was national representative samples from all states and regions by using a two-stage stratified sampling method.

The study inclusion criteria are mothers who had children less than 2 years old last child including both single or multiple births. The exclusion criteria are mothers who did not answered the question of EIBF (early initiation of breastfeeding practices). The total samples of the mothers who answered questions of Early initiation of breastfeeding practice (EIBF), 3,715 mothers, are included and below diagram (Fig1.) showed the sampling frame of this study.







about early initiation of breastfeeding n=3,715

**Figure1** Diagrammatic presentation of sample extraction from Myanmar Demographic Health survey 2015-2016

#### The measurement of the variables

The outcome/dependent variable in this study is EIBF practices and questions for this variable was "When did you put to the breast (last child) after delivery?". According to WHO definition, outcome variable had two dichotomous variables with categories 1 as "Early initiation" (within one hour) and 0 as "Late breastfeeding".

For the independent variables, individual characteristics are (mother age, mother education, occupation, parity, place of residence, smoking habits and betel quid habits. Family related factors included ANC visit, family decision making, pre-lacteal feeding practice. Health system related factors are mode of delivery, place of delivery and sex of child.

This study analyzed by descriptive statistics, Chi-square test and multiple logistic regression to examine factors associated with EIBF in Myanmar by using the STATA/SE software version 14.0.

DHS survey in Myanmar is approved by the National Health Sciences Research Committee. This survey was voluntary based and informed consent for this survey took place at several levels (household and individual). The study



received the permission from DHS program for using of secondary data set MDHS (2015-2016). For ensuring confidentially and security, data will not be shared to others. This study received IRB (Institutional Review Board) approval from Institute for Population and Social Research (COE No. 2020/05-225).

### RESULTS

According to WHO definition and calculations of the Early initiation of breastfeeding rate was calculated and described as below in equations.

EIBF = <u>Children born in last 24 months who put breast within one hour</u>\*100 children born in last 24 months

Early initiation of breastfeeding rate classified as poor (0-29%), fair (30-49%), good (50-89%) and very good (90-100%) respectively .<sup>12, 14</sup> In the study, according to the WHO definition, the early initiation of breastfeeding rate was 78% and it was good in range of WHO.

Variables	n	%
Mother age		
15-19	92	2.5
20-34	2,481	66.8
35-49	1,142	30.7
Mother education level		
No education	588	15.8
Primary school	1,632	43.9
Secondary	1,204	32.4
Higher	291	7.8
Mother occupation		
No work or Housewife	1,357	36.6
Manager/professional/ technical	180	4.9
Clerical/ Sales/Services	599	16.2
Agriculture worker	578	15.6
Manual worker	992	26.8
Parity		
1-2	2,105	56.7
3-4	1,002	27.0
≥5	608	16.4
Residence		
Urban	848	22.8
Rural	2,867	77.2
AN visit times		
No visit or none	488	13.1
1-3	348	9.4
<u>≥</u> 4	2,879	77.5

**Table 1** Descriptive statistics of maternal characteristics (n=3,715)





Variables		n	%	
Mother smoking habit	S			
No		3,619	97.4	
Yes		96	2.6	
Mother betel quid hab	its			
No		2,819	75.9	
Yes		896	24.1	
Family decision maker	•			
Mother alone		2,038	54.9	
Husband alone		190	5.1	
Both mothers and fa	thers	1,237	33.3	
Relatives or others		250	6.7	
Pre-lacteal feeding practice				
No		2,919	78.6	
Yes		796	21.4	
Mode of delivery				
Vaginal delivery		3,055	82.2	
Cesarean delivery		660	17.8	
Place of Delivery				
Home		2,293	61.7	
Government	hospital/RHC/	1,167	31.4	
Subcenter				
Private center		243	6.5	
Others		12	0.3	
Sex of child				
Male		1,933	52.0	
Female		1,782	48.0	
Total sample		3,715	100	

In this study found 67% of mother was age between 20-34, mean age was 30.93 (SD= 6.75). Nearly half of mothers had only primary school education and housewife. 56% of mothers had one or two children. Most of respondents are lived in rural area, few mothers had smoking habits (3%) and betel quid chewing (24%). Mothers who took four and above ANC times are (77%). In family characteristics, the decision-making process about wellbeing of children are done by mothers alone but head of household are fathers in Myanmar (54%).

This study also found that most of children are born at home (62%) by vaginal delivery (82%). Mothers who had delivered at government hospital was nearly one third of total births (31%).



				EIBF		
Variables	Yes		No		Chi- square	p-value
Mother age					1.88	0.390
15-19	74	80.4	18	19.6		
20-34	1,936	78.0	545	22.0		
35-49	913	79.9	229	20.1		
Mother education					4.43	0.219
No-education	448	76.2	140	23.8		
Primary	1,278	78.3	354	21.7		
Secondary	968	80.4	236	19.6		
Higher	229	78.7	62	21.3		
Mother occupation					11.88	0.018*
No work	1,073	79.1	284	20.9		
Manager/prof	145	80.5	35	19.5		
Clerical/sales/services	480	80.1	119	19.9		
Agriculture worker	472	81.7	106	18.3		
Manual worker	745	75.1	247	24.9		
Maternal Parity					3.24	0.198
1-2	1,634	77.6	471	22.4		
3-4	803	80.1	199	19.9		
≥5	486	79.9	122	20.1		
Place of residence					5.6	0.018*
Urban	692	81.6	156	18.4		
Rural	2,231	77.8	636	22.2		
Mother's AN visit					16.06	0.007**
No visit	360	73.8	128	26.2		
1-3 times	256	73.6	92	26.4		
≥4	2,307	80.1	572	19.9		
Mother smoking habits					0.806	0.372
No	2,851	78.8	768	22.2		
Yes	72	75.0	24	25.0		
Mother betel habits					3.86	0.049*
No	2,239	79.4	580	20.6		
Yes	684	76.3	212	23.7		

**Table 2** Distribution of early initiation of breastfeeding practices by socio-demographic of mothers, family related factors and health care factors on mothers (n=3,715)





			]	EIBF		
Variables	Yes		No		Chi- square	p-value
Family decision making						
Mother alone	1,601	78.5	437	21.5	4.12	0.249
Husband alone	144	75.8	46	24.2		
Both Mother and Father	990	80.0	247	20.0		
Relatives and others	188	75.2	62	24.8		
Pre-lacteal feedingpract	ice				509.95	<0.001***
No	2,528	86.6	391	13.4		
Yes	395	49.6	401	50.4		
Mode of delivery					52.61	< 0.001***
Cesarean delivery	451	68.3	209	31.7		
Vaginal delivery	2,472	80.9	583	19.1		
Place of delivery					9.69	0.021*
Home	1,841	80.3	452	19.7		
Government Hospital	889	76.2	278	23.8		
Private	183	75.3	60	24.7		
Others	10	83.3	2	16.7		
Sex of child					3.67	0.055
Male	1,497	77.4	436	22.6		
Female	1,426	80.0	356	20.0		

*Significant at p-value,* \*\*\**p*<0.001, \*\**p*<0.01, \**p*<0.05.

According to Table 4.2, significant factors are mother occupation, place of residence, parity, ANC visit, betel quid habits, pre-lacteal feeding practice, mode of delivery, place of delivery. Mother who had manual workers are 20% less likely to initiate early initiation of breastfeeding than housewife mother or non-working mothers (OR=0.80; 95% CI = 0.64-0.99) after controlling of other variables. Maternal education and maternal age were not significant association in early initiation of breastfeeding in this study. Place of residence was another determinant in this study, found that 26% less likely to do early breastfeeding within one hour than those who lived in urban mothers with significant p-value <0.05 (OR=0.74; 95% CI = 0.58-0.95).

Mother with above four children was another determining significant, those mothers were 1.5 times more initiate for breastfeeding within one hour (OR=1.48; 95% CI = 1.08-2.01) than mothers who had few or less than four children mothers. Furthermore, others positively association of EIBF was maternal history of ANC care visit. The mother who will breastfeed early and 1.5 times more likely to perform early initiation of breastfeeding than those mothers who had no history of antenatal care visits. Net betel-quid mothers are less likely to breastfeed early than those no habits of betel quid in pregnancy. The mothers who had five or above children had 1.5 times more likely to initiate breastfeeding practice than those who had less children (OR=1.48; 95% CI = 1.08-2.01). Pre-lacteal feeding practice was one of strong determinant in family, Mothers



who had pre-lacteal feeding practice was 74% less likely to perform early breastfeeding within one hour and (OR=0.16; 95% CI = 0.13-0.19) than those of mother who had no pre-lacteal feeds. Mothers who gave birth last child by cesarean delivery was 50% less likely to initiate early breastfeeding than mother who had normal vaginal delivery (OR=0.50; 95% CI

= 0.38-0.66). Therefore, maternal workers as manual labor, place of residence, mother AN visit time, mode of delivery, pre-lacteal feeding practices, mother betel quid habits and maternal parity was significant association in early initiation of breastfeeding practice in study, other variable are not in binary logistic regression analysis.

Variable	OR	95% CI		P value
		Lower	Upper	
Mother age				
15-19	1.00			
20-34	0.84	0.46	1.50	0.550
35-49	0.95	0.51	1.77	0.879
Mothereducation				
No education	1.00			
Primaryschool	1.07	0.84	1.41	0.519
Secondary	1.33	0.99	1.79	0.057
Higher	1.26	0.80	1.99	0.312
Mother occupation				
No work or housewife	1.00			
Professional/Manager	1.32	0.83	2.11	0.241
Sales/services/Clerical	1.09	0.83	1.42	0.529
Agriculture worker	1.15	0.87	1.52	0.309
Manual workers	0.80	0.64	0.99	0.041*
Parity				
1-2	1.00			
3-4	1.14	0.91	1.42	0.239
5&above	1.48	1.08	2.01	0.014*
Mother AN visit				
None	1.00			
1-3 times	0.98	0.69	1.39	0.921
4& above	1.45	1.11	1.90	0.007**
Residence				
Urban	1.00			
Rural	0.744	0.58	0.95	0.018*

**Table 3** Binary Logistic Regression analysis of early initiation of breastfeeding





Variable	OR	95% CI		P value
		Lower	Upper	
Mother betel habits				
No	1.00			
Yes	0.81	0.66	0.99	0.042*
Mother smoking habits				
No	1.00			
Yes	0.85	0.50	1.43	0.541
Family decision making				
Mother alone	1.00			
Father alone	0.86	0.59	1.27	0.458
Both mothers and fathers	1.11	0.92	1.35	0.271
Relatives or others	0.83	0.59	1.67	0.293
Pre-lacteal feeding practice				
No	1.00			
Yes	0.16	0.13	0.19	<0.001***
Mode of delivery				
Vaginal delivery	1.00			
Cesarean delivery	0.50	0.38	0.66	<0.001***
Place of delivery				
Home	1.00			
Government hospital	1.06	0.82	1.37	0.651
Private	1.11	0.73	1.67	0.630
Others	1.18	0.22	6.48	0.845
Sex				
Male	1.00			
Female	1.15	0.97	1.37	0.109

*Significant at p-value,* \*\*\**p*<0.001, \*\**p*<0.01, \**p*<0.05.

### DISCUSSION

In this study, EIBF rate 78% and delay breastfeeding rate is about 22%. WHO targeted for EIBF rate to all countries to above 80% and to reduce neonatal deaths and under-five deaths at 50% in Global target goal in 2025 for achieve Sustainable Development Goal at 2030.<sup>15</sup> This

EIBF rate was similar with the study done in Ethiopia  $.^{16}$ 

This study found that place of residence was significant association on EIBF practice that mothers who lived in urban were more likely to breastfeeding than those of mothers who lived in rural area and the finding supported this hypothesis, 22% of mothers are lived in urban area and 77% of respondents are lived in rural





area. This finding supported by the study done in Tanzania.<sup>17</sup> The possible causes are due to lack of health knowledge, the practice of home delivery and colostrum feeding was uncommon in rural area in Myanmar.<sup>18</sup>

Among maternal characteristics, manual workers are less likely to early breastfeed and results were supported in Ethiopia<sup>19</sup> due to lack of time and going back to work.<sup>18</sup> Regarding lifestyle factors, smoking habit of mothers was not significant in association with early initiation of breastfeeding in this study. In contradiction, betel quid chewing is associated to EIBF.

Maternal ANC was strong factors for deciding for EIBF practice and 1.5 times more likely to initiate early breastfeeding than mothers with no ANC visits. The reason would be that in every antenatal visit, there is a higher chance of receiving knowledge about benefits of colostrum and early initiation of breastfeeding practices .<sup>19</sup>

This study found that decision making factor from family characteristics is not significant in early initiation of breastfeeding practice. This finding is supported by MDHS that majority of head of household in Myanmar are male. We can say that men are not involved in the deciding the initiation of early breastfeeding.

Pre-lacteal feeding practice was in strong association. Mothers who do pre-lacteal feeding to neonate are 74% less likely to initiate early breastfeeding than those of mother only feed breast milk. The common practice for pre-lacteal feeding in Myanmar but in Nigeria is water. <sup>20</sup>

The study found that Caesarean's delivery was one of the strong significant factors in EIBF practice. Women who birthed with cesarean delivery were 50% less likely to initiate early than normal delivery. Vaginal delivery with home or hospital setting are more likely to get early breastfeeding than cesarean type of births in this study. The possible reasons for delay are mothers need to take care more than breastfeeding, separation of mothers and neonate if baby had serious problems and most of cesarean of obstetric problems such as emergency situations, pain or inverted nipples and sleepy baby or mother needed more time for rest after operation, planned cesarean and emergency cesarean differences are still common problems in delay of early breastfeeding. <sup>21</sup> Thus, vaginal delivery was more likely to get early initiation of breastfeeding, exclusive breastfeeding and longer duration than Cesarean delivery. <sup>21, 22</sup>

# CONCLUSION

Early initiation of breastfeeding can reduce neonatal mortality and morbidity but still low in low or middle incomed countries. EIBF was strongly associated with maternal characteristic of parity, place of residence, ANC visits, betel quid habits. In family related factors, prelacteal feeding was significant and in health factors related factor are only mode of delivery, was significant association with early initiation of breastfeeding.

# RECOMMENDATIONS

ANC visit was significant association with EIBF and all pregnant mothers should receive regular antenatal care with good quality and quantities cares by using mass media by MCCT (Mother to child cash transfer) Program is recommended. This program is mainly intended to mothers and children health for nutrition and health education. This program should be collaborated with Ministry of Health with frontline workers for health education to breastfeeding and nutrition by free of charge with Broadcasting of national radio line, television and newspapers within project period to alert for participation Human resources of frontline workers are also trained about ten successful breastfeeding with WHO standard guideline. Effectiveness of EIBF and EBF will explain with clear understanding of flags, posters and vinyl in every ANC visits. Mothers played in dual tasks in family as





should be paid with effective maternity leave in private settings with provision of nursing rooms and facilities. For hospital setting, government should upgrade all hospital with baby friendly hospital initiative for promoting of skin-to-skin contact and rooming in practice in ten successful breastfeeding practice in hospital to get EIBF practices.

# LIMITATIONS OF THE STUDY

The study emphasized only mothers who had children less than two years with Myanmar Demographic Health Survey (2015-2016). Thus, the study will not directly reflect to current situation of early initiation of breastfeeding and further studies is needed. Other limitations were recall or perceptions of the events or bias of mothers due to last child births within one hour after delivery.

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### WOMEN'S EMPOWERMENT AND MODERN CONTRACEPTIVE USE: ANALYSIS OF INDONESIA DEMOGRAPHIC HEALTH SURVEY (IDHS) 2017

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#### ABSTRACT

As suggested by SDGs, women's empowerment leads to significant positive changes in many domains of maternal health outcomes, including the use of modern contraceptive methods. Understanding about whether or not and how women's empowerment influenced the uses of modern contraception is important to the improvement of reproductive health outcomes of Indonesian women. Using Women's Empowerment Framework (WEF) of Longwe, this study uses representative national data to examine the association of women's empowerment and use of modern contraception in welfare, access, conscientization, and participation level. Samples of 8,194 currently married and cohabiting Indonesian women aged 15-49 years were drawn from the 2017's Indonesia Demographic and Health Survey (IDHS) to be analyzed. Women's empowerment was measured by several composite variables such as women's employment; ownership of assets; attitude towards wife-beating; attitude towards negotiating in safer sexual relationships; and participation in the decision-making process. The Binary Logistic Regression analysis was applied to determine the associations between women's empowerment and modern contraceptive use, controlling for other related factors. This study shows that 61.3% of the study sample currently uses modern contraceptive method. Women who owned house jointly and her name appeared on the title deed (AOR=1.35, 95%, CI=1.16-1.58), has agreement on negotiating safer sexual relationship with their husband (AOR=1.10, 95%, CI=1.02-1.18), and women who participated in household decision making (AOR=1.05, 95%, CI=1.02-1.09) are significantly more likely to use modern contraceptive method. The findings suggest that an increase in modern contraceptive use can be achieved by enhancing women's empowerment. Also, an increase in women's participation in decision making, ownership of house, and their awareness of negotiating safer sexual relations with their husband are all key issues to be considered. Women's empowerment should be addressed in family planning policies to promote women's reproductive health outcomes

Keywords: women's empowerment, gender equality, modern contraceptive use, Indonesia

#### **INTRODUCTION**

Women's empowerment is a broad and complex issue to be explained, therefore several organizations and experts attempted to conceptualize the definition of women's empowerment. The term women's empowerment was first defined in 1995 by United Nations after the 4<sup>th</sup> World Conference on Women in Beijing.<sup>1</sup> Women's empowerment was defined as "women's possibility of realizing their full potential in society and shaping their lives in accordance



with their own aspirations which include the right to freedom of thought, conscience, religion and belief, which contributing to the moral, ethical, spiritual and intellectual needs of women and men, individually or in community with others".<sup>2</sup> Meanwhile, Kabeer<sup>3</sup> refers to women's empowerment as the "processes by which those who have been denied the ability to make choices acquire such ability". Thus, women's empowerment is women's process from 'unable' to 'able' or from 'helpless' and not getting what they are entitled to, to be empowered and able to claim what they are entitled to.

The target of reducing gender inequality has held a salient place in the eyes of international organizations and in national strategy statements for more than two decades.<sup>4</sup> The Cairo Declaration on population and development in 1994 at the International Conference on Population and Development included reducing gender inequality as the seventh point and as the fifth goals of the Sustainable Development Goals (SDGs), namely achieving gender equality and empowering all women and girls. This shows gender equality is not only a fundamental of human rights, but also a necessary foundation for a peaceful, affluent and sustainable world.<sup>5,6</sup>

As suggested by SDGs, women's empowerment leads to significant positive changes in many domains of maternal health outcomes, including the use of modern contraceptive methods, utilization of antenatal and post-natal care, giving birth in a health facility and have a skilled birth attendant at delivery.<sup>8,9</sup> Previous studies have established positive associations between women's empowerment and modern contraceptive use.10-15 By increasing women's empowerment, women have the right to their own body and the right to choose whether to space, limit, or stop producing a child. So, it is likely that a highly empowered woman may adequately utilize modern contraceptive methods.<sup>16</sup> Women who are less empowered may encounter a significant barrier to obtaining sexual and reproductive health rights.<sup>17</sup>

Indonesia, as the fourth most populous country in the world has to deal with large population and the high rate of population growth.<sup>18</sup> According to the Central Statistics Agency (BPS), the population in Indonesia increased 3 to 4 million every year or around 1.30% of the total population.<sup>19</sup> To deal with this major challenge, the Indonesian government has implemented the Family Planning Program policy and had succeeded in suppressing the population growth from 5.47 in 1970 to 2.31 in 2018.20 But the success achieved is not without problems and barriers. Aside from health, social, economic, education, and family planning facilities and services factors, patriarchal cultures have proven to be a factor that acts as a barrier to the use of contraception method in Indonesia.<sup>21</sup> The existence of a patriarchal culture in Indonesian society indicates that gender inequality currently still exists in Indonesia.

An improved status of women within the household beneficially affects the health of the women itself and her surroundings, including her own children.<sup>14, 22-23</sup> The hypothesis that women's empowerment has a relationship with modern contraceptive use has been proven in many African and South Asian countries.<sup>12-15</sup> Meanwhile, in the context of Indonesia, there is limited understanding about whether and how women's empowerment at the household level influences the use of modern contraception, specifically using representative national data. Therefore, this study aims to examine the association between women's empowerment in welfare, access, conscientization and participation level and use of modern contraception method among women in reproductive ages in Indonesia.

# METHODS

This study employs a quantitative approach using cross-sectional data of the IDHS



(Indonesia Demographic Health Survey) 2017. The IDHS is a nationally representative survey conducted in Indonesia since 1987. The 2017 IDHS is the eighth round carried out jointly by the Central Statistics Agency (BPS), the National Population and Family Planning Agency (BKKBN) and the Ministry of Health during July to December 2017. The details information regarding validity and reliability of the measurements are provided in the DHS reports.27 The study populations are Indonesian women in reproductive age (15 to 49 years old). In order to meet the objectives of this study, the inclusion and exclusion criteria are set. Inclusion criteria are currently married and cohabitating women aged 15-49 years old. Meanwhile, women who declared themselves infertile and currently pregnant at the time of the survey are excluded from this study, as both infertile and currently-pregnant women are considered as a non-contraceptive user and infertile women are not exposed to of pregnancy.<sup>24-26</sup> Based on risk the established inclusion exclusion criteria, the sample size of this study is 8,194 respondents.

#### Variable description

The dependent variable identifies whether a given woman is currently use modern contraceptive, which includes sterilization, pills, IUD, injectables, implants, condoms, diaphragm, contraceptive foam and jelly, Lactational Amenorrhea Method (LAM), Standard Days Method (SDM), countryspecific modern methods and respondentmentioned other modern contraceptive methods (e.g. cervical cap, contraceptive sponge, and others).<sup>26</sup> This study combines no use and traditional methods into one group as not currently use modern method. Thus, the variable is coded 1 if currently use modern contraceptive method, and 0 if otherwise.

Women's empowerment in the study has been conceptualized based Women's on Empowerment Framework (WEF) by Longwe at welfare, access, conscientization and participation level. Namely employment, cash earnings, and access to earnings, ownership of house, ownership of land, ownership of bank account, ownership of mobile phone, attitude towards wife beating, attitude towards negotiating safer sexual relationship with husband and participation in decision making process. Several socio demographics and socio economic factors including women's age, educational status, number of children ever born, knowledge of any contraceptive method, mass media exposure, husband education, and wealth index (poorest, poorer, middle, richer, and richest) were added into the model as controlled variables.

#### Statistical Analysis

Statistical data package STATA 14 is used to analyze data. The univariate analysis is employed to obtain a clear description of the data by examining each variable. This study used the Chi-square test to analyze the categorical relationship between each independent variable and modern contraceptive use with 95% confidence interval (CI). The Binary Logistic Regression is used to assess the association between women's empowerment and modern contraceptive use. The results are shown as an adjusted odds ratio (OR), 95% Confidence Interval (CI) and p-value <0.05 to consider for significance level.





Figure 1 Schematic measurement models

#### Ethical Consideration

The dataset was provided by the DHS program after registering and offering from the Demographic and Health Survey (DHS website). The permission to use the data was approved by DHS on 6<sup>th</sup> February, 2020. The ethics approval for this current study was granted by the Institutional Review Board (IRB) from the Institute for Population and Social Research, Mahidol University, with number COE No. 2020/05-252, in order to assure that the rights and welfare of participants in this study are protected.

#### RESULTS

The study populations are married and cohabiting women aged 15-49 years old in Indonesia and covered 8,194 respondents. Among 8,194 respondents, 61.2% (5,019 respondents) currently used modern contraceptive methods and 38.8% (3,175 respondents) did not currently use modern contraceptive methods. The demographic and women's empowerment characteristics of the respondents are presented in Table 1. The mean age of women in this study is 35.4 years (SD=7.7). The mean number of children ever born is 2.2 (SD=1.3). In this study, 46.7% women completed primary education, 42.1% women completed secondary and higher education and 11.1% completed less than primary education. More than a half of the women have a medium knowledge on contraceptive method, while 19.4% of them have a low knowledge and 19.5% have good knowledge. More than half of the women were exposed to at least one media about family planning messages in the past six months, while 42.8% were not exposed. 12.2% of women have husband with less than primary education, 42.1% have husbands with primary education and 45.5% with secondary/higher education. As many as 1,822 (22.2%) women comes from family with poorest quintiles and as many as 1,543 (18.8%) of the women comes from family with richest quintiles.



#### Table 1 Demographic Characteristic of Respondents

Variables	Overall (%)	Modern Contraceptive Us		tive Use
		Yes (%)	No (%)	<i>p</i> -value
Age of women	35.4, 7.7	34.9, 0.1	36.3, 0.1	•
Mean, SD, Min=15, Max=49				
Education of women				0.000
Less than primary	911 (11.1)	59.9	40.1	
Completed primary	3,827 (46.7)	67.4	32.6	
Completed secondary and higher	3,456 (42.2)	54.7	45.3	
Number of children ever born	2.2, 1.3	2.4, 0.01	2.0, 0.02	
Mean, SD, $Min=0$ , $Max=12$	,	,	,	
Knowledge of any contraceptive method				0.000
Low	1,591 (19.4)	56.9	43.1	
Medium	4,999 (61.0)	63.7	36.3	
Good	1,604 (19.6)	57.7	42.3	
Media exposure	, , ,			0.074
Exposed	4,684 (42.9)	62.0	38.0	
Not exposed	3,510 (57.1)	60.1	39.9	
Husband education				0.000
Less than primary	1.007 (12.3)	63.6	36.4	
Completed primary	3.456 (42.2)	64.8	35.2	
Completed secondary and higher	3.731 (45.5)	57.3	42.7	
Wealth index	-,,()	- /		0.000
Poorest	1.822 (22.2)	59.4	40.6	
Poorer	1.614 (19.7)	65.8	34.2	
Middle	1.643 (20.0)	62.5	37.5	
Richer	1.572 (19.2)	61.8	38.2	
Richest	1.543 (18.9)	56.6	43.4	
Women's empowerment dimension	-,- ()			
Employment, cash earnings and access to				0.000
earnings				
Not work	2,980 (36.3)	64.4	35.6	
Worked, not paid in cash	1.375 (16.8)	60.6	39.4	
Worked, paid in cash, no access to earnings	136 (1.7)	53.7	46.3	
Worked, paid in cash, joint decision	1.037 (12.7)	60.4	39.6	
Worked, paid in cash, decided by women	2,666 (32.5)	58.7	41.3	
Ownership of house	)()		-	0.004
Does not own house	2,738 (33.4)	59.3	40.7	
Owned house, but not own title deed	2,577 (43.7)	62.6	37.4	
Owned house jointly and has title deed	1.240 (15.1)	63.5	36.5	
Owned house alone and title deed under her name	-,,			
	639 (7.8)	57.6	42.4	
Ownership of land			·=· •	
Does not own land	4,691 (57.3)	62.0	38.0	0.389
Owned land, but not own title deed	2,164 (26.4)	60.3	39.7	
Owned land jointly and has title deed	754 (9.2)	60.0	40.0	
Owned land alone and title deed under her name	585 (7.1)́	60.0	40.0	



Variables	Overall (%)	Modern Contraceptive Use		
		Yes (%)	No (%)	<i>p</i> -value
Ownership of bank account				0.000
No	5,155 (63.0)	63.7	36.3	
Yes	2,039 (37.0)	57.0	43.0	
Ownership of phone				0.004
No	2,241 (27.4)	63.7	36.3	
Yes	5,953 (72.6)	60.3	39.7	
Attitude towards wife beating	4.3, 1.1	4.2, 0.01	4.3, 0.02	
Mean, SD, $Min=0$ , $Max = 5$				
Attitude towards negotiating safer sex	1.5, 0.6	1.5, 0.00	1.5, 0.01	
Mean, SD, Min= 0, Max= 2				
Participation in decision making	4.4, 1.4	4.5, 0.02	4.4, 0.02	
Mean, SD, Min= 0, Max= 12				
Total	8,194			

Around one-third of women did not work and 16.8% worked but were not paid in cash. Meanwhile, 1.6% work, were paid in cash but have no access to their own earnings and 32.5% work, were paid in cash and decided by herself on how the money she earns would be used. Furthermore, women who owned house and land and the title deed is under her name accounted for 7.8% and 7.1%, respectively. Around one-third of women do not own house and more than half (57.2%) do not own any land. In addition, only 37.1% of women have an account in a bank and 72.6% owns a mobile phone. The mean of women's attitude towards wife beating is 4.3 (SD=1.1) and the mean of women's attitude towards negotiating safer sexual relationship with husband is 1.5 (SD=0.6). The mean of women's participation in decision making process is 4.4 (SD=1.4).

In Table 1, the data shows that women's education, knowledge of any contraceptive method, husband education, and wealth index are all demographic factors that significantly associated with modern contraceptive use. In addition, variables of women's empowerment that significantly associated with modern contraceptive use are employment, cash earnings and access to earnings, ownership of house, ownership of bank account and mobile phone.

More than a half of respondents who worked, were paid in cash and decided by herself how the money she earns would be used currently modern contraceptive method. use Respondents who owned a house and land alone and the title deed is under her name and currently used modern contraceptive method is 57.6% and 60.0%, respectively. Of those who owned a bank account, 57.0% currently used a modern contraceptive method and a slightly higher proportion (60.3%) of those who owned a mobile phone currently used modern contraceptive method. Women with higher approval of wife beating use a modern contraceptive method more than women with less approval of wife beating. Meanwhile, women with higher agreement on negotiating safer sexual relationship and women who participated or are involved in more scenarios of decision-making process, use a modern contraceptive method more than women with lower agreement on negotiating safer sexual relationship and women who participated in less scenarios of the decision-making process. Table 2 portrays the result of binary logistic regression. Model with the main 1 independent variables shows that women's employment, cash earnings and access to earnings, ownership of house, ownership of land, ownership of bank account, women's attitude towards negotiating safer sex and women's participation in decision-making process are significantly associated with modern contraceptive use. In model 2, after controlling for all variables, only ownership of



house, ownership of bank account, attitude towards wife beating and women's participation in decision making process remain statistically significant with modern contraceptive use.

Table 2 Binary	Logistic	Regression	Analysis of	f Modern (	Contraceptive	Use $(n = 8)$	8,194)
J	0	0	2		1		, ,

Factors	Modern Contraceptive Use			
	Model 1	Model 2		
	Crude OR (95% CI)	Adjusted OR (95% CI)		
Age of women	-	0.94 (0.93-0.94) ***		
Education of women	-			
Less than primary (ref.)				
Completed primary		1.16 (0.98-1.38)		
Completed secondary and higher		0.71 (0.58-0.87) **		
Number of children ever born	-	1.41 (1.35-1.47) ***		
Knowledge of any contraceptive	-			
method				
Low (ref.)				
Medium		1.47 (1.29-1.68) ***		
Good		1.42 (1.19-1.69) ***		
Media exposure	-			
Not exposed (ref.)				
Exposed		1.09 (0.99-1.20)		
Husband education	-			
Less than primary (ref.)				
Completed primary		0.89 (0.76-1.05)		
Completed secondary and higher		0.79 (0.66-0.95) *		
Wealth index	-			
Poorest (ref.)				
Poorer		1.48 (1.27-1.72) ***		
Middle		1.45 (1.24-1.69) ***		
Richer		1.59 (1.35-1.88) ***		
Richest		1.57 (1.30-1.88) ***		
Women's Empowerment				
Welfare				
Not work (ref)				
Worked not paid in cash	0 85 (0 74-0 98) *	0 94 (0 82-1 09)		
Worked naid in cash no access to		0.91 (0.02 1.09)		
earnings	0 72 (0 50-1 02)	0.81 (0.56-1.16)		
Worked paid in cash joint decision	0.89(0.77-1.04)	1 03 (0 88-1 20)		
Worked, paid in cash, decided by	0.81 (0.77 - 0.91) ***	0.93(0.83-1.04)		
women	0.01 (0.72 0.91)	0.95 (0.05 1.04)		
Ownership of house				
Does not own house (ref)				
Owned house but not own title deed	1 21 (1 08-1 35) **	1 26 (1 12-1 43) ***		
Owned house jointly and has title deed	1.21(1.00-1.33) 1 25 (1 08-1 $15$ ) **	1.20 (1.12 - 1.73) 1 35 (1 16-1 58) ***		
Owned house alone and title deed	0.96(0.79-1.16)	1.06 (0.87-1.20)		
under her name	0.20 (0.72 1.10)	1.00 (0.07 1.27)		



Factors	Modern Contraceptive Use				
	Model 1	Model 2			
	Crude OR (95% CI)	Adjusted OR (95% CI)			
Ownership of land					
Does not own land (ref)					
Owned land, but not own title deed	0.87 (0.77-0.98) *	0.86 (0.77-0.98) *			
Owned land jointly and has title deed	0.87 (0.73-1.02)	0.88 (0.74-1.05)			
Owned land alone and title deed under	0.99 (0.82-1.19)	1.04 (0.86-1.27)			
her name					
Ownership of bank account					
No (ref)					
Yes	0.77 (0.70-0.85) ***	0.83 (0.74-0.93) **			
Ownership of phone					
No (ref)					
Yes	0.91 (0.82-1.02)	0.91 (0.80-1.03)			
Attitude towards wife beating	0.99 (0.96-1.03)	1.02 (0.98-1.07)			
Attitude towards negotiating safer sex	1.14 (1.01-1.08) ***	1.10 (1.02-1.18) *			
Participation in decision making	1.04 (1.01-1.08) **	1.05 (1.01-1.08) **			
LR chi-square	96.2***	626.3***			
Pseudo R square	0.0088	0.0572			
Note: $*p < 0.05$ . $**p < .0.01$ . $***p < .0.001$					

Further, women who owned house jointly and her name appeared on the title deed (AOR=1.35, 95%, CI=1.16-1.58), has higher score in agreement towards negotiating safer relationship (AOR=1.10, sexual 95%. CI=1.02-1.18) and women who participated in more scenarios of household decision making process (AOR=1.05, 95%, CI=1.01-1.08) are more likely to use modern contraceptive method. However, negative association has been found from ownership of land and ownership of bank account with modern contraceptive use.

In addition, Table 2 shows that use of modern contraceptive method increases with increasing women's knowledge of any contraceptive method (AOR=1.42, 95%. CI=1.19-1.69), children ever born (AOR=1.41, 95%, CI=1.35-1.47), and wealth index (AOR=1.57, 95%, CI=1.30-1.88). But surprisingly, a negative association was found from women who completed secondary education or higher and husband education. Meanwhile, as the age of women increases, the probability of women to use modern contraceptive method will decrease by 6.0% (AOR=0.94, 95%, CI=0.934-0.948).

