

# Relationships Between Health Beliefs, Fear of COVID-19, Knowledge of HIV Transmission, And HIV Preventive Behaviors Among Young Thai Men Who Have Sex with Men During the COVID-19 Pandemic

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## ABSTRACT

**Background:** Young Thai men who have sex with men (MSM) are at high risk of HIV transmission, making effective prevention crucial. This study aimed to examine the relationships between health beliefs, fear of COVID-19, knowledge of HIV transmission, and HIV preventive behaviors among young Thai MSM during the COVID-19 pandemic.

**Methodology:** A cross-sectional online questionnaire study guided by the health belief model was conducted among young Thai MSM using snowball sampling. Data on HIV/AIDS health beliefs, knowledge of HIV prevention, fear of COVID-19, and HIV preventive behaviors were collected and analyzed using descriptive and inferential statistics.

**Results:** The study included 134 participants (59.7% gay, 40.3% transgender). Knowledge of HIV prevention, fear of COVID-19, and HIV preventive behaviors were at a moderate level. Perceived severity of HIV/AIDS, perceived benefits of HIV prevention, self-efficacy for HIV prevention, knowledge of HIV transmission, and fear of COVID-19 were significantly related to HIV preventive behaviors among young Thai MSM ( $p < .05$ ). These five variables were predictors of HIV preventive behaviors (Adjusted  $R^2 = 0.304$ ,  $F = 6.740$ ,  $p < 0.05$ ).

**Conclusions:** The findings highlight the need for intervention programs focused on improving health beliefs and promoting HIV preventive behaviors among young Thai MSM.

**Keywords:** Fear of COVID-19, Health belief model, HIV prevention, Men who have sex with men

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## INTRODUCTION

Men who have sex with men (MSM) are disproportionately affected by HIV, with prevalence rates significantly higher than those in the general population.<sup>1-2</sup> Structural factors and ongoing sexual risk behaviors contribute to this elevated risk<sup>3</sup>, making MSM a key focus of global public health efforts. In Thailand, while HIV rates have declined in the general population, they have surged among MSM, particularly young Thai MSM (aged 15-24).<sup>4-5</sup> This group now accounts for the largest proportion of new HIV infections in the country, driven by high-risk behaviors, such as unprotected receptive anal intercourse and having multiple male partners.<sup>6-7</sup>

HIV prevalence among young Thai MSM in Bangkok has been rising, outpacing that of older MSM.<sup>8-10</sup> The National AIDS Committee of Thailand reported an increase in HIV infection rates among young MSM from 4.1 to 7.6 per 100 person-years, between 2003 and 2014.<sup>11-12</sup> By 2019, young MSM had represented nearly half of all new HIV cases in Thailand.<sup>13</sup>

The COVID-19 pandemic has further complicated the HIV crisis by disrupting the global HIV control efforts and sidelining routine services.<sup>14</sup> Despite lockdowns and social restrictions, risky sexual behaviors persisted among MSM, potentially increasing the risk of both HIV and COVID-19.<sup>15-16</sup> The psychological impact of the pandemic, including fear and anxiety, has been particularly concerning in vulnerable groups such as MSM.<sup>17-22</sup>

Given their high risk for both HIV and psychological disorders, assessing the mental health of young Thai MSM and its influence on HIV-preventive behaviors is crucial. This study examined the relationships between health beliefs, fear of COVID-19, knowledge of HIV transmission, and HIV preventive behaviors among young Thai MSM during the pandemic. Using the Health Belief Model as a framework,<sup>23-27</sup> this study explored how psychological factors and subjective beliefs influence health behaviors to inform targeted interventions to enhance HIV prevention efforts in this high-risk population.

## METHODOLOGY

**Study Design and Population:** This study is part of a larger study aimed to explore HIV-related risk behaviors among young Thai MSM during the COVID-19 pandemic. The current study focused on young Thai MSM, including male-to-female transgenders and gay men and used a set of modified validated questionnaires for young Thai MSM.