### DISCUSSION

Findings from this study demonstrate a positive association between certain measures of women's empowerment and modern contraceptive use. Women who owned house jointly and her name appears on the title deed are more likely to use modern contraceptive methods compared to women who do not own a house. This finding is consistent with other study from Burkina Faso and Mali.28 The explanation for this finding might be that ownership of house could be proxy for both women's empowerment and wealth index in the sense that women may have more power at home if she has real ownership or perceives ownership of her house, which could in turn implying her control over her reproductive choices.28

Another variable of women's empowerment included in access level and significantly associated with modern contraceptive use is



ownership of bank account. This variable surprisingly has a negative association with modern contraceptive use. This finding contradicts with the study's hypothesis and with previous studies in different countries.<sup>15,29</sup> The possible explanation for this is that, similar with ownership of house, ownership of a bank account is also a proxy for both women's empowerment and wealth index. In the context of Indonesia, most of women who owned a bank account came from the poorest and poorer wealth index and the bank account was used to receive funding assistance from the government.<sup>30</sup> Meanwhile, it has been proven in many studies that women who come from poorest wealth index are less likely to use modern contraceptive use.<sup>16-17, 31</sup>

Women's agreement with negotiating safer sexual relations with husband's is positively associated with use of modern contraceptive methods. Similar results are also found in previous studies conducted in different countries.<sup>17, 32-33</sup> A woman's ability to control her own sexual life is an important aspect of her empowerment and bodily integrity. This ability is also essential for a woman's health, particularly for her ability to avoid sexually transmitted diseases (STDs).34 Moreover, women's agreement on negotiating safer sexual relations with husbands reflects their ability on initiating or participating equitably in discussion of contraceptive use and subsequent contraceptive adoption with their husband's or partners.<sup>35</sup>

Based on the results of the binary logistic regression, women's participation in decisionmaking process is strongly and positively associated with use of modern contraceptive methods. This means that women who involved in more scenarios of household decision-making and women as the sole decision maker have higher possibility to use modern contraceptive method than women who involved in fewer scenarios or even do not involved in any of the scenario. The finding of this study is aligned with other studies from different countries. <sup>7,8, 12, 14-15, 31-33</sup> This is because women's household decisionmaking power reflects the women's ability to control and make decisions about their own bodies and resources without the need for permission within marital relations.<sup>33</sup> Further, increasing women's participation in decisionmaking will promote greater gender equality which in turn may encourage women's autonomy and may facilitate the uptake of contraception.<sup>36</sup>

Women's participation in decision making process was identified as proxy for women's empowerment at participation level of WEF used in this study. This framework arranged in five levels of equality with each higher level representing a higher level of empowerment. Participation level is the fourth level after welfare, access and conscientization. If a program intervention concentrates on the higher levels of the empowerment, there is greater likelihood that women's empowerment will be enhanced by the intervention than if the program focuses on the lower levels.<sup>37</sup> Therefore, increasing women's participation in decision-making process will increasewomen's empowerment and hence, increasing the likelihood of women to use modern contraceptive method.

In addition to women's empowerment, this study also reveals the significance of other factors including age of women, educational status. number of children ever born, knowledge of any contraceptive method, and index. Indonesian women wealth who completed primary school, have higher number of children ever born, have good knowledge of any contraceptive method, and come from relatively rich families or Java and Bali Island are more likely to use modern contraceptive methods. Meanwhile, as women get older, the likelihood of using modern contraceptive method decreases.

This study reflects the pivotal role of the association between women's empowerment and modern contraceptive use in conservative settings such as Indonesia. As in the context of



Indonesia, with a patriarchal culture as the social system, the role of women in the decision-making process in family affairs is still discriminatory. The husband is still the person who determines the policies that stands out, who must be valued in decision making, and conventionally followed as the head of the family.<sup>38-39</sup>

This study is not without limitations. No causal relationships assumed between the dependent variable and independent variables because of the nature of the cross-sectional data used. Further, the author acknowledges that women's empowerment dimension is broad, while the variables used in this study are limited to the availability of the data. Therefore, several important variables such as culture, religion and women's involvement in community activities cannot be included in the analysis. Moreover, variables of women's empowerment that found to be not significantly associated such as women's employment, cash earnings and access to earnings, ownership of phone, and women's attitudes towards wife beating might not be appropriate as the measurement of women's empowerment in the context of Indonesia.

### CONCLUSION

This study reflects the pivotal role of the association between women's empowerment and modern contraceptive use in conservative settings such as Indonesia. Using Women's Empowerment Framework (WEF) of Longwe, this study aimed to examine the association between women's empowerment in welfare, access, conscientization and participation level and use of modern contraception. Multivariate analysis performed using binary logistic regression revealed that after controlled for other variables, only ownership of house, women's agreement on negotiating safer sexual relationship and women's participation in decision making process which are positively associated with modern contraceptive use. In addition, a woman who has higher number of children ever born, has good knowledge of any contraceptive method, and come from richest family are more likely to use modern contraceptive method.

### RECOMMENDATIONS

The findings of this study reaffirm the importance of women's participation in decision-making process, especially in the setting of household level, to increase the use of modern contraceptive method. Therefore, it is recommended to the Indonesian government to aim at developing policies to improve women's participation, in the household process. decision-making This recommendation is especially for the BKKBN Kependudukan (Badan dan KeluargaBerencana Nasional – National Population and Family Planning Board) and Ministry of Women's Empowerment and Protection Child in Indonesia. These organizations must make a concerted effort to organize campaigns in raising awareness about gender equality to overcome the patriarchy cultural barriers in Indonesia. In addition, there is need to pay more attention to gender sensitivity in every aspect of existing regulations, both in the central and regional governments. Future studies should explore variable regarding women's more empowerment since some variables used in this study might not be comprehensive enough to adequately determine modern contraceptive use in Indonesia. Moreover, a qualitative research is needed to describe and understand better the gendered dominance issue in the setting of household level.

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#### PREVALENCE AND FACTORS RELATED TO SMARTPHONE ADDICTION AMONG HIGH SCHOOL STUDENTS IN BANGKOK, THAILAND

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### ABSTRACT

Most teenagers are smartphone users and seem to be inseparable from their smartphones, even displaying signs of addiction. This study investigated the prevalence of smartphone addiction and sought to determine associated factors related to smartphone addiction among high school students. A total of 420 high school students were randomly selected from three different high schools in Bangkok, Thailand. These students participated in a cross-sectional study of smartphone addiction by completing self-administrated questionnaires. The prevalence of smartphone addiction in the study group was 52.1%, but only age had a significant association with smartphone addiction (pvalue=0.026), with older students being more likely to show signs of addiction. Of the 15-year-old students, 35.2% displayed signs of smartphone addiction, while of students 16 and 17 and above, 56.1% and 53.7%, respectively, showed signs of addiction. Other demographic factors like gender (p-value = 0.724), educational level (p-value = 0.079) and grade point average (p-value = 0.532) had no significant association with smartphone addiction among high school students in Bangkok, Thailand. Future studies on smartphone addiction among high school students should consider different factors that might be associated with the condition, including socio-economic variables, history of medical illness(es), sleep quality, physical health and mental health. It is important to raise awarness of the rising trend of smartphone addiction and the contributing factors so as to find appropriate remedies.

Keywords: smartphone addiction, prevalence, and high school

#### **INTRODUCTION**

Young people today, particularly high school students, frequently engage with smartphones, as these devices have multiple functions that assist young people in their daily life. High school students seem to be inseparable from their smartphones, and this has reached a point where many young people display signs of addiction. The number of smartphone users is globally increasing, and adolescents form the highest number of smartphone users.<sup>1</sup> This generation is growing up with smart technology

and is able to adapt to the trend of smartphone use.<sup>1, 2</sup> Although smartphones can positively assist teenagers in their daily lives, they also have disadvantages that affect health and wellbeing and have been associated with conditions such as neck pain, poor posture, lower sleep quality, bad eyesight, depression, anxiety and ADHD.<sup>3-9</sup> The trend of smartphone addiction is increasing and expanding globally, and is drawing increasing attention from researchers.<sup>1</sup> Multiple studies have chronicled the rising trend of smartphone dependence, addiction and excessive use, which is sometimes linked with



internet addiction. In studies in Hong Kong, the United States and Iran, it is perceptible to see in 2010s the prevalence of smartphone addiction has vastly gone up from 27.4% (in 2008) to between 62% (in 2015) and 64.5% (in 2014).<sup>10-12</sup>

The World Health Organization (WHO) and the Centers for Disease Control (CDC) define adolescents as persons aged 10 to 19, while teenagers are 15-17 and youth are aged 10 to 24.<sup>13, 14</sup> The age cohort between teenagers and youth has the highest rate of smartphone use and addiction, so most studies have been conducted among adolescents and university students. The study by Bianchi and Phillips (2005) found that younger people tended to embrace new technology more readily than the older people and are more likely to use new technological products. Many studies have indicated that the trends of smartphone addiction by gender have varied since the emergence of smartphones up to the present day.<sup>15-17</sup> Multiple researchers have conducted studies on smartphone addiction in different countries around the world, but there are few studies conducted in English on smartphone addiction in Thailand. This study therefore investigated the prevalence of smartphone addiction and sought to determine if it has any association with personal characteristics such as gender, age, education level or GPA among high school students in Bangkok, Thailand.

Previous studies showed prevalence of Smartphone Addiction was ranging from 4.1% to 62.1% which presented an increasing trend of number of prevalence. (Reference from. 10-<sup>12, 18-28</sup> Additionally, the prevalence from the past five years was ranging from 21.3% -62.6%. It is noticeable to see the increasing trend of prevalence of smartphone addiction.<sup>26-</sup> <sup>28</sup> The prevalence of smartphone addiction has vastly gone up from 27.4% (in 2008) to between 62% (in 2015) - 64.5% (in 2014) which similar to the current study (prevalence of this study was 52.1%).

Previous studies have shown the prevalence of smartphone addiction was ranging from 4.1%

to 62.1%, or from 21.3% to 62.6% over the past five years, thus following an increasing trend.(10-12, 18-28) Studies by Durak investigating 'nomophobia' (fear of being without a mobile phone) and smartphone addiction predictors among adolescents in Turkey and by Sahin, Ozdemir, Unsal and Temiz evaluating smartphone addiction and sleep quality among university students both claimed that age is a predictor of smartphone addiction.<sup>29, 30</sup> Also, another study, the Survey of Personal and National Identity on Cell Phone Addcits and Non-Addicts in 2018, presented that age was a protective factor of smartphone addiction (OR = 0.87, CI = 0.80-0.95).<sup>17</sup>

Although many previous studies have suggested an association between smartphone addiction and gender, a study by Chen, Ying, Wang and Wen found that the prevalence of smartphone addiction among patients was 29.8%, of which 30.3% were male and mostly spent their time using game applications, and 29.3% were female, who often used multimedia 16 applications such as social networking. Others studies found an association between education performance (GPA) and smartphone addiction; a study by Junco and Cotten found a negative relationship between GPA and multitasking through the use of Facebook and text messaging in the class or while doing homework.<sup>31</sup> Similarly, a study by Karpinski, Kirschner, Ozer, Mellot and Ochwo discovered a negative association between GPA and use of social networking sites, which was moderated by multitasking in a sample of 451 US university students.<sup>32</sup> The study by Rosen found a link between lower academic performance and task switching (multitasking by using a smartphone while studying) and students who are off task (either studying or being on a smartphone) were less likely to be distracted during study.<sup>33</sup>

### **METHODS**

In total, 420 high school students in Bangkok, Thailand, were randomly selected from three different high schools to participate this crosssectional study of smartphone addiction by





completing a self-administrated questionnaire during the period November 2019 to February 2020. The sample size for this study was calculated using Cochran's sample size formula based on the prevalence (62.6%) of smartphone addiction from the study by Buctot, Kim, and Kim.<sup>28</sup> The number of participants was 413 (with 15% error), which was rounded up to 420 participants.

The development of instrument began by requesting and receiving permission to use the questionnaire from the authors of the Smartphone Addiction Scale – Short Version (SAS-SV). The questionnaire was then translated from English to Thai and then back translated from Thai to English by an English expert. After back translation, the items from the questionnaire were reviewed and revised based on the comments and suggestions of three experts. The validity of the measurements was then attained to determine whether the questionnaire corresponded to the objective of the study. The IOC of SAS-SV was 1.0, which indicated that the questionnaire was congruent. After assessing the validity, the reliability of the measurements was also determined by giving the questionnaire to a test sample of 30 high school students; the Cronbach's alpha for the SAS-SV was 0.84, which indicated that the questionnaire is qualified for use.

Research participants were selected and contacted using a random sampling method; three different schools registered under the Office of the Basic Education Commission were chosen: Yothinburana School, Wat Raja O Ros School and Samsenwittayalai School. The researcher then sent a request letter from the College of Public Health, Chulalongkorn University, to these three schools. After receiving approval by the principals to conduct this study in the schools, a list of students was arranged by the school administration. The researcher sent out three forms to the teachers to pass along to the students: (a) a participation information sheet, (b) a letter of consent, and questionnaire. Participation (c) a was voluntary, and students could decide for themselves if they wanted to participate in the project. If the students were interested in participating, they were instructed to take all of the forms to their parents or guardians. After the guardians reviewed all of the forms and signed the letter of consent, the students returned all three forms to the teacher or the researcher. Verbal explanations were given to the students for further clarification about the research study, and a signed letter of consent was required before any further participation in the study. After receiving the signed consent, the students could then complete the selfadministered questionnaire survey. Before the students took the survey, the researcher verbally explained the importance of the study to the participants and asked them to cooperate and answer the questionnaire truthfully. Once the questionnaires were completed by the participants, all questionnaires and any information related to the study was and will be kept confidential, will be terminated once the study is complete.

Because the majority the participants were under the age of 18, ethics approval was necessary before the study could take place. Ethics approval was received from the Research Ethics Review Committee for Research Involving Human Research Participants, Health Sciences Group, Chulalongkorn University (Approval number: 138.1/62), and a request letter regarding the research was sent to the principals of the participating schools from the College of Public Health, Chulalongkorn University. A letter of consent from the guardians and the students was also necessary before administration of the questionnaire.

The inclusion criteria for this study were students who used smartphones, both male and female, who studied in a high school in Bangkok from grades 10 to 12 (Mattayhom 4 to 6) and were willing to participate in the study. Exclusion criteria for the study were incomplete questionnaire responses or failure to meet in inclusion criteria. There were no shortcomings among the participants, and the



study was only conducted among public high schools in Bangkok, Thailand.

Data were collected from a survey with two sections of questionnaires. The first section, characteristics. covering demographic contained four items to analyse the background of the participants in terms of gender, age, class years and academic performance (GPA). The second section of the questionnaire was the SAS-SV Questionnaire containing 10 items to assess the level of smartphone addiction, but not to diagnose any mental disorder, based on Kwon, Kim, Cho and Yang in 2013.<sup>34</sup> The SAS-SV questionnaire was shown to be relatively valid and reliable, as the internal consistency was 0.91. Multiple studies have replicated the questionnaire in various countries including France, Italy, China and Thailand.<sup>16, 35-37</sup>

# RESULTS

The study sought to determine the relationships between general characteristics – age, gender, educational level, academic performance (GPA) – and smartphone addiction. Base on the results of the questionnaire survey, 52.1% of participating high school students had a smartphone addiction. Table 1 shows the general characteristics of the participants (N=420) and their addiction status by gender. Of the participants, 64.0% identified as female and 36.0% as male. The percentage of male students addicted to smartphones was higher for those aged 17 years old and more (58.8%). For females, the percentage was higher among those aged 16 years old (59.6%), although in terms of real numbers, there were more smartphone-addicted females aged 17 years old and older, than aged 15 and 16.

Students in grade 11, both male and female were more likely to be addicted to smartphones than those in grades 10 and 12 (Table 1). Interestingly, among male students, the real number of those with smartphone addiction and a GPA under 3.02 was higher than among male students with other GPA scores. Based on percentage, however, male students with a GPA 3.03–3.45 (60.0%) had the highest percentage of smartphone addiction. For females, the highest percentage of smartphone addiction was in females with a GPA of 3.46– 3.75 out of 4

Table 1 General Characteristics and Smartphone Addiction between Male and Female

	Ma	le (n=151)	Female (n=269)		
Characteristic	SmartphoneNon-SmartphoneAddictAddict		Smartphone Addict	Non-Smartphone Addict	
	n (%)	n (%)	n (%)	n (%)	
Age (Years)					
15	2 (12.5)	14 (87.5)	17 (44.7)	21 (55.3)	
16	25 (50.0)	25 (50.0)	53 (59.6)	36 (40.4)	
≥17	50 (58.8)	35 (41.2)	72 (50.7)	70 (49.3)	
<b>Educational Level</b>					
Grade10	17 (34.7)	32 (65.3)	46 (51.1)	44 (48.9)	
Grade11	35 (64.8)	19 (35.2)	49 (55.1)	40 (44.9)	
Grade12	25 (52.1)	23 (47.9)	47 (52.2)	43 (47.8)	
<b>Grade Point Average</b>					
$\leq 3.02(25 \text{ percentiles})$	31 (55.4)	25 (44.6)	24 (50.0)	24 (50.0)	
3.03 - 3.45	24 (60.0)	16 (40.0)	34 (54.8)	28 (45.2)	
(26-50 percentiles)					
3.46 - 3.75 (51-75	13 (41.9)	18 (58.1)	45 (56.3)	35 (43.8)	
percentiles)					



Characteristic	Male (n=151)		Female (n=269)		
	Smartphone Addict	one Non-Smartphone Smartphon Addict Addict		Non-Smartphone Addict	
	n (%)	n (%)	n (%)	n (%)	
>3.75 (>75 percentiles)	9 (37.5)	15 (62.5)	39 (49.4)	40 (50.6)	

Table 2 displays the association between age and smartphone addiction, with older students being more likely to have a smartphone addiction. Of students aged 15 years, 35.2% had a smartphone addiction, for 16-year-old, this was 56.1% and of students 17 years old and older, 53.7% had a smartphone addiction. Gender, educational level, and GPA appeared to have no association with smartphone addiction.

**Table 2** Association of Gender, Age, Education Level, and GPA and Smartphone Addiction (n=420)

Variables	Non- Smartphone	Smartphone Addict (%)	$\chi^2$	df	p-value
	Addict (%)				
Gender					
Male	74 (49.0)	77 (51.0)	0.13	1	0.724
Female	127 (47.2)	142 (52.8)			
Age (Years)					
15	35 (64.8)	19 (35.2)	7.34	2	0.026*
16	61 (43.9)	78 (56.1)			
≥17	105 (46.3)	122 (53.7)			
Educational Level					
Grade 10	76 (54.7)	63 (45.3)	5.09	2	0.079
Grade 11	59 (41.3)	84 (58.7)			
Grade 12	66 (47.8)	72 (52.2)			
Grade Point Average					
$\leq$ 3.02(25 percentiles)	49 (47.1)	55 (52.9)	2.20	3	0.532
3.03 – 3.45(26-50 percentiles)	44 (43.1)	58 (56.9)			
3.46 – 3.75 (51-75 percentiles)	53 (47.7)	58 (52.3)			
>3.75 (>75 percentiles)	55 (53.4)	48 (46.9)			

\* *p*-value < 0.05, if statistically significant at  $\alpha = 0.05$ 

\*\* *p*-value < 0.01, if statistically significant at  $\alpha = 0.01$ 

\*\*\* *p-value* < 0.001 if statistically significant at  $\alpha = 0.001$ 

#### DISCUSSION

The current study showed that the prevalence of smartphone addiction is more than 50% among both male and female high school students. This is in line with the increasing trend of smartphone addiction in high school students, as previous studies have found percentages ranging from 4.1% to 62.1%.<sup>10-12</sup>, <sup>18-28</sup> of from 21.3% to 62.6% in the past five years <sup>26-28</sup> The only significant association between any of the factors studied here and smartphone addiction was age. This is in line with research by Durak on adolescents in Turkey and by Sahin, Ozdemir, Unsal and Temiz on university students.<sup>29, 30</sup> These results may reflect diminishing parental monitoring as children get older.

Gender, educational level and GPA appeared to have no association with smartphone addiction,





which contrasts with many previous studies that found such an association. Junco and Cotten, for example, found a negative relationship between GPA and smartphone use of Facebook and text messaging during class or while doing homework.<sup>31</sup> Although, the results of this study do not support any significant association between GPA and smartphone addiction, it is worth noting that the real number of male students with a smartphone was higher among those with the lowest GPA.

# CONCLUSION

The current study found that more than half of the high school students from Bangkok, Thailand, who participated in this study were smartphone-addicted, both male and female. The only factor that had a significant association with smartphone addiction was age, and the percentage of older students with a smartphone addiction was higher.

# RECOMMENDATIONS

This study only investigated the prevalence of smartphone addiction and the association between smartphone addiction and gender, age, educational level and GPA among high school students in Bangkok, Thailand. Future studies should consider other potential factors such as socioeconomic variables, history of medical illness(es), sleep quality, physical health and meantal health, which might be associated with smartphone addiction.

The key players for high school students are parents, teachers, scholars, related agencies and policymakers, and these should get involved to educate and raise awareness among students about the dangers of excessive smartphone use and the rising trend of smartphone addiction. Schools could, for example, create a campaign to reduce the number of hours students spend on their smartphone, which could alter student behaviour, rather than simply prohibiting smartphones. The collaboration of parents and teachers will be important for students as they can monitor the hours of student smartphone use.

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#### PREVALENCE AND CORRELATE OF MENTAL HEALTH PROBLEMS AMONG VOCATIONAL SCHOOL STUDENTS IN BANGKOK, THAILAND

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### ABSTRACT

One in five adolescents have a mental disorder, and mental health has become a major burden of disease for adolescents globally. This study examined the prevalence of mental health problems and its associated factors among vocational students in Bangkok. It analyzed data from the 2019 round of the Bangkok Behavior Surveillance Survey (BBSS) with a total sample of 408 students from Year 2 vocational schools. Mental health problems were examined in terms of sadness, suicidal ideation, suicidal attempt, anxiety, and depression. Life time history of adverse childhood experiences (ACEs) was assessed by 11 questions. Bullying experience was examined by history of experience in both bully role and victim role in past 12 months. Multiple logistic regression was used to analyze the predictors of each mental health problem. About three-fourths of the participants reported at least one mental health problem. The most common problem was depression (56.6%) followed by anxiety (51.0%), sadness (38.5%), suicidal ideation (19.9%) and suicidal attempt (6.6%). Cases with parental separation, intimate partner violence and/or cyber victimization reported higher sadness symptoms. Emotional neglect, cyber victimization and school absence were associated with higher odds of suicidal ideation. Victims of bullying outside of the school, and those with a school absence in the previous 30 days reported more suicidal attempts. Physical victimization was associated with higher odds of anxiety. Those who had experienced physical neglect and childhood violence reported higher symptoms of depression. Individuals with at least four ACEs were at increased risk of suicidal attempt and symptoms of depression. Prevalence of mental health problems is high among the study group and these problems are correlated with a history of ACEs and experience of bullying. The findings suggest that prevention and intervention efforts could target ACEs and bully victims as a high-risk group.

Keywords: prevalence, mental health, ACEs, bullying, adolescent

#### **INTRODUCTION**

"No health without mental health" is a globallyaccepted core principle of mental health, and mental well-being is the fundamental component of WHO definition of health.<sup>1</sup> Adolescence is very fragile and critical time when individuals are experiencing developmental changes in physical, anatomical, and psycho-social area. It is important to promote a healthy adolescent life with complete physical, mental and social wellbeing.<sup>2,3</sup> One in five adolescents have a mental disorder each year, and depression and selfharm are common issues among them.<sup>2</sup> Mental health issues have become a major burden of disease for adolescents globally.<sup>2</sup> Mental





illness accounts for 16% of the global burden of disease and injury in persons age 10-19 years, and the third leading cause of death among 15-19 year-olds is suicide; depression is one of the leading causes of illness among adolescents.3,4 Studies among Asian and **ASEAN-member** countries (Cambodia, Indonesia, Malaysia, Myanmar, Thailand and Vietnam) found that prevalence of suicidal ideation and suicidal attempt is higher for Asian youths, with 11.7% and 2.4% respectively.<sup>5, 6</sup> Mental health outcomes depend on multiple factors including peer pressure, sexual identity, increased access to and use of technology, quality of home life, relationships with peers, violence and other socio-economic risk factors. Globally, depression is the 4<sup>th</sup> leading cause of illness and anxiety, and the 9th leading cause of illness among 15-19 year-old adolescents. Other adolescent mental health problems include emotional disorders. childhood behavioral disorders. eating disorders. psychosis, suicide. self-harm, and risk behaviors.<sup>3</sup> Mental health problems are associated with serious adverse impacts on individual and family life, and negative impacts education future and occupational on opportunities.7

traumatic ACEs negative events are experienced in childhood including experience of violence, abuse, neglect, witnessing violence at home and having a family member's death or attempted suicide.<sup>8</sup> Having had more ACEs is significantly associated with having more physical and mental health problems.<sup>9</sup> Mental health problems associated with these ACEs include anxiety, depression, post-traumatic stress disorder (PTSD), psychosis, and suicidal tendency.<sup>10</sup> Moreover, the more severe depression symptoms are associated with longer duration of exposure to adverse experiences in their childhood. Individuals experiencing adverse events during both childhood and adulthood were more likely to have depression symptoms compared to those experiencing adversity in either adulthood or childhood.11

Bullying is defined as a negative behavior which is repeatedly carried out by an individual or group with the intension to be harmful, and there is power imbalance between perpetrator and victim so that the victim cannot defend him/herself easily.<sup>12,13</sup> Bullying is common among both school-based adolescents and outof-school adolescents in different forms ranging from being verbally harassed or called names, to being pressured to do things, or being harassed threatened and about sexual orientation. Most researchers classify bullying into physical, verbal, social and cyber bullying.<sup>12,14</sup> Different mental health outcomes are associated with different involvement in bullying.<sup>15</sup> Some problems are associated with a specific role in bullying; victims tend to have more internalizing problems (depression and anxiety) and bullies are characterized by more externalizing problems (aggression, irritability).<sup>15</sup> **Bully-victims** have both internalizing and externalizing problems.<sup>15</sup>

Although Thai adolescents have faced mental health problems like depression and suicide, very few studies have been done on the related factors of these mental health problems. The objective of the current study is to assess the prevalence of mental health problems among Thai vocational students, and to examine the correlation of history of ACEs and experience of bullying with mental health problems. This study provides information on mental health support measures for adolescents, and the findings should be useful for policy makers to strengthen social protections for adolescents for better mental health outcomes.

# **METHODS**

### Design, Setting & Participants

This study analyzed the data from 2019 round of the Bangkok Behavior Surveillance Survey (BBSS) with the permission from the authorized person of this survey. BBSS is a web-based, cross-sectional, self-administered survey among adolescents from grade 9, grade 11 and year 2 of vocational schools in Bangkok, Thailand. The BBSS was conducted in 18


government vocational training schools under Office Vocational Education the of Commission (OVEC) in Bangkok. The original survey used probability proportion to size (PPS) sampling method. Sample size was calculated based on the prevalence of mental illness among adolescents which is 20% and the data of year 2 vocational school students were extracted from BBSS data-set and analysis was done with a total sample of 408 adolescents age 13-19 years. Students whose parents gave consent to participate in this study and who attended the classes at the day of data collection were involved in this study. Students with mental disorder and learning difficulties were excluded from this study.

Participation in this study was voluntary and parents and students were informed one month ahead by sending an informed-consent letter through teachers about this study. On the day of data collection, special tokens were distributed to participants to gain access to the survey web site and complete survey by using school computers. The students were not under the supervision of teachers while answering the questionnaire to protect their privacy. The researcher checked the completeness of the survey at the end of each day. The data collection was done from October 2019 to February 2020 by trained data assistants. This survey was conducted with the approval number 2019/059.1503 from the Mahidol University Social Science Independent Review Board (MUSSIRB).

### **Definitions and Measurements**

Mental health problems were assessed in terms of anxiety, depression, sadness, suicidal ideation, and suicidal attempt. Anxiety and depression were measured by using the Hopkins Symptom Checklist – 25 items (HSCL-25) scale which is commonly used for common mental health disorders in populationlevel studies.<sup>16,17</sup> There are 10 questions for anxiety and 15 questions for depression, and response options use a Likert-type scale: 1=Not at all, 2=A little, 3=Quite a bit and 4=Extremely. The threshold for the average anxiety and depression scores was 1.75.<sup>16,17</sup> The reliability score of HSCL-25 for this study was 0.97. Sadness refers to feeling sad or hopeless almost every day for two weeks, and suicidal ideation and suicidal attempt were measured for the past 12 months.

ACEs were measured by using an 11-item scale covering the following events before the age of 18 years: (1) physical abuse; (2) unwanted sexual touching of oneself; (3) unwanted sexual touching of another; (4) forced sex; (5) psychological/emotional abuse; (6) living with an adult who was depressed, mentally ill or suicidal; (7) living with anyone who was a problem drinker or alcoholic; (8) living with a drug user or abuser; (9) living with someone who had been incarcerated or jailed; (10) having parents who are separated or divorced and (11) living in a home where adults physically harm each other.<sup>18</sup> Response to each item was dichotomized as yes/no, and a total ACEs score was calculated by summation of 11 ACE items to represent the cumulative history of ACEs in their life time. The cumulative ACEs score was categorized into No ACEs (0), Low ACEs (1-3) and Multiple ACEs (4-11) based on the setting from previous research.<sup>19</sup> The reliability score of the ACEs 11-item scale in this study was 0.72.

Experience of bullying has been assessed for bully/perpetrator role with two questions, and the victim role with two questions. Bully experience refers to bullying at or outside of school, while victimization experience applies and to both physical cyber bullying victimization. Response options to all of these questions are dichotomized with yes/no. If they answered "yes", question about how may frequency within past 12 months were followed. The questions from BBSS survey applied the standard questions of "Youth risk behavior survey (YRBS)" from CDC.<sup>20</sup>

Regarding the validity and reliability of the questionnaires, in 2007, 20012 and 2017 three experts reviewed existing empiric literature to assess cognitive and situational factors that



might affect the validity of adolescent selfreporting of behaviors measured by the BBSS questionnaire. BBSS has conducted two testretest reliability studies of the BBSS questionnaire, one in 2002 and one in 2017. Approximately three fourths of the questions were rated as having a substantial or higher reliability (kappa = 61%-100%).

#### Statistical analysis

Descriptive statistical analysis was used to present the prevalence of mental health problems, individual and cumulative ACEs, experience of bullying, and socio-demographic characteristics of the respondents. Association between experiences of ACEs, experience of bullying, socio-demographic characteristics and each mental health outcomes are described using odd ratios (COR) and 95% CI by using binary logistic regression. No experience on ACEs and bullying were set as reference for analysis. The prediction effect of independent variables was analyzed by multiple logistic regression and described with adjusted odd ratios (AORs) and 95% CI by adjusting for socio-demographic characteristics. An association considered statistically is significant with a p value <0.05 for all variables.

### RESULTS



Figure 1 Prevalence of mental health problems

**Remark:** Depression was measured on a 15-item scale with response ranging from 1 to 4, and anxiety was measured on a 10-item scale with response ranging from 1 to 4. Feeling of sadness, suicidal ideation and suicidal attempt were measured for occurence in the past 12 months.

Figure 1 presents the prevalence of mental health problems among this sample of adolescent vocational school students in Bangkok. Depression was the most common condition (56.6%), while suicidal attempt was least common (6.6%). About three-fourths of the sample reported at least one mental health problem which means that mental health is one of the major challenges for adolescents.



#### Table 1 General characteristics of the respondents

Socio-demographic Characteristics	Respondents	(n = 408)
	n	%
Living with Parents		
With Parents	315	77.2
With others	93	22.8
Sex		
Male	192	47.1
Female	216	52.9
School absence		
Yes	23	5.6
No	385	94.4
Partner Status		
Currently with partner	199	48.8
Currently with no partner	209	51.2
Bullies experience (answer =yes)		
At School	22	5.4
Out of school	31	7.6
Physical Victimization	40	9.8
Cyber Victimization	46	11.3
History of ACEs (answer =yes)		
Emotional abuse	74	18.1
Physical abuse	34	8.3
Sexual abuse	42	10.3
Emotional neglect	65	15.9
Physical neglect	35	8.6
Parental separation/divorce	100	24.5
Child violence	41	10.0
Parental violence	86	21.1
Alcohol and drug abuse in home	77	18.9
Household mental illness	38	9.3
Member of household ever incarcerated	54	13.2
ACEs Score		
0	214	52.5
1	54	13.2
2	36	8.8
3	26	6.4
4-11	78	19.1

Table 1 shows the socio-demographic characteristics of the respondents. About half of the respondents were female (52.9%) and most of the respondents were staying together with their parents (77.2%). Nearly fifty percentage of the students in this study had partners and only 5.6% had school absence within past 30 days. Among individual ACEs factors, parental separation/divorce was the most common form (24.5%) and physical abuse was the least common form (8.3%). Nearly half of the respondents had experienced at least one ACE in their life-time and 19.1% had history of multiple ACEs (i.e., at least 4 ACEs). Few of them had experienced bullying in past 12 months. Among bullying



experiences, the most common type was cyber bullying victimization (11.3%) and least common form was bullying others at school (5.4%).

Independent	Sadness	Suicide ideation	Suicide attempt	Anxiety	Depression
Variables —	COR	COR	COR	COR	COR
	(95% CI)	(95% CI)	(95% CI)	(95% CI)	(95% CI)
		· · · ·	. ,	· · ·	
Socio-demographic cha	racteristics				
Female (Ref=male)	1.64*	4.73***	1.84	1.16	1.07
	(1.09-2.46)	(2.62-8.53)	(0.81 - 4.21)	(0.79 - 1.71)	(0.72 - 1.58)
Living with others	1.27	1.97*	2.5*	1.22	1.53
(Ref=parent)	(0.79-2.04)	(1.15-3.37)	(1.12-5.61)	(0.76 - 1.94)	(0.94-2.41)
With intimate	1.36	1.49	1.33	1.57*	1.51*
partner (Ref=no)	(0.91 - 2.03)	(0.91-2.44)	(0.61-2.93)	(1.06-2.33)	(1.02-2.24)
School Absence	1.5	4.99***	10.27***	1.53	2.26
(Ref=no absence)	(0.64 - 3.48)	(2.11 - 11.79)	(3.87-27.21)	(0.64 - 3.62)	(0.87 - 5.86)
History of individual AC	CEs (Ref=no expe	erience)			
Emotional abuse	2.49***	2.33**	2.91*	1.74*	2.82***
	(1.49-4.17)	(1.32-4.10)	(1.27-6.65)	(1.04-2.91)	(1.59-5.01)
Physical abuse	1.46	2.41*	2.03	1.61	2.67*
-	(0.72 - 2.97)	(1.13-5.10)	(0.66-6.27)	(0.78 - 3.32)	(1.18-6.07)
Sexual abuse	1.09	1.29	4.29**	1.47	2.33*
	(0.57-2.10)	(0.61-2.76)	(1.75-10.54)	(0.76-2.81)	(1.14-4.79)
Emotional neglect	2.45**	3.2***	3.48**	1.32	2.7**
8	(1.43-4.20)	(1.80-5.69)	(1.51 - 8.01)	(0.77 - 2.26)	(1.48 - 4.95)
Physical neglect	1.57	1.7	1.96	1.7	5.13**
	(0.78 - 3.15)	(0.78 - 3.70)	(0.63 - 6.03)	(0.83 - 3.47)	(1.94 - 13.52)
Parental separation	2.75***	1.61	2.66*	1.53	2.56***
•	(1.73 - 4.37)	(0.94-2.75)	(1.20-5.90)	(0.97 - 2.42)	(1.56-4.21)
Child violence	1.99*	1.55	2.82*	1.98*	5.08***
	(1.03-3.81)	(0.74 - 3.25)	(1.06-7.46)	(1.00-3.90)	(2.09-12.39)
Intimate partner	2.46***	1.8*	2.8*	1.62*	2.7***
violence	(1.52-4.00)	(1.03-3.12)	(1.25-6.29)	(1.00-2.64)	(1.58-4.59)
Household drug use	2.11**	1.84*	2.3	1.19	1.25
5	(1.27 - 3.48)	(1.04-3.25)	(0.99-5.34)	(0.72 - 1.96)	(0.75 - 2.07)
Household mental	1.49	2.3*	4.92**	1.53	3.15**
problem	(0.76 - 2.92)	(1.12 - 4.74)	(1.99-12.1)	(0.77 - 3.03)	(1.40-7.06)
Incarcerated	1.32	1.33	1.98	1.92*	1.23
household member	(0.74 - 2.37)	(0.67 - 2.62)	(0.76-5.15)	(1.06-3.49)	(0.68-2.22)
Bullies Experience (Ref	=no experience)	. ,			
Bullied at school	0.9	0.89	0(0)	0.95	0.62
	(0.37 - 2.21)	(0.29-2.71)		(0.40 - 2.26)	(0.26 - 1.47)
Bullied out of school	1.78	2.41*	4.06**	1.57	1.67
	(0.85 - 3.72)	(1.10-5.26)	(1.50-10.99)	(0.74 - 3.33)	(0.76 - 3.64)
Physical	1.88	3.1**	5.64***	2.43*	2.16*
victimization	(0.97 - 3.63)	(1.56-6.17)	(2.34-13.61)	(1.20-4.93)	(1.05-4.46)
Cyber victimization	2.07*	4.22***	4.64**	1.57	1.35
-	(1.11-3.85)	(2.22-8.04)	(1.94-11.08)	(0.84-2.94)	(0.71-2.54)



Independent	Sadness	Suicide ideation	Suicide attempt	Anxiety	Depression	
Variables -	COR	COR	COR	COR	COR	
	(95% CI)	(95% CI)	(95% CI)	(95% CI)	(95% CI)	
History of cumulative	ACEs					
No ACEs (0 score)	1	1	1	1	1	
Low ACEs (1-3)	1.37(0.85-2.20)	1.91*	3.09	1.04	1.86**	
		(1.06-3.46)	(0.98-9.69)	(0.66-1.64)	(1.17-2.95)	
Multiple ACEs (≥4)	3.4***	3.51***	9.14***	2.11**	3.54***	
	(1.98-5.82)	(1.90-6.49)	(3.17-26.36)	(1.23-3.62)	(1.97-6.33)	
<i>Remark:</i> ***p<.	001; **p<.01; *p<	.05				

Table 2 represents the association between socio-demographic characters, ACEs and bullying with each mental health problem. Females were significantly more likely to have sadness (COR 1.64, 95%CI 1.09,2.46) and suicidal ideation (COR 4.38, 95% CI 2.37,8.09) compared to males. Respondents who had an intimate partner were at higher risk of having anxiety (COR 1.59, 95% CI 1.07,2.36) and depression (COR 1.51, 95%CI 1.02,2.24). School absence in the past 30 days was associated with higher odds for suicidal ideation (COR 3.52, 95% CI 1.32,9.34) and suicidal attempt (COR 6.74, 95% CI 2.13,21.30). Those who were not currently staying with their parents had increased likelihood of suicidal ideation (COR 1.97, 95%CI 1.15,3.37) and suicidal attempt (COR 2.5, 95%CI 1.12,5.61).

Independent variables	Sadness	Suicide ideation	Suicide attempt	Anxiety	Depression
	AOR (95% CI)	AOR (95% CI)	AOR (95% CI)	AOR (95% CI)	AOR (95% CI)
History of individual ACEs (Ref=no e	experience)				
Emotional neglect		2.77** (1.49-5.18)			
Physical neglect					3.09* (1.04-9.15)
Parental separation	2.25** (1.35-3.74)				· · · · ·
Child violence	(100 011)				3.19* (1.08-9.43)
Intimate partner violence	1.73* (1.01-2.96)				0.39*
Incarcerated household	(1.01 2.90)				$0.43^{*}$
Bullies experiences (Ref=no experien	ce)				(0.20-0.94)
Bully out of school	,		4.97*		
Physical victimization			(1.38-17.88) 3.16* (1.13-8.87)	2.48* (1.21-5.05)	
Cyber victimization	2.07* (1.09-3.92)	3.18** (1.56-6.49)	. ,	× ,	

Table3 Prediction of ACEs, bullying experiences on mental health problems



Independent variables	Sadness	Suicide ideation	Suicide attempt	Anxiety	Depression
	AOR (95% CI)	AOR (95% CI)	AOR (95% CI)	AOR (95% CI)	AOR (95% CI)
Cumulative ACEs (Ref=0 ACE)					
1-3 ACEs				2.46**	
				(1.45 - 4.17)	
$\geq 4$ ACEs		6.18**		4.57**	
		(1.99-19.14)		(1.68-12.46)	
Socio-demographic characters					
Female (Ref=male)		4.38***			
		(2.37 - 8.09)			
With partner (Ref=no partner)				1.59*	
				(1.07-2.36)	
School Absence (Ref=no absence)		3.52*	6.74**		
		(1.32-9.34)	(2.13-21.30)		

*Remark:* \*\*\*p<.001; \*\*p<.01; \*p<.05

Table 3 shows the results of regression model estimating odds of mental health problems by each ACEs and each bullying experience. In the adjusted model, significant predictors of sadness were history of parental separation (AOR 2.25, 95% CI 1.35,3.74), history of intimate partner violence (AOR 1.73, 95% CI 1.01,2.96) and cyberbullying victimization (AOR 2.07, 95% CI 1.09, 3.92). Higher risk of suicidal ideation was significantly associated with history of emotional neglect (AOR 2.77, 95% 1.49,5.18) and cyberbullying CI victimization (AOR 3.18, 95% CI 1.56,6.49). Higher odds of suicidal attempt were correlated with bullying outside of the school (AOR 4.97, 95% CI 1.38,17.88) and physical bullying victimization (AOR 3.16, 95% CI 1.13,8.87) and history of 4 or more ACEs (AOR 6.18, 95%CI 1.99,19.14). Higher risk of anxiety was associated with physical bullying victimization (AOR 2.48, 95% CI 1.21, 5.05). Higher odds of depression was significantly linked with history of physical neglect (AOR 3.09, 95% CI 1.04,9.15), history of childhood violence (AOR 3.19, 95% CI 1.08,9.43), history of 1-2 ACEs (AOR 2.46, 95%CI 1.45, 4.17) and history of 4 or more ACEs (AOR 4.57, 95%CI 1.68-12.46).

## DISCUSSION

The mean age of the study population is 16 years which fits with the objective of the study of exploring mental health problems among adolescents, and it is also consistent with the standard age and level of vocational education grades from the Thai Ministry of Education.<sup>21</sup> The study population is comprised of 47.1% males and 52.9% females, which is a bit unusual given the convention belief that male students are tracked to vocational education more than females.<sup>22</sup> This may reflect improved gender equality in the Thai labor force.

Among ACEs factors, emotional abuse is more common (18.1%) compared to physical abuse (8.3%) and sexual abuse (10.3%). It is generally accepted that it is easier to abuse someone emotionally than physically/sexually. Emotional neglect is more common than physical neglect. History of parental separation or divorce was reported by 24.5% of the sample, which is lower than the divorce rate of Thailand (39%) according to an article in the newspaper.<sup>23</sup> Bangkok Post Elsewhere, parental separation or divorce is one of the most common forms of ACEs<sup>24</sup> and, in the current study, prevalence of parental divorce is higher than other forms of ACEs. Intimate-partner



violence (21.1%) is the most common among the family issues domain. Domestic violence against Thai women is common, and one study found that 16% of Thai women had a history of suffering from domestic violence in psychological, physical, sexual forms, and a majority of cases reported repeat episodes. Half of the domestic abuse victims reported that their children had witnessed the violence.<sup>25</sup> Household drug use is the second most common form of adverse family experience. There are 1.2 million drug addicts in Thailand which is 2.0% of the population and the highest prevalence in Southeast Asia.<sup>26</sup> According to a 2018 report on the drug situation in Thailand, persons age 20-24 years and employed had the highest percentage of drug addiction. These drug use problems impact on the family situation, and children are adversely affected by family dysfunction. There is a high level of overlap between domestic violence and physical abuse (39.4%) which is consistent with 30-60% in another study on a child's witnessing adult domestic violence.<sup>27</sup> Nearly 50% of the study population had at least one ACE, and that is consistent with international ACE studies.<sup>28</sup>

The prevalence of both bullying and victimization from the current study is lower than 2019 UNICEF data on bullying among youths aged 13-15 years which reported 33% prevalence for Thailand.<sup>29</sup> However, the difference is that UNICEF data combined different sources of data, including the Health Behavior in School-aged children (HBSC) 2009/2010 and 2013/2014 and Global Schoolbased Student Health Survey (GSHS) 2003-2017. The current study is focused on a small sample population for only Year 2 vocational students. Moreover, the age of the target group of 13-15 years for HBSC and GSHS surveys is younger compared to the mean age of 16 years in this study. Thirdly, the current study is focused on mental health problems generally, while the HBSC and GSHS surveys focused narrowly on bullying.

In this sample, the prevalence of anxiety (51%)and depression (56.6%) is three times higher than found in other studies among adolescents in Thailand, namely, 16% for severe anxiety and 18% for depression.<sup>30</sup> Although age of the study population is same for the two studies, the assessment tools for anxiety and depression are different. The current study used the Hopkins Symptom Checklist-25 (HSCL-25) while the previous study used the Thai Hospital Anxiety and Depression Scale (Thai HADS). But this finding on higher prevalence of anxiety and depression in vocational student groups compared to general population is consistent with the finding on the study of prevalence on mental health problems among vocational students in China.<sup>31</sup> Suicidal ideation during the past 12 months in this sample was reported by 19.9% which is higher than self-harm or suicidal ideation (15.8%) among posttrafficked adolescents in Thailand, Cambodia and Vietnam.<sup>32</sup> The difference may be due to the different duration of suicidal ideation. The current study asked about suicidal ideation within the past 12 months while the previous study measured suicidal ideation within one month prior to the study. Other emotional distress conditions, such as sadness, was reported by 38.5% which is consistent with a previous study among college students in the USA who experienced bullying victimization at their schools (37.9%).<sup>33</sup> Among this sample of vocational students, 77.2% have either one or more mental health problems which indicates that mental health is a major challenge for these youth, and specific measures for prevention and response to these problems should be considered.

One of the key findings from this study is that increased number of ACEs experiences are significantly associated with higher odds of mental health problems. That supports the finding from other studies that the cumulative number of ACEs is associated with increased mental health problems.<sup>9,10,34,35</sup> So, adolescents who have history of ACEs should be considered as high-risk group of mental illnesses. Physical bullying victimization is



significantly associated with higher odds of anxiety and depression which is consistent with the previous findings on that bullied victims have more internalizing symptoms of anxiety depression.<sup>36-38</sup> and Cyberbullying victimization is associated with sadness, and suicidal ideation and bullying outside of the school are associated with increased likelihood of suicidal attempt. This association between experience of bullving with suicidal ideation is consistent with the findings from previous studies that bullied victims showed more suicidal ideation and suicidal attempts regardless of type of bullying.<sup>32,39-41</sup> This key finding on that bullying expereience is also a significant risk factors of mental health problems could be applied that mental health services should be included for the care of bullied victims.

This study found that the significant association of individual ACEs with different mental health problems; emotional neglect with suicidal ideation, physical neglect and child violence with depression, parental separation and intimate partner violence with sadness. Moreover, it was found that total ACE scores of 1-2 is significantly associated with increased odds of depression and ACE scores of 4 or more with higher odds of suicidal attempt and depression. Another key finding from this study is that bullying experience is a significant predicator of mental health problems; bully out of school as a predictor of suicidal attempt, physical victimization as a predictor of suicidal attempt and anxiety, cyber victimization as a predictor of sadness and suicidal ideation. This study could prove that association between history of ACEs and experiences of bullying with mental health problems are strong and significant. This could help for future researches to understand the significant predictors of mental health problems among adolescents.

Findings from this study may have limitations since self-report survey methods could be potentially affected by a number of biases. The question on ACEs referred to lifetime experience, and that may introduce recall bias or under-rerpoting.<sup>42</sup> Since the study design is cross-sectional, we cannot explore the causeeffect relationship among ACES, experience of bulling and mental health outcomes. The data are quantitative and do not provide in-depth information to explore the nuances of different mental health conditions. The findings are almost certainly not representative of the national situation since the study population is vocational school students in Bangkok.

## CONCLUSION

The main finding from the current study is that the prevalence of mental health problems is high among Year 2 vocational school students in Bangkok. We need to develop regular screening for mental health problems among students and counselling services should be provided at schools to reduce these problems. We found out that history of ACEs and experience of bullying are significant risk factors of these mental health problems. Understanding the factors that contribute to the high prevalence of mental health problems are critical to guide prevention efforts. Integration of trauma-informed intervensions into education system should be considered. Parents and care givers should be targeted for education program on ACEs and counselling services for experiences adverse family should be developed. Proper policies and procedures for addressing bullying incidences should be reinforced. In conclusion, ACEs and bullying are well-established risk factors of poor mental health among adolescents. Therefore, programs to help adolescents cope with ACEs and bullying should be considered as important and urgent for restoring and maintaining the mental health of adolescents.

## RECOMMENDATIONS

The prevalence of mental health problems are high in this respondent group and programs for mental health awareness should be strengthened by improving awarenss on mental health among adolescents and integration of



mental health services into existing adolescent health programs. Since ACEs are the significant risk factors of mental health, prevention and response programs to combat ACEs at the family level should be considered. Another risk factor of ACEs is bullying experience and specific measures for reporting of bullying incidences and proper response for these issues should be strengthened. Specific guidelines and operating procedures should be developed for reporting mechanism or pathways to ensure the safety of the victims e.g. Speaking up services for bullying at schools would like to be recommended. Coordination and collaboration between different stakeholders, students, parents, teachers and school administrators are strongly recommended.

Mental health problems are broad and we need to determine other predisposing factors of mental health in further studies. Moreover, indepth information on how these predisposing factors affect mental health should be explored with qualitative research in the future. This will provide more insightful information on mental health programs for adolescents.

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## MENTAL HEALTH AND EMPLOYMENT STATUS: EVIDENCE FROM THAILAND

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## ABSTRACT

Mental health and mental disorder are significantly considered to be worldwide issue nowadays such as depression and suicidal. Moreover, the problem of employment is still occurred as aspect of unemployment or employment status issue in that people who work in each economic sector. The objective of the study was to assess the impact of employment status on mental health and to investigate the relationship between personal characteristics and mental health in Thailand. A crosssectional data, 2014 Thailand survey on conditions of society, and culture and mental health (Thai happiness) from the National Statistical Office Thailand, is used for the study, including 9,260 who are not working (28.09%), 11,039 agricultural workers (33.48%), 2,332 industrial workers (7.07%) and 10,339 service workforces (31.36%). For the mental health state was measured using the Thai Mental Health Indicator (TMHI) of the SF-15, including good mental health state, normal mental health state and poor mental health state. Descriptive statistics analysis was used to describe the baseline characteristics of samples and ordered logistic regressions were used to determine level of mental health state for people in each employment status. Thereafter, marginal effects were computed to obtain the effect of each employment status, socioeconomic-demographic and community characteristics variable on the probability of mental health state. The significance of variables was tested at P-value of 95 percent class interval. The result revealed that majority, participants were normal mental health state (56.6%), female (59.2%), aged over 40 years (72.17%), married (67.9%) and lived in urban area (54.6%). There were negatively significant association between "not working" employment stage and mental health state and also the same association in "agricultural" sector subsequently, in case of employment status. Additionally, being females, being head of household and insufficient income also had statistically significant negative correlation to mental health state in Thai people. Regarding the study results, agricultural sector is the major employment sector in Thailand, encouraging from Thai government especially agricultural activities could partially improve mental health of Thai people. Also, Thai government should consider in term of cost of living that effect on mental health state across by perception of affordable in income.

Keyword: mental health, employment status, Thailand

### **INTRODUCTION**

Health, the important element of life, in which about the definition of health from World Health Organization (WHO) has defined the meaning of health in the constitution of the World Health Organization in 1948 as follows: "Health means the state of physical and mental integrity including living in a normal society and does not mean only the absence of disease and disability". Later, at the general assembly of WHO, in May 1998, a resolution was passed to add the term spiritual well-being or spiritual health in the definition of "Health".<sup>1</sup>

Mental health problem can also lead to mental disorder such as depression, bipolar disorder, schizophrenia and other psychoses, dementia,



and developmental disorders including autism (WHO,2019).<sup>2</sup> Furthermore, people with a diagnosed mental health problem have been found to be at a higher risk of suicidal thoughts and behavior (Mental Health Foundation, 2019).<sup>3</sup> With the situation of mental health problems occurring at the national and global levels, there is some increasing rate of suicidal rate to total population overtime.<sup>4</sup>

In terms of Thailand, from 2019 Cigna 360 Well-Being Survey", an annual survey was made to study people's perceptions and attitudes about health and well-being from Cigna Corporation (a global health services company). It found that Thailand ranks in the 5<sup>th</sup> among the country with the highest number of people under stress internationally, equal to 91% of Thai population, which is higher than the average level (84%) (including the sample of 23 countries in all regions around the world).<sup>5</sup> Also, from the 2015 Thai mental health survey, the Department of Mental Health revealed that the main factors that affect mental health include gender, marital status, and employment status. The employment status situation is therefore an issue of interest in this research.

With the problem of mental health and employment, many empirical studies have examined the association between mental health and employment. In 2000, Flatua, Galea and Petridis documented a negative correlation between mental health and being unemployment, finding that unemployed persons showed the poorer mental health than full-time employed in Australia.<sup>6</sup> More recent evidence from Rosenthal et al. (2012) reveals that, within New Haven, USA, those full time showed the lowest level of stress and depression comparing with those employed part-time and unemployed.<sup>7</sup> In Canadian study, M. Perreault et al. (2017) found that significantly employment status affects depression among those under 45 years old, that means having full-time employment reduces depression and distress comparing to those who are unemployed.8 And in case of Canada, study by Torre et al. (2018) was revealed that Major Depressive Disorder state (MDD) has more prevalent for those unemployed, retired, pre-retired or unable to work comparing to those who are employed.<sup>9</sup>

For Thailand studies, there is no study in Thailand that investigates the association between mental health and employment status by using employment category by sector like what this research attempt to do. And according to studies in Thailand context that researcher had reviewed, there were not any studies utilized the data surveys from the National Statistics Officer (NSO), which are the national representative observation of Thai people.

With mental health the situation and employment problems occurring in internationally and Thailand, the researcher would like to explore the relationship between employment status and mental health in Thailand. By this research's primary focus is investigating the link between mental health and employment status in Thailand and secondly, investigating the relationship between personal characteristics and mental health in Thailand.

## **METHODS**

### Research design

A cross sectional descriptive survey, from the 2014 survey on Conditions of Society, Culture and Mental Health (Thai happiness) which prepared by the National Statistical Office of Thailand. The survey utilized stratified twostage sampling method, in which all the provinces are the stratum, hence in total there are 77 stratums. For each stratum except Bangkok, the sub stratum was created which are municipality and non – municipality area. The enumeration area (EA) is the primary sampling, and those secondary sampling is household level. For the secondary sampling, the size of sample in sub stratum of municipality area is 16 households per EA, and non-municipality area is 12 households per EA.



Then the representative households were selected randomly.

#### Population, sample and sampling

This study used nationally representative condition of society, culture and mental health (Thai happiness) 2014, which is the 7<sup>th</sup> version conducted quadrennially by National Statistical Office. The survey was conducted August in 2014. The aim of this survey is to be gathering the state of Thai society in terms of behavior, social value, cultural and mental health. There are total of 27,960 households across the regions, when omitted missing variables, the total number of respondents are 75560, excluding all the respondents with age less than 15 years old because they didn't answer in mental health questions. So, the total sample size is reduced to 32,790 participants.

#### Measurement

#### Dependent variable

Mental health state is dependent variable was considered in this research, Thailand Mental Health Indicator (TMHI-15) version 2007 is the questionnaire which researcher utilizes for measured mental health state in the study, this questionnaire is constructed by Mongkol, et.al. (2007) under the Department of Mental health, Ministry of Public Health, Thailand, to assess a person's mental health state, that developed from the framework of the definition of mental health, the components of mental health

 Table 1 Detail of Dependent Variables

(Domain: Mental state, Mental capacity, Mental quality, Supporting factors) and subelements of mental health (Subdomain). The reliability of the questions reported according to each domain are 0.86, 0.83, 0.77, 0.80 respectively and the whole reliability of this indicator was 0.70.10 Which the results will be the norm of the study group as standard by categorized in 3 state included: good mental health state (better than normal people), normal mental health state (equal to normal people) and poor mental health state (worse than normal people). The questionnaire consists of 15 questions, the questions ask to investigate yourself and assess your situation, symptoms, opinions, and feelings in which a person experiences in the past 1 month to the present for each question. For each question a person can answer, if be 0 if it does not apply at all, 1 if it applies a little, 2 if it applies a lot and be 3 if it extremely applies. Thus, for each question the point can range from 0 to 3. For 15 questions, the total points can range between 0 to 45 scores. Poor mental health state ranging from 0 to 26, normal mental health state ranging from 27 to 34 and good mental health state ranging from 35 to 45.

Table1 shows the detail of dependent variables used in this study, to present the name and descriptive of each state of dependent variable. In the event that participants have the poor mental health score, they may help themself first by requesting consultation services from public health facilities near your home (department of mental health, 2009)

Variable	Name	Description
Mental Health (MH)	=3 if be Good mental health state	With scores in the range 35-45 from answering the TMHI-15 questionnaires
	=2 if be Normal mental health state	With scores in the range 27-34 from answering the TMHI-15 questionnaires
	=1 if be Poor mental health state	With scores in 26 or below from answering the TMHI-15 questionnaires



#### Independent variable

Employment status is the main independent variable was considered in this research, by categorized with economic sector criteria that the classification of employment by type of labor used in their career function and production. The employment by sector help to show the contribution of job creation of each sector to gross employment in each economy (Thailand A labour market profile, 2013). The classification for employment by sector divides employment into three broad group of economic activity included agriculture sector, industry sector and services sector, the sectoral information is particular meaningful for identify the broad changes in employment and levels of developing in each nation (International labour office, 2016)

Other independent variables included: age, gender, marital status, education level, living region, head of household status and the type of living site, perception of income, self-esteem state and social interaction state.

#### Data analysis

Descriptive statistic includes frequency tables with percentages. Ordered logit regression to analyze the effect of each factor on this outcome.

#### Model

$$\begin{split} MH^* &= \beta_0 + \beta_1 Notworking + \beta_2 Agri + \beta_3 Serivices + \beta_4 Age2239 + \beta_5 Age4059 \\ &+ \beta_6 Age60above + \beta_7 Male + \beta_8 MAarried + \beta_9 Widowed + \beta_{10} Divorced \\ &+ \beta_{11} Othermari + \beta_{12} Sch_{witho_{deg}} + \beta_{13} Bachelorabove + \beta_{14} Central \\ &+ \beta_{15} North + \beta_{16} Northeast + \beta_{17} South + \beta_{18} Headhouse + \beta_{19} Insuffi \\ &+ \beta_{20} Slight_{suffi} + \beta_{21} Suffi + \beta_{22} Slightsoc + \beta_{23} Socin + \beta_{24} VerySoc \\ &+ \beta_{25} Slightself + \beta_{26} Selfes + \beta_{27} Veryself + \beta_{28} Urban + \varepsilon_i \end{split}$$

MH\* is a latent index which assume to have linear function with parameters and is a function of many observed explanatory variables as well as the error term,  $\varepsilon$ . The research observes mental health state, MH, which is an ordered categorial variable.

For MH defined Mental Health, this research used ordered logit regression to analyze the effect of each factor on this outcome.

For the data analysis of MH, the model should be represented like this:

MH\* = 1  $\rightarrow$  poor mental health state = 2  $\rightarrow$  normal mental health state = 3  $\rightarrow$  good mental health state

Assuming that the error term has logistic distribution, the following probability expressions can be obtained:

$$\begin{aligned} \Pr(\mathbf{Y}_{i}=1) &= \frac{e^{\left(C_{1} - \left(\beta_{1} X_{1i} + \dots + \beta_{k} X_{ki}\right)\right)}}{1 + e^{\left(C_{1} - \left(\beta_{1} X_{1i} + \dots + \beta_{k} X_{ki}\right)\right)}} \\ \Pr(\mathbf{Y}_{i}=2) &= \frac{e^{\left(C_{2} - \left(\beta_{1} X_{1i} + \dots + \beta_{k} X_{ki}\right)\right)}}{1 + e^{\left(C_{2} - \left(\beta_{1} X_{1i} + \dots + \beta_{k} X_{ki}\right)\right)}} - \frac{e^{\left(C_{1} - \left(\beta_{1} X_{1i} + \dots + \beta_{k} X_{ki}\right)\right)}}{1 + e^{\left(C_{1} - \left(\beta_{1} X_{1i} + \dots + \beta_{k} X_{ki}\right)\right)}} \end{aligned}$$



$$\Pr(\mathbf{Y}_{i}=3) = 1 - \frac{e^{\left(c_{3}-(\beta_{1}x_{1i}+...+\beta_{k}x_{ki})\right)}}{1+e^{\left(c_{3}-(\beta_{1}x_{1i}+...+\beta_{k}x_{ki})\right)}}$$

Where  $c_1$ ,  $c_2$  and  $c_3$  are the cutoff points that will be estimated along with the coefficients

These probabilities' expressions will be used to form likelihood function, which later be maximized to get the coefficient estimates. For the sign of coefficient shows the direction of marginal effect for the highest category whereas the direction of the marginal effect of the lowest category will be opposite from the sign of the coefficient, Once the coefficient estimates were obtained and the best specification chosen, the marginal effect was calculated to investigate the effect of explanatory variables on the probability of mental health

Marginal effect is defined as  $\partial \Pr(Y=j)/\partial X_k$  when X is continuous variable and  $\Pr(Y=j | X=1) - \Pr(Y=j | X=0)$  for X that is dummy variable.

### RESULTS

#### Personal characteristic of participants

Table 2 shows summary statistics for the total sample. For the sample, the mean of three categories of mental health state shows most of participants fell into the second category: normal mental health state (56.6%). Also, the smallest group of people are found to have poor mental health state at only 7.1%. There are 36.2% of people who had good mental health state than normal people.

The mean for four categories of employment status shows that most people most of sample were in agricultural sector (33.5%). Also, the smallest group of people are employed in industrial sector at 7.1%. There are 28.1% of the people who are not working. Furthermore, 31.4% of the sample are employed in the service sector.

Most participants is female (59.2%), that aged over 40 years old (72.17%), the majority of them are married (67.90%), for educational level 85.8% of them are school without bachelor's degree, have perception on their income is sufficient (47.1%) and living urban area (54.56%).

And in term of mechanism that transmit the effect of employment to mental health state, the majority self-esteem level of participants was moderate self-esteem (73.62%) and also the most state of social interaction of samples was moderate social interaction (69.61%)

Variables characteristics	n	%	
Mental health state			
Poor mental health	2,349	7.12	
Normal mental health	18,675	56.64	
Good mental health	11,946	36.23	
Employment status			
Not working	9,260	28.09	
Agricultural sector	11,039	33.48	
Industrial sector	2,332	7.07	
Services sector	10,339	31.36	

**Table 2** Frequency, Percentage of each variable characteristics (n=32,970)



Variables characteristics	n	%
Age group		
15-21	2,721	8.25
22-39	6,453	19.57
40-59	14,893	45.17
≥60	8,903	27.00
Gender		
Male	13,445	40.78
Female	19,525	59.22
Marital status		
Singled	4,901	14.87
Married	22,382	67.89
Widowed	4,049	12.28
Divorced	677	2.05
Other	961	2.91
Education level		
No education	1,418	4.30
School without bachelor's degree	28,277	85.77
Bachelor's degree and above	3,275	9.93
Perception on income		
Not sufficient income	1,897	5.75
a little sufficient	13,966	42.36
Much sufficient	15,531	47.11
Most sufficient	1,576	4.78
Living region	,	
Bangkok	1,363	4.13
Central	8.872	26.91
Northern	7.887	23.92
Northeastern	9,364	28.40
Southern	5,484	16.63
Being head of household		
Yes	16.853	51.12
No	16,117	48.88
Type of living area site		
Urban	17,990	54.56
Rural	14,980	45.44
Social interaction state	,	
Nonsocial interaction	203	0.62
Slightly social interaction	5471	16.59
Moderate social interaction	22952	69.61
A lot of social interaction	4344	13.18
Self-esteem state		
None self esteem	109	0.33
Slightly self esteem	2011	6.10
Moderate self esteem	24273	73.62
A lot of self esteem	6577	19.95



Table 3 shows the percentage of mental health state in each employment status. There were 2349 participants who were poor mental health state, 18675 people who normal mental health state and 11946 who had good mental health. Of the participants were not-working, 9% of participants were had poor mental health. In agriculture sector, 6.44% of participants fell into the poor mental health group. Of the samples who worked in industry sector, 7.2% had poor mental health and 6.16% of participants worked in services sector were in poor mental health state. Comparing across the row of poor mental health state, one can see that the largest proportion belongs to those who not working (i.e. 9%). On the other hand, comparing across the row of good mental health, the largest proportion (i.e. 39.6%) occurs for those working in service sector and the smallest proportion is found for not working people. For the chi-square test, the p-value is equal to 0.000, which is less than 0.05. This means that the H<sub>0</sub> was rejected and thus the mental health state and employment status are not independent of each other. That is mental state significantly differs across health employment status

Table 3 Cross-tabulation between mental health and employment status

	Employment status				
Mental health state	Not-working	Agricultural	Industrial	Services	Total
Poor mental health	833	711	168	637	2349
	(9.00%)	(6.44%)	(7.20%)	(6.16%)	(7.12%)
Normal mental health	5310	6430	1325	5610	18675
	(57.34%)	(58.25%)	(56.82%)	(54.26%)	(56.64%)
Good mental health	3117	3898	839	4092	11946
	(33.66%)	(35.31%)	(35.98%)	(39.58%)	(36.23%)
Total	9260	11039	2332	10339	32970
	(100.00%)	(100.00%)	(100.00%)	(100.00%)	(100.00%)
Pearson chi2(6)	=133.9055 Pr=	=0.000			

Table 4 shows the percentage of participants mental health across perception of income. As can be from *table 8*, from the sample of this study, there were 1897 people who perceive their income were insufficient, 13966 people those perceive slightly sufficient income, 15531 people who feel their income is sufficient and 1579 people whose income is very sufficient. Among those who perceived their income not sufficient, 21.45% had poor mental health and for those who felt their income were very sufficient for them, 1.46% had poor mental health. this shows that having high perceived income seems to be associated with lower poor mental health. As expected for good mental health state, it is found that the largest proportion falls upon those who perceive their income to be very sufficient and the smallest proportion happens for those who report having insufficient income. The p-value of the chi-square test was 0.00, which was less than 0.05, therefore the perception of income and mental health were not independent of each other and this could imply mental health state significantly differs across the individually perception of income.



	Perception of income					
Mental health state	Insufficient	Slightly sufficient	Sufficient	Very sufficient	Total	
Poor mental health	407	1464	455	23	2349	
	(21.45%)	(10.48%)	(2.93%)	(1.46%)	(7.12%)	
Normal mental health	1061	8984	8287	343	18675	
	(55.93%)	(64.33%)	(53.36%)	(21.76%)	(56.64%)	
Good mental health	429	3518	6789	1210	11946	
	(22.61%)	(25.19%)	(43.71%)	(76.78%)	(36.23%)	
Total	1897	13966	15531	1576	32970	
	(100.00%)	(100.00%)	(100.00%)	(100.00%)	(100.00%)	
Pearsonchi $2(6) = 3,30$	0 $Pr = 0.0$	00				

Table 4 Cross-tabulation between mental health and perception of income

Table 5 represents the result from ordered logit model. In term of employment status, there are 2 sectors that have negatively significant relationship. Being male, single, have bachelor's degree or above are positively correlated with mental health state. In case of mechanism variable, there are positively significant relationship between having a lot of self esteem and social interaction on mental health state.

Variables	Coef.	SE	p-value	95% CI		Sig
Notworking	161	.054	.003	266	056	***
Agriculture	214	.051	0	315	114	***
Industry	Reference					
Services	063	.05	.21	161	.035	
Age 15-21	Reference					
Age 22-39	321	.056	0	431	211	***
Age 40-59	241	.055	0	349	134	***
Age 60 above	213	.057	0	325	101	***
Male	.157	.027	0	.104	.21	***
Single	Reference					
Married	.25	.04	0	.171	.329	***

Table 5 Result of ordered logit model for determinant of mental health state



Variables	Coef.	SE	p-value	95% CI		Sig			
Widowed	061	.057	.28	172	.05				
Divorced	099	.092	.281	279	.081				
Other status	212	.079	.008	367	056	***			
No education	Reference								
School_w/o degree	.264	.06	0	.146	.382	***			
Bachelor or above	.604	.073	0	.46	.748	***			
Urban	.022	.025	.389	028	.071				
Bangkok	Reference								
Central	309	.064	0	435	183	***			
North	017	.065	.79	145	.11				
North-east	184	.065	.004	311	057	***			
South	038	.067	.566	17	.093				
Being head of household	055	.028	.048	109	001	**			
Insufficient income	-1.964	.086	0	-2.133	-1.796	***			
Slightly sufficient	-1.551	.07	0	-1.688	-1.414	***			
Sufficient income	899	.069	0	-1.034	764	***			
Very sufficient	Reference								
None social	Reference								
Slightly social	125	.154	0.417	4275	.1770				
Moderate social	.752	.153	0	.4532	1.052	***			
A lot of social	1.86	.157	0	1.552	2.167	***			
None self esteem	Reference								
Slightly self esteem	061	.221	.783	493	.372				
Moderate self	1.142	.216	0	.718	1.565	***			
A lot of self	2.586	.218	0	2.159	3.013	***			
Constant	-2.221	.284	.b	-2.778	-1.664				
Constant	1.57	.285	.b	1.012	2.128				

\*\*\* *p*-value<.01, \*\* *p*-value<.05, \* *p*-value<.1



Table 6 show the marginal effect of each variables, as can that employment status has an impact to the level of mental health state. Those are not-working have less mental health state than those in industry sector by 0.029 degree. Being male have strong positive impact toward good mental health state (p-value < 0.01). However, aging and those who are head of household have moderately negative impact toward being in good mental health state (p-value <0.05). In term of mechanism between mental health and employment status, reveal that sufficient income, having social interaction and having self-esteem, have the strong impact to being good mental health state(p-value<0.01).

Variables	Effects	SE	Variables	Effects	SE
Notworking	-0.029***	0.009	Bangkok	Reference	
Agriculture	-0.038***	0.009	Central	-0.055***	0.011
Industry	Reference		North	-0.003	0.012
Services	-0.011	0.009	Northeast	-0.033***	0.011
Age15-21	Reference		South	-0.007	0.012
Age22-39	-0.057***	0.01	Head of household	-0.01**	0.005
Age40-59	-0.043***	0.01	Insufficient income	-0.347***	0.015
Age60above	-0.038***	0.01	Slightly sufficient	-0.274***	0.012
Male	0.028***	0.005	Sufficient income	-0.159***	0.012
Single	Reference		Very sufficient	Reference	
Married	0.044***	0.007	None social	Reference	
Widowed	-0.011	0.01	Slightly social	022	0.027
Divorced	-0.018	0.016	Moderate social	0.133***	0.027
Othermari	-0.037***	0.014	A lot of social	0.329***	0.027
No educ	Reference		None self Reference		
School w/o degree	0.047***	0.011	Slightly self	-0.011	0.039
Bachelorabove	0.107***	0.013	Moderate self	0.202***	0.038
Urban	0.004	0.004	A lot of self	0.457***	0.038

 Table 6 Marginal effects of order logit model

\*\*\* *p*-value<.01, \*\* *p*-value<.05, \* *p*-value<.1

## DISCUSSION

The results from descriptive shown that in terms of employment status and their mental health state, people mostly were in normal mental health state in each employment sector and total number (56.63%) next below had the good mental health state (36.24%) and the least were people who had poor mental health (36.24%). The majority of participants is female (59.2%), that aged over 40 years old (72.17%), the majority of them are married (67.90%), and 85.8% of them are school without bachelor's degree.



Presence of not-working and employed in informal sector (agricultural sector) are the important factor that could determine the state of menta health, which is consistent with the studies from Bernarda et al. (2003)<sup>11</sup> and Milner et al.  $(2014)^{12}$  that work status have the impact to the mental health state. Also being aging has negative impact to the mental health state, which is similar with the results from the study by Torre et al. (2018), that prevalence of major depressive disorder was more prevalent for those older age.<sup>9</sup> And for the educational level, higher education has positive impact to the mental health state, which is correspond with the study from Torre et al. (2018), that those with lower educational level are more likely to experience with Major Depressive Disorder (MDD).<sup>9</sup> The result from ordered logit regression also reveal that those male and married have positively significant correlation with mental health state, which is same as the result from study by Honkonen et al. (2017).<sup>13</sup> While being head of household are negatively significant related with mental health state.