This was a cross-sectional, descriptive study, which used an online survey. A snowball sampling technique was used to recruit Thai MSM for the self-administered survey. The eligibility criteria included: (1) 18-25 years of age; (2) identified as a Thai cisgender male; (3) a social media user and be able to

access the internet; (4) not feeling coerced to participate in the study; and (5) in a sexual relationship with a man (gay or transgender) for  $\geq 6$  months. To calculate the sample size of this study, the power analysis technique was used through the G\*Power version 3.19.2<sup>28</sup> with a significance level ( $\alpha$ ) of 0.05, a power of 0.80, and two-tailed hypothesis. An effect size of 0.152 was used, based on a review of a previous relevant study. Using this process, the required sample size for this study was at least 114 participants. A total of 134 participants completed the survey questionnaires, and all were included in the final analysis.

**Recruitment and Data Collection:** Data were collected using a set of modified validated questionnaires. This was developed using a Google survey tool (Google Forms), with attached consent form. A set of online questionnaires was sent through the networks of the participants via a Line application, the most popular and mostly used social media in Thailand. Upon receiving and clicking the link the participants automatically provided the study information and informed consent. After obtaining informed consent, participants were invited to complete the online survey. They then filled in their sociodemographic characteristics. Subsequently, a set of online questionnaires appeared consecutively, which the participants were asked to answer and complete. Since this was an online survey study, only the participants with access to the internet either on their smart phones or at home use internet would be able to participate in the study. Data were collected during a single period from Dec 2020 to March 2021.

**Instruments:** A set of modified validated questionnaires included questions about demographics, HIV/AIDS health belief, knowledge of HIV Prevention, and HIV preventive behaviors. The demographic questionnaire elicited information on age (in years), sexuality (dichotomized as gay and transgender), educational attainment, employment (dichotomized as employed full- or part-time and unemployed), monthly income (dichotomized as sufficient and insufficient), career, ever tested for HIV, ever received a sexually transmitted infection (STI) check-up, history of STI in the last 6 months, HIV status, accommodation, who do the participants live with? Moreover, the participants were asked if they were presently in a sexual relationship with another man; with a relationship defined as someone called a boyfriend, partner, or someone that the participants had felt a special emotional commitment.

**HIV/AIDS health belief:** This was measured using 40 Likert questions ranging from 1 to 5 (strongly disagree to strongly agree). The negative questions were reverse-coded, and the mean score was computed. This instrument was modified by the research team based on our previous study<sup>7</sup>. The instrument contains the following domains: perceived susceptibility to HIV/AIDS, perceived severity of HIV/AIDS, perceived benefits of condom use, perceived barriers

to condom use, and self-efficacy for HIV prevention. A total score of the scale has a possible range of 40 to 200. Higher scores indicated a higher degree of health belief related to HIV/AIDS. The reliability of the scale in the current study was acceptable (Cronbach's  $\alpha = .84$ ).

**Knowledge of HIV Prevention:** It was assessed by 21 questions. The measure was developed by Thato and colleagues.<sup>29</sup> The items on the scale were arranged in a three-category response format (true, false, and don't know). Each correct response was given a point value of 1. The don't know responses were not assigned a value. The total knowledge score was computed from the correct responses, with a higher score indicating greater HIV prevention knowledge. The total score ranged from 0 to 21. Participants' overall knowledge score was categorized using cut-off point of mean (SD), as good for a score between 17-21 points, moderate for a score between 12-16 points, and low for a score of less than 11. The test-retest reliability of this scale was assessed in the current study and resulted in a Cronbach's alpha coefficient of 0.80.