## CONCLUSION

Not-working dimension is the one of most concerning from government to support, since the results that show they had significant negative relationship with being in good mental health, that abled to cause the cost for their individual and society further the nationally in term of human capital dimension. Also, agricultural sector is the majority employment sector in Thailand and had significant negative relationship with being in good mental health too, encouraging from Thai government especially agricultural activities could partially improve mental health of Thai people.

In case of social-demographic factor: age, gender, education level, being head of household were significantly associated with mental health state. In term of age, aging had strong negatively significance to being good mental health and with the nowadays situation of aging society, government should concern in this issue as soon as possible. Gender is the one that found which had significantly impact to mental health state. While the positive impact of being male to mental health state, the majority of Thai people is still be female. Problem of inequality by gender, is the one that government could improve the gap by law and policy.

For mechanisms between mental health and employment status, income, self-esteem and social interaction were significantly associated with mental health state. Thai government should consider in term of cost of living that effect on mental health state across by perception of affordable in income.

## RECOMMENDATIONS

The findings of this study have implications for moving towards agricultural sector in Thailand by concerning increased supporting to this economic sector in their production or products from government and call for policymaker in Thailand to make the strategic policies in providing more accessible health facility in physical dimension and each mental dimension. This study was expected to benefit every economic sector for concerning and improving in the mental health aspect of their sector.

For the possible benefits of this study, author resume that (1) If people not working significantly worsens mental health, this could raise the severity of not working problem. The government can allocate the intervention to reduce the not working rate in order to control the trend of mental health problem. (2) when socioeconomic-demographic factors have the statistically significance effect on mental health, the government can gear proper policy for particular group of people to solve mental health problem. (3) when other employment status such as agricultural sector employment has significant effect on mental health, the government can direct appropriate policy to support particular employment status in order to alleviate mental health problem



For further study, newer data should be taken to investigate the up-to-date trends of there year situation and should collected the data that refer actual unemployment state in that time to interpret the actual impact of unemployment to mental health in Thailand.

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## Construction and Characterization of Anti-CD34 scFv Antibody Fragment by Phage Display Technique in the Immobilization onto Cardiovascular Implants for Self-endothelialization

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## ABSTRACT

Recently, cardiovascular diseases have become the leading cause of death globally. Vascular intervention is commonly used for the treatment of vascular obstruction by cardiovascular device implantation. However, the implantation usually causes local vascular injury leading to thrombosis and intimal hyperplasia. Self-endothelialization induction of cardiovascular implants in vivo has emerged as a promising approach to promote the healing of endothelium for the prevention of these problems. Endothelial progenitor cells (EPCs) play a vital role in the endothelialization of vascular implants spontaneously. EPCs express the cluster of differentiation 34 (CD34) as a surface marker. Previous studies have investigated the immobilization of anti-CD34 antibodies on material surface to capture EPCs for inducing endothelialization. Nevertheless, the monoclonal antibody molecule has shown several limitations clinically, such as poor tissue penetration and slow blood clearance due to the large size, also particular immunogenicity due to the presence of Fc portion. A singlechain variable fragment (scFv) is a smaller format of antibody that retains the antigen-binding capability and specificity of the original immunoglobulins. Several advantages of human scFv (HuscFv) have been reported, especially the reduced immunogenicity due to the absence of Fc portion. The objective of this study is to construct and characterize the HuscFvs that are specific to CD34 with high affinity and specificity to CD34-expressing cells. The phage clones displaying HuscFv against recombinant human CD34 were selected from the phage library with bio-panning technique. HuscFvs were determined by western blot, then were purified with His-tag affinity resins. Finally, the generated anti-CD34 HuscFvs were evaluated for binding affinity and specificity with CD34-expressing cells using ELISA and immunofluorescence assay. The anti-CD34 HuscFvs were successfully constructed using a phage display bio-panning technique. The binding evaluation of unpurified HuscFvs to CD34-expressing cells by ELISA had shown that 5 HuscFv clones could specifically bind to CD34-positive cells, with low binding to CD34-negative cells. The immunofluorescence had revealed that the representative purified HuscFv clone 62 could bind to CD34-expressing cells. In conclusion, the constructed anti-CD34 HuscFv was able to recognize CD34 and bind specifically with CD34-expressing cells.

Keywords: CD34, single-chain variable fragment (scFv), phage display, bio-panning, endothelialization





## **INTRODUCTION**

Cardiovascular diseases (CVDs) have been reported as the global leading cause of death.<sup>1,2</sup> According to the World Health Organization, 17.9 million deaths due to CVDs have been reported in the year  $2016.^{3}$ Vascular intervention, such as balloon angioplasty and stenting, is commonly used for the treatment of vascular obstruction by cardiovascular device implantation to open up the narrowed blood vessels.<sup>4</sup> However, the implantation usually causes local vascular injury leading to thrombosis and intimal hyperplasia.<sup>4, 5</sup> Thus, these problems are the main limitations of vascular intervention efficacy.

Post-treatment with vascular intervention usually causes vascular wall injury that induces thrombosis and inflammation as response to tissue injury. Firstly, prothrombogenic reactions are stimulated at the damaged vascular endothelium. P-selectin and von Willebrand factor (vWF) is highly deposited on subendothelium surface at the vascular damaged site.<sup>6</sup> This can trigger platelet adhesion at the injured site via interaction between adhesion receptors on platelet surface and activated endothelial cells or extracellular matrix (ECM) components.7,8 The process of thrombus formation at the vascular damaged site starts from platelets rolling over the lesion, followed by firm adhesion, platelet activation, and irreversible platelet aggregation leading to thrombus growth.7 Also, the activated platelets can promote inflammation at the injured endothelium. Growth factors released from activated platelets and leukocytes activate vascular smooth muscle cells (SMCs) proliferation and migration from the media to the intima, leading to thickening of the intimal vessel wall layer consisting of vascular SMCs and ECM, called intimal hyperplasia. It can restrict the luminal blood flow causing in-stent restenosis, or re-narrowing of the treated vessel.<sup>8-11</sup>

Nowadays, several approaches have been investigated to reduce intimal hyperplasia after the vascular intervention. Drug-eluting stents (DES) have been developed by coating drugs onto bare-metal stents to release antimitotic agents at local vascular tissues, such as, sirolimus (rapamycin)- and paclitaxel-eluting stents that are reported to decrease the rate of restenosis compared with bare-metal stents.<sup>12,13</sup> As a result, the released drugs can decrease SMC proliferation. However, they also cause delayed endothelial regeneration and impair vascular healing leading to late stent thrombosis.<sup>6, 14-16</sup> Therefore, late stent thrombosis is a major limitation of DES. Later, self-endothelialization induction of cardiovascular implants in vivo has emerged as a promising approach to promote the healing of endothelium for the prevention of thrombosis and intimal hyperplasia.<sup>4, 17, 18</sup> Endothelial progenitor cells play a vital role in the endothelialization of vascular implants spontaneously.<sup>18, 19</sup> CD34 is a surface marker expressed on EPCs.<sup>18, 20</sup> EPC-capturing graft or stents have been produced to local recruitment of EPCs to damaged vascular site by coating EPC-specific ligands on stents, such as anti-CD34 antibodies, which can enhance vascular repair and endothelium regeneration.<sup>6, 21</sup> The immobilization of anti-CD34 antibodies on material surface has been studied to attract and capture circulating EPCs for inducing endothelialization.<sup>17, 18</sup> Recently, numerous monoclonal antibodies (mAb) that recognize human CD34 have been produced. However, there are several limitations of the mAb molecule in clinical treatment, including poor tissue penetration and slow blood clearance due to the large size, and also the presence of Fc portion, or the constant region of the antibody that can interact and activate effector cells and the complement cascade, causes immunogenicity particularly in human.<sup>22, 23</sup> Thus, antibody engineering has been investigated tremendously for medical purpose to reduce immunogenicity.

A scFv is a smaller format of antibody which is a fusion protein of the variable regions of the heavy and light chains of immunoglobulins, linked together by a short linker peptide.<sup>24</sup> The



antibody in scFv format contains the antigenbinding site, so it retains the antigen-binding capability and specificity of the original immunoglobulins while reducing the size of the antibody molecule.<sup>24</sup> The HuscFv has shown several advantages in therapeutic and diagnostic applications, such as more rapid tissue penetration and blood clearance and reduced immunogenicity, due to the absence of Fc portion, compared to the original antibody.<sup>22,</sup> <sup>23</sup> The present study aims to construct and characterize the HuscFvs that are specific to CD34 with high affinity and specificity to CD34-expressing cells by phage display technology. The ultimate goal of this study is to develop the novel anti-CD34 HuscFv as a medical tool immobilized onto vascular implant surfaces to promote EPC capture and recruitment for inducing self-endothelialization, thus to prevent thrombosis and intimal hyperplasia after vascular intervention.

## **METHODS**

#### Selection of phage clones displaying HuscFv that bound to recombinant CD34 by biopanning technique

Human recombinant CD34 (rCD34) or bovine serum albumin (BSA) were immobilized on the surface of 96-well plate, then incubated at 4°C for 16 hours. After blocking the well with 5% skim milk in PBS at 37°C for 1 hour, the HuscFv phage display library (obtained from Therapeutic Proteins and Antibody the Engineering laboratory, Faculty of Medicine, Siriraj Hospital) was added appropriately into the BSA-coated well and incubated at 37°C for 1 hour. The unbound phages were transferred to rCD34-coated well and incubated at 37°C for 1 hour. The unbound phages were removed by extensive washing with PBS-T. One hundred  $\mu$ L of log-phase grown HB2151 E. coli was added into each well containing phages that bound to immobilized rCD34, and incubated at 37°C for 15 minutes to allow the phages to transduce their genome into the E. coli. Then the bacteria were collected and spread onto 2×YT-AG plates (LB-A agar agar supplemented with 2% glucose). The plates were incubated at 37°C for 16 hours. The *E. coli* colonies that appeared on the plates were picked randomly and checked for the presence of the HuscFv-coding sequences by direct colony polymerase chain reaction (PCR) using the pCANTAB5E phagemid specific primers.

#### Cloning of huscfv genes into pET-23b<sup>+</sup> vector

The huscfv genes were cloned into pET-23b<sup>+</sup> vector, a high copy plasmid, for higher expression of HuscFvs to the appropriate level for protein purification at large scale. Briefly, each clone of the huscfy-pCANTAB5E plasmids and the pET-23b<sup>+</sup> vector was digested with NotI and SfiI. The huscfv gene fragments and linear pET-23b<sup>+</sup> vector fragments were ligated together using T4 DNA ligase. The ligation reactions were transformed into E. coli DH5 $\alpha$  competent cells and these cells were grown on LB agar containing ampicillin as selective culture. The transformed E. coli colonies were randomly picked to perform direct colony PCR for determination of the husefv genes. The positive colonies were selected and extracted for the huscfv-pET-23b+ plasmids. After that, these plasmids from each clone were transformed into E. coli Rosetta, which is the selected expression bacterial strain.

# Induced expression of huscfv-positive E. coli clones

The *huscfv*-positive *E. coli* clones were cultured at 37°C for 16 hours (overnight culture). Ten mL of fresh LB medium with appropriate antibiotics were inoculated with 5% of the overnight culture and incubated at 37°C with 250 rpm shaking until the absorbance at 600 nm ( $A_{600nm}$ ) was 0.8-1.0. IPTG (final concentration 0.5-1.0 mM) and PMSF (final concentration 1 mM) were added into each culture and incubated further at 16°C with shaking at 150 rpm for 72 hours. The bacterial culture was centrifuged, then the supernatant culture medium containing soluble proteins was collected. Alternatively, the cell



pellet was collected and resuspended in 1 mL of PBS. The suspension was sonicated and centrifuged, then the supernatant was collected. After that, soluble HuscFvs in the culture medium or the bacterial lysates were detected by western blot using mouse anti-His-tag polyclonal antibody, goat-anti-mouse immunoglobulin-alkaline phosphatase conjugate and BCIP/NBT substrate, respectively.

#### Binding test of the unpurified soluble HuscFvs to rCD34 and CD34-positive cells by ELISA

rCD34 was immobilized onto the surface of an ELISA plate. BSA served as a control antigen. After blocking the wells with 5% skim milk in PBS, *E. coli* lysates containing the HuscFvs were added to antigen-coated wells and kept at 37°C for 1 hour.

For cell-based ELISA, human umbilical vein endothelial cells (HUVECs, moderate CD34positive cells) were seeded onto 96-well culture plate pre-coated with 0.2% gelatin (at 20,000 cells/well), and incubated at 37°C, 5% CO<sub>2</sub> for overnight. HeLa cells served as negative control (CD34-negative cells). The cells were fixed with 4% paraformaldehyde, and then were incubated with the *E. coli* lysates containing the HuscFvs for 16 hours at 4°C.

Whole-cell lysate of *E. coli* HB2151 and PBS served as negative antibody control and blank, respectively. After washing, rabbit anti-His-tag polyclonal antibody, goat anti-mouse immunoglobulin-horseradish peroxidase conjugate, and ABTS substrate were added, respectively with washing between the steps. The  $A_{405nm}$  of the content in each well was measured by a microplate reader.

#### Determination of complementary determining regions (CDRs) and immunoglobulin framework regions (FRs) of the rCD34-bound HuscFvs

The *huscfv* sequences coding for the HuscFvs that bound to the rCD34 were extracted from

individual E. coli clones and sequenced. The deduced amino acid sequences were obtained from individual nucleotide sequences and aligned with human variable regions of heavy  $(V_H)$  and light  $(V_L)$  chain sequences of immunoglobulins in the IMGT database using IMGT software. The CDRs and FRs of all clones were determined and characterized whether they are HuscFvs, and the identity to human immunoglobulins was also determined.

#### Purification of the soluble HuscFvs with Histag affinity resins

The secreted proteins (including interested HuscFvs with His-tag) in bacterial culture medium were precipitated with 4M ammonium sulfate. The precipitated proteins were centrifuged and resuspended with 50 mM sodium phosphate buffer (Na<sub>2</sub>HPO<sub>4</sub>) pH 7.0. Then, the proteins were incubated with TALON<sup>®</sup> His-tag affinity resin beads at 4°C for 2 hours. The bound-beads were loaded into a gravity flow column, and followed by washing and elution according to the manufacturer's instructions (Clontech Laboratories, CA, USA). The purity of HuscFvs was determined by sodium dodecyl sulfate polyacrylamide gel electrophoresis (SDS-PAGE) followed by Coomassie blue staining.

#### Binding test of the purified HuscFvs to CD34positive cells by immunofluorescence

HUVECs (CD34-positive cells) were seeded onto a round glass in 24-well culture plate precoated with 0.2% gelatin (at 100,000 cells/well), and incubated at 37°C, 5% CO<sub>2</sub> for 48 hours. HeLa cells served as negative control (CD34-negative cells). The cells were fixed with 4% paraformaldehyde, and then were blocked with 5% BSA. After that, the cells were incubated with either the purified HuscFv clone 9 or clone 62 (His-tagged) for 1 hour at room temperature. After washing, the cells were co-stained with rabbit anti-His tag polyclonal antibody and mouse anti-CD34. Then, goat anti-mouse immunoglobulin-Alexa Fluor 555 (AF555) conjugate and goat anti-



rabbit immunoglobulin-AF488 conjugate were added, with washing between the steps. The cells on the round glass were mounted onto a glass slide, then observed under a confocal fluorescence microscope.



**Figure 1** The flow chart illustrating each experimental process along with the number of selected positive clones tested in each step

## RESULTS

## Phage clones displaying HuscFv that bound to rCD34

After bio-panning selection of phage clones displaying HuscFv that could bind to rCD34 from the HuscFv phage display library, the transduced *E. coli* were randomly picked and

checked for the presence of the HuscFv-coding sequences by direct colony PCR. Ninety-four colonies out of 152 colonies were positive for the HuscFv-coding sequences (Figure 2). These positive clones were determined for induced expression of HuscFvs by western blot. They were 67 of the 94 *huscfv*-positive clones that expressed soluble HuscFvs shown as bands at  $\sim$ 25-35 kDa (data not shown).







**Figure 2** Representatives of PCR amplicons of huscfvs (~1,000 bp; arrow) in randomly picked pCANTAB5E-transformed E. coli derived from phage bio-panning with rCD34. Lane M, GeneRuler<sup>™</sup> 1 kb DNA ladder; Lanes 1-30, randomly picked pCANTAB5E transformed E. coli; Lane Neg, Negative control; Lane Pos, Positive control; Numbers at the left are DNA sizes in bp

## Reactivity of the soluble HuscFvs against rCD34

The unpurified soluble HuscFvs from *E. coli* cell lysates were tested for binding to rCD34 by indirect ELISA. From the expressed 67 HuscFv clones, there were 7 huscfv-pCANTAB5E-transformed *E. coli* clones, i.e., clone 1, 3, 4, 9,

10, 62, and 97, with high binding to rCD34 while low binding to BSA as shown in Figure 3 (data were shown only 41 clones, the remaining 26 clones data not shown). Therefore, these 7 clones were selected for further determination of potential HuscFvs with high affinity and specificity to CD34-expressing cells.



**Figure 3** Representative binding result of the HuscFvs from huscfv-pCANTAB5E-transformed *E. coli* (41 clones) to rCD34 tested by indirect ELISA, while BSA served as negative control. HB2151, lysate of original *E. coli* HB2151 as antibody control; Positive control, mouse anti-CD34 antibody; Dotted blackline, the cut-off  $A_{405nm}$  between positive and negative ELISA which determined from the highest absorbance of *E. coli* HB2151 control. \* represents the selected *E. coli* clones which the  $A_{405nm}$  of rCD34 group was above the cut-off line and over as double times to the BSA group. Data are presented as the mean  $\pm$  SD (n=3)

## CDRs and immunoglobulin FRs of the rCD34-bound HuscFvs

Deduced amino acid sequences of the 7 rCD34bound-HuscFvs were complete antigenbinding site of the single-chain antibody, i.e., consisted of four V<sub>H</sub>-FRs and three V<sub>H</sub>-CDRs linked via (G4S)3 to complete V<sub>L</sub> (four V<sub>L</sub>-FRs and three V<sub>L</sub>-CDRs). Also, the identity of these V<sub>L</sub> and V<sub>H</sub> sequences to human Ig was over 85% (data not shown). Alignment of the deduced amino acid sequences of all HuscFvs showed that there was no identical clone among all HuscFvs (no sibling clones).

#### Binding of the soluble HuscFvs to CD34positive cells

From the preliminary binding test of unpurified anti-CD34 HuscFvs to CD34-expressing cells by cell-based ELISA, the result had shown that HuscFvs from 5 clones i.e., clone 1, 9, 10, 62, and 97, bound to HUVECs (CD34-positive cells) without any binding with HeLa cells (CD34-negative cells) (Figure 4). It was suggesting that these HuscFvs could bind specifically to CD34-positive cells. Thus, these 5 HuscFv clones were selected for large scale expression and purification.





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Figure 4 Preliminary binding test of unpurified anti-CD34 HuscFvs to HUVECs (CD34-positive cells) by indirect ELISA. HeLa cells served as CD34-negative cell control. HB2151, lysate of original E. *coli* HB2151 as antibody control; Positive control, mouse anti-CD34 antibody; Dotted blackline, the cut-off A405nm between positive and negative ELISA which determined from the highest absorbance of E. coli HB2151 control. \* represents the selected E. coli clones which the A405nm of HUVEC group was above the cut-off line and over as double times to the HeLa group. Data are presented as the mean  $\pm$ SD (n=3)

#### HuscFv expression of transformed E. coli Rosetta clones

The soluble HuscFvs secreted in the bacterial culture medium were detected by western blot. All 5 clones of selected *huscfv* positive-*E*. *coli* Rosetta were able to express soluble HuscFvs (Figure 5). Then, the soluble HuscFvs were purified using TALON<sup>®</sup> His-tag affinity resins. The purity results from SDS-PAGE had shown that the HuscFvs were successfully purified (Figure 6).



Figure 5 Representative HuscFvs (~25-35 kDa; arrow) expressed by the huscfv-positive E. coli Rosetta clones (at 16°C for 72 hours) as determined by western blot using mouse anti-His-tag antibody. Lane



M, Pre-stained standard protein marker; Lanes 1-20, randomly picked transformed *E. coli* from each clone. Numbers at the left are protein masses in kDa



**Figure 6** The purity of the representative HuscFv clone 9 (a) and clone 62 (b) (~25-35 kDa; arrow) after purification with His-tag affinity resins as determined by SDS-PAGE and coomassie blue staining. Lane M, Pre-stained standard protein marker; Lane C, crude protein sample; Lane U, unbound flow-through fraction; Lane W, wash flow-through fraction; Lanes 1-5, eluted fractions. Numbers at the left are protein masses in kDa

#### Binding of the purified HuscFvs to CD34-expressing cells by immunofluorescence

The purified soluble HuscFv clone 9 and 62 were evaluated for the binding ability to CD34-positive cells (HUVECs) as representative. The cells were co-incubated with mouse anti-CD34 and HuscFvs. The immunofluorescence had revealed that the HuscFvs could bind to HUVECs, with very low or no binding to CD34-negative cells (HeLa cells), especially higher binding with HUVECs in the HuscFv clone 62 (Figure 7) compared to the clone 9 (data not shown). Furthermore, co-localization of CD34 and HuscFv was also observed in the clone 62, which was indicating that the HuscFv could recognize CD34 as the target.



**Figure 7** Immunofluorescence of HeLa cells (a) and HUVECs (b) evaluated for the binding with the HuscFv clone 62. Red and green color represents CD34 and HuscFv (His-tagged), respectively. Blue color was DAPI staining of cell nucleus. Enlargement of the rectangular area in HUVEC group was also shown (c)



## DISCUSSION

Recently, monoclonal antibodies have been widely developed and used in medical treatment, such as cancer therapy, due to their specificity and affinity toward particular targets.<sup>24, 25</sup> Thus, antibody engineering has been investigated tremendously to design and produce new antibodies that are suitable for medical purpose. The scFv, a smaller format of antibody with full antigen-binding capability, has been established and applied for medical therapeutics and diagnostics due to its several benefits over a whole antibody molecule. The smaller size of scFv allows these fragments to penetrate more rapidly to tumors and other tissue, and have more rapid clearance from blood which is suitable to be coupled with drugs for low exposure to normal tissues.<sup>26-29</sup> Also, the lack of Fc portion allows the molecules to be very less immunogenic in human.<sup>22, 24, 30</sup> Thus, the scFv molecules are potential for imaging and cell targeting in clinical use.23

Phage display technology has become an approach for the production of recombinant scFv in which the phage recombinants displaying antibody variable domains on the surface are utilized, and also bio-panning technique is developed for affinity selection against specific antigen.<sup>24,31</sup> This phage display approach allows *in vitro* selection of high affinity scFv from a large phage library by circumventing immunization in conventional techniques.<sup>24</sup>

This study demonstrates the preliminary construction of HuscFv that recognizes CD34 and could bind to CD34-expressing cells by phage display technology. Most of the huscfvpositive colonies (67 out of 94 positive colonies) could express soluble HuscFvs (Figure 2). From the preliminary binding test of unpurified HuscFvs to rCD34 and CD34positive cells, 5 HuscFv clones i.e., clone 1, 9, 10, 62, and 97 (Figure 3, 4) were selected as the potential candidates with high affinity and specificity to CD34 for further large-scale expression and purification. The selected 5 HuscFv clones could express soluble HuscFvs at large scale, especially high expression in clone 9 (Figure 5). After purification, the HuscFv bands (molecular size~25-35 kDa) in eluted fractions had shown higher intensity compared to crude samples and unbound fractions. Also, there was very less intensity or absence of the other undesired proteins after purification (Figure 6). It had revealed that the interested HuscFvs could be highly purified and more concentrated. Our construction and characterization process or techniques were performed similar to other previous studies of novel HuscFv development against different antigens by phage display technology, and the results were also related.<sup>25,32</sup> After purification, the HuscFv clone 9 and 62 had shown higher HuscFv concentration compared to other clones, corresponding to the higher amount of expressed HuscFv detected by western blot (Figure 5). Thus, these 2 clones were selected for further analysis by immunofluorescence assay due to the high total amount of purified HuscFvs.

The purified HuscFv clone 62 could bind to HUVECs (CD34-positive cells), also showed localization with CD34, while HeLa cells (CD34-negative cells) had shown no binding with the HuscFv (Figure 7). This result was indicating that the HuscFv clone 62 was the best potential candidate with high specificity to CD34. However, the binding of HuscFv to HUVECs had shown low fluorescence intensity which might be caused by small CD34 expression in HUVECs. Some previous studies reported that the CD34 is expressed in a small subset of cultured HUVECs, and these CD34positive cells are endothelial tip cells located at the leading edge of the vascular sprout that can extend filopodia.33 Only about 20% of the HUVEC culture is CD34-positive.<sup>34</sup> These preliminary binding results with HUVECs, a primary cell used as CD34-positive cells, might not fully represent the ability of constructed HuscFv to capture EPCs circulating in blood. Thus, these HuscFvs should be evaluated the binding affinity to human CD34-positive



peripheral blood mononuclear cells (PBMCs) or EPCs, also the binding test in the flow condition should be conducted to demonstrate the capture ability to circulating cells.

Our construction of HuscFv against CD34 is a preliminary step to develop the vascular implant surfaces immobilized with anti-CD34 HuscFv for capturing of circulating EPCs to attach and repair the vascular wall injury that occurred after the intervention. However, the major concerns are whether the attached EPCs could function and differentiate normally to form endothelialization.<sup>18</sup> Thus, the EPC function and behavior after capture and attachment onto implants coated with anti-CD34 HuscFv should also be studied.

## CONCLUSION

In conclusion, the novel anti-CD34 HuscFv constructed in this study can recognize CD34 and bind specifically with CD34-expressing cells. This HuscFv might be potential for further development as a new EPC-capturing molecule with reduced immunogenicity for immobilization onto vascular implant surfaces to promote EPC recruitment and selfendothelialization at the vascular injured site after vascular intervention approach.

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# HOUSEHOLD PREPAREDNESS IN THE FLOOD-PRONE COMMUNITIES OF KAYIN STATE, SOUTHERN MYANMAR

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# ABSTRACT

Due to global climate change, the frequency, severity of flooding and risk of future floods have been increasing in the recent years including Myanmar. Flood preparedness at household level plays as a fundamental component in community-based disaster risk reduction in order to reduce the flood impacts and increase resilience in communities. This study aims to ascertain the predictors of household preparedness by applying the Protection Motivation Theory as a disaster-based model in the flood-prone communities of Kayin state, southern Myanmar. A community-based study was conducted in flood-prone areas of four districts of Kayin state from April to May, 2020 by webbased self-administered questionnaires. A total of 390 household's representative age 18 to 64 years was enrolled. The measurements were based on the protection motivation theory; perceived vulnerability and severity of future floods as threat appraisal, coping appraisal; response-efficacy of preparedness measures, self-efficacy and response cost and flood experiences. The household emergency preparedness standard checklist was assessed. Crude and adjusted odds ratios (ORs) were reported for association between exposure and households' preparedness with 95% CIs. A pvalue < 0.05 was considered statistically significant. Nearly half of the respondents were within 18 to 25 years of age, 74% had university or higher education, 46.2% had monthly household income more than 300,000 Myanmar Kyats. Multiple logistic regression revealed that completed higher education attainment (AOR: 2.42, 95%CI: 1.42-4.14), more than 300,000 MMK of households' monthly income (AOR: 2.38, 95%CI: 1.54-3.67), obtaining information from television (AOR: 2.00, 95%CI: 1.31-3.07), being exposed to more severe previous flood experience (AOR: 1.50, 95%CI: 0.95-2.37) and higher perceived vulnerability (AOR: 1.75, 95%CI: 1.09-2.78) were found to be positively associated with the emergency preparedness in households. Overall household preparedness in the flood-prone communities of Kayin state was identified to be low. Risk communication should focus on perceived vulnerability of population through different types of media. Household level preparedness should be seen as a strategy of community-based disaster risk reduction in Myanmar.

Keywords: flood, household preparedness, disaster, Myanmar

#### **INTRODUCTION**

Due to the impacts of global warming, natural disasters have become one of the major public health issues in the recent years mainly due to the disastrous impacts on the global population.<sup>1</sup> During 1998 to 2017, flood affected around 2.0 billion of world population, caused around 142,088 deaths (11% of total death due to natural disasters) and total economic losses of 2.0 billion USD worldwide (45% of total loss due to natural disasters).<sup>2</sup>





Myanmar is one of the 15 countries that account for 80% of global population affected by flooding.<sup>3</sup> The widespread flooding and landslide in 2015 caused a significant decline in quality of life of disaster affected population in Myanmar.<sup>4</sup> The vulnerability of population in Myanmar is mainly due to poverty, inequality, poor infrastructure, vulnerable population such as war victims, deforestation and limitation of communication.<sup>5</sup> Moreover, community-based disaster risk management are "stand-alone", implemented as lacks of addressing underlying causes of to underlying vulnerability to risks and community preparedness levels are usually low.<sup>4</sup>

Over the past few years, global policies and actions have started to change the trend of disaster risk reduction and emergency from top-down management to a more inclusive approach of emphasizing all community to get involve in preparedness activities, decision making, communication, policy formation throughout the disaster management cycle.<sup>6</sup> The previous study stated the importance of household level preparedness as "Citizens share responsibility for their own protection, by taking protective actions and avoiding the harms that may befall them. The more prepared people are, the less harm they will suffer when disaster strikes".<sup>7</sup> Household preparedness is focused on the coping capacity of household to natural disaster and responsibilities of family as a whole unit to improve the safety measures.<sup>8</sup> It is very important for households to prepare in the pre-disaster phase by stockpiling and storing of emergency supplies (e.g. food, water, emergency medicine, first aid kits) because public aids and supports may not be immediately available at the time of emergency.<sup>9</sup> Several studies had evaluated that effective household measures could effectively reduce the negative impacts of natural disasters. <sup>10</sup> 9, <sup>11-14</sup> It was stated that "every dollar spent reducing disaster risk, seven dollars will be saved from economic losses associated with cleanup and recovery".<sup>15</sup>

However, despite being affected by flooding every year in our study area, Kayin State, there was no study conducted concerning with households' emergency preparedness. Therefore, the aim of the study is to ascertain the predictors of emergency preparedness in the flood-prone households in the community. The finding of this study will be beneficial for policy makers in Myanmar to strengthen risk communication through household level and the community-based disaster risk reduction programs.

# **METHODS**

# Study design

A community-based cross sectional survey was conducted in the flood-prone communities of Kayin State, Myanmar to determine the factors associated with households' emergency preparedness to flood by the Protection Motivation Theory.<sup>16</sup>

#### Study areas

Kayin State is situated in the southern part of Myanmar with the total area of 30,382.8 km<sup>2</sup>. The state has the estimated total population of 1,574,0792.<sup>17</sup> There are four districts Hpa-an District, Myawaddy District, Kawkareik District, Hpapun District. The northern part is upland with the general elevation of 3,000 feet. In the eastern part of the state, there is the elevation of 3,000 feet aligned in northwest-southwest direction and the lower parts forms the extensive plain areas. The state has tropical monsoon climate.

#### Population and sample

The study population were households in the flood-prone areas of Kayin State, Myanmar. The respondents were the representatives of each household between age of 18 to 64 years who live in the study area for at least one year in the data collection time. Every respondent had the direct flood experience of at least one time in their lifetime. Firstly, we purposively



selected four districts of Kayin State based on the occurrence of flood every year. After that, sample size of 422 respondents were selected from four districts in proportion to the total households of each district. Total of 221 respondents from Hpa-An distract. 9 60 respondents from Pharpon district. respondents from Myawady district and 132 from Kawkerike district were participated in this survey.

Sample size was estimated according to the following formula:

 $n = \frac{z^2 p(1-p)}{d^2}$ n= sample size

d= maximum allowable error

z= value from normal distribution associated with 95% CI = 1.96

p= preparedness prevalence assumption 50% (Based on previous studies, as the preparedness prevalence is unknown in the population of the study area, the value of expected proportion (p) is considered as 50%)  $^{18}$ 

$$n = (1.96) (1.96) (0.5) (1-0.5) (0.05) (0.05) n = 0.9604 0.0025 n = 384.16$$

10% will be added to compensate the incomplete questionnaire which made the total sample size of 422.

#### Measurements

Based on the household disaster preparedness literature, the survey questionnaire were developed. <sup>14, 19-22</sup> The reliability of the questionnaires was tested by a pilot study with 40 respondents from Mawlamyaing Township, Mon State, Myanmar. For the knowledge questionnaires, overall KR-20 score was 0.47. The Cronbach's Alpha for risk perception was 0.82, perceived coping capacity was 0.63, and prior flood experience was 0.73. The final questionnaire was modified using the results and experience from the pilot test and reviewed

by public health experts, environmental health experts in the university.

The final questionnaires included five parts. The first part contained nine questions associated with sociodemographic characteristics of the respondents' households such as age, sex, education, households' income, primary source of household income, total family members, the presence of elderly household members and members with underlying medical conditions, the type of media used for weather information.

The second part included knowledge questionnaires about preparedness measures. The respondents were asked ten True/False statements. The statements were to assess the respondents' knowledge on flood risk and households' flood preparedness measures. (E.g. We should wait for the volunteer and donors will come and offer food and water/ In emergency situation, we need to listen to the public media, TV).

The third part included one open question about the frequency and five questions of severity of direct flood experience(s). The respondents were asked "How many times did you experience direct flood in your lifetime?" and "Have you ever had any damage to your property/any injury to you or family members/suffered from worried and sleepless nights due to past flood experiences?". The answers were five ordinal scales; none, very mild, mild, moderate, severe.

The fourth part was based on Protection Motivation Theory to measure individual's threat appraisal and coping appraisal. Threat appraisal part included two parts; perceived vulnerability and perceived severity. For perceived vulnerability, respondents were asked five statements. (E.g. I think my house is prone to flood disaster. For perceived severity, there were five statements (E.g. I think if a major flood event occurs, my home could be damaged severely or affected severely. The answers were based on five Likert scales





(1=strongly agree, 3= I don't know, 5= strongly agreed).

The coping appraisal was measured with three components; self-efficacy, response efficacy and response cost. For self-efficacy, the respondents were asked four statements about to which extend they believe themselves that they will be able to hand the flood risk and perform preparedness measure. (Eg. I believe myself that I can handle and solve the problems when flooding occurs). As for response efficacy, the questionnaire included four statements about how they positively perceived the effect of household preparedness measures (E.g. Preparing for flood will improve the habits of our household members to deal with flood). For response cost, the respondents were asked three questions about their perception on the amount of money, time, knowledge required for implementation of preparedness measures in their households. The answers were based on five Likert scales (1=strongly agree, 3= I don't know, 5= strongly agreed).

In the last part, the emergency preparedness was measured with the presence of eight items which were the standard items checklists recommended by Department of Disaster Management, Myanmar. The items were 1) water—at least 1 gallon daily per person for 3 to 7 days, 2) food—at least enough for 3 to 7 days for all household members (nonperishable packaged or canned food and juices, food for infants or the elderly, snack food), 3) First aid kit (medicines, bandages, prescription drugs), 4) clothing with waterproof bag. (E.g. raincoat, warm clothes), 5) torch light, 6) fully charged phone, 7) radio with extra battery, 8) emergency phone numbers.

#### Data collection procedures

Due to the COVID-19 pandemic situation, online survey was conducted in the study area. Purposive sampling and proportion sampling were used to select the samples. Firstly, selfadministered questionnaires were created by Google form. The research assistants were master degree holders and trained for one day by the researcher via Zoom meeting about web based data collection methods, clarification of questionnaires and data entry method to Google form. Secondly, the respondents were contacted by the research assistants one day before the data collection date to explain about the survey process, objectives and asked permission to participate in the survey. Finally, the data collection was carried out by research assistants in the four districts of Kayin State by sending the link of questionnaires to the respondents' mobile phones via social media applications, emails and the responding were monitored by research processes assistants via phone calls. The real time data were monitored closely by the researcher throughout the data collection process for accuracy. The duration of data collection was from April to May, 2020.

# Ethical consideration

This research was approved by Mahidol University, Social Science Institutional Review Board, Thailand MUSSIRB No. 2020/079 (B2). The permission for data collection in study area was approved by the Ministry of Social Welfare, Relief and Resettlement, Myanmar.

#### Data analysis

The collected data from the Google e-form was imported to The Statistical Packages for Social Science (version 21.0). Univariate analysis was used to describe the characteristics of the respondents' household, knowledge, past experiences, coping appraisal, threat appraisal and preparedness of emergency flood kits. Bivariate analysis was employed to ascertain the association between each independent variable and the dependent variable. The statistically significant variables (p < 0.25) in the bivariate analysis were put into Multiple Logistic Regression (Backward LR) to find out the significant predictors of household preparedness.



# RESULTS

# Descriptive analysis of Respondents' characteristics, Knowledge, Coping appraisal and Threat appraisal

A total of 410 subjects was enrolled (response rate 95%) the online survey and 390 completed questionnaires were used to analysis. The age range of representatives were within 18 to 64 years (Median = 25, QD=8.25). Majority of the respondents were female (59.2%), majority had education attainment of university or higher education (74.1%). More than half of the households had less than or equal to five members. Among the respondents, only 23.6% were heads of the households. More than half of households (53.8%) had households' monthly income less than 300,000MMK. The most common main source of household income was agriculture (25.9%). Three-fourth (75.6%) had faced the direct floods for 1 to 5 times in their lifetimes. More than half of the experiences (58.2%) were not much severe. Nearly half of the respondent's households (48.2%) in this study area obtained the flood information from television.

Two third (65.4%) of the respondents had good knowledge on flood risk and preparedness. In threat appraisal part, 39.5% of respondents had high perceived severity and 44.1% had high perceived vulnerability to flood. In coping appraisal part, 33.6% of respondents perceived that flood adaptation measures are effective to reduce the impacts and easy to perform, 44.9% of the respondents expressed that they have high self-efficacy to perform flood adaptation measures are not costly, not time consuming and need not to have high skill.

Sociodemographic Factors	n	%
Age in years		
18 to 25	186	47.7
26 to 64	204	52.3
Sex		
Female	231	59.2
Male	159	40.8
Education		
No Education	10	2.6
Primary School	27	6.9
Secondary School	34	8.7
High School	30	7.7
University and Higher	289	74.1
Number of family members		
Less than or equal 5	230	59.0
More than or equal	160	41.0
Households with family member(s) older than 60 years		
No	194	49.7
Yes	196	50.3
Households with family member(s) who has(have) underlying medica	al condition	S
No	247	63.3
Yes	143	36.7

 Table 1 Characteristics of the respondents (n= 390)





Sociodemographic Factors	n	%			
Respondents who are household heads					
No	298	76.4			
Yes	92	23.6			
Household income (Myanmar Kyats)					
Less than or equal 300,000	210	53.8			
More than 300,000	180	46.2			
Main source of households' income					
Agriculture	101	25.9			
Fishery	13	3.3			
Government Job	75	19.2			
Own Business	80	20.5			
Others (retirement, workers, NGO staffs, private company staffs)	121	31.0			
Main type of information media in household					
Television	188	48.2			
Online media	121	31.0			
Radio	61	15.6			
Newspaper	5	1.3			
Neighbors	15	3.8			
Frequency of direct flood experiences in life time					
1-5 times	295	75.6			
6-10 times	48	12.3			
More than 11 times	47	12.1			
Severity of past flood experiences					
Less severe ( $\leq 3$ )	227	58.2			
More severe (>3)	163	41.8			

**Table 2** Levels of knowledge, threat appraisal and coping appraisal (n=390)

n	%
135	34.6
255	65.4
226	57.9
164	42.1
236	60.5
154	39.5
	n 135 255 226 164 236 154



Variables	n	%
Self-Efficacy		
Low ( $\leq 15$ )	215	55.1
High (> 15)	175	44.9
Response Efficacy		
Low ( $\leq 16$ )	259	66.4
High (> 16)	131	33.6
Response Cost		
$High(\leq 9)$	98	50.8
Low (> 9)	192	49.2

#### Household Emergency Preparedness

The result shows the presence of emergency flood kits items in each household of the respondents. Most of the households have non-perishable food (83.6%), water (79%), torch light (78.7%), emergency contact numbers (74.6%), First aids kits (72.6%), fully charged phone (59.7%), radio with extra batteries (54.1%) and clothing with water proof bag (53.6%).

**Table 3** Number and percentage of emergency flood kit items preparing before the flooding (n=390)

Variables	n	%
Emergency Flood Kits		
Drinking Water	308	79.0
Nonperishable food	326	83.6
First aid kits	283	72.6
Clothing with waterproof bag	209	53.6
Torch light	307	78.7
Fully charged phone	233	59.7
Radio with extra batteries	211	54.1
Emergency contact numbers	291	74.6

Factors associated with households' emergency preparedness

Among all variables, in bivariate analysis, education, household income, types of main

media for weather information, knowledge, severity of past experiences and perceived vulnerability were statistically significant associated with the presence of emergency kits





in the households while others factors were non-significant.

The final multiple logistic regression was calculated by using Backward LR method in SPSS version 21.0 to determine the significant predictors of the preparedness of emergency flood kits. Households' representative with university or higher education were 2.42 times more likely to have emergency flood kits than those with high school or lower education (AOR: 2.42, 95%CI: 1.42-4.14). Secondly, households with monthly income of more than 300,000MMK were 2.38 times more likely to prepare for flood than households with lower

income less than 300,000 MMK (AOR: 2.38, 95%CI: 1.54-3.67). Thirdly, household which obtained weather information from television channels were 2.00 times more likely to prepare for flood than households which relied on radio and newspaper (AOR: 2.00, 95%CI: 1.31-3.07). Furthermore, household representatives with high perceived vulnerability were 1.67 times more likely to prepare for flood than those with low Perceived vulnerability (AOR: 1.75, 95%CI: 1.09-2.78). Finally, household representatives with high knowledge level on preparedness measure were 1.56 times more likely to prepare for flood than those with low Received vulnerability (AOR: 1.75, 95%CI: 1.09-2.78). Finally, household representatives with high knowledge level on preparedness measure were 1.56 times more likely to prepare for flood than those with low knowledge. (COR: 1.56, 95%CI: 1.01-2.41)

**Table 4** Factors associated with household's emergency preparedness (n=390)

Variables	Total Emergency Flood Kit Items		Crudo OD		
		Less than or	More than 5	- Crude OK (95% CI)	Auj. OK (95% CI)
		equal 5 items	items	()3/0(1)	()370 (1)
Age					
18 to 25	186	93 (50.00)	93 (50.00)	1	
26 to 64	204	101 (49.50)	103 (50.49)	1.02 (0.68-1.51)	
Sex					
Female	231	110 (47.60)	121 (52.40)	1.23 (0.82-1.84)	
Male	159	84 (52.83)	75 (47.17)	1	
Education					
High School or Less	101	66 (65.35)	35 (34.65)	1	1
University and Higher	289	128 (44.30)	1.61 (55.70)	2.37*** (1.48-3.79)	2.42*** (1.42-4.14)
Number of family memb	pers				
<u>&lt;</u> 5	230	110 (47.83)	120 (52.17)	1.20 (0.80-180)	
> 5	160	84 (52.50)	76 (47.50)	1	
Household head					
Yes	92	51 (55.43)	41 (44.57)	0.74 (0.4618)	
No	298	143 (48.00)	155 (52.00)	1	
Family member with me	edical co	ndition			
Yes	143	72 (50.40)	71 (49.60)	0.96	
No	247	122 (49.40)	125 (50.60)	1	
Family member more th	an 60 ye	ears			
Yes	196	104 (53.06)	92 (46.94)	1	
No	194	90 (46.39)	104 (53.61)	1.30	



Variables	Total	Emergency Flood Kit Items		Carrada OD		
		Less than or equal 5 items	More than 5 items	(95% CI)	Adj. OR (95% CI)	
Household Income (MM	K					
Less than or equal 300,000	210	128 (61.00)	82 (39.00)	1	1	
More than 300,000	180	66 (36.67)	114 (63.33)	2.69*** (1.78-4.06)	2.38*** (1.54-3.67)	
Households' source of in	come				<b>`</b>	
Agriculture and Fishery	114	64 (56.14)	50 (43.84)	1		
Government Job and Own Business	155	73 (47.09)	82 (52.91)	1.43 (0.88-2.33)		
Others	121	57 (47.11)	64 (52.89)	1.43 (0.86-2.40)		
Main Information Media	a					
Television	188	75 (39.90)	113 (60.10)	2.160*** (1.44-3.24)	2.00*** (1.31-3.07)	
Others (Radio, Newspapers)	202	119 (58.90)	83 (41.10)	1	1	
Knowledge on flood						
Poor	271	144 (53.14)	127 (46.86)	1		
Good	119	50 (42.01)	69 (57.99)	1.56* (1.01-2.41)		
Frequency of direct floo	d experi	ence				
Less than or equal 5 times	295	151 (51.19)	144 (48.81)	1		
More than 5 times	95	43 (45.26)	52 (54.74)	1.26 (0.79-2.01)		
Severity of flood experie	nce					
Less severe	216	121 (56.02)	106 (43.98)	1	1	
Severe	164	74 (45.12)	90 (54.83)	1.41 (0.94-2.11)	1.50* (0.95-2.37)	
Perceived vulnerability						
Low	216	112 (51.85)	104 (48.15)	1	1	
High	164	72 (43.90)	92 (56.10)	1.50* (1.00-2.24)	1.76* (1.09-2.78)	
Perceived severity						
Low High	236 154	119 (50.42) 75 (48.70)	117 (49.58) 79 (51.30)	1 1.07 (0.71-1.60)		
<b>Response efficacy</b>				(		
Low	259	136 (52.51)	123 (47.49)	1		
High	131	58 (44.30)	73 (55.70)	1.39 (0.91-2.12)		



Variables	Total	Emergency Flood Kit Items		Crue de OD	
		Less than or equal 5 items	More than 5 items	- Crude OR (95% CI)	Adj. OK (95% CI)
Self-Efficacy					
Low	215	108 (50.23)	107 (49.77)	1	
High	175	86 (49.14)	89 (50.86)	1.04	
-				(0.71 - 1.55)	
<b>Response Cost</b>					
Low	192	88 (45.83)	104 (54.17)	1.36	
				(0.91-2.03)	
High	198	106 (53.54)	92 (46.46)	1	

\* *p*-value < 0.05, if statistically significant at a = 0.05

\*\* *p*-value < 0.01, if statistically significant at a= 0.01

\*\*\* *p-value* < 0.001, if statistically significant at *a*= 0.001

# DISCUSSION

This study evaluated the factors influencing households' emergency preparedness and it was revealed that the overall preparedness in the study area was low. Education, income, knowledge, type of information media, severity of past experience and perceived vulnerability were found to be associated with households' emergency preparedness.

The findings from Multiple Logistics Regression showed that individuals with university or higher education were more likely to have more than five items of emergency flood kit than those with low education. This finding was consistent with a study conducted in Japan which provided that college graduated were more likely to perform household disaster preparedness than those with lower education status.<sup>13</sup> The result could be due to respondents with higher education have better knowledge and awearness of flood risk and disaster preparedness measures than those with lower education.

This study also indicated that households with monthly income more than 300,000 Myanmar Kyats were more likely to have more than five items of emergency flood kit than those households with monthly income lower than 300,000 MMK. The finding supported the results from a previouse study that households with higher income were more like to prepare for disaster than low-income households.<sup>14</sup> The result could be because households with higher income are more capable of purchasing resources needed for preparedness and adaptation measures.

In addition, households which obtained weather news from television were more likely to have emergency flood kit than those households' using other types of media (e.g. social media, radio, newspaper). This result might be because television was the best source of information in our study area which played an important role in risk communication with communities. Therefore, government sector should incorporate with the television enterprise to deliver the timely updated information to the community. In addition, early warnings of flood should be deliver through local and national television channels.

Furthermore, households which had been exposed to more sever flood experiences in the past were 1.50 times more likely to have emergency flood kit than those with less sever experiences. This result was supported by the study conducted by A. Atreya et al. who found out that individual who were exposed to severe flood incidences in the past ten years and lost more money were more likely to protect from flood than those with less severe experience.<sup>22</sup>





This could be because of the fact that households with more severe flood experiences learnt from the past, increase preparedness knowledge and performe better than those with less experiences.

Among the Protection Motivation Theory households which perceived factors. themselves as high vulenrable to flood were more likely to prepare emergency flood kit than those with low perceived vulnerability. This finding supported the previous study that individual who perceived their home were at high risk of typhoon were more likely to prepare for future typhoon than those with lower perceived risk.<sup>23</sup> The result could be interpreted that the respondents' perception on their vulnerability to floods could motivate the respondents to prepare for future floods.

In addition, respondents with good knowledge on flood preparedness measures were more likely to prepare emergency flood kit than those with poor knowledge. This finding supported the previous study that individuals with high knowledge level were more likely to prepare less for flood than those knowledge individuals.<sup>14</sup> This migh be due to the reason that more knowledge household member knows what to prepare, how to prepare and when to prepare for the flood risk than those with poor knowledge. Therefore, flood preparedness and risk reduction contents should be prioritized to add in the training and disaster education sessions to the communities.

# CONCLUSION

Household preparedness of flood in this study area, four districts of Kayin state, was found to be low. Education, income, knowledge, type of information media, severity of past experience and perceived vulnerability were found to be predictors of households' emergency preparedness. The findings in the result part could be beneficial for the policy makers to develop the effective risk communication to the household level. Further study should focus on the non-protective behaviours such as denial, fatalism, reliance on social support of the Protection Motivation Theory with the qualitative approach.

# RECOMMENDATIONS

The author suggested that flood preparedness education and trainings should focus on perceived vulnerability of households in order to protection motivation to prepare for flood. In addition, for long term sustainability, it is necessary to strengthen the economy and knowledge of local community with the available local resources.

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# FACTORS INFLUENCING SAFETY BEHAVIOR OF PESTICIDE APPLICATIONS AMONG TOMATO FARMERS IN THE INLE LAKE AREA, NYAUNG SHWE TOWNSHIP, SHAN STATE, MYANMAR

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# ABSTRACT

The Inle Lake Area is famous for producing tomato in floating gardens in Myanmar. It still remains a big gap of knowledge regarding safety pesticide use and its associated factors among farmers. The aim of this study was to identify safety behavior of pesticide application and its influencing factors among tomato farmers. This cross-sectional study was conducted from April to May 2020 among tomato farmers in Inle Lake Area. Tomato farmers were selected by using multi-stage sampling and data collected in tomato farmers who work in tomato farms and use pesticide, aged 18-60 years old. A total of 422 tomato farmers participated in this study by interviewing with structured questionnaires. Chi-square test and multiple logistic regression analysis were used to explore the associated factors. There were 422 participants that consisted of 325 men (77%) and 97 women (23%). Most of age was 31 to 45 years and were 85.3% of married. Nearly half of respondents (48.1%) had primary school level. Nearly thirty-six percent of respondents had the high level of safety behavior in pesticide application. Multiple logistic regression analysis indicated that educational level (AOR =2.07, 95% CI =1.26-3.41, p = 0.004), time of exposure (hours/day) (AOR =1.80,95% CI =1.05-3.09, p =0.033), knowledge level (AOR =1.82,95% CI =1.07-3.09, p =0.027), perceived severity (AOR = 3.65, 95% CI = 2.07-6.46, p < 0.001), perceived barrier (AOR = 1.96, 95%) CI =1.15-3.35, p = 0.013) and cue to action (AOR =2.30, 95% CI =1.26-4.29, p = 0.007) were significantly associated with level of safety behavior in pesticide applications. To improve safety behavior in pesticide application, health care personnel and agronomist should educate tomato farmers more regularly about how to use pesticide safely by giving training program to increase health awareness and health concern.

Keywords: safety behavior, pesticide application, tomato farmers, Myanmar

#### **INTRODUCTION**

Pesticides had carried out a key part to succeed in the production of modern food since the green revolution in the early 1970s. But, the excessive use of pesticides had detrimental consequences on human health and the environment, making it was a crucial public health concern.<sup>1</sup> Due to pesticide usage, nearly 1.3 billion workers worldwide in agriculture suffered from occupational injuries.<sup>2</sup> According to the records of ILO (International Labor Organization), 17,000 agriculturists were facing with a lethal effect every year.<sup>3</sup> Globally the incidences of pesticide poisoning were increasing with estimated 1-41 million people due to pesticide exposure every year (Pesticide Action Network - PAN International 2007). Each year, at least



of 300,000 people occurred deaths due to pesticides poisoning according to World Health Organization (2009). Ninety-nine percent of deaths due to pesticides poisoning were from low- and middle-income countries.<sup>4</sup>

Agriculture was one of the major areas of Myanmar economy. Myanmar had been now trying to transform its agriculture-based economy into agriculture based industrialized economy. The agriculture sector provided 40% of the Gross Domestic Product (GDP) and 47% of the external profits of Myanmar.<sup>5</sup> From Myanmar agricultural statistics (2004-2005), pesticides used for pests and disease control by crops in Myanmar was 26,461 pounds and 33,716 gallons.

From general survey data collected in 16 states and regional hospitals, Myanmar in 2003, 23 deaths occurred out of 216 acute pesticide poisoning cases by organophosphates, 9 deaths out of 89 acute pesticide poisoning cases by insecticide and 6 deaths out of 82 acute pesticide poisoning cases by rodenticide. From the reports of the Occupational and Environmental Health Department, the Ministry of Health and Sports, 45 deaths (60%) of deaths due to total acute poisoning cases) occurred out of 575 acute pesticide poisoning cases (19.9% of total acute poisoning cases) in 2016.6 In 2017, 33 deaths (70.2% of deaths due to total acute poisoning cases) occurred out of 480 acute pesticide poisoning cases (27.5% of total acute poisoning cases).7

Inle Lake Area was famous for producing tomato in floating gardens in Myanmar. The primary income of the native people was mainly derived from tomato production, one of the most important cash vegetable crops, comprising two third of the regions' agriculture.<sup>8</sup> For cabbage and cauliflower, farmers applied pesticides at the early age of plant but for tomato, farmers applied pesticides every 10-day interval, from transplanting until the last fruit was harvested. Farming workers used higher rates of pesticide in the monsoon (rainy) season than dry season since pest infestation is higher and tomatoes are intensively grown in the monsoon season.9,10 It still remains a big gap of knowledge regarding safety of pesticide use and its associated factors among farmers in Inle Lake Area where is one of the biggest regions of tomato plantation and farmers play an important role in the socioeconomic development.8 Safety behavior of pesticide use could be less harmful to the environment and community while improper pesticide use behavior can lead negative impact to health and environment.<sup>11</sup> According to this pesticide use throughout the year in demand of tomato production in this area, it created the researcher to study the influencing factors on safety behavior of pesticide usage by tomato farmers in Inle Lake Area.

Hence, the objective of this research was to identify factors influencing safety behavior of pesticide applications among tomato farmers in the Inle Lake Area, Nyaung Shwe Township, Shan State, Myanmar.

# METHODS

#### Study area

The study area was Inle lake area, which is situated in Nyaung Shwe Township, Shan State in Myanmar. It is the second largest lake in Myanmar at about 14 miles long and 7 miles wide and extends from approximately 20°159' to 20°459'N latitude and 96°499' to 96°489'E longitude, averaging 2900 feet above sea level.<sup>12</sup> Main business in this area is agriculture with the floating gardens.<sup>13</sup> Inle Lake floating gardens have become a national production area for tomatoes, supplying markets all over Myanmar.<sup>14</sup> Tomatoes, the primary cash crop, comprise two-thirds of the region's agriculture. The farmers routinely use pesticides for their crops.<sup>15</sup>



#### Target population

The target population was tomato farmers (male/female) who work in the tomato farms and prepare, mix, spray and dispose pesticide solution, aged 18-60 years old in Inle Lake Area, Nyaung Shwe Township, Shan State, Myanmar.

#### Sample size

Sample size for this study was calculated based on the following formula for the sample size estimation;

$$\mathbf{n} = \frac{Z^2 \alpha / 2 * p (1-p)}{d^2}$$

n = estimated sample size Z = standard normal deviation at 95% confidence interval = 1.96 p = the proportion of population perform preventive behavior of pesticide use in good level from the previous study =  $0.517^{16}$ 

d = allowance for relative error = 0.05

n = 
$$\frac{(1.96)^2 \times 0.52 \times (1 - 0.52)}{(0.05)^2}$$
  
n = 383.54 = 384

By adding 10% with consideration of non-response rate, the sample size was 422 in number.

#### Sampling technique

Multistage sampling technique was used to select the sample in this study. Each step of sampling was described as following:

Process 1: There are 240 villages in Inle Lake area, Nyaung Shwe Township. 57 villages were purposely selected due to they were the villages with higher tomato farms compared with the others.

Process 2: 57 tomato villages were divided into 4 groups based on geographic units, north, east, west and south by cluster sampling.

Process 3: From each cluster, numbers of tomato villages were proportionately sampled according to the density of villages in it and then simple random sampling technique was used to select tomato villages.

Process 4: Number of tomato farmers growing on floating gardens from tomato farms in tomato villages were selected by convenient sampling according to inclusion criteria and exclusion criteria. Questionnaires were asked by face to face interview by interviewers.

#### **Inclusion criteria**

- 1) Tomato farmers who living in Inle Lake Area, Nyaung Shwe Township, Shan State, Myanmar.
- 2) Age is between 18 to 60 years old
- 3) Participants who work in the tomato garden and prepare, mix, spray and dispose pesticides solution.
- 4) Willing to participate in the study and agree to sign the informed consent form.

#### **Exclusion criteria**

- 1) Participants who hired for apply pesticides from another area
- 2) Disable people and participants who could not be able to participate

#### **Research instruments**

The data were collected by face-to-face interviews using a structured questionnaire.





The questionnaire consisted of five parts as follows:

Part 1 asks 12 questions related to general information and characteristic of farmers regarding age, gender, marital status, education level, monthly income, duration of pesticide use, time of exposure (hours/day), (times/month), (times/season), number of farmer in family, type of pesticides frequently use in tomato farm and size of tomato farm.

Part 2 asks about knowledge on kind of pesticides, routes of exposure, harmful effect of pesticides and safety practice in using pesticides. The questionnaire was composed of 18 items. Each item was prepared as part of a standard answer (Yes, No, or Don't Know) and score ranged from 0–18. Knowledge level had classified into 2 levels as 50th percentile cut-off point. Scores were classified in 0-15 (< 50<sup>th</sup> percentile) as low level and 16-18 ( $\geq$  50<sup>th</sup> percentile) as high level.

Part 3 asks about perceived susceptibility to expose to pesticide, perceived severity of consequences from pesticide exposure, perceived benefits of adopting safety pesticide use behavior, and perceived barriers to adopt pesticide behavior. The safety use questionnaires for perceived susceptibility, perceived severity, perceived benefit and perceived barrier were composed of 15 items, 12 items, 12 items and 11 items that were rated on a 5-point Likert scale. Responses ranged from 1 (strongly disagree) to 5 (strongly agree) and score ranged from 1 to 5. Perceived susceptibility had classified into 2 levels as 50th percentile cut-off point. Scores for perceived susceptibility were classified in 15-62 (< 50<sup>th</sup> percentile) as low level and 63-75 ( $\geq$ 50<sup>th</sup> percentile) as high level. Perceived severity had classified into 2 levels as 50th percentile cut-off point. Scores for perceived severity were classified in 12-46 (< 50th percentile) as low level and 47-60 ( $\geq 50^{\text{th}}$  percentile) as high level. Perceived benefit had classified into 2 levels as 50th percentile cut-off point. Scores for perceived benefit were classified in 12-46 (< 50<sup>th</sup> percentile) as low level and 47-60 ( $\geq$  50<sup>th</sup> percentile) as high level. Perceived barrier had classified into 2 levels as 50th percentile cut-off point. Scores for perceived barrier were classified in 11-44 (< 50<sup>th</sup> percentile) as low level and 45-55 ( $\geq$  50<sup>th</sup> percentile) as high level.

Part 4 concerns cue to action to initiate for taking action. It will be potentiated by advice of the health care personnel, health information from mass media. There were 5 items based on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree). The score ranged from 5 to 25. Cue to action had classified into 2 levels as 50th percentile cut-off point. Scores were classified in 5-19 (< 50<sup>th</sup> percentile) as low level and 20-25 ( $\geq$  50<sup>th</sup> percentile) as high level.

Part 5 asks about individual's behavior in safety practice before, during, and after spraying pesticides. There were 30 items based on fours scale ranging 0 (Never done), 1 (Sometimes done), 2 (Often done) and 3 (Always). Scores varied from 0-90 points and had classified into 2 levels as 75<sup>th</sup> percentile cut-off point. Scores were classified in 0-72 (< 75<sup>th</sup> percentile) as low level and 73-90 ( $\geq$  75<sup>th</sup> percentile) as high level.

#### Validity and reliability of the instruments

A structured questionnaire was developed by review of related studies with strong reliability results and modified to suit the Burmese context. The research instrument was first developed in English and then translated Burmese version. The pre-tested questionnaire for reliability and validity was prior completed with 30 tomato farmers in the nearest and similar characteristics to the sample. Kuder-Richarson (KR-20) of knowledge questionnaire was 0.72. Cronbach's coefficient alpha of perception questionnaires (including perceived susceptibility, perceived severity, perceived benefit and perceived barrier) were 0.90, 0.87, and 0.89 respectively. Cronbach's 0.71 coefficient alpha of cue to action questionnaire



and safety behavior of pesticide applications questionnaire were 0.82 and 0.92.

#### Data Collection

Five research assistants from Rural Health Centers, which is located in area of chosen villages, were trained in the meaning of obtaining informed consent, keeping confidentiality, quality control and the protection of the respondents under the various legal and ethical rights. After completion of data collection was checked by each interviewer themselves and re-checked by the principal investigator daily for completeness and accuracy. Data collection process was done in May 2020.

#### Data analyses

The data were analyzed in SPSS version 21.0. Descriptive statistics (frequency, percentage, median, percentile, mean and standard deviation) were used to describe sample distributions. Chi-square test was used for analysis of association between independent variables and safety behavior of tomato farmers. Multiple logistic regression was used to examine the factors influencing safety behavior of pesticide applications.

#### **Ethical Considerations**

The study protocol was approved by the Institutional Review Board, Institute for Population and Social Research, Mahidol University (IPSR-IRB). The certificate of ethical approval number is 2020/03-110.

#### Results

#### Demographic and farming characteristics of Tomato farmers

The total participants were 422 tomato farmers. The demographic and farming characteristics of tomato farmers was shown in Table 1. More than half of tomato farmers (77.0%) were male. Tomato farmers had a mean age of 39.28 years  $(\pm 9.92$  SD). Most of tomato farmers was married (85.3%). About half of tomato farmers was at primary school level (48.1%). The income level of participants were mostly between 120001-200000 kyats per month was 46.2%. More than half of tomato farmers (60.4%) had below and equal to 10 years using pesticides. At this area, most of them worked in the tomato farms at least 2 hours per day (72.3%) in pesticide application, average time of exposure was  $3.6 \pm 1.13$  times/month and  $15.22 \pm 5.39$  times/season. Most of tomato farmers had  $\leq 2$  acres of tomato farm (66.6%) and had only one farmer (81.3%).

**Table 1** Demographic and farming characteristics of Tomato farmers (n = 422)

Characteristics	Tomato Farmers		
	n	%	
Gender			
Male	325	77	
Female	97	23	
Age			
18-30 years	98	23.3	
31-45 years	201	47.6	
46-60 years	123	29.1	
Mean = 39.28, SD = 9.92, Min = 18, Max = 60			
Marital Status			
Single	55	13	
Married	360	85.3	



Characteristics	Т	omato Farmers
	n	%
Widowed/Divorced	7	1.7
Education Level		
Illiterate	8	1.9
Primary school	203	48.1
Middle school	142	33.6
High school	56	13.3
College/University	12	2.9
Vocational school	1	0.2
Family income (kyats/month)		
Below 120000	113	26.8
Between 120001-200000	195	46.2
Between 200001-250000	23	5.4
Above 250001	91	21.6
Mean = 198483.41, SD = 144468.72, Min = 15000.	Max = 2500000	
Years of using pesticides		
$\leq 10$ years	255	60.4
11- 20 years	118	28.0
$\geq 21$ years	49	11.6
Mean = $11.76$ , SD = $8.16$ , Min = 1, Max = $39$		
Time of exposure (Hours/day)		
≤2	305	72.3
>2.1	117	27.7
Mean = $2.37$ , SD = $2.07$ , Min = $0.5$ , Max = $9$		
Time of exposure (Times/month)		
≤3	236	55.9
>3.1	186	44.1
Mean = $3.60$ , SD = $1.13$ , Min = $1$ , Max = $10$		
Time of exposure (Times/season)		
≤ 14	216	51.2
>14.1	206	48.8
Mean = $15.22$ , SD = $5.39$ , Min = $9$ , Max = $42$		
Number of farmer in family		
1	343	81.3
2 and above	79	18.7
Mean = $2.02$ , SD = $1.68$ , Min = $1$ , Max = $25$		
Size of Tomato farm		
$\leq 2$ Acres	281	66.6
> 2.1 Acres	141	33.4
Mean = $2.35$ , SD = $1.95$ , Min = $0.2$ , Max = $25$		

#### Pesticides used by tomato farmers in the Inle Lake area

The most commonly used pesticides were a mixture of chlorpyrifos and cypermethrin (41.7%) followed by mancozeb (41.2%) and cartap (40.0%) (Table 2). A mixture of chlorpyrifos and cypermethrin and cartap were classified by WHO as belonging to Class II, considered as moderately



hazardous. Mancozeb was classified as unlikely to cause acute hazard in normal use (Class U). A total of 26 active ingredients were used by tomato farmers in the Inle lake area for their tomato of the year 2020. Among the 26 ingredients, 21 were insecticides and 5 were fungicides. Most of the insecticides they used were moderately hazardous (Class II). For fungicides, copper Hydroxide and matalaxy were classified as moderately hazardous (Class II) and sulphur fell into a slightly hazardous class (Class III). Mancozeb and azoxystrobin were classified as unlikely to cause acute hazard in normal use (Class U) by the World Health Organization.

Active ingredients	Туре	WHO Class	n	%
Insecticides				<u> </u>
Acephate	Organophosphate	II	125	29.6
Chlorpyrifos	Organophosphate	II	73	17.3
Profenofos	Organophosphate	II	57	13.5
Cypermethrin	Pyrethroid	II	91	21.6
Lambda Cyhalothrin	Pyrethroid	II	113	26.8
Chlorpyrifos+Cypermethrin	Organophosphate+ Pyrethroid	II	176	41.7
Chlorpyrifos+Alpha-Cypermethrin	Organophosphate+ Pyrethroid	II	143	33.9
Profenofos+Lambda Cyhalothrin	Organophosphate+ Pyrethroid	II	82	19.4
Fenobucarb	Carbamate	II	46	10.9
Carbosulfan	Carbamate	II	77	18.2
Cartap	Carbamate	II	169	40.0
Thiodicarb	Carbamate	II	33	7.8
Imidacloprid	Neonicotinoid	II	63	14.9
Acetamiprid	Neonicotinoid	II	54	12.8
Abamectin	Avermetin	Ib	88	20.8
Emamectin benzoate	Avermetin	II	101	23.9
Indoxacarb+Lambda cyhalothrin	Oxadiazine+ Pyrethroid	II	58	13.7
Emamectin+Lambda cyhalothrin	Avermectin+ Pyrethroid	II	43	10.2
Fipronil	Phenyl Pyrazole	II	20	4.7
Indoxacarb+ Emametin benzoate	Oxadiazine+ Avermectin	II	41	9.7
Chlorantraniliprole	Diamide	U	23	5.4
Fungicides				
Copper Hydroxide	Copper	II	112	26.5
Mancozeb	Dithiocarbamate	U	174	41.2
Matalaxy	Phenylamide	II	150	35.5
Azoxystrobin	Strobilurin	U	94	22.3
Sulphur	Sulphur	III	79	18.7

**Table 2** Pesticides used by tomato farmers in the Inle Lake area (n = 422)

WHO Class Ia: Extremely hazardous, Ib: Highly hazardous. II: Moderately hazardous, III: Slightly hazardous. U: Unlikely to present acute hazard.

#### Knowledge, perception, cue to action and safety behavior of pesticide applications

Knowledge, perception, cue to action and safety behavior of pesticide applications was shown in Table 3. The majority of them had high level of knowledge in pesticide applications (60.7%). A half of tomato farmers ranked perceived susceptibility to expose to pesticides at a low level (52.4%). A half of tomato farmers ranked perceived severity from exposure to pesticides at a low level (51.7%). A half



of tomato farmers ranked perceived benefit to pesticides at a low level (50.9%). The majority of them had low level of perceived barrier in pesticide applications (63.5%). The majority of them had low level of cue to action about pesticide applications (69.4%). The majority of them had low level of safety behavior of pesticide applications (74.4%).