**Fear of COVID-19:** Fear of COVID-19 scale (FCV-19S) was developed by Ahorsu and colleagues.<sup>30</sup> It is a seven-item questionnaire that investigates only one dimension structure of fear of the COVID-19 pandemic. It is a five-point Likert-type rating scale ranging from 1-strongly disagree to 5-strongly agree. The score on the scale varies between 7 and 35. Its total score (summation of individual response items) ranges from 7-35 with higher scores indicating greater fear of COVID-19. Fear of COVID-19 was classified into three levels: mild (score < 14), moderate (score 14-28), and severe (score > 28). The Thai version with robust psychometric properties was used. Reliability of the FCV-19S in the current study was acceptable (Cronbach's  $\alpha = .83$ ).

**HIV preventive behaviors:** This was measured using 10 questions. This instrument was developed by our research team. It is a three-point Likert-type rating scale; every time was assigned a score of 3, sometimes a score of 2, and never a score of 1. A total score of the scale has a possible range of 10 to 30. The total score was categorized using cut-off point of mean (SD), as high level for a score between 26 and 30 points, moderate for a score between 21 and 25 points, and low for a score of less than 21. The scale focused on sexual relations related to HIV preventive behaviors in the past 6 months. The higher the score, the greater the HIV preventive behaviors. Reliability of the scale in the current study was acceptable (Cronbach's  $\alpha = .78$ ).

**Data analysis:** Prior to data analysis, the questionnaire responses underwent a thorough review and cleaning process. Data were analysed using Statistical Package for the Social Sciences (SPSS version 23.0 for Windows). Descriptive statistics including mean, standard deviation, percentage, and frequency distribution were performed to describe the sample. Bi-

variate correlations were calculated for study variables. Pearson's correlation was used to assess relationships among the study variables. Multivariable linear regression was used to identify factors associated with HIV preventive behaviors among young Thai MSM. The significance level was set at  $p < .05$ .

**Ethical Considerations:** This study obtained an ethical approval from the Institutional Review Board for Protection of Human Subjects in Research of Boromarajonani College of Nursing, Suphanburi, Faculty of Nursing, Praboromarajanok Institute, Thailand. (approval number 032/2563). Participants were shown a short paragraph about the study procedures at the beginning of the survey study. Detailed information of the study regarding its objectives, procedures, potential risks, and benefits, voluntary nature was provided to the participants. Prior to answering the online questionnaires, electronic informed consent was obtained. The participant's anonymity and confidentiality were ensured. Then, the participants were invited to complete the survey.

## RESULTS

**Characteristics of the Participants:** The study included 134 participants (gays=80 [59.7%], transgender women=54 [40.3%]). The participants' age ranged from 22 to 25 years, with the mean age being 22.52 years (SD=1.68). Regarding education level, the majority had completed the secondary high school/vocational school (42.5%). Most participants were employed (87.32%). More than half (57.46%) of the sample claimed a sufficient monthly income. About 40.30% worked in the fashion sector, including hair style, make-up, and dress designer. All sample had regular male partner, and about 37% of them lived with a male partner. More than half (52%) of them live in dormitory/apartment. More than 90% reported ever tested for HIV and ever received a sexually transmitted infection check-up in the last 6 months. Most of them (90%) reported HIV-negative, meanwhile some of them (10%) reported unknown HIV status. Interestingly, about 32.79% of the respondents were told having sexually transmitted infection in the last 6 months.

**Descriptive Characteristics of the Study Variables:** The mean  $\pm$  SD score of HBM constructs, and knowledge of HIV transmission in young Thai MSM are shown in Table 1. Among HBM constructs, the highest and the lowest mean  $\pm$  SD scores belonged to perceived barriers to condom use ( $46.34 \pm 2.89$ ) and perceived susceptibility to HIV ( $23.23 \pm 2.64$ ) constructs, respectively. Moreover, mean  $\pm$  SD score of knowledge of HIV transmission was  $14.53 \pm 1.94$ .

**Distribution of fear of COVID-19 among young Thai MSM:** As shown in Table 2, an average score for each question on fear of COVID-19 varied between  $3.30 \pm 0.66$  and  $4.97 \pm 0.17$  while the average total score was  $26.97 \pm 1.80$ .

**Table 1: Mean and standard deviation scores of Health Belief Model constructs, and knowledge of HIV transmission in young Thai MSM (n=134)**

Variables	Mean	SD	Possible range	Actual range
<b>Health Belief Model Constructs</b>				
Perceived susceptibility to HIV/AIDS	23.23	2.64	6-30	17-30
Perceived severity of HIV/AIDS	35.93	4.35	9-45	24-45
Perceived benefits of condom use	26.65	2.66	6-30	20-30
Perceived barriers to condom use	46.34	2.89	12-60	41-55
Self-efficacy for HIV prevention	26.51	3.97	7-35	16-35
<b>Knowledge of HIV transmission</b>	<b>14.53</b>	<b>1.94</b>	<b>0-21</b>	<b>10-19</b>

**Table 2: Fear of COVID-19 among young Thai MSM (n=134)**

Items	Average score Mean±SD.	Strongly disagree (%)	Disagree (%)	Neutral (%)	Agree (%)	Strongly Agree (%)
1. I am most afraid of Corona.	4.97±0.17	0 (0)	0 (0)	0 (0)	4 (3.0)	130(97)
2. It makes me uncomfortable to think about Corona.	3.48±0.82	0 (0)	0 (0)	98(73.1)	8(6.0)	28(20.9)
3. My hands become clammy when I think about Corona.	3.55±0.83	0 (0)	0 (0)	89(66.4)	16(11.9)	29(21.6)
4. I am afraid of losing my life because of Corona.	4.81±0.54	0 (0)	0 (0)	9(6.7)	8(6.0)	117(87.3)
5. When I watch news and stories about Corona on social media, I become nervous or anxious.	3.31±0.68	0 (0)	0 (0)	109(81.3)	8(6.0)	17(12.7)
6. I cannot sleep because I'm worrying about getting Corona.	3.55±0.76	0 (0)	0 (0)	82(61.2)	30(22.4)	22(16.4)
7. My heart races or palpitates when I think about getting Corona.	3.30±0.66	0 (0)	0 (0)	109(81.3)	10(7.5)	15(11.2)
<b>Total score</b>	<b>26.97±1.80</b>					

**Table 3: Percentage of HIV preventive behaviors, classified by item (n=134)**

Items	Every time (%)	Some-times (%)	Never (%)
1. I use condoms when having anal sex.	43(32.1)	57(42.9)	34(25.0)
2. I can use condoms correctly every step of the way.	43(32.1)	53(39.3)	38(28.6)
3. I look at the expiration date of condoms before using them.	43(32.1)	43(32.1)	48(35.8)
4. I store condoms at high temperatures such as in the sun or hot weather.	14(10.8)	43(32.1)	77(57.1)
5. I have oral sex without using a condom.	24(17.8)	57(42.9)	53(39.3)
6. I swallow/eat your partner's semen when having sex.	19(14.2)	14 (10.8)	101(75.0)
7. I had sex while intoxicated or while taking drugs.	19 (14.2)	53(39.3)	62(46.5)
8. I use condoms together with lubricants that contain oil as a compound, such as lotion, Vaseline, skin oil, etc.	24(17.8)	53(39.3)	57(42.9)
9. I have had sex with multiple partners without using condoms.	19(14.3)	72(53.6)	43(32.1)
10. After having sex, I wash and clean my genitals, mouth, and anus.	62(46.5)	19(14.2)	53(39.3)

The mean ± SD score of HIV preventive behaviors was 22.14 ± 3.30.

**HIV preventive behaviors:** As shown in Table-3, 19 participants (14.2%) reported that every time they had sex while intoxicated or while taking drugs. And 72 participants (53.6%) reported that they sometimes have had sex with multiple partners without using condoms. Also, 34 participants (25%) reported that they never used condoms when having anal sex.