**Table 3** Frequency and percentage of knowledge, perception, cue to action and safety behavior of pesticide applications (n = 422)

Variables	n	%		
Level of knowledge				
Low (< 50 <sup>th</sup> percentile)	166	39.3		
High ( $\geq 50^{\text{th}}$ percentile)	256	60.7		
Mean = 15.57, SD = 2.01, Min = 1, Max = 18, 50 <sup>th</sup> percenti	le = 16			
Level of Perceived Susceptibility				
Low ( $< 50^{th}$ percentile)	221	52.4		
High ( $\geq 50^{\text{th}}$ percentile)	201	47.6		
Mean = $64.24$ , SD = $8.50$ , Min = $20$ , Max = $75$ , $50^{\text{th}}$ percent	tile = $63$			
Level of Perceived Severity				
Low (< 50 <sup>th</sup> percentile)	218	51.7		
High ( $\geq 50^{\text{th}}$ percentile)	204	48.3		
Mean = $47.47$ , SD = $6.45$ , Min = $12$ , Max = $60$ , $50^{\text{th}}$ percent	tile $= 47$			
Level of Perceived Benefit				
Low (< 50 <sup>th</sup> percentile)	215	50.9		
High ( $\geq 50^{\text{th}}$ percentile)	207	49.1		
Mean = $48.60$ , SD = $5.65$ , Min = $16$ , Max = $60$ , $50^{\text{th}}$ percent	tile $= 47$			
Level of Perceived Barrier				
Low (< 50 <sup>th</sup> percentile)	268	63.5		
High ( $\geq 50^{\text{th}}$ percentile)	154	36.5		
Mean = $43.28$ , SD = $8.56$ , Min = $11$ , Max = $55$ , $50^{\text{th}}$ percent	tile = $45$			
Level of cue to action				
Low (< 50 <sup>th</sup> percentile)	293	69.4		
High ( $\geq 50^{\text{th}}$ percentile)	129	30.6		
Mean = $20.20$ , SD = $2.63$ , Min = $9$ , Max = $25$ , $50^{\text{th}}$ percentile = $20$				
Level of Safety Behavior				
Low (< 75 <sup>th</sup> percentile)	314	74.4		
High ( $\geq 75^{\text{th}}$ percentile)	108	25.6		
Mean = $64.08$ , SD = $14.37$ , Min = $29$ , Max = $90$ , $75^{\text{th}}$ perc	centile $= 73$			

# Association between demographic and farming characteristics and safety behavior of pesticide applications

The results of association demographic and farming characteristics and safety behavior of pesticide applications were displayed in Table 4. Gender, age, marital status and income were not associated with safety behavior of pesticide application. Education had a significant association with safety behavior of pesticide application among tomato farmers (p = 0.001). In the farming characteristics, two variables, including time of exposure (hours/day) and time of exposure (times/season), had a significant association with safety behavior of pesticide application among tomato farmers (p<0.001 and p= 0.038, respectively). Four variables, including year of using pesticides, time of exposure (times/month), number of



farmer in family and size of tomato farm, had no significant association with safety behavior of pesticide application among tomato farmers  $(p = 0.230, 0.138, 0.728 \text{ and } 0.229, respectively}.$ 

**Table 4** Association between demographic and farming characteristics and safety behavior of pesticide applications

	Low level	High level	Crude	95% CI	p-value	
	Safety	Safety	OR		_	
	Behavior	Behavior				
	n (%)	n (%)				
Gender						
Male	241(74.2)	84(25.8)	1			
Female	73(75.3)	24(24.7)	0.94	0.56-1.59	0.827	
Age						
Below 40 years	173(75.2)	57(24.8)	1			
Above 41 years	141(73.4)	51(26.6)	1.09	0.71-1.70	0.677	
Marital Status						
Single	46(83.6)	9(16.4)	1			
Married and						
Widowed/Divorced	268(73.0)	99(27.0)	1.89	0.89-4.00	0.093	
<b>Educational Level</b>						
Primary school and below	172(81.5)	39(18.5)	1			
Middle school and above	142(67.3)	69(32.7)	2.14	1.36-3.36	0.001**	
Family income (kyats/mor	nth)					
Below 180000 kyats	140(70.7)	58(29.3)	1			
Above 180001 kyats	174(77.7)	50(22.3)	0.69	0.45-1.07	0.101	
Year of using pesticides						
Below 10 years	195(76.5)	60(23.5)	1			
Above 11 years	119(71.3)	48(28.7)	1.31	0.84-2.04	0.230	
Time of exposure (Hours/	day)					
≤ 2	241(79.0)	64(21.0)	1			
>2.1	73(62.4)	44(37.6)	2.27	1.42-3.61	<0.001***	
Time of exposure (Times/1	nonth)					
≤ 3	169(71.6)	67(28.4)	1			
>3.1	145(78.0)	41(22.0)	0.71	0.45-1.11	0.138	
Time of exposure (Times/s	season)					
≤ 14	170(78.7)	46(21.3)	1			
>14.1	144(69.9)	62(30.1)	1.59	1.02-2.47	0.038*	
Number of farmer in family						
1	254(74.1)	89(25.9)	1			
2 and above	60(75.9)	19(24.1)	0.90	0.51-1.59	0.728	
Size of Tomato farm						
Below 2 Acres	204(72.6)	77(27.4)	1			
Above 2.1 Acres	110(78.0)	31(22.0)	0.74	0.46-1.20	0.229	

p-value based on Chi-square test; \*p-value < 0.05, \*\*p-value < 0.01, \*\*\*p-value < 0.001



#### Association between knowledge, perception, cue to action and safety behavior of pesticide applications

Table 5 showed the association between knowledge, perception, cue to action and safety behavior of pesticide applications using Chisquare test. According to the study results, level of knowledge was significantly associated with level of safety behavior (p = 0.009). Perceived susceptibility (p = 0.001), perceived severity (p < 0.001), perceived benefit (p < 0.001), perceived barrier (p < 0.001). and cue to action (p < 0.001) were significantly associated with level of safety behavior of pesticide applications.

**Table 5** Association between knowledge, perception, cue to action and safety behavior of pesticide applications

Variables	Low level	High level	Crude	95% CI	P-value
	Salety Rehavior	Salety Rehavior	UK		
	n,(%)	n,(%)			
Level of knowledge					
Low (< 50 percentile)	135(81.3)	31(18.7)	1		
High (≥ 50 percentile)	179(69.9)	77(30.1)	1.87	1.16-3.00	0.009**
Level of Perceived Suscept	ibility				
Low (< 50 percentile)	180(81.4)	41(18.6)	1		
High ( $\geq$ 50 percentile)	134(66.7)	67(33.3)	2.19	1.40-3.44	0.001**
Level of Perceived Severity	,				
Low (< 50 percentile)	192(88.1)	26(11.9)	1		
High ( $\geq$ 50 percentile)	122(59.8)	82(40.2)	4.96	3.02-8.15	<0.001***
Level of Perceived Benefit					
Low (< 50 percentile)	176(81.9)	39(18.1)	1		
High (≥ 50 percentile)	138(66.7)	69(33.3)	2.25	1.44-3.54	<0.001***
Level of Perceived Barrier					
Low (< 50 percentile)	218(81.3)	50(18.7)	1		
High (≥ 50 percentile)	96(62.3)	58(37.7)	2.63	1.68-4.12	<0.001***
Level of cue to action					
Low (< 50 percentile)	242(82.6)	51(17.4)	1		
High ( $\geq$ 50 percentile)	72(55.8)	57(44.2)	3.75	2.37-5.95	<0.001***

*p*-value based on Chi-square test; \**p* < 0.05, \*\* *p* < 0.01, \*\*\* *p* < 0.001

# Factors influencing safety behavior of pesticide applications

Factors having a p < 0.05 in the bivariate analyses were analyzed using multiple logistic regression analyses (Table 6). Finally, the best predictive model was including six factors influencing safety behavior. namely educational level. time of exposure (hours/day), level of knowledge, level of perceived severity, level of perceived barrier and level of cue to action.

It was found that educational level (AOR =2.07, 95% CI =1.25-3.40, p = 0.004), time of exposure (hours/day) (AOR =1.79, 95% CI =1.05-3.08, p = 0.033), knowledge level (AOR =1.82, 95% CI =1.07-3.09, p = 0.027), perceived severity (AOR =3.65, 95% CI =2.07-6.46, p < 0.001), perceived barrier (AOR =1.96, 95% CI =1.15-3.35, p = 0.013) and cue to action (AOR =2.32, 95% CI =1.25-4.28, p = 0.007) were significantly associated with level of safety behavior in pesticide applications.



 Table 6 Multiple logistic regression results: Factors influencing safety behavior of pesticide applications

Variables	Adjusted OR	95% CI	P-value
Educational Level			
Primary school and below	1		
Middle school and above	2.07	1.25-3.41	0.004**
Time of exposure (Hours/day)			
≤ 2	1		
>2.1	1.79	1.05-3.08	0.033*
Time of exposure Times/season)			
≤ 14	1		
>14.1	1.05	0.61-1.80	0.858
Level of knowledge			
Low (< 50 percentile)	1		
High ( $\geq$ 50 percentile)	1.82	1.07-3.09	0.027*
Level of Perceived Susceptibility			
Low (< 50 percentile)	1		
High ( $\geq$ 50 percentile)	1.15	0.66-2.01	0.615
Level of Perceived Severity			
Low (< 50 percentile)	1		
High ( $\geq$ 50 percentile)	3.65	2.07-6.46	<0.001***
Level of Perceived Benefit			
Low (< 50 percentile)	1		
High ( $\geq$ 50 percentile)	0.57	0.30-1.10	0.095
Level of Perceived Barrier			
Low (< 50 percentile)	1		
High ( $\geq$ 50 percentile)	1.96	1.15-3.35	0.013*
Level of cue to action			
Low (< 50 percentile)	1		
High ( $\geq$ 50 percentile)	2.32	1.25-4.28	0.007**

*Remark: Method* – *Backward LR*, *p*-value based on logistic regression analysis; \*p < 0.05, \*\*p < 0.01, \*\*\*p < 0.001

#### DISCUSSION

The aim of this study was to identify safety behaviors of pesticide application and its influencing factors on safety behavior of pesticide application among tomato farmers. The best predictive model was including six factors influencing safety behavior, namely educational level, time of exposure (hours/day), level of knowledge, level of perceived severity, level of perceived barrier and level of cue to action. Tomato farmers ranked safety pesticide use behavior at a low level, accounted for 74.4 %, the rest was high level (25.6%). It means that the farmers still have unsafe behavior in using pesticide. This finding was similar with the results of most studies in other countries. Study in Thailand showed that the unsafe behavior, especially related to the use of improper personal protective equipment, were at a remarkably high level.<sup>17</sup> In France, researcher revealed that pesticide use behavior of participant was also observed at low and moderate level.<sup>18</sup>



Most of tomato farmers did not finish primary school. Lower education had more possibility to do unsafety behavior of pesticide application. That could cause difficulties for those farmers to read the labels and instructions containing how to take care of themselves from hazardous effects of pesticides on the pesticides containers. Similar to the previous studies of researchers<sup>4,19,20</sup>, most farmers had only basic education. In addition, there was a strong association between education and safe use of pesticides (p < 0.001) in this study. Poor educated farmers practice pesticides poorly compared to that of high educated farmers. This was similar to the studies conducted in Egypt<sup>20</sup> and the study from Cambodia.<sup>19</sup>

Most of the farmers applied pesticides to their field about 2 hours per day in the tomato fields and this information indicated that the farmers who work in tomato field could be exposed to pesticides.

Regarding to knowledge level of respondents, 60.7 % of the respondents had high level knowledge and 39.3 % had poor knowledge. This study was similar to the study in Gaza Strip in which 97.9 % had high level of knowledge. On the other hand, the majority of farmers had low knowledge.<sup>18</sup> In fact, there was association between knowledge and pesticides use practices (p-value<0.027) as in these studies from Palestine and United States of America.4,21

Perceived severity of consequence from exposure to pesticide was the consistent component to show the significant predictor of safety pesticide use behavior in this study. Perceived severity had was with safety pesticide use behavior (p < 0.001). This indicates that the more perceived severity, the more likely farmer is to report a good behavior. It implied that farmers who have high perceived severity of consequences from exposure to pesticide will do safety behavior more. A high perceived severity of pesticide hazard was correspondingly high risk pesticide use behaviors (p < 0.005).<sup>22</sup>

In this study, level of perceived barrier was significantly associated with level of safety behavior (p = 0.013). Perceived barrier to adopt pesticide behavior safety use were correspondingly pesticide behaviors (p < 0.05).<sup>17</sup> In addition, there were positive statistically significant correlations between perceived barriers and behavior scores (p < 0.001).<sup>23</sup>

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Cue to action initiate an individual to change safety behavior of pesticide use by health information from media and availability of training program. Tomato farmers with high level of cue to action were 2.320 times (AOR =2.32, 95% CI =1.25-4.28, p=0.007) more likely to perform safety behavior compared to those tomato farmers with low level of cue to action. The study in Iran found that cue to action was not associated with the safety behavior, representing p < 0.059.24

Our study suggests that urgent comprehensive intervention measures are needed to improve safety behavior in pesticide application to tomato farmers, their families and surrounding animals and ecosystems. Such measures could include training program on safety pesticide application, pesticide and health information in the formal education curriculum, adequate warning descriptions in local language and measures to reduce cost barriers to the adoption of safe behaviors. This study may guide policy makers to formulate intervention strategies.

# CONCLUSION

The finding of this study showed that safety behavior of pesticide applications was poor in these Inle Lake Area. In this study, there were six variables could predict safety pesticide use behavior (education, time of exposure (hours/day), knowledge, perceived severity, perceived barrier and cue to action). Tomato farmers who had high knowledge of farmer in using pesticide they would act to get safety pesticide use behavior. Tomato farmers with high perceived severity and perceived barrier had to perform safety behavior compared to



those tomato farmers with low level. With regard to obtaining health information, cue to action, by farmers about the use of pesticides, is one of the predictors for safety behavior of pesticide applications.

# RECOMMENDATIONS

This study had some limitations as the study was done only in Inle Lake Area and data may not be generalized for Myanmar agricultural workers. Since this is a cross-sectional study, the causal relationship cannot be inferred. Another limitation was lack of direct observation during farmers' safety behavior.

Training programs for tomato farmers was highly recommended to increase their knowledge about how to maintain, transport, and dispose the pesticides more safely and how to use personal protective equipment to reduce the risks of pesticide exposure. Careful and responsible use of pesticide among the farm workers in order to show a consideration for the environment was also needed. It was recommended that interventional studies should be conducted to increase safety behavior of pesticide applications.

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# HOUSEHOLDS RISK EVIDENCE ON DENGUE FEVER AMONG HOUSEHOLDS IN THE ENDEMIC AREA OF CENTRAL REGION, THAILAND

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# ABSTRACT

Dengue is the fastest-growing mosquito-borne viral disease in the world today, causing nearly 400 million infections and an estimated 20,000 deaths every year. Thailand, a dengue-prone region, was reported dengue infections exceeded 140,000 in 2015. Dengue fever is ranked as one of the most prevalent communicable diseases and leading causes of sickness in the community, Thailand. The objective of this study is to determine the factors associated with household risk evidence and knowledge, attitude, practice on dengue fever among households in the endemic area of the central region, Thailand. A cross-sectional study was conducted among 422 household respondents by using a structured questionnaire. SPSS version 21 was used to analyze data. Chi-square and multiple logistic regression analyses were conducted to determine associated factors of households risk evidence. Among a total of 422 respondents, 33.4% had a high-risk household index(HI) and 66.6 % low risk. Majorities of respondents were female (72.5%), married people (79.4%), the age range of 20-45 (51.4%), Buddhism (55.2%), high knowledge (72.7%), positive attitude (56.9%), and good practice (50.2). As the result of multiple logistic regression, age group (20-45) (AOR=3.93, 95% CI: 2.05-7.53), female sex (AOR=2.78, 95%CI:1.35-5.72), family member  $\geq$  5 (AOR=1.80, 95%CI:1.10-2.95) family income <15000Baht (AOR=0.23,95% CI:0.12-0.47), dengue knowledge training program at last 12 months (AOR=1.88, 95% CI:1.03-3.44), good knowledge on (AOR=3.24, 95% CI:1.62-6.47) and good practice (AOR=5.29, 95% CI:2.98-9.39) were significantly associated with households index(HI). According to the survey, the result shows that the endemic area needs to strengthen dengue prevention and control strategies and programs. The effective health promotion, health education activities, and awareness-raising for dengue fever control in the community by primary health care approach especially on households based environmental practice.

Keywords: dengue fever, household risk evidence, endemic area, Central Region of Thailand

#### **INTRODUCTION**

Dengue is a mosquito-borne viral infection that is common in subtropical and tropical regions of the world and it's also the most rapidly spreading.<sup>1</sup> Over 150 countries affect dengue infection. <sup>2</sup> The global incidence of dengue increased a 30-fold compare with over the past 50 years. Currently, more than 40 percent of the world's population is at risk of dengue, and an estimated that 390 million of dengue infections occured around the world. Dengue fever can exist everywhere that





Aedes aegeypti mosquitoes live. There are no vaccines currently anv or specific therapeutics, and substantial vector control efforts have not stopped its emergence and global spread.<sup>4</sup> In addition to the impact of morbidity and mortality, the dengue virus also carries a high financial burden on affected regions, many of which are ill-equipped to bear these costs.<sup>5</sup> Although it is initially believed that an infection mainly afflicted the pediatric age group, this infection has been rapidly spreading across all age groups.<sup>6</sup> According to the WHO, dengue is the leading cause of hospitalization and death in children in Southeast Asia especially Vietnam and Thailand.7

In Thailand, the first cases of dengue disease occurred in 1949; sporadic cases continued to be reported throughout the 1950s.<sup>8</sup> Thailand was faced with two large outbreaks in 1997 and 1998, with 101,689 and 126,348 cases reported, respectively.<sup>9</sup> DHF had become a leading cause of hospitalization and death among children in Thailand.<sup>10</sup> Before 2004, Thailand reported the highest number of annual dengue disease cases in Southeast Asia, with an average of almost 69,000 cases per year reported between 1985 and 1999.9 According to Thailand the Bureau of Epidemiology, Ministry of Public Health annual report in 2015, had 142,925 DENV cases as morbidity rates 219.46 per 100,000 populations.<sup>11</sup> Dengue as a burden of endemic in all four regions of Thailand. Since 2013-2015 the highest morbidity rate dengue occurred in the Central Region of Thailand. The morbidity rates of DENV cases were 183.73 per 100,000 populations in the Central Region of Thailand in 2015. It is increasing dengue burden because Phetchaburi and Ratchaburi province were the top five high dengue cases provinces every year while Bangkok was also continuously increasing dengue morbidity rates especially urban areas in the central region of Thailand every year.<sup>12</sup>

Nowadays, the main method to control or prevent the transmission of the dengue virus is to combat the mosquito vectors. Integrated community-based approaches, including addressing environment cleanliness, viruses, vector control, population mobility, and climate change need to be emphasized.<sup>13</sup> The successful implementation of the dengue prevention and control program depends on the knowledge, attitude, and practice of dengue fever prevention. The household risk evidence or entomological survey is also important in dengue prevention and control because it's associated with a dengue outbreak. By knowing the household risk level that can predict the risk of transmission of dengue fever.<sup>14</sup> The entomological survey conduct to predict the risk level of the dengue epidemic on the community, especially on house index (HI) and container index (CI) can predict the epidemic level and used to plan dengue prevention and control program. Therefore, this study conducted to determine factors associated with knowledge, attitude, and practice on preventive behavior of dengue hemorrhagic fever among households in the endemic area of the Central Region of Thailand. And also there was limited research deal with entomological survey (HI, BI, CI) as outcome variables. The finding of this study would benefit better management of effective dengue prevention and control, consequently reduce the morbidity and mortality of dengue fever in the endemic area of central region, Thailand.

# METHODS

# Study setting and population

Household-based a descriptive, cross-sectional study was conducted in the three endemic areas of urban, semi-urban, and rural areas central region of Thailand communities, involving three provinces namely Phetchaburi, Ratchaburi, and Bangkok by using a structured questionnaire. The sample size required for this study was estimated as 384 respondents. This calculation, using the formula form W.g Cochran, 1996), was based on previous study parameters (Mondo M, et al, 2003). We added 10 % of the calculated sample size (38) to compensate for missing data or non-responses





(the sample size became 422). In this study got 100 percent response rate. A systematic sampling method was used to select the representative of households from the three areas. Representative of household aged (20-60) years, only Thai Nationalities were included in this study.

#### Sampling technique

A total of 422 households participated in this study. In knowledge, attitude, and practice (KAP) survey and household environment risk evidence (entomological survey) was used multistage cluster random sampling and steps for the sampling. In the first step, the researcher selected 3 provinces the cluster sampling method criteria by the highest incidence of dengue fever in 2015. In the second step, the study sample comprises the household representative included 422 respondents in 3 areas were selected in a systematic random sampling method taking the first house in the center of the village as a random start. The total household respondents are 140,141, and 141 persons as Ratchaburi area, Phetchaburi area, and Bangkok area respectively. The researcher picks a starting point at the center of the village and sample every 5<sup>th</sup> household from that until we have reached a complete sample size.

#### Measurement

A questionnaire was developed previous study (Wachirawit et.al, 2017). The data collection process included two parts: firstly, the KAP questionnaire was designed to collect data on demographic characteristics, people's knowledge of dengue, attitude toward dengue, and preventive behavior practices on dengue prevention and control in their house. Secondly, investigation for household environment survey at indoor and outdoor of the home as an entomologic survey (HI, BI, CI index). House index (HI): percentage of houses infested with larvae and/or pupae. Container index (CI): percentage of water-holding containers infested with larvae or pupae. Breteau index (BI): number of positive containers per 100 houses inspected.<sup>15</sup> The results from the KAP survey were coupled with the results from an extensive entomologic survey (HI, CI and BI) during Januarys and March 2017.

KAP survey: In the socio-demographic factors consisted of 12 items regarding demographic data, such as age, sex, marital status, religion, education level, family pattern, the total number of a family member, occupation, household income, duration of stay, training experience, family history. The knowledge part included on awareness of knowledge about dengue fever was assessed by 15 questions with scores "zero" for "No, "Don't know" and "one" for "Yes". A total score varied from 0 to 15 scores. The classification level of knowledge was according to Bloom's classification.<sup>16</sup> Therefore, a high level of knowledge was interpreted for >80%, moderate level for 60-80%, and low level for < 60%. Attitude for 14 questions and classification of attitude level was according to by 5 rating Likert scales (strongly agree, agree, neither or not sure, disagree, and strongly disagree). Classification into two groups such as positive attitudes and negative attitudes. So, positive attitudes had been interpreted as  $\geq$  median and negative attitudes < median. Practice on dengue prevention control for 20 questions by using five Anchor Order on Item Response by 5 rating scales.<sup>17</sup> (rating scales are always, often, sometimes, occasionally/rarely, never). Total scores varied from 20 to 100 and it was categorized into two levels. Good preventive behavior and Poor preventive behavior. Therefore, Good preventive behavior was interpreted as  $\geq$  median and Poor preventive behavior < median.

**Entomological survey**: Larval surveys were conducted between January to March 2017 by three research assistant village health voluntary (VHV) by using a survey check-list. It included indoor and outdoor containers of household inspected to look for the presence of larvae and calculated as entomological indices (HI, BI, CI). Three lava indices, the house index (HI)



and container index (CI) will be calculated by the following formula,

(HI) House Index = Number of house infested × 100% number of house inspected Breteau (BI) Index Number of container infested  $\times 100\%$ Number of house inspected Container Index (CI) = Number of positive containers  $\times 100\%$ Number of containers inspected

According to Breau of Epidemiology, Department of Disease Control, Ministry of Public Health, Thailand, 2003 reference level of entomologic survey (households risk evidence) was categorized into safe, low risk, moderate risk, and high risk.

- Zero in any of HI, CI, and BI were categorized as a safe level
- The proportion between 1 to 10 in HI, between1 to 5 in CI, and between 1 to 5 in BI were categorized as a low-risk level
- HI between 10 and 50, between 5 to 9 in CI, and between 5 to 50 in BI were categorized as a moderate level
- The proportion of more than 50 in HI, more than 10 in CI, and more than 50 in BI were categorized as high-risk level

#### Statistical analysis

Descriptive analysis using frequency means, and median were used. For analysis of the relationships between demographic background, knowledge attitude, practice, and household risk evidence (HI, CI, and BI), used binary logistic and multiple regression procedures. Factors having a screening significance of P < 0.05 in univariate analysis were included in multivariate analysis. This analysis also included all possible two-way interactions in the full model. The final model was selected using a backward procedure. In the first step, all two-way interactions were excluded from the model. If there was no significant loss of fit as evaluated by comparing in binary and (chi-square distribution) the next step was to exclude the least significant factor until the model lost significant information compared with the previous model.

#### Ethical considerations

Approval of the study was obtained from the ethics committee of Mahidol University Social Science Independent Review Board (MUSSIRB) with the approval no 2020/018.02. The objectives and benefits of the study were explained to respondents. They were assured that participation was voluntary, and information would be confidential. Written consent was obtained from those who agreed to participate.

# RESULTS

Part (I) KAP survey: Table 1 shows the demographic characteristics of 422 respondents. Majorities of respondents were female (72.5%), married (79.4%), the age range of 20-45 (51.4%), Buddhism (55.2%). Concerning the educational background of the respondents, the majority of the respondents (52.4%) had primary school level education. According to occupation status, the majority of people were employees (43.7%) and only 6.9% of respondents were village health volunteers. The family pattern of respondents showed that (65.4%) of the respondents were nuclear family and the number of family members of households demonstrated that (51.8%) had more than five family members. Regarding family total income of respondents (58.1%) of families had income less than 15,000 Baht. The duration of stay in this area less than 27 were (51.2%). Most of the respondents (82%) had never been training dengue knowledge programs in the last 12 months. In percentage of family history about dengue fever infection found that (78.7%) of respondents had never received dengue infection and (21.3%) ever been. Among them (14.5%) of dengue patient were family members, (5.5%) were neighbor, (5%) infected themselves.



Socio-demographic variables	n	%
Age group		
20-45	217	51.4
46-60	207	48.6
Mean = 44.1, SD = 11.0, Min = 20, Max = 60		
Gender		
Male	116	27.5
Female	306	72.5
Religion		
Buddhism	233	55.2
Islam	139	33.0
Christian	19 <i>)</i> 49	11.6
Other	1	0.2
	1	0.2
Marital status		
Single	64	15.2
Married	335	79.4
Divorced/Widow/Separated	23	5.4
Education level		
No education	53	12.5
Primary school	221	52.4
Secondary school	103	24.4
Bachelor's degree	40	9.5
Master's degree	5	1.2
Family pattern		
Nuclear family	276	65.4
Extended family	146	34.6
Occupation		
Employee	181	13 7
Agriculture	65	<b>15</b> /
Agriculture Gevernment officer	12	13.4
Soller huginess	12	2.0
Johloga	00	10.1
JODIESS	10	3.0 15 (
	00	15.0
INON- V H V	373	<b>73.</b> 1
Family member		
< 5 members	205	48.6
> 5 members	217	51.4
Median = 10,000, QD = 14.4, Min = 1,000, Max = 100,000		

Table 1 Frequency and percentage of household respondents by Socio-demographic variables



Socio-demographic variables	n	%
Total family income (per month)		
< 15,000 baht	245	58.1
$\geq$ 15,000 baht	177	41.9
Duration stay		
$\leq$ 27 years	216	51
>28years	206	48
Median= 27, $Min = 3$ month, $QD = 15.5$ , $Max = 60$ years		
Family history about dengue fever infectious at last 12 months		
Never had dengue infection	332	78.7
Ever had dengue infection	90	21.3
Family history who got dengue fever infectious at last 12 months		
Yourself	21	5.0
Family member	61	14.5
Extended family	23	5.5
Others	10	2.4

Table 2. showed that the number and percentage of respondents who correctly answered by the frequency and percentage of knowledge level by poor knowledge and good knowledge level and (72.7%), of respondent were good knowledge level. Attitude towards dengue fever was classified into two groups positive and negative by using a median score. Just over half (56.9%) of the respondents had a positive attitude. The preventive behavior was decided by the tow group used as a median to the cutoff point; poor and good preventive behavior level. The (50.2%) of respondents had good preventive behavior.

 Table 2 Frequency and percentage of household respondents by KAP variables (n=422)

Variables	n	%
Knowledge level		
Poor	115	20.3
Good	307	72.7
Attitude level		
Negative	182	43.1
Positive	240	56.9
Preventive behavior practice		
Poor	210	49.8
Good	212	50.2

*Part (II) Entomological survey:* Table 3 indicated that the entomologic survey (HI) in three endemic areas in the central region of Thailand where was divided three living places as rural, urban, and semi-urban areas. The 196 out of 422 households found lava in the survey time. After that calculate the house index as the percentage of households that found larvae at survey time divided by the total



household's survey and multiply 100. Therefore, the household index was (46.5) and classified into low and high risk by using cutoff point 20.

Provinces	Total of	Total of	Number of	Number of	HI**
	households	containers	households that	containers that	(House index)
	survey(a)	survey (b)	found larvae at	found larvae at	(c)/(a) *100
			survey time(c)	survey time (d)	
Rural area	140	684	57	145	40.7
(Ratchaburi		Mean = 4.9		Mean = 1.0	
nrovince)		Min = 0		Min = 0	
province)		Max = 18		Max = 13	
Urban area	141	562	60	230	42.5
(Bangkok)		Mean = 4		Mean = 1.6	
		Min = 0		Min = 0	
		Max=22		Max = 10	
Semi-urban	141	1,172	79	231	56.0
(Phetchaburi)		Mean $= 8.3$		Mean = 1.7	
( )		Min = 0		Min = 0	
		Max = 31		Max = 19	
Total of three	422	2,418	196	606	46.5
endemic areas		Mean = 5.7		Mean = 1.5	
		Min = 0		Min = 0	
		Max = 31		Max= 19	

Table 3 Calculation of entomological survey (HI) in the endemic area of the central region of Thailand

*HI*, **\*\*-** *cutoff point* 20.

Table. 4 showed that the significant predictors of house index (HI). The age group(46-60) was associated with the house index and significant predictor. This group was a more high risk of house index (43.0%). Regarding gender, the female group was significant predictor of house index and (37.9%) had a high risk . Concerning monthly family income, the group of respondents who had ( $\geq$  15,000baht) per month was an association and significant predictors house index. In the knowledge part, a good knowledge level was a significant predictor for house index, and (41.4%) had high risk. For the result of preventive behavior, it was significant and the best predictor for house index.

Table 4 Significant predictors of House index(HI) by the binary and final model

Independent Variables	House inde	ex (HI)	Crude OR	Adjusted OR
-	High n(%)	Low n(%)	(95% CI)	(95% CI)
Age group				
20-45	52(24.0)	165(76.0)	1	1
46-60	89(43.0)	116(56.6)	2.44***	3.04***
	× ,		(1.60-3.69)	(1.84-5.01)
Sex				0.038
Male	25(21.6)	91(78.4)	1	1
Female	116(37.9)	190(62.1)	2.22**	1.87*
		~ /	(1.35-3.66)	(1.04 - 3.37)
Family member			· · · · ·	
< 5 members	83(40.5)	122(59.5)	1.86 **	1.80**
			(1.23-2.75)	(1.10-2.95)
$\geq$ 5 members	58(26.7)	159(73.3)	1	1



Independent Variables	House inde	House index (HI) High n(%) Low n(%)		Adjusted OR
-	High n(%)			(95% CI)
Total family income (per 1	month)			
<15,000baht	72(29.4)	173(70.6)	1	1
$\geq$ 15,000baht	69(39.0)	108(61.0)	1.54**	2.74***
			(1.02-2.31)	(1.61-4.68)
Dengue knowledge on a tr	aining program a	at last 12 month	S	
Never been	100(28.9)	246(71.1)	1	1
Ever been	41(53.9)	35(46.1)	2.88***	1.88*
			(1.73-4.78)	(1.03-3.44)
Knowledge level				
Poor	14(12.2)	101(97.8)	1	1
Good	127(41.4)	180(58.6)	5.09***	3.24**
			(2.78 - 9.30)	(1.62-6.47)
Practice behavior level				
Poor	31(14.8)	179(85.2)	1	1
Good	110(51.9)	102(48.1)	6.23***	5.29***
			(3.94-9.90)	(2.98-9.39)

\*= P-value <0.05, \*\*= P-value<0.01, \*\*\*= P-value <0.001

# DISCUSSION

In this part, highlighted discuss about the predicor of house index. As a result of this study showed that the house index was moderate level (46.5%) which close to high risk. Similar study conducted in Vietnam, found that the risk of dengue was significantly associated with high household index, household mosquito, container index, breteau index.<sup>18</sup> Beside, there was a positive association between the incidence of dengue and HI and the BI.<sup>19</sup> To reduce house index, the program should need to focus on integrated vector management followed by global strategies for dengue prevention and control guidelines (World Health Organization).<sup>20</sup> It was the most effective method to reduce the HI, CI, and BI. Dengue vector control programs with integrated approach to reduce the dengue indices was more effective than that of programs with environmental management alone.21

According to the age group especially older age group (46-60) had associated with outcome which linked with a previous study conducted in Brazil.<sup>22</sup> Concerning gender, the female was

a significant predictor of house index. A similar study conducted in Sudan, found the females were higher risk of developing dengue because they usually spend the majority of their time at home and the dengue vector breeds inside home environments.<sup>23</sup> The family with less than five members was a predictor of HI which consistant with a study conducted in Thailand. More than five family members perfomed household environment elimination activities against dengue prevention and control.<sup>24</sup>

Regarding family income, the high-income group ( $\geq$  15,000 Bahts per month) was associated with HI. The result was different from a study of spatial point pattern analysis and risk factors assessment which found that low-income groups had a higher risk of dengue infection.<sup>22</sup> However, a high risk of dengue transmission was observed in both low and high economic status.<sup>25, 26</sup> The respondent who ever been attended to training program in the last 12 months for knowldege of dengue was a predictor of house index. The people who already received training for dengue had done more interventions to reduce vector breeding sites and risk of transmission.<sup>27</sup> Thus, the result





of this study indicated to focus on the traning programs for dengue interventions.

In the part of association KAP and house index, good knowledge was a positive association and a significant predictor for HI. As the correct answer for knowledge about vector control every week around their house was 25.4%, they needed adequate knowledge about control vector breeding sites cleaning and elimination. On the other hand, they had good knowledge awareness of dengue but the poor practice of dengue prevention and control which consistant with the study conducted in North India.<sup>28</sup> Good preventive behavior practice was a predictor for HI. One study conducted in Kamphaeng Phet found that there was an association between dengue prevention practices and dengue vector indices.<sup>29</sup> In this study 60.7% had good practice for community participation but 52.8% for vector control management. Therefore, the dengue prevention and control programs need to emphasis on outdoor and indoor households enviroments cleaning practics to reduce dengue indecies. The current study was conducted in only three endemic areas and can not represent the entire population of this region. So, it recommends increasing the number of sample site in each area to representative each areas that make strongly research. This study used secondary data, it cannot add new variables and factors and also used cross-sectional study design only know the situation of study time. It may suggest that further study should explore the association that can be further investigated by more rigorous methods.

# CONCLUSION

The entomologic survey interpreted that risk level of dengue epidemic on community. The house index of current study found that moderate and categorized as high risk area (urgently to prevention and control), especially Phetchaburi province where was high risk on HI. Moreover, one-fourth of respondents still left poor in some important knowledge regarding to prevention and control practices especially in weekly cleaning household environment indoor and outdoor. After that mostly got dengue prevention and control information from the education programs without good in attitude and practice in daily life so finally still high dengue endemic in central region of Thailand. To make effective dengue prevention and control programs, it is necessary to use simple and non-technical words to avoid.Consequently, the program needs to focus on the eradication of dengue vector breeding sites and educational programs to increase knowledge and understanding of best practices.

# RECOMMENDATIONS

The outcomes of this study would help in implementing action towards the practice of dengue prevention and control program, reducing dengue mortality rates, morbidity rates, and decrease the burden of dengue to all area of Thailand. Public education is necessary to address the knowledge gap household members. VHVs, health staff and all stakeholders in community revealed in the study. The properly and effectively educate the people DF KAP of on household environment practice especially vector control measure. Promote public awareness to closing the gaps between attitudes and preventive behavior on household environment practice will remain an important. Promote household environment practice by used IVM approach integrated with health staff, VHV collaborate with local administrative. All of dengue prevention and control program should be evaluated and monitor by responsible staffs and nongovernmental organizations.

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# KNOWLEDGE AND ATTITUDE TO THE EFFECT OF SOLID WASTE ON COMMUNITY HEALTH AMONG COMMUNITY HEALTH STUDENTS IN MAGWAY, MYANMAR

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# ABSTRACT

Our society generates an enormous amount of solid waste. Most of it is municipal in origin; a substantial part is industrial and biomedical. Nowadays, abundant public health and environmental issues arise from improper solid waste management. Students are principally regarded as the future of the nation and schools are expected to develop their potential as advocates of the sustainable environment. This study aims to determine the knowledge and attitude level of community health students and factors influencing knowledge and attitude towards the effect of solid waste on community health. A cross-sectional descriptive study was conducted using web-based selfadministered questionnaires among community health students (n = 322) in the University of Community Health, Magway, Myanmar. Data were analyzed by SPSS version 21.0 using multiple logistic regression and Chi-squared tests with significant levels at 0.05. Majority of participants were male, single and less than 19 years students. Internet accessibility, information accessibility, learning about solid waste management, performing solid waste management activities, types of solid waste management activities, age group and education level of the students were significantly influenced the knowledge and attitude level of community health students. The community health students have a high knowledge level (61.2%) and high attitude level (64%) to the effect of solid waste on community health. The present study highlighted that it is warranted to launch community health education and skill development in the University of Community Health so that the next community health students will have better knowledge and attitude in solid waste management.