**Correlations between studied variables and HIV preventive behaviors:** The correlations among the studied variables are shown in Table 4. There were significant correlations among knowledge of HIV transmission ( $r=0.45$ ,  $p<0.05$ ), fear of COVID-19 ( $r=0.46$ ,  $p<0.05$ ), perceived severity of HIV/AIDS ( $r=0.38$ ,  $p<0.05$ ), perceived benefits of HIV prevention ( $r=0.33$ ,  $p<0.05$ ), and self-efficacy for HIV prevention ( $r=0.48$ ,  $p<0.05$ ) and HIV preventive behaviors.

**Factors influencing HIV preventive behaviors:** As shown in Table 5, multivariable linear regression was used to examine the association and predictive ability between the independent variables and the dependent variable, HIV preventive behaviors. Results revealed that perceived severity of HIV/AIDS, perceived benefits of HIV prevention, self-efficacy for HIV prevention, knowledge of HIV transmission, and fear of COVID-19 together explained 30.40% (Adjusted  $R^2 = 0.304$ ,  $F=6.740$ ,  $p<0.05$ ) of the total variance in HIV preventive behaviors. Perceived severity of HIV/AIDS ( $B=0.150$ ,  $p<0.05$ ), perceived benefits of HIV prevention ( $B=0.252$ ,  $p<0.05$ ), self-efficacy for HIV prevention ( $B=0.402$ ,  $p<0.05$ ), knowledge of HIV transmission ( $B=0.350$ ,  $p<0.05$ ), and fear of COVID-19 ( $B=0.422$ ,  $p<0.05$ ) were statistically significant predictors of HIV preventive behaviors.

**Table 4: Correlations among studied variables and HIV preventive behaviors of young Thai MSM (n=134)**

Variables	HIV preventive behaviors Correlation Coefficient ( <i>r</i> )	<i>p</i>
Knowledge of HIV transmission	0.45	<i>p</i> <0.05*
Fear of COVID-19	0.46	<i>p</i> <0.05*
Perceived severity of HIV/AIDS	0.38	<i>p</i> <0.05*
Perceived benefits of HIV prevention	0.33	<i>p</i> <0.05*
Self-efficacy for HIV prevention	0.48	<i>p</i> <0.05*

\*Significance level at *p*<0.05**Table 5: Factors influencing HIV preventive behaviors (n=134)**

Variables	B	SD.	Beta	t	p-value
Constant	2.478	0.409	-	6.057	<i>p</i> <0.05
Perceived severity of HIV/AIDS	0.352	0.043	0.15	2.46	<i>p</i> <0.05
Perceived benefits of HIV prevention	0.217	0.102	0.252	2.134	<i>p</i> <0.05
Self-efficacy for HIV prevention	0.186	0.28	0.402	4.31	<i>p</i> <0.05
Knowledge of HIV transmission	0.527	0.115	0.35	6.23	<i>p</i> <0.05
Fear of COVID-19	0.612	0.253	0.422	4.321	<i>p</i> <0.05

R=0.375, R<sup>2</sup>=0.293, adjusted R<sup>2</sup>=0.304, F=6.740, *p*<0.05\*Significance level at *p*<0.05

## DISCUSSION

According to our knowledge, this is the first study to examine factors associated with HIV preventive behaviors of young Thai MSM during the COVID-19 pandemic, which can be considered the strength of the study. The significant results of this study suggested that five factors (perceived severity of HIV/AIDS, perceived benefits of HIV prevention, self-efficacy for HIV prevention, knowledge of HIV transmission, and fear of COVID-19) were important in explaining HIV preventive behaviors among young Thai MSM during COVID-19 pandemic. This study provides important information regarding the predictors of HIV/AIDS preventive behaviors and associated factors among young MSM in Thailand using the HBM. In this study, among the HBM constructs, perceived barriers to condom use had the highest score overall, whereas perceived susceptibility to HIV had the lowest score overall; these are consistent with the findings in Iran.<sup>25</sup>

In term of knowledge, the participants' level of HIV transmission knowledge was at a moderate level. This is incongruent with a study conducted in 422 MSM in Yangon, Myanmar which showed that MSM in Myanmar reported a high level of HIV transmission knowledge. Knowledge of HIV transmission among young Thai MSM in this current study is weaker than those reported in other studies.<sup>31-32</sup> Lack of knowledge about HIV transmission is one of the reasons that lead to low level of HIV preventive behaviors. One explanation is that our participants' mean age was about 22 years. They are so called young people (under 44 years was the young people, according to the United Nations standard). They were also sexually active, which intend to engage in frequent sexual relationship than other age groups. Hence, healthcare providers need to actively guide

their sexual risk behaviors and correct the homosexuality in time when they were.

Our study assessed fear of COVID-19 of young Thai MSM during the COVID-19 and we found that fear of COVID-19 was reported at a moderate level among this vulnerable population.

This finding could be attributed to a connectivity to regular updates and COVID-19 information distributed daily by the Thai government via Thai television channels and social media such as YouTube, and Facebook.<sup>33</sup> However, fear of COVID-19 level in our participants was significantly higher than in the general adult population in Thailand,<sup>34</sup> compared to previous study that used the same measurement instrument (FCV-19S) for the psychological status survey of the Thai population during COVID-19. It is evident that the potential mental health problems of Thai MSM population as a vulnerable group during the COVID-19 cannot be ignored.

Additionally, the participants reported a moderate level of HIV preventive behaviors. Our participants (14.2%) reported that they every time had sex while intoxicated or while taking drugs, which could be taken as a major health risk for HIV infection. Heavy alcohol use was reported by young MSM in various studies.<sup>35-37</sup>

Moreover, more than half of the participants (53.6%) reported that they sometimes have had sex with multiple partners without using condoms. Having sex with multiple partners, especially without using a condom, puts MSM at risk of acquiring HIV; and this have been reported in studies.<sup>7,38-39</sup> Interestingly, 25% of the participants revealed that they never used condoms when having anal sex. This finding is consistent with the results reported in studies conducted in other countries.<sup>38-39</sup>

Perceived severity of HIV/AIDS could significantly predict HIV preventive behaviors ( $B=0.150$ ,  $p<0.05$ ), indicating that young Thai MSM with a higher level of perceived severity of HIV/AIDS would frequently perform HIV preventive behaviors. How perceived severity of HIV/AIDS may impact HIV preventive behaviors in MSM was illustrated in a study by Gizaw and colleagues<sup>40</sup> in which adolescents who perceived severity of HIV/AIDS were more likely to report a higher practice of HIV preventive behaviors. Congruent with the finding of a previous study conducted among Japanese and Asian-American college students, it was found that perceived severity of HIV/AIDS, being a strong predictor, could influence HIV preventive behavior among the students.<sup>41</sup> Likewise, this finding is supported by a study conducted among high school students in Ethiopia.<sup>42</sup> Therefore, enhancing perceived severity of HIV/AIDS might help individual to prevent HIV infection.

Perceived benefits of HIV prevention significantly predicted HIV preventive behaviors ( $B=0.252$ ,  $p<0.05$ ). This result demonstrates that MSM with a greater perceived benefits of HIV prevention had higher HIV preventive behaviors. This result is consistent with the results of studies,<sup>6,43</sup> but contrary to those of other studies.<sup>24,44</sup> The explanation might be that HIV/AIDS is a sexually transmitted disease that cannot be completely cured, and MSM compose a high-risk population for HIV infection cases. Therefore, MSM generally have perceived benefits of HIV prevention.<sup>45</sup> According to the finding of our study, enhancing perceived benefits of HIV prevention might help young MSM at high risk of HIV infection to perform better HIV preventive behaviors.