Keywords: solid waste management, knowledge, attitude

## **INTRODUCTION**

Solid waste can be characterized into miscellaneous types hinging on their source, household waste is generally recognized as municipal waste, whereas industrial waste refers to hazardous waste, and biomedical waste or hospital waste is demarcated as an infectious waste.<sup>1</sup> Solid waste can be engendered by various sources including domestic, commercial, industrial, healthcare, and agricultural activities.<sup>2</sup> Nowadays, solid waste generation is expressively increasing day bv dav due to rapid urbanization, industrialization, and exploding global population.<sup>3</sup> In accordance with the world-bank report, the global waste generation was about 0.68 billion tons per year one decade ago and the present global situation is about 1.3 billion tonnes per year around the world. It would





significantly rise to approximately 2.2 billion tonnes per year by the year 2025.<sup>4</sup>

Inappropriate disposal of solid waste can generate numerous health impacts on the community. Contamination of surface and groundwater principally through leachate or direct contact with solid waste may lead to community health problems. Municipal solid waste blocks the drains which fabricate the stagnant water for insect breeding and flooding especially in the rainy seasons. Other manifest health effects on community health are dengue outbreak, leptospirosis, and food poisoning by vectors like mosquitoes, insects, and rodents. Unrestrained burning of municipal solid waste incineration and improper contributes pointedly to urban air pollution. Moreover, greenhouse gases are produced from the decomposition of organic wastes in landfills, and untreated leachate pollutes surrounding soil and water bodies.<sup>5,6</sup>

Solid waste management (SWM) is one of the most critical challenges faced by developing countries.7 Myanmar is also grappling with challenging solid waste management and waste generation is noteworthily increasing due to rapid urbanization, rapid economic changes, increasing consumption level, and deficiency of effective waste treatment and disposal.<sup>8</sup> Some research studies found that knowledge and attitude of students is associated with age and education level.9,10 The University of Community Health is a university that produces community health professionals who are the main providers of primary health care in rural communities in Myanmar and the knowledge and attitude of community health students to the effects of solid waste on community health is very crucial to contribute to the community. However, a lack of research in terms of the effect of solid waste on community health among community health students in Myanmar discovered. this was From situation. knowledge, and attitude of community health students, the factors that influence knowledge and attitude to the effect of solid waste on community health were studied to provide planning and implementation to strengthen solid waste management systems and development of environmental sustainability.

# METHODS

## Study design

This study was a cross-sectional descriptive study by the web-based survey to determine the knowledge and attitude level of community health students and factors influencing of it towards the effect of solid waste on community health by implication for community health educational design.

## Study location

This study was undertaken at the University of Community Health (UCH), Myanmar. It is located in the large town of Magway of 50,000-249,999) (population range inhabitants. UCH was established in 1995 and its motto is to born public health specialists to uplift the health status of the nation. It is a university that produces community health professionals who are the main providers of primary health care in rural communities, Myanmar. There are twelve major academic departments in UCH, Magway including Community Health, Biomedical Science, Health Promotion and Health Education. Control, Environmental Health, Disease Educational Science and Field Research, etc. The university offers a four-year Bachelor of Community Health (B.Comm.H) degree Program and a one-year Master of Community Health (M.Comm.H) degree Program.<sup>11</sup>

## Participants and sampling procedure

The target population of this study included undergraduate students from the University of Community Health. It was purposively selected for the study because of UCH is a public health university under the Ministry of Health and Sports (Myanmar), and located in Magway, Myanmar. The graduates are the main providers of primary health care in rural



communities, Myanmar where access to regular physicians is difficult.<sup>11</sup> There were approximately 664 undergraduate students at the University of Community Health and the students who met the eligibility criteria were asked to participate in the study according to their willingness. Inclusion criteria were all undergraduate students (first year, second year, third year and final year) from the University of Community Health, the students who were accessible to the online system such as email, social media and websites and the students who were willing to participate included in this study. All undergraduate students who were accessible to online systems were invited to complete the questionnaires, 340 participants agreed to fill the questionnaire. However, 18 subjects were discarded due to incomplete and invalid data on key variables. Therefore, the total number of valid subjects was 322 in the study. The development for data collection lasted from May to June of 2020. The researcher designed the questionnaires by literature review and it was developed in English and then translated into Myanmar language through a back-translation process. This research was approved by the Committee for Research Ethics, Mahidol University Social Science, and Humanities Institute of Review Board (COA No. MUSSIRB 2020/068.3103).

#### Data collection tools

The data collection tools included four parts. Part I was the socio-demographic factors consisting of the background of the students. Part II was about the experiences of community health students depending on learning activities and information accessibility. Parts III and IV were about the knowledge and attitude to the effect of solid waste on community health. questionnaires Socio-demographic were general demographic information of the students and the other sections were developed by the objectives of the study and literature. The socio-demographic questionnaires consisted of 9 items, experiences questionnaires consisted of 7 items, knowledge questionnaires involved 10 items and attitude

questionnaires contained 10 items respectively. Knowledge questionnaires towards the effect of solid waste included consequences of improper solid waste management, significant health impact of industrial hazarous waste and hosiptal waste. Attitude questionnaires towards the effect of solid waste included responsibility of public health professionals related with solid waste management, significance of proper solid waste management and importance of reduce, reuse and recycle. Higher than 80% of total scores were classified to high knowledge and attitude levels of community health students. The researcher conducted a pilot test with 30 participants. Reliability tests for the parts on both knowledge and attitude were 0.88 of Conbrach's Coefficient-Alpha formula. Selfadministered questionnaires were verified by experts for accuracy, which covered the content validity.

## Data analysis

Statistical analysis was performed by IBM SPSS 21. The Chi-square test was used to determine associations between independent variables and dependent variables. The multiple logistic regression was used to determine the strength of relationships between independent variables and knowledge and attitude level of community health students. The *p*-value < 0.05 was considered statistically significant. The independent variables in this were learning activities, study sociodemographic characteristics and information access such as age group, education level, marital status, family member, family income, received scholarship, support organization, hometown, learned about SWM, hours of learning SWM, performed SWM activities, types of SWM activities, internet access for learning activities, information access for SWM and enough information by the teachers. The dependent variables in the study were knowledge and attitude towards the effect of solid waste on community health.



# RESULTS

According to the questionnaires, majority of students were male (74.5%), single (99.4%)and less than 19 years old undergraduate students (73.9%). Regarding the educational level, first-year students (22.7%), second-year students (25.2%), third-year (25.8%) and final year students (26.4%) participated in this study. Almost 70% of students had less than five family members and half of the students or 51.6% had household monthly income less than 200,000 Kyats (145 US\$). Twenty four students (7.5%) got scholarships from health foundation (BHS family), education foundation, and local foundations. Among the fifteen states and regions, most of the students come from the Sagaing Region (31.4%). Fiftytwo percent of the students learned about solid waste management in their syllabus and half of them learned about 6 hours and above. Most of the students (68.3%) performed solid waste management activities such as plastic campaigns (40.1%), collection garbage (15.8%), and sweeping (12.4%) respectively. The majority of respondents (85.4%) got internet accessibility to search for further information in learning activities. The data revealed that (74.8%) of respondents got access related solid information waste management and 43.2% of students got enough information by the teachers. Tables 1 and 2 show the knowledge and attitude level on the effect of solid waste on community health. Higher than 80% of total scores were classified to high knowledge and attitude levels and less than or equal 80% of total score; low knowledge and attitude level of community health students.

Table 1 Knowledge level of community health students towards the effect of solid waste on community health (n=322)

Knowledge	n	%
Low	125	38.8
High	197	61.2
Total	322	100

Table 2 Attitud	e level of com	munity health stu	udents towards tl	he effect of solid	l waste on communit	y
health (n=322)						

Attitude	n	%
Low	116	36
High	206	64
Total	322	100

Pearson chi-square analysis test was used to determine the association between independent variables and dependent variables. Tables 3 and 4 present the results of chi-square analysis covering the association between independent variables and knowledge and attitude level of community health students. The analysis revealed that the factors with age group, educational level, learned about solid waste management, performed solid waste management activities, types of solid waste management activities, internet accessibility, and information accessibility were found significantly associated with knowledge level and attitude level of community health students *p-value* < 0.05.



**Table 3** Associated factors of knowledge level towards the effect of solid waste on community health (Chi-square Test)

Factors	No. of cases	p-value
Gender	322	0.631
Age group (years)	322	<0.001*
Marital status	322	0.258
Educational level	322	<0.001*
Family members	322	0.258
Monthly family income (Kyats)	322	0.203
Received scholarship	322	0.060
Supported organization	24	0.992
Hometown (Origin of State and Region)	322	0.485
Learn about solid waste management	322	<0.001*
Hours of learning SWM	168	0.357
Performed SWM activities	322	<0.001*
Types of SWM activities	220	0.002*
Internet access for learning activities	322	<0.001*
Information access of SWM	322	<0.001*
Enough information by teachers	168	0.161

\* Significant level: p-value < 0.05

**Table 4** Associated factors of attitude level towards the effect of solid waste on community health (Chi-square test)

Independent factors	No. of cases	p-value
Gender	322	0.681
Age group (years)	322	0.014*
Marital status	322	0.287
Educational level	322	0.001*
Family members	322	0.503
Monthly family income (Kyats)	322	0.150
Received scholarship	322	0.107
Supported organization	24	0.442
Hometown (Origin of State and Region)	322	0.388
Learn about solid waste management	322	<0.001*
Hours of learning SWM	168	0.685
Performed SWM activities	322	0.021
Types of SWM activities	220	0.085



Independent factors	No. of cases	p-value
Internet access for learning activities	322	0.046*
Information access of SWM	322	<0.001*
Enough information by teachers	168	0.228
* Significant level: p-value < 0.05		

The following Table 5 and 6 present the results of multiple logistic regression analysis covering the strength of association to find the predictive factors of the dependent variables.

**Table 5** Factors influencing knowledge level of community health students towards the effect of solid waste on community health (Multiple logistic regression analysis)

Factors	Adjust		95% CI	of OR	p-value
	OR	Lower	I	Upper	
Gender					
Male	1				
Female	1.14	0.68		1.91	0.631
Age goup (years)					
<19 years	1				
19 and above	2.99	1.68	:	5.35	<0.001*
Marital status					
Married	1				
Single	0.00	0.00	-	-	0.999
Educational level					
First year	1				
Second year	1.45	0.77	4	2.74	0.252
Third year	3.55	1.82	(	6.96	<0.001*
Final year	3.26	1.68	(	6.31	<0.001*
Family members					
<5	1				
5 and above	0.76	0.47		1.23	0.258
Monthly family income					
<200,000 Kyats	1				
200,000 Kyats and above	1.34	0.85		2.10	0.204
<b>Received scholarship</b>					
No	1				
Yes	2.56	0.93	,	7.05	0.068
Supported organization					
Local Foundation	1				
Health Foundation	1.14	0.13		10.39	0.906
Education Foundation	1.14	0.08		16.95	0.923
Learn about SWM					
No	1				
Yes	2.79	1.76	2	4.44	<0.001*
Hours of learning SWM					
6 and above	1				
<6	0.67	0.34		1.33	0.252



Factors	Adjust		95% CI of OR	p-value
	OR	Lower	Upper	
Performed SWM activities				
No	1			
Yes	3.01	1.85	4.89	<0.001*
<b>Types of SWM activities</b>				
Plastic Campaign	1			
Garbage collection	2.33	1.00	5.41	0.049*
Sweeping	0.43	0.21	0.90	0.024*
Internet access for learning	activities			
No	1			
Yes	3.00	1.59	5.69	<0.001*
Information access of SWM				
No	1			
Yes	3.32	1.97	5.60	<0.001*
Enough information				
No	1			
Yes	1.82	0.78	4.22	0.165

\* Significant level: p-value < 0.05

**Table 6** Factors influencing attitude level of community health students towards the effect of solid waste on community health (Multiple logistic regression analysis)

Factors	Adjust		95% CI of OR	p-value
	OR	Lower	Upper	_
Gender				
Male	1			
Female	1.12	0.66	1.89	0.682
Age goup (years)				
<19 years	1			
19 and above	1.99	1.14	3.48	0.015*
Marital status				
Married	1			
Single	0.00	0.00	-	0.999
Educational level				
First year	1			
Second year	0.94	0.50	1.77	0.845
Third year	2.42	1.24	4.72	0.010*
Final year	2.66	1.35	5.21	0.004*
Family members				
<5	1			
5 and above	1.19	0.72	1.95	0.503
Monthly family income				
<200,000 Kyats	1			
200,000 Kyats and above	1.40	0.89	2.21	0.151



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Factors	Adjust	Adjust 95% CI of OR		p-value	p-value
	OR	Lower	Upper		
Received scholarship					
No	1				
Yes	2.26	0.82	6.21	0.115	
Supported organization					
Local Foundation	1				
Health Foundation	0.38	0.04	4.00	0.417	
Education Foundation	2.00	0.15	26.73	0.600	
Learn about SWM					
No	1				
Yes	2.62	1.64	4.19	< 0.001*	
Hours of learning SWM					
6 and above	1				
<6	0.15	0.58	2.31	0.686	
Performed SWM activitie	S				
No	1				
Yes	1.76	1.09	2.85	0.022*	
Types of SWM activities					
Plastic Campaign	1				
Garbage collection	2.27	1.04	4.95	0.039*	
Sweeping	0.92	0.44	1.93	0.832	
Internet access for learnin	ng activitio	es			
No	1				
Yes	1.88	1.01	3.50	0.048*	
Information access of SW	Μ				
No	1				
Yes	3.45	2.04	5.81	<0.000*	
Enough information					
No	1				
Yes	1.69	0.72	3.99	0.231	

\* Significant level: p-value < 0.05

## DISCUSSION

This study established that the high knowledge level of community health students was 61.2% and a high attitude level was 64%. Similarly, Philippine State University revealed that most of the students had satisfactory knowledge level by the classes to solid waste management (73.4%).<sup>12</sup> This study found that the age group was significantly associated with the knowledge and attitude level of the students. Similarly, Nigeria's study showed that a significant relationship was observed between students' age and knowledge of waste management.<sup>9</sup> The Iran study among Abadan residents found that the attitude of solid waste management was influenced by age.<sup>13</sup> Another factor educational level was significantly associated with the knowledge and attitude level of the students. Nigeria study described that a significant relationship was observed between students' educational level and knowledge of solid waste management <sup>9</sup> and Iran study found that educational level was significantly associated with the attitude of solid waste management.<sup>13</sup> The senior students, third year and final year students, have learned about solid waste management in the classes and therefore they have high knowledge level







than the junior students. Moreover, the students learned about solid waste management, performed solid waste management activities and types of solid waste management activities were significantly associated with the knowledge and attitude level of community health students. The result from Malaysia study found that previous recycling campaign involvement was significant to the level of recycling knowledge of the students.<sup>14</sup> Access to the internet and information was significant with the knowledge and attitude level of the students. The Malaysia's study demonstrated that the internet was regarded as students preferred choice of media to disseminate environmental information.<sup>15</sup>

Environmental knowledge and the attitude of young people, especially students, appears to be crucial as their point of view ultimately plays an important role in providing solutions problems.<sup>16</sup> to future environmental Environmental education is concerned with the level of knowledge and attitude of the students.<sup>17</sup> Therefore, the strategy to develop educational and skill development at the University of Community Health is very important. The implications of educational and skills development will enhance proficient and skilful knowledge to the students. We found many strengths in the syllabus and the curriculum. This study was the first research on the effect of solid waste on community health in Myanmar. Nevertheless, this study had quite a few limitations. This research was conducted by a web-based survey system due to pandemic COVID-19 and researchers prepared google forms to conduct data collection among community health students. It was conducted self-administered questionnaires instead of interviewer-administered questionnaires due to social distancing. Most of the students participated very enthusiastically however some students could not participate in the study due to the inaccessibility of the online system. Furthermore, the research was conducted within one month for data collection due to time limitations.

# CONCLUSION

Community health students are very critical for the community and they are the main providers of primary health care in rural communities in Myanmar. High knowledge level to the effect of solid waste on community health, 61.2%, and high attitude level. 64% existed among community students. health Age and educational level were found significantly associated with their knowledge and attitude level. Experience factors depending on learning activities such as learning about solid waste management, performed solid waste management activities and types of solid waste management activities were significantly associated with knowledge and attitude level of students. Additionally, experience factors depending on information access such as internet accessibility and information accessibility were significantly associated with knowledge and attitude level to the effect of solid waste on community health among students. Educational and skills development, appropriate teaching methods and media, the sustainability of environmental education are needed to develop students' knowledge and attitude about the effects of solid waste management on human health.

## RECOMMENDATIONS

Regarding the implication of educational and skills development, teaching health effects of solid waste on community and sustainable solid waste management should be developed and upgraded especially in the third-vear environmental health curriculum at the University of Community Health, Myanmar as the environment health is one of the major subjects in the third academic year. Likewise, teaching methods and media should also be developed to convey information to the community health students in both active learning and passive learning. Training and teachers refresher training of through programs, and seminars workshops, on environmental health issues should also be expanded to handle teaching and learning of



solid waste practices in university education. Creative teaching should also be developed that is a more student-centred class with less focus on teachers and more peer interaction. Besides, more field trips and activities should be arranged to enhance the knowledge level of community health students. In future research, the health effect of solid waste on the community, the findings of this study, could also catch on the ways of interaction with other The studies' tools. communities and institutions can be used more effectively for solid waste management by using the findings of the study. The future study should be a qualitative study method for a better outcome. Additionally, future studies should be conducted in a community setting or other institutions.

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# THE STUDY OF ASSOCIATION BETWEEN SOCIAL CAPITAL AND COMMUNITY PARTICIPATION ON DISASTER MANAGEMENT AMONG FLOOD AFFECTED HOUSEHOLD IN WARIN CHAMRAB SUB-DISTRICT, UBON RATCHATHANI, THAILAND

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# ABSTRACT

Over the last three-decades, more lives have been deprived by increase in natural disasters and imposed both health and economic impact directly to the human well-being. To mitigate this threaten, community has an imperative role to own the responsibility with public sectors. Concider this concept, community participation (CP) is a crucial factor for developing comprehensive disaster management. To draw the effective participation, social capital (SC) is one of the predictors that drives the people to involve in disaster risk reduction, which is recognized as "resources" enable individuals to ties to the community.

The disaster events concentrated more in Asia globally and Thailand is one of the most vulnerable countries in this region. The serious flood that occurred in 2019 and Ubon-Ratchathani (UR) province was one of the severely affected and flood-prone area in Thailand.

This research aimed to assess SC (network, governance/decision-making, trust/norms and cohesion) and CP-level, and investigate association between SC and CP among flood-affected households both before and during impact.

A cross-sectional survey was conducted with structured-questionnaire. Warinchamrab sub-district in UR province was selected purposively. Five-villages in which all households were officially reported as being flooded were chosen. Three-hundred-twenty households were recruited by simple-random-sampling. Data collection was conducted on during May, 2020. Multivariate statistics were applied for data analysis.

Three-hundreds-fourteen samples were validated out of collected 320 samples. The SC before and during-flood found altered, network, governance/decision-making and trust/norms positively changed and cohesion altered negatively) and over 80% respondents participated in community reconstructions. Multinomial logistic regression revealed that the cohesion before-flood and governance/decision-making during-flood were found significantly associated with community-level participation in during-flood(p-value<0.05, Exp(Beta)=2.45, 95%CI=1.23-4.86 and p value<0.05, Exp(Beta)=2.74, 95% CI=1.31-5.73 respectively.)

SC was affected both in negative and positive way in disaster situation and SC in the community found positive association with CP in during-flood among affected households. This research suggests implications to foster SC strategically to draw CP in disaster risk reduction policy.

Keywords: flooding, community participation, social capital, sustainable development, disaster risk reduction



# **INTRODUCTION**

Discussing about disaster is not talking about emergency, but rather talking about where we are living on. We are witnessing and sharing the circumstance of increasing natural disasters nowadays.<sup>1</sup> Once disaster strikes, many lives will be deprived and people need to survive under the unstable situations without sufficient livelihood which direct impact on our wellbeing. Simultaneously, in the Sustainable Development Goals (SDGs), it is clearly stated for immediate action for coping to the disaster risks which have brought us more than 1.6 million lives loss in over three decades. mitigate the vulnerability with sustainable development effort for quality of human life and health.<sup>2</sup>

Disaster events are concentrated more in Asia, especially the events of hydrometeorologicaldisasters. In this region, Thailand is one of the highest disaster frequency countries under and tropical climate geographical characteristics,<sup>3, 4</sup> as well as the highest rate of affected population which were estimated 60 million people in the last decade.<sup>5</sup> The latest flood that occurred on September in 2019, the tropical storms hit to the northeastern part, which brought severe flooding to Ubon Ratchathani (UR) province where is wellknown as flood-prone area in Thailand.<sup>6</sup> Perspectives of human-rights on security and protection, disaster risk reduction in disasterprone area might be required and contributes for further community development.

To reduce the risks, effective community participation (CP) is the crucial factor which will be built on what "resources" are already possessed in a community.<sup>7</sup> In other words of "resources", can be described as social capital (SC)<sup>8</sup> which contribute to individuals ties to the community and enable the community to mobilize the "resources" in disaster management. To draw CP, therefore, an assessment of the SC which the disaster affected community have already possessed might purposeful.

SC in this study as classified into two broad categories as "structural SC" including network and governance/decision-making and "cognitive SC" including trust/norms and cohesion in the community.<sup>9</sup> The past researchers have built a strong evidence of the role of SC in a disaster situation,<sup>10</sup> as well as its association to CP.<sup>11</sup>

This research aimed to achieve three objectives among flood affected households in Warinchamrab sub-district, UR province, Thailand; 1)assess SC; 2)examine CP-level; and 3)investigate the association between SC and CP.

## **METHODS**

## Study design and area

The cross-sectional survey was applied in this study. The research location was UR province in northeastern Thailand where located in the largest basin called "Khong-Chi-Mun basin"surrounded by 3-rivers. The historical record shows the serious flooding occurred several times<sup>12</sup> and the worst flood was in September in 2019 in 17 years which was brought by the Podul and Kajiki storms.<sup>13</sup> According to the official report, Warinchamrab district was severely affected by Mun river's overflow with the highest rate of affected households (60%) in UR.14 Warinchamrab subdistrict has been chosen purposely as the research field in Warinchamrab district.



#### Sample size and sampling technique

The study population was 1,835 households that were evacuated to the local shelters in Warinchamrab sub-district. The sampling steps have been undertaken as figure1 and five villages were determined from 100% households affected villages by cluster sampling techniques. The total sample size was calculated as 320 households and 10% of drop-out has not been added due to the covid-19 situation.



Figure 1 Sampling Procedure

#### Research instrument and data-collection

The structured questionnaire was developed and reviewed by three experts from AIHD Mahidol University. Data collection was organized and conducted on 23<sup>th</sup>-31<sup>st</sup> of May, 2020 by local assistant who had research experience.

The Independent-variable was SC.Measuring SC was developed by reference to the Social Capital Assessment Tool (SCAT),<sup>15</sup> Social Capital IQ test<sup>8</sup> and several Thai scholars examined SC in both disaster and general settings.SC was categorized into four contexts; 1)network; 2)governance/decision-making; 3)trust/norms; and 4)cohesion. Questionnaire were mixture with dichotomous and Likert-scale questions. The points were allocated to each question for scaling the grade 1 (low) to 5 (high). SC was evaluated by the score which was calculated summation from answers and divided by the number of questions in each

context.Furthermore,the level of each SC was classified into lower and higher by the cut-off point(median).Paired t-test was applied to examine the comparison of SC between before and during-flood.

The dependent-variable was CP of flood related activities. It was evaluated with 7 basic questions to categorize the level of CP into 3 levels as individual, community and societylevel. The questions were developed reference to Auditing Community Participation An Handbook.<sup>7</sup>The Assessment points were allocated for identifying the level of participation to the questions and categorized as; Q1 to Q4 for individual-level participation and provided 1 point for "yes" (highest score is 4 points); Q5 and Q6 for community-level and 5 points for each answer (Over 5 points was identified as "community-level" participation) and; Q7 for society-level and counted as 20 points (Over 20 points was identified as "society-level").



Wilcoxson signed rank test was applied to examine the comparison of CP between before and during-flood.In the final model, multinomial logistic regression was employed to analyze the association between independent and dependent variables.

#### Validity and reliability

The pilot-test was conducted with 30 samples to ensure validity by detecting unclear statements or confusable questions. Several questions were revised according to the local information and obtained understandable contents after the pilot-test. The reliability was tested by Cronbach's Alpha and obtained more than 0.7 alpha coefficient in every units of variables.

#### Table 1 Characteristic of respondents (n=314)

## RESULTS

In this study, 320 households were recruited and 6 questionnaires were excluded because there were more than one answer sheets blank. Finally, 314 respondents were applied for analysis.

### 1. Characteristic of respondents

# *1-1.* Socio-demographic status of population in study area

Socio-demographic characteristics were asked with 11-items (Table1). In Economic status, the household income was classified based on international poverty-line<sup>16</sup> with currency rates from Bank of Thailand, 2<sup>nd</sup>/March, 2020 (31.361THB=USD).<sup>17</sup>

Variables	Option	n (%)
Sex	Male	97(30.9)
	Female	217(69.1)
Age(Years)	< 20	4(1.3)
	21-30	27(8.6)
	31-40	37(11.8)
	41-50	70(22.4)
	51-60	86(27.5)
	>60	89(28.4)
Role in household	Head of household	241(76.8)
	Spouse/other	73(23.2)
Number of members	1-3	143(46.0)
	4-6	138(44.0)
	>7	30(9.6)
Number of under 5-years children	0	229(72.9)
	1	49(15.6)
	2	21(6.7)
	> 3	12(3.8)
Number of over 65-years elderly	0	227(72.8)
	1	71(22.8)
	2	14(4.5)
Number of disability/bed-ridden	0	286(91.1)
	1	27(8.6)
	2	1(0.3)
Marital status	Married/Live with partner	194(61.8)
	Divorced/Separated	22(7.0)



Variables	Option	n (%)
	Single	34(10.8)
	Widowed	64(20.4)
Education	Primary	181(57.6)
	Secondary	92(29.3)
	Vocational	19(6.1)
	Bachelor or higher	16(5.1)
	Non	6(1.9)
Occupation	Civil servant/government staff	9(2.9)
-	Private company	22(7.0)
	Agriculture	8(2.6)
	self-employed/freelance	144(46.0)
	Non	130(41.5)
Annual income (Baht)	≤21,600	76(24.8)
	21,601-35,999	54(17.6)
	36,000-61,919	34(11.1)
	≥61,920	142(46.4)

### 1-2. Severity of flood damage

The damage of the flood was assessed by 9 questions presented in Table2. Most of the respondents (96.7%) were evacuated and 95.8% stayed in shelter longer than 3 weeks. In terms of accessibility to basic needs (e.g.Water, Sanitation and Hygiene (WASH), Food), 67.8% could not access adequately. For physical and psychological damage, nearly 50% respondents needed medical treatment.

Table 2	Severity	of flood	damage
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Variables	Options	n (%)
Evacuation	Yes	262(96.7)
	No	9(3.3)
Degree of damage	Water lower-knee	4(1.3)
	Water higher-knee	26(8.3)
	Water covered whole-house	270(86.0)
	Damaged totally	14(4.5)
Length of water remaining	8-14 days	5(1.6)
	15-21 days	3(1.0)
	Over 22 days	305(97.1)
Length in shelter	Not evacuated	6(1.9)
	7 days or less	1(0.3)
	8-14 days	5(1.6)
	15-21 days	4(1.3)
	Over-21 days	298(94.9)
Accessibility to basic-needs	Hard/moderately-hard access	213(67.8)
	Neither	81(25.8)
	Greatly/Moderately access	20(6.4)
Physical-damage	No-injured/illness	153(48.7)



Variables	Options	n (%)
	Treated out-patient-	152(48.4)
	department(OPD)	
	Hospitalization	9(2.9)
Psychological-damage	No-damage	162(51.6)
	Treated OPD	146(46.5)
	Hospitalization	5(1.6)
Lost someone	-	5(1.3)
Repair-cost(Baht)	Min=0, Max=600,000, Median=20,000,	Mode=20,000,
	SD=45892.879	
Burden of repair-cost(%)	0-50.0	189(60.2)
(percentage in annual-income)	50.1-100.0	59(18.8)
	100.1-150.0	22(7.0)
	>150.1	44(14.0)

# 2. Social capital in the flood affected community

The SC is presented in Table3.

Lastly, the result of comparison of SC before and during-flood is presented in Table4.

### 2-1. Network

Overall network, 53.8% categorized as higher level before-flood and was risen to 66.2%during-flood. Most of the respondents didn't belong to formal and informal groups (77.1% and 81.2% respectively) and 64.7% did not know the frequency of meetings in the community before-flood, but 63.4% knew that meetings were held more than 3 times duringflood. The total score of network during-flood changed significantly compared to before-flood (p-value<0.05, 95%CI=-2.08--1.78).

## 2-2. Governance/decision-making

This section was asked about formal/informal leadership and the respondents' perspective toward their governance and decision-making in the community.The result showed 70% of respondents were categorized as higher-level and satisfaction for the governance/decisionmaking throughout before and during-flood. More than 80% respondents knew their formal leader(s) both before and during-flood. By contrast, only 34.7% recognized informal leader(s) before-flood, it rose up to 51.0% during-flood. Compared to before and during-flood, the total scores were changed significantly (p-value<0.05, 95%CI=-0.97--0.41).

## 2-3. Trust/norms

Trust have four-distinct types,1)generalized trust: 2)competence-based trust: 3)commitment-based trust; and 4)government trust. More than 70% of respondents answered that trust people generally(generalized-trust), as well as around 70% answered as no preferable to work with between family/friend (commitment-based trust) qualified and strangers (competence-based trust). Regarding norms, the participants were asked about their willingness to contribute time and money even though it might not directly benefit to them. Compared to the total score, these were significantly different (p-value<0.05, 95%CI=-0.42--0.08).

## 2-4. Cohesion

The questions were constructed to assess community togetherness and sharing common sense.

Refer to the analysis, before-flood obtained more higher score than during-flood and was altered significantly (p-value<0.05, 95%CI=0.01-0.14).



Table 3 Social capital in Warinnchamrab sub-district

Networks			<b>Before-flood</b>	During-flood
Variables		Options/Yes	n(%)	n(%)
Belong to t	formal-group	-	71(22.9)	
Type of for	rmal-group	(Local) government organization	27(39.1)	
		Nongovernment organization	0(0)	
		Village health volunteer	35(50.7)	
		Parent-committee	1(1.4)	
		Habit-club/others	4(5.7)	
Frequency	of community-	Don't know	194(64.7)	6(1.9)
meeting		Never	55(18.3)	12(3.8)
		Once	15(5.0)	28(8.9)
		2-times	4(1.3)	69(22.0)
		>3-times	32(10.7)	199(63.4)
Household	help each-		235(78.3)	300(95.5)
other				
Someone f	or personal-		151(48.6)	196(62.6)
help				
Belong to i	informal-group		59(18.8)	
Borrowing 10,000Baht		No/maybe no-one	111(35.6)	
		Not sure	86(27.6)	
~ 11		Maybe/surely someone	115(36.8)	
Call some	one for help			246(78.6)
Called for	help	_		196(62.6)
Level of network		Lower	145(46.2)	106(33.8)
-	<i>,</i>	Higher	169(53.8)	208(66.2)
Governanc	e/decision-maki	ng		
<formal-le< td=""><td>eadership&gt;</td><td></td><td>205(07.1)</td><td></td></formal-le<>	eadership>		205(07.1)	
Vote last el	lection		305(97.1)	
Formal-	Know	<b>TT 1</b>	256(81.5)	267(85.3)
leader	Trust	Untrusted	27(10.5)	28(10.8)
		Neither	57(22.2)	75(29.0)
		Trusted	172(66.9)	156(60.0)
	satisfaction	Unsatisfied	13(5.1)	13(4.9)
		Neither	4/(18.4)	61(23.0)
X 0 1		Satisfied	195(76.5)	191(67.2)
<informal-< td=""><td>leadership&gt;</td><td></td><td>100(24.7)</td><td>1(0(51 0)</td></informal-<>	leadership>		100(24.7)	1(0(51 0)
Informal-	Know	<b>TT 1</b>	109(34.7)	160(51.0)
leader	Trust	Untrusted	12(11.2)	24(15.0)
		Neither	23(21.3)	36(22.5)
		Irusted	73(67.6)	100(62.5)
	satistaction	Unsatisfied	4(3.6)	10(6.3)
		Neither	17(15.6)	38(23.8)
		Satisfied	88(80.8)	112(70.0)



Networks		<b>Before-flood</b>	During-flood
Overall satisfaction	Unsatisfied		11(3.5)
	Neither		82(26.2)
	Satisfied		220(70.3)
Level of	Lower	103(32.8)	89(28.3)
governance/decision-	Higher	211(67.2)	225(71.7)
making			
Trust/Norms			
<trust></trust>			
General-trust	Untrusted	17(5.5)	13(4.2)
	Neither	69(22.0)	59(18.8)
	Trusted	228(72.6)	242(77.0)
Specified-trust	family/friends	31(9.9)	25(8.0)
	Okay-both	212(67.9)	221(70.6)
	qualified strangers	69(22.1)	64(20.4)
Local-government trust	Untrusted	20(6.4)	16(5.1)
	Neither	100(31.8)	95(30.4)
	Trusted	194(61.8)	202(64.5)
Central-government trust	Untrusted	14(4.4)	27(8.6)
	Neither	107(34.2)	91(29.0)
	Trusted	192(61.3)	196(62.4)
<norms></norms>			
Time-contribution	Unlikely	11(3.5)	21(6.7)
	Neither	85(27.1)	66(21.0)
	Likely	218(69.5)	227(72.3)
Money-contribution	Unlikely	29(9.9)	40(12.8)
	Neither	66(22.4)	73(23.2)
	Likely	199(67.7)	201(64.0)
Level of trust/norms	Lower	126(40.1)	150(47.8)
	Higher	188(59.9)	164(52.2)
Cohesion			
Villagers help	Disagreed	11(3.6)	15(4.8)
	Neither	50(16.0)	60(19.2)
	Agreed	252(80.5)	237(76.0)
Villagers solve problem	Unlikely	34(11.0)	42(13.7)
	Neither	75(24.4)	92(29.9)
	Likely	199(64.6)	174(56.5)
Share common-sense/goal	Unlikely	13(3.8)	19(6.1)
	Neither	74(23.9)	67(21.3)
	Likely	227(72.3)	228(72.6)
Share flood-risk sense	Unlikely	13(4.2)	
	Neither	47(23.6)	
	Likely	195(72.3)	
Feel safe stay in home	Unsafe	71(22.6)	78(24.9)
alone	Neither	100(31.8)	95(30.3)
	Safe	143(45.6)	141(45.0)



Networks		<b>Before-flood</b>	During-flood
Recovery faster	Unlikely		42(13.4)
	Neither		88(28.2)
	Likely		182(58.4)
Level of cohesion	Lower	143(45.5)	131(41.7)
	Higher	171(54.5)	183(58.3)

**Table 4** Comparison of social capital between before and during-flood

SC contexts	Before flood		Durin	ng flood	Paired t-test
	Mean	SD	Mean	SD	t-value
Network	2.1	1.1	4.0	1.0	-25.5**
Governance/decision- making	4.8	2.7	5.5	2.2	-4.9**
Trust/norms	11.0	1.7	11.6	1.8	-2.9**
Cohesion	3.7	0.6	3.6	0.7	2.3*

\*p-value<0.05, \*\*p-value<0.01

## 3. Community participation before and during-flood

The descriptive statistic of CP is presented in table 5.