Relevant to other studies and as previously reported,<sup>46-47</sup> our result showed that self-efficacy for HIV prevention significantly predicted HIV preventive behaviors ( $B=0.402$ ,  $p<0.05$ ) among young Thai MSM. Our results illustrate that MSM with high self-efficacy were more likely to practice HIV preventive behavior. As anticipated, individuals with confidence in the ability regarding HIV/AIDS prevention were more likely to consistently practice safe sex behaviors. Consistent with the HBM,<sup>26</sup> self-efficacy is the direct antecedent of behavior; hence, self-efficacy has been proposed to affect HIV/AIDS preventive behaviors.<sup>48-49</sup> The scientific literature suggests that self-efficacy significantly predicted sexual risk behaviors, including condom non-use at last anal sex, drunken sex, partner of unknown sero-status, and having never been tested for HIV.<sup>50-51</sup> Especially, young MSM who demonstrated high self-efficacy during sexual activities were more likely to consistently practice safe sex when compared with their peers who reported low self-efficacy.<sup>52</sup>

Consistent with the finding of a previous study conducted by Liu et al. (2010), the findings of our study revealed that knowledge of HIV transmission was a significant predictor of HIV preventive behaviors ( $B=0.350$ ,  $p<0.05$ ). Furthermore, our study has the

similar finding with a study conducted among Nigerian university students that, knowledge about HIV/AIDS significantly predicted HIV prevention.<sup>53</sup> This indicates that the participants who possessed good knowledge of HIV transmission would perform safer sex practice to prevent HIV infection. Adequate knowledge regarding HIV/AIDS is a powerful way to promote engaging in safe sex practices.<sup>54</sup> Knowledge about HIV transmission and prevention is a necessary step for adopting preventive behaviors. The association between knowledge of HIV transmission and HIV preventive behaviors is clear in the literature, with evidence demonstrating that young MSM report significantly better HIV prevention in the presence of good HIV knowledge.<sup>54</sup>

Consistent with the finding of a previous study conducted among HIV-negative MSM,<sup>15</sup> our finding showed that fear of COVID-19 was a significant predictor of HIV preventive behaviors ( $B=0.422$ ,  $p<0.05$ ). This indicates that young Thai MSM who reported higher fear of COVID-19 would perform safer sex behavior to prevent HIV infection. One possible explanation was that impact of the COVID-19 outbreak has been vast in terms of who has been impacted and broad in terms of how people have been affected. Findings in our study emphasize the experiences of those living at the intersection of multiple colliding epidemics and vulnerabilities, including COVID-19, mental health, and HIV.

## LIMITATIONS

Several limitations of the study should be noted. First, this was an online survey and collected data using Google Forms. Hence, young Thai MSM participated in this study were only those with internet access. During data collection period, it was not possible to conduct face-to-face interview because of COVID-19 pandemic. The online survey was a vital alternative for the current study. Second, this study used a cross-sectional study design and self-reported measures. Therefore, it was difficult to establish the causal inferences. Third, this study was conducted among young MSM in Thailand so that this might not allow generalizability of the findings to young MSM in other countries. Besides, study data were obtained from a snowball sampling technique and may not be generalizable to all young Thai MSM even after demographic standardization. Furthermore, this study only involved self-report of COVID-related impacts on HIV preventive behaviors. Participants might have misreported the impacts that the COVID-19 pandemic has had on their HIV prevention. However, our findings help to advance the knowledge base for nursing. Based on the significant findings of this study, interventions could be developed to enhance HIV preventive behaviors among young Thai MSM. Also, nurses should recognize the need for interventions. Assessments and interventions directed at promote HIV prevention during the COVID-19 pandemic may be just as important as those for preven-

tion of the COVID-19. Nurses have a professional responsibility to assess HIV preventive behaviors of all clients, including MSM. Tailoring appropriate support and interventions for young Thai MSM can lead to more effective outcomes in managing and preventing HIV transmission.

## CONCLUSION

Our findings demonstrated that during the COVID-19 pandemic era, young Thai MSM had continued engaging in sexual risk behaviors. The study has revealed a moderate level of HIV transmission knowledge. The participants also reported the moderate level of HIV preventive behaviors, which highlights the need for targeted improvements in HIV prevention and education. The study also found significant correlations between HIV preventive behaviors among participants and their perceived severity of HIV, perceived benefits of HIV prevention, self-efficacy for HIV/AIDS prevention, knowledge of HIV transmission, and fear of COVID-19. Hence, it is crucial to establish and sustain educational programs focused on HIV prevention to address knowledge gap effectively, in addition to solving the new challenges created by the COVID-19 pandemic.

## REFERENCES

1. Yu L, Jiang C, Na J, et al. Elevated 12-month and lifetime prevalence and comorbidity rates of mood, anxiety, and alcohol use disorders in Chinese men who have sex with men. *PLoS One*. 2013;8(4):1-7. doi: 10.1371/journal.pone.0050762
2. UNAIDS. Thailand: HIV and AIDS estimates. Geneva: UNAIDS; 2018. Available from: <http://www.unaids.org/en/regions/countries/countries/thailand>.
3. Baral SD, Poteat T, Strömdahl S, et al. Worldwide burden of HIV in transgender women: a systematic review and meta-analysis. *Lancet Infect Dis*. 2013 Mar;13(3):214-222. doi: 10.1016/S1473-3099(12)70315-8
4. Holtz TH, Pattanasin S, Chonwattana W, et al. Longitudinal analysis of key HIV-risk behavior patterns and predictors in men who have sex with men, Bangkok, Thailand. *Arch Sex Behav*. 2015 Feb;44(2):341-348. doi: 10.1007/s10508-014-0427-7
5. Weir BW, Dun C, Wirtz AL, et al. Transactional sex, HIV and health among young cisgender men and transgender women who have sex with men in Thailand. *Ann Epidemiol*. 2022 Aug;72:1-8. doi: 10.1016/j.annepidem.2022.03.012
6. Wang C, Tucker JD, Liu C, et al. Condom use social norms and self-efficacy with different kinds of male partners among Chinese men who have sex with men: results from an online survey. *BMC Public Health*. 2018 Dec;18(1):1-8. doi: 10.1186/s12889-018-6090-5
7. Khumsaen N, Stephenson R. Beliefs and Perception About HIV/AIDS, Self-Efficacy, and HIV Sexual Risk Behaviors Among Young Thai Men Who Have Sex With Men. *AIDS Educ Prev*. 2017 Apr;29(2):175-190. doi: 10.1521/aeap.2017.29.2.175
8. Davis M, Johnson C, Pettit AR, et al. Adapting Safety Check as a Universal Suicide Prevention Strategy in Pediatric Primary Care. *Acad Pediatr*. 2021 Sep;21(7):1161-1170. doi: 10.1016/j.acap.2021.04.012
9. van Griensven F, Thienkrua W, McNicholl J, et al. Evidence of an explosive epidemic of HIV infection in a cohort of men who have sex with men in Thailand. *AIDS*. 2013 Mar 13;27(5):825-832. doi: 10.1097/QAD.0b013e32835c546e
10. Ananworanich J, Fletcher JL, Pinyakorn S, et al. A novel acute HIV infection staging system based on 4th generation immunoassay. *Retrovirology*. 2013 Dec;10(1):1-6. doi: 10.1186/1742-4690-10-56
11. National AIDS Committee. Thailand AIDS response progress report. Bangkok, Thailand: Author; 2015.
12. Seekaew P, Pengnonyang S, Jantarapakde J, et al. Characteristics and HIV epidemiologic profiles of men who have sex with men and transgender women in key population-led test and treat cohorts in Thailand. *PLoS ONE*. 2018 Aug 30; 13(8): e0203294. doi: 10.1371/journal.pone.0203294.
13. UNAIDS. UNAIDS data 2020. Geneva: UNAIDS; 2020. Available from: [https://www.unaids.org/sites/default/files/media\\_asset/2020\\_aids-data-book\\_en.pdf](https://www.unaids.org/sites/default/files/media_asset/2020_aids-data-book_en.pdf)
14. Jardim