#### Table 5 Community participation

Levels	Questions	<b>Before-flood</b>	During-flood
		n(%)	n(%)
(Before)Individual-	knew flood plan	190(60.5)	
level	prepared emergency-kit	216(69.2)	
	close to the news/information	310(98.7)	
	discuss among family	306(97.5)	
(During)Individual-	evacuated		276(88.2)
level	manage yourself/family		311(99.0)
	cleaning house		313(99.7)
	attention to government-announcement,		310(98.7)
	news/information		
<b>Community-level</b>	(before-flood)discuss with	273(86.9)	
	neighbors/friends		
	work together with neighbors/friends		242(77.1)
	attend community organized activities	187(59.6)	175(55.7)
Society-level	attend (local)government meeting	118(37.6)	136(43.5)
<b>Overall</b> satisfaction	Very/moderately unsatisfied	25(8.0)	18(5.7)
with participation	Neither	73(23.2)	55(17.5)
	Very/moderately satisfied	216(68.8)	241(76.8)



The three levels of CP and comparison between before and during-flood are presented in Table6. In during-flood, 17.5% were individual-level and increased compared to before-flood. The significant change between before and during-flood was not found(p-value>0.05)

Participation-level	Before-flood	During-flood	Wilcoxon tes	st
	n(%)	n(%)	Ζ	p-value
Individual-level	30(9.6)	55(17.5)	-0.7	0.515
<b>Community-level</b>	166(52.9)	123(39.2)	(r=0.0)	
Society-level	118(37.6)	136(43.3)		
Total	314(100)	314(100)		

**Table 6** The level of community participation

#### 4. Association between social capital and community participation

The obtained result by multinomial logistic regression to analyze association between SC and CP is presented in Table 7.

The reference group of dependent-variables was set as individual-level of participation. Regarding independent-variables, reference groups were lower-score group in each SC context.

## SC before-flood and CP during-flood

The analysis revealed that the higher-score group of cohesion in community-level participation group was found significant versus lower-score of cohesion group (p-value<0.05, Exp(B)=2.45, 95%CI=1.23-4.86). For society-level participation, the higher-score group of network and cohesion were found significant versus lower-score group of each SC context (p-value<0.05, Exp(B)=2.03, 95%CI=1.06-3.91 and p-value<0.05, Exp(B)=2.73, 95%CI=1.37-5.44 respectively).

## SC during-flood and CP during-flood

The analysis revealed that the higher-score group of governance/decision-making and cohesion in community-level participation group was found significant versus lower-score group(p-value<0.05, Exp(B)=2.74, 95%CI=1.31-5.73 and p-value<0.05, Exp(B)=2.93, 95%CI=1.48-5.78 respectively). For society-level, the higher-score group of network (p-value<0.05, Exp(B)=2.93, 95%CI=1.48-5.78), governance/decision-making (p-value<0.05, Exp(B)=2.18, 95%CI=1.07-4.46) and trust/norm (p-value<0.05, Exp(B)=0.31, 95%CI=0.15-0.65) were found significant versus lower-score group of each context of SC, respectively.



Participation	Social capital	p-value	Exp(B)	95%CI
(During-1100d)	( <u>Before-flood</u> )			Lower-Upper
Community-level	Network	0.908	1.04	0.54-2.01
	Governance/decision- making	0.183	1.76	0.77-4.41
	Trust/norms	0.141	0.56	0.26-1.21
	Cohesion	0.011*	2.45	1.23-4.86
Society-level	Network	0.034*	2.03	1.06-3.91
	Governance/decision- making	0.080	0.50	0.23-1.09
	Trust/norms	0.386	0.72	0.34-1.52
	Cohesion	0.004**	2.73	1.37-5.44
Community-level	Network	0.146	1.64	0.84-3.18
	Governance/decision- making	0.007**	2.74	1.31-5.73
	Trust/norms	0.517	0.79	0.38-1.63
	Cohesion	0.213	1.57	0.77-3.18
Society-level	Network	0.002**	2.93	1.48-5.78
	Governance/decision- making	0.033*	2.18	1.07-4.46
	Trust/norms	0.002**	0.31	0.15-0.65
	Cohesion	0.299	1.45	0.72-2.94

Table 7 Association between social capital and community participation

\**p*-value<0.05, \*\**p*-value<0.01

# DISCUSSION

#### Social capital in disaster

In the result, every context of SC during-flood compared before-flood altered to in Warinchamrab sub-district. Network, which assistsed the affected people to access to the aid-distributions information, and an opportunity to link the individual to the during an emergency,<sup>10</sup> community was increased during-flood, particularly, respondents who knew the community-meeting during-flood elevated dramatically.

In governance/decision-making, disasters often led to negative consequences to lose the trust toward the leaders if their performances did not needs.<sup>18</sup> meet the residents' In this study, however, the result revealed that governance/decision-making score was raised during-flood, especially respondents who recognized informal-leader(s) were increased. This result is back-upped its efficiency by the prior study which discussed the importance of informal-leadership for an effective disaster response.<sup>19</sup> Moreover, 70.3% of respondents showed their satisfaction with the leadership



and 54.8% of them answered as recovered faster, this is supported as a higher trust to the community-leadership will reflect to higher satisfaction and quicker recovery on their reconstruction.<sup>10</sup> Regarding trust/norms, the general-trust was more enhanced during-flood to accept anyone to work with. Moreover, both local and central government-trust were rised during-flood. The similar result was shown in the Philippines after Typhoon-Washi in 2011.<sup>20</sup>

In contrast, the cohesion appears diminished during-flood. The prior study argued that disasters affect negatively to community cohesion,<sup>10</sup> the likely reasons were examined by some case studies<sup>21, 22</sup> as most of the people were suffered from disaster concurrently, cohesion is less effective in providing mutual assistance among households and similar result was shown in this study. Interestingly,the survivors in Japan expressed greater interest in civic-activities and involvement in Tohoku-earthquake in 2011, this finding existed among those with fewer losses or who recovered more quickly<sup>23</sup> as little suffering will make the affected people tend to help the others.

# Community participation among flood affected households

Around 80% of respondents participated in the community-level of disaster recovery activities in Warinchamrab sub-district during-flood. A study discussed the strength of CP in Thailand was "capable of making their own decisions and organizing themselves to assist each other."<sup>24</sup>

## Social capital and community participation

The result revealed that cohesion before-flood was associated with the affected people's participation. Additionally, network and cohesion before-flood were significantly associated with the society-level participation. Three contexts of SC, exept cohesion which was declined compared to before-flood, were found associated with higher level of CP

during-flood. significantly The positive association between cohesion and CP was not contradicted from the prior study as "the cohesion was predicted by a degree of participation".<sup>25</sup> However, cohesion was affected negatively by the direct impact and was not found associated between cohesion during-flood and CP. Regarding network, increased opportunity for attending the community meeting during-flood might facilitate the people's participatory action in this study. Considering the multi-dimension of SC, Jicha KA (2011)'s study of SC dynammics by the path-analysis, network was the strong predictor to influence positive effect on reciprocity (cohesion) and cohesion had a positive effect on social-trust.<sup>26</sup> This guides us that each dimension of SC may interact with one another. Moreover, the network might be expected to complement declined cohesion during emergencies while they were suffered from the catastrophe and might enable people to participate in their recovery activities consequently. Importantly, for the disaster affected people, even they were facing difficulties in their life, more participation led to more satisfaction which will avoid a negative outcome in mental health.

## Implication of the study

This study is expected to contribute for further assessment of SC in flood-prone community to establish community-based disaster management (CBDM) for sustainable community resilience and preparedness to draw effective CP.

## Limitations and strength

Several limitations of this study must be considered. First, the result on casual relationship between SC and CP is difficult to interplete because of the limitations of quantitative cross-sectional study analysis. Second, confounding factors may have some influence to the outcome of the study, such as sociodemographic factors and severity of the





damage. Third, the questionnaire might have information bias such as recall and observer bias.

Despite the limitations, the strength of this study is obtaining the result of SC in deferent disaster phase and revealed its transformation (dynamics) of the SC. This result might enhance the result of empirical studies of SC in disaster management.

# CONCLUSION

Much research has investigated how the SC can influence to post-disaster recovery.<sup>10</sup> In this study, certain level of SC and CP were investigated. Simultaneously, the research found the dynamics of SC in a disaster situation and was affected both in positive and negative ways. Moreover, SC was connected and might influence the residents' participation in postdisaster reconstruction. This study is expected to assist to understand the transformation of SC by the disaster impact and its relationship with CP in terms of effective CBDM to overcome collective action problems and obstacles that are often seen in a post-disaster situation.<sup>27</sup>

## RECOMMENDATIONS

The author recommends to proceed more further research to investigate the background of SC and association to CP for more deep analysis. In addition, this research recommends for policy-maker to utilize these findings to foster SC strategically which contributes to draw CP for a more effective disaster risk reduction policy.

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# ASSOCIATION BETWEEN SANITARY TOILET COVERAGE RATE AND INTESTINAL INFECTIOUS DISEASE IN JIANGSU PROVINCE, CHINA

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## ABSTRACT

Intestinal infectious diseases are one of the most common disease group prevalent worldwide. It is also one of the commonly report acute infectious diseases in Jiangsu Province, China. Chinese government had announced the China's toilet improvement campaign for more than decades. The purpose of this ongoing campaign is to improve the hygiene and promote health. However, there are limited studies evaluating the effect of toilet improvement and the incidence of intestinal infectious diseases. This study aims to determine the association of the increasing of sanitary toilets and intestinal infectious diseases in Jiangsu Province, China. The research used an ecological study design, taking Jiangsu Province as the unit of analysis. The toilet coverage rate and the incidence of intestinal infectious diseases from 2011 to 2019 were obtained through Jiangsu Provincial Health Commission with permission of using secondary data. The water quality and other environmental data (i.e. temperature, rainfall) were obtained from Jiangsu Water Resources Bureau and Statistical Bureau, respectively. Descriptive analysis was used to describe the distribution of toilet coverage and the incidence of intestinal infectious diseases. Multiple linear regression analysis was performed to investigate the association of toilet coverage rate and intestinal infectious disease. From 2011 to 2019, the total incidence of strictly control Type A (cholera) and B (hepatitis A, E, and untyped viral hepatitis, bacillary and amoebic dysentery, typhoid and paratyphoid) intestinal infectious diseases (IIDs) together in Jiangsu Province showed a downward trend from 20.05/100,000 to 8.08/100,000 cases. Type C IDD (i.e. other infectious diarrhea and hand-foot-mouth disease) accounted for more than 90% of all IIDs and showed a fluctuating change over study period. The accumulative households using sanitary and harmless toilets, public toilets in Jiangsu Province were increased over time. Final multiple linear regression analysis results suggested that the incidence of Type A and B IDDs together was negatively associated with the accumulative use of sanitary toilet  $(\beta = -0.036)$  and surface water quality  $(\beta = -0.135)$  with p < 0.05. This study revealed that the toilet improvement campaign and water quality control can reduce the number of new cases which benefit the population in the province. However, this study used the secondary data which lack of the personal characteristics and behavior of using toilet of each individual. Further study may be conducted at the household level and the recommendation for individual can be provided.

Keywords: sanitary toilet, harmless toilet, intestinal infectious disease, China



# **INTRODUCTION**

Sanitary and safe toilets are the premise of health, dignity, privacy and education.<sup>1</sup> The concept of fertilization during the period of farming civilization, that is, collecting human waste for agriculture is the source of toilet hygiene problems in China. The prevention and control of diseases cannot proceed smoothly and the incidence of intestinal infectious diseases was very high. After the founding of the People's Republic of China, toilet hygiene received more attention.<sup>2</sup> In the early years of the People's Republic of China, sanitary conditions were poor, the environment was abominable, and endemic diseases and infectious diseases were prevalent. Coupled with the threat of germ warfare, the patriotic health campaign was carried out nationwide.<sup>3</sup> China's toilet improvement originated from the patriotic health campaign in the 1960s. It runs through the activities of "killing four pests" and "two managements and five reforms" in 1970s. In the 1980s, the concept of sanitary toilets and basic hygiene standards were basically established. In the 1990s, the National Patriotic Health Commission decided to carried out pilot construction of rural sanitary toilets throughout the country. In 2015, General Secretary Xi Jinping made important instructions on the toilet revolution and demanded that the toilet revolution be extended to the vast rural areas.4

However, about 17 million household in China still have serious sanitation problems due to poor toilet conditions. According to the main data bulletin of the third national agricultural census in 2017, only 48.6% of rural households have access to sanitary toilets, while 2 % still do not have toilets.<sup>5</sup> The limit of toilet accessibility can lead to the spreading of intestinal infectious diseases.

Intestinal infectious diseases are one of the most common diseases in the world, with high morbidity but low mortality. Even in developed countries, the morbidity and economic costs remain high.<sup>6</sup> In China, intestinal infectious diseases are also the main types of infectious diseases, and they are also the most prevalent acute infectious diseases.<sup>7</sup> Compared with the epidemic in 2018, the morbidity of 2019 has decreased by 7.6% but the mortality has increased by 18.8%. The incidence of other infectious diarrhea and hand-foot-mouth disease reached 95 per 100,000 and 137 per 100,000, respectively.

The popularity of sanitary toilets may influence intestinal infectious diseases. Some studies have demonstrated that poor toilet hygiene is a risk factor for intestinal infectious diseases, but no direct evidence has been drawn that there is a between sanitary toilets relationship and intestinal infectious diseases. The World Bank estimates that inadequate sanitation and unsafe discharge of toilet water cause intestinal infections in about 1.5 million children each year.<sup>8</sup> Many studies in developing countries revealed that the limited of toilet access can cause more intestinal infectious diseases and the most vulnerable group are the children.<sup>9-11</sup>

A study in Guangxi Zhuang Autonomous Region, China, showed that the incidence of intestinal infectious diseases in the entire region has decreased year by year after the implementation of the toilet improvement. Similar results were also reported in Jiangxi Province as well.<sup>12</sup>

During 2013-2017, there was a significant difference in the incidence of intestinal infectious diseases in areas with and without toilet improvement in Tai'an city, China, and the incidence of major intestinal infectious diseases in areas with improved toilet was significantly lower. However, the incidence of infectious diarrhea has shown an upward trend during these five years, and the specific reasons have not been further studied.<sup>13</sup>

Jiangsu Province actively implements the national health work policy, and the health creation ranks first in the country. The rural toilet improvement in Jiangsu Province have been in the forefront of the country and the popularity of sanitary toilets has also grown rapidly. There are



many opportunities to present the experience of improving toilets at national conferences.<sup>3</sup> According to the latest data released in 2019, intestinal infectious diseases are common infectious diseases in Jiangsu Province, accounting for about 45% of all legally reported infectious diseases, especially hand-foot-mouth disease, with a higher incidence than any other infectious diseases.

To our knowledge, there is a very limited study conducted in Jiangsu Province. Therefore, in this study we aim to study the association of the increasing of sanitary toilets and intestinal infectious diseases in Jiangsu Province, China during 2011-2019 when the data recording has been started. In addition, water resource quality, vector density, population density and other environmental factors were also analyzed. Through literature review, water transmission and insect transmission are two of the transmission modes of intestinal infectious diseases, and these have a certain impact on intestinal infectious diseases. The findings may provide a baseline evidence to formulate the disease prevention effective and control measures.

# **METHODS**

## Study design

This study was conducted using an ecological retrospective study design. An ecological research is to study the relationship between certain factors and diseases at the group level. In this study, Jiangsu Province was considered as a single unit of analysis with retrospective data from 2011 to 2019. None of individual data are exposed nor used in the analysis. Only secondary data of Jiangsu Province were utilized. All secondary data were legally applied with the permission to access. The study protocol was approved by the Ethical Reviewing Board Committee of Chulalongkorn University (Ethic No. 102/2020).

#### Data collection

All data used in this research were the secondary data for the period from 2011 to 2019.

### Dependent variable

#### Intestinal infectious diseases

Intestinal infectious diseases selected the diseases that included in the list of legally reported infectious diseases in China. There are 3 types of intestinal infectious diseases included in this study. Type A includes cholera [ICD-10-A00.]. Type B includes typhoid[ICD-10-A01.0], paratyphoid[ICD-10-A01.1-A01.4), dysentery (i.e. bacillary dysentery[ICD-10-A03.0] and dysentery[ICD-10-A06.0]), amoebic viral hepatitis (i.e. hepatitis A[ICD-10-B15.], hepatitis E[ICD-10-B17.2], and untyped hepatitis[ICD-10-B19.]. Type C includes Other infectious diarrhea (i.e. infectious diarrhea other than cholera, bacterial and amoebic dysentery, typhoid fever and paratyphoid fever [ICD-10-A09]), hand-foot-mouth disease [ICD-10-B08.4]. They were retrieved from Jiangsu Commission of Health.

The total incidence of intestinal infectious diseases (3 types) for each year were calculated as:

```
Total incidence = \frac{Total no. of intestinal infectious diseases for each year}{the total population of Jiangsu Province} \times 100,000 \dots [eq.1];
while the incidence of each disease was calculated as:
Incidence of each disease = \frac{No. of reported cases of each intestinal infectious disease}{the total population of Jiangsu Province} \times 100,000 \dots [eq.2]
```

#### Independent variables

#### Sanitary toilet

In this study, sanitary and harmless sanitary

toilets, sanitary public toilets were included. The sanitary toilet was defined as the toilet with fences and roofs. The septic tank for wastes collection was impermeable and airtight. The





toilet is clean, free of fly maggots, odorless, and feces remove were required. The Harmless sanitary toilet was defined as the toilets that meet the basic requirements of sanitary toilets. Additionally, it should have facilities for the decontamination of feces, and managed according to specification. The construction standard of sanitary toilets is basically the same as that of sanitary toilets. The coverage rate of two type of toilet were calculated as the number of households using sanitary toilets and the harmless sanitary toilets divided by the number of total rural households in Jiangsu Province. These data were retrieved from "China Statistical Yearbook on Environment". In 2018, Jiangsu Provincial Health Commission adjusted and eliminated the data of toilets in disrepair and damage. In this study, the number of newly built toilets in 2018 was added on the basis of 2017 to obtain the total usage in 2018.

## Surface water quality

The surface water is adopted in the cross-section included in the national surface water environmental quality assessment, and the average annual water quality meets the type III standard. The surface water can be further processed as drinking water. Data was retrieved from Water Resources Bureau and Department of Ecology and Environment of Jiangsu Province.

#### Vector density

Vector density (i.e. mice, flies, cockroaches, and mosquitoes) at selected monitoring points according to different geographic locations were obtained from Jiangsu Health Commission (number of vectors / number of traps).

#### Environmental parameters

Rainfall: the annual average rainfall Jiangsu Province, in millimeters. Temperature: the annual average temperature, the highest temperature, the lowest temperature, in degrees Celsius. They were obtained from Jiangsu Statistical Yearbook. For the data collection of sanitary toilets, the government will formulate the sanitary toilet construction target every year, then distribute it to the next level of government and check the completion rate at the end of the year. The incidence of intestinal infectious diseases is reported uniformly by medical institutions at all levels, and the Center for Disease Control and Prevention supervises and checks. Environmental factors, vector density, and water quality are all supervised, recorded, and sample collection and monitored by specialized agencies.

### Statistical analysis

In this study, Jiangsu Province was taken as a unit of analysis. The distribution of the coverage rate of sanitary toilets and harmless sanitary toilets in Jiangsu Province from 2011 to 2019, incidence trend of intestinal infectious diseases and other independent variables were described using descriptive statistics. The association between incidence of intestinal infectious diseases and sanitary toilet coverage rate was pre-screened using scatter plot and the simple linear regression analysis. The independent variable with p < 0.2 was considered statistically significant and included for further multiple regression analysis. Independent variable with p < 0.05 was considered statistically significant in the final multiple regression model. A11 statistical analyses were analyzed using SPSS (V. 22 IBM Corporation, Armonk, NY).

## RESULTS

The study included three types of intestinal infectious diseases, the incidence of typhoid and paratyphoid fever, the incidence of hepatitis A, hepatitis E, and untyped hepatitis were combined, and finally showed six intestinal infectious diseases.

Figure 1 shows the variation trend of intestinal infectious diseases, the total incidence of Type A and B intestinal infectious diseases showed a clear downward trend, from 20.04/100,000 in 2011 to 8.28/100,000 in 2019. That of Type C



intestinal infectious diseases fluctuates, with a high incidence every other year, and after 2017, the fluctuation range is relatively large. The variation trend of the total incidence of Type A, B and C intestinal infectious diseases is generally consistent with that of Type C intestinal infectious diseases.



Figure 1 Variation trends of three types of intestinal infectious diseases in Jiangsu Province during 2011-2019

In table 1, it is obvious that the incidence of hand-foot-mouth disease is the highest, accounting for 81% of the total intestinal infectious diseases, and the average incidence in 9 years is 158.2 / 100,000 followed by other infectious diarrhea, which accounts for 12%. The incidence of viral hepatitis and dysentery accounted for 4% and 3%. The incidence of typhoid and paratyphoid in Type B intestinal infectious diseases and cholera, the only Type A intestinal infectious disease are very low.

From 2011 to 2019, the incidence of two typical Type B intestinal infectious diseases, i.e., viral

hepatitis and dysentery, showed a general downward trend. The incidence of viral hepatitis has dropped from 10.3/100,000 to 5.9/100,000, a decrease of nearly half. That of dysentery dropped from 9.4/100,000 to 2.8/100,000, the largest decrease. From 2011 to 2016, the incidence of other infectious diarrhea did not change much, and the overall trend was a rising trend. The incidence of hand-foot-mouth disease changes the most, presenting a cycle every two years, with a high incidence every other year. The incidence of cholera, typhoid and paratyphoid are very low, and the changes are very small, showing a general downward trend.

**Table 1** Incidence rate of each intestinal infectious diseases in Jiangsu Province for each year during2011 - 2019

Year	Inci	Incidence rate of Intestinal Infectious Disease (1/100,000)						
	Type A		Type B		Typ	be C		
	Cholera	Viral	Dysentery	Typhoid,	Other	Hand-		
		hepatitis		Paratyphoid	infectious	foot-		
					diarrhea	mouth		
						disease		
2011	0.0	10.3	9.4	0.3	18.3	146.0	184.3	
2012	0.0	9.3	7.3	0.3	19.2	146.5	182.5	
2013	0.0	9.5	5.7	0.3	20.1	121.7	157.3	
2014	0.0	8.8	5.0	0.2	18.7	210.5	243.2	
2015	0.0	7.6	4.9	0.2	19.2	119.4	151.3	



Year	Incidence rate of Intestinal Infectious Disease (1/100,000)						
	Type A		Type B		Tyj	be C	_
	Cholera	Viral	Dysentery	Typhoid,	Other	Hand-	
		hepatitis		Paratyphoid	infectious	foot-	
					diarrhea	mouth	
						disease	
2016	0.0	6.7	4.1	0.4	19.3	197.6	228.0
2017	0.0	6.4	3.4	0.2	31.9	114.2	156.1
2018	0.0	6.0	3.1	0.2	27.9	237.5	274.6
2019	0.0	5.9	2.8	0.2	33.5	130.7	173.0
Mean	0.0	7.8	5.1	0.3	23.1	158.2	194.5

Note: The permanent population of Jiangsu Province in 2019 was 80.7 million

Three types of sanitary toilets: sanitary toilets, harmless sanitary toilets and sanitary public toilets. Their cumulative usage has increased year by year. As shown in figure 2, the earliest building was sanitary toilets, so the coverage rate was the highest. In 2011, the coverage rate of sanitary toilets already reached 87.36%, and in 2019 it was close to 100%, the number of households using sanitary toilets reached 15.4083 million. The coverage rate of harmless sanitary toilets changes the most. In 2011, the coverage rate was only 67.42%, and the cumulative number of households using it was just over 10 million. In 2019, this number rose to 95%.





Table 2 shows the vector density and other environmental data during study period. There is no consistent change pattern in the overall density of the four pests in Jiangsu Province. The density of cockroach and mice were more stable. Among them, the density of flies is the highest. The compliance rate of surface water showed an overall upward trend, from 36% in 2011 to 78% in 2019 except for a slight decline in 2018. The average temperature in Jiangsu Province has generally increased in the past 9 years. as shown in Figure 2. Basically, the rainfall varied across the study period and above 800 mm every year. In 2016, the rainfall was reach with a maximum value of 1612.3mm.



Year	Vector density				Surface	Average	Dainfall			
	Mice	Cockroach	Mosquito	Fly	water	temperature	Kalliläll			
2011	0.3	0.7	2.1	3.5	36%	15.4	1016.8			
2012	0.4	1.0	3.7	3.7	43%	15.5	1027.1			
2013	0.5	1.0	1.9	4.6	46%	16.1	882.4			
2014	0.4	1.3	2.3	3.6	46%	15.9	1083.3			
2015	0.3	1.0	2.5	3.7	48%	15.9	1371.1			
2016	0.3	0.7	1.4	4.6	68%	16.3	1612.3			
2017	0.4	0.7	1.9	4.0	71%	16.6	1109.6			
2018	0.3	0.5	1.8	3.7	68%	16.5	1145.7			
2019	ND	ND	ND	ND	78%	ND	798.5			
ND is no data available										

**Table 2** Vector density, compliance rate of surface and average temperature in Jiangsu Province foreach year during 2011 – 2019

We performed a regression analysis on all variables, use p < 0.2 as the test standard to determine the variables included in the multiple regression model. In final multiple regression model, only 3 variables in Table 3 are statistically significant with some intestinal infectious diseases. The final multiple linear regression showed that the accumulative households using sanitary toilets ( $\beta = -0.036$ ), the compliance rate of surface water ( $\beta = -0.135$ ) were negatively correlated with the incidence of Type A and B intestinal Infectious diseases in

Jiangsu Province with p < 0.05. The accumulative number of households using sanitary toilets has a greater impact on the incidence of intestinal infectious diseases of Type A and B than surface water quality. The accumulative households using sanitary toilets ( $\beta = -0.016$ ) and the accumulative households using sanitary public toilets ( $\beta = -0.159$ ) were negatively correlated with dysentery with p < 0.05. The accumulative households using sanitary public toilets has a greater impact on the incidence of dysentery.



**Table 3** Multiple linear regression analysis between intestinal infectious diseases and various factors in Jiangsu Province

	Multiple linear regression							
Variables				95.0% Cl	[			
	β	SE	<i>P</i> value	Lower Bound	Upper Bound	R Square		
Type A and B								
Accumulative households using sanitary toilets	-0.036	0.003	<0.00 1	-0.043	-0.029	0.996		
Surface water (Meets Class III standards and above)	-0.135	0.011	<0.00 1	-0.164	-0.107			
Dysentery								
Accumulative households using sanitary toilets	-0.016	0.002	0.001	-0.02	-0.012	0.998		
Accumulative households using sanitary public toilets	-0.159	0.011	<0.00 1	-0.191	-0.128			

# DISCUSSION

The total incidence of Type A and B intestinal infectious diseases in Jiangsu Province and the incidence of each disease except typhoid and paratyphoid are on a downward trend. This is similar to many research results, especially in Zhejiang Province, which is adjacent to Jiangsu Province, and the incidence and variation trend of Type A and B intestinal infectious diseases are most consistent with Jiangsu Province.<sup>14</sup>

In the Type C intestinal infectious diseases in Jiangsu Province, the incidence of other infectious diarrhea is increasing year by year, which is consistent with the research results of Citv.<sup>15</sup> Hand-foot-mouth Lanzhou disease (HFMD) is the most common intestinal infectious disease in Jiangsu Province, with a high incidence every other year. The incidence of hand-foot-mouth disease in Beihai city also present periodic changes that are lower in odd years and higher in even years.<sup>16</sup> This should be related to antibodies in the human body. Studies have found that after hand-foot-mouth disease infection, specific antibodies will persist in the body for more than 6 months.<sup>17</sup>

The incidence of Type C intestinal infections is much higher than that of Type A and B. The reason may be that there are many kinds of pathogens of Type C intestinal infectious diseases.<sup>18</sup> In addition, the government has implemented stricter management of Type A and B intestinal infectious diseases.<sup>19</sup>

The higher the coverage rate of sanitary toilets, the lower the incidence of intestinal infectious diseases of Type A and B. Sanitary toilets should clean human excreta regularly, protect water sources from pollution, and can effectively reduce the density of fly maggots and prevent the spread of disease.<sup>20</sup> However, There are also research findings on the opposite relationship. A study in Yuxi City found that typhoid and paratyphoid continue to occur frequently due to the construction of flushing sanitary public because there is no reasonable toilets. construction of a sewage discharge system that is compatible with toilets.<sup>21</sup> Therefore, when building sanitary toilets, we must pay attention to the construction of suitable sewer pipes according to local conditions.

Generally, the better the water quality, the lower the risk of intestinal infections. Surface water is one of the main sources of drinking water.





Although people do not drink it directly, but there are still many opportunities for direct and indirect contact such as using water for agricultural purpose or using silt as a fertilizer to gown the vegetables. These can lead to the contamination of pathogen to the human.<sup>22</sup>

Most studies use a small area as the research unit. but this study uses the entire Jiangsu Province as the research unit, which can better reflect the effect of policy implementation. In this study, we have several limitations that needs to be mentioned. First, it is the short research period. The study only analyzed the situation of Jiangsu Province from 2011 to 2019, variables have not changed much, and may not reveal the actual distribution of the data. Secondly, there are many predisposing factors for intestinal infectious diseases. Except for sanitary toilets, only four pests' densities, water quality (only surface water and drinking water) and environmental factors (only temperature and rainfall) are included in the study. The research used ecological study design, lacking personal characteristics and habits of using toilet, it is unable to analyze and give recommendations at the individual level, and there are missing data in 2019.

# CONCLUSION

In general, the incidence of Type A and B infectious intestinal diseases showed a downward trend, while that of other infectious diarrhea among Type C continued to rise, and hand-foot-mouth disease showed a high incidence every other year. The use of all kinds of sanitary toilets, the compliance rate of surface water quality and the average temperature are all on the rise. But the control of vectors is not very good. The increase in the number of sanitary toilets is significantly related to the decrease in Type A and B intestinal infectious diseases, that means the popularization of sanitary toilets can directly and effectively prevent and control the incidence of Type A and B intestinal infectious diseases. In view of the fact that the coverage rate of sanitary toilets and harmless sanitary toilets has almost achieved full coverage. In the next phase of the toilet improvement goal, new technologies can be studied and new construction standards can be proposed based on the current sanitary toilets' control of intestinal infectious diseases.

# RECOMMENDATIONS

It is essential to formulate disease prevention and control measures based on the characteristics of the incidence of various intestinal infectious diseases. In the national patriotic health campaign, the toilet improvement part must not only meet the annual mission goals, but also ensure quality. Strengthen the monitoring and control of vector organisms, increase the layout of monitoring points, especially in rural areas. Strengthen hygiene promotion and let residents take the initiative to participate in toilet improvement.

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ประกาศ วิทยาลัยวิทยาศาสตร์สาธารณสุข จุฬาลงกรณ์มหาวิทยาลัย เรื่อง แต่งตั้งกณะกรรมการจัดการประชุมวิชาการบัณฑิตศึกษานานาชาติ ด้านประชากรและวิทยาศาสตร์สาธารณสุข ครั้งที่ 11

(The 11<sup>th</sup> International Graduate Students Conference on Population and Public Health Sciences)

ตามที่ สถาบันวิจัยประชากรและสังคม สถาบันพัฒนาสุขภาพอาเซียน มหาวิทยาลัยมหิดล และวิทยาลัยวิทยาศาสตร์สาธารณสุข จุฬาลงกรณ์มหาวิทยาลัย ได้มีบันทึกข้อตกลงความร่วมมือระหว่าง สามสถาบัน เพื่อการพัฒนาวิชาการด้านการเรียนการสอน การวิจัย และกิจกรรมนิสิตนักศึกษา ระดับบัณฑิตศึกษา ทั้งนี้ได้กำหนดให้มีการนำเสนอผลงานวิจัยของนิสิต อาจารย์ และบุคลากรร่วมกัน ทั้งสามสถาบัน ในการประชุมวิชาการบัณฑิตศึกษานานาชาติด้านประชากรและวิทยาศาสตร์สาธารณสุข ครั้งที่ 11 "The 11<sup>th</sup> International Graduate Students Conference on Population and Public Health Sciences" (IGSCPP) ในวันที่ 14 กรกฎาคม 2563 ณ วิทยาลัยวิทยาศาสตร์สาธารณสุข จุฬาลงกรณ์มหาวิทยาลัย เพื่อให้ การดำเนินการเป็นไปโดยเรียบร้อย มีประสิทธิภาพ และบรรลุวัตถุประสงค์ จึงขอแต่งตั้งคณะกรรมการใน การดำเนินงานประชุมดังกล่าว ตามรายนามและตำแหน่งต่อไปนี้

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## <u>ภาระหน้าที่ความรับผิดชอบ</u>

ให้คณะกรรมการปฏิบัติงานหน้าที่พิจารณากำหนดกรอบ แนวทาง หัวข้อของการประชุม และ กำหนดกรอบแนวทางเนื้อหา/กิจกรรม วิทยากร และผู้เข้าร่วมประชุม

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### <u>ภาระหน้าที่ความรับผิดชอบ</u>

ให้คณะทำงานปฏิบัติงานหน้าที่การเตรียมการค้านการเชิญวิทยากร ประสานงานวิทยากร จัคทำระบบ ประชาสัมพันธ์ การรับสมัคร การลงทะเบียน และการเตรียมการค้านสถานที่จัคประชุม ค้านเอกสารประกอบการ ประชุม ค้านการเงินการบัญชีของการประชุม รวมทั้งกิจกรรมอื่นใดที่เกี่ยวข้อง และประสานงานกับหน่วยงานอื่นใดที่ เกี่ยวข้อง

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ที่ปรึกษา ที่ปรึกษา ที่ปรึกษา ที่ปรึกษา ประกานกรรมการ ประธานกรรมการร่วม ประธานกรรมการร่วม รองประธานกรรมการ กรรมการ กรรมกำร กรรมการ กรรมการ กรรมการ กรรมการ กรรมการ กรรมการ

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35. อาจารย์ คร.ปกเกศ วงศาสุลักษณ์	กรรมการ
36. คร.นุชนาฎ หวนนากลาง	กรรมการ
37. คร.อรอุมา ซองรัมย์	กรรมการ
38. อาจารย์ คร.อนุชิต ภานุมาสวิวัฒน์	กรรมการ
39. พญ.นิพรรณพร วรมงคล	กรรมการ
40. รองศาสตราจารย์ คร.รัตนา สำโรงทอง	กรรมการ
41. ภก.คร.ประมณฑ์ วิวัฒนากุลวาณิชย์	กรรมการ
42. อาจารย์ คร.ไกรวุฒิ กัลวิชา	กรรมการ
43. อาจารย์ คร.อัญชลี ประสารสุขลาภ	กรรมการ
44. อาจารย์ คร.วันดี ศิริโชคชัชวาล	กรรมการ
45. รองศาสตราจารย์ ฉวีวรรณ บุญสุยา	กรรมการ
46. นางสาวกุลญาณินทร์ ศรีดาชาติ	กรรมการและเลขานุการ
47. นางสาวกาญรัตน์ อินทุรัตน์	กรรมการและผู้ช่วยเลขานุการ
48. นางสาวสฐาปนีย์ นิลทะราช	กรรมการและผู้ช่วยเลขานุการ

# <u>ภาระหน้าที่ความรับผิดชอบ</u>

ให้คณะทำงานปฏิบัติงานหน้าที่พิจารฉาบทความวิจัยเพื่อการนำเสนอในการประชุมของผู้สมัคร พิจารฉาให้รางวัลการนำเสนอคีเค่น (Outstanding Oral / Poster Presentation Award) รวมทั้งจัคทำ บทความวิจัยตีพิมพ์เผยแพร่ลงใน Proceeding งานประชุม / Journal of Health Research และหน้าที่อื่นๆ ที่เกี่ยวข้อง

ทั้งนี้ ตั้งแต่บัดนี้เป็นต้นไป จนเสร็จสิ้นภารกิจ

ประกาศ ณ วันที่ 🌾 กรกฎาคม พ.ศ. ๒๕๖๑

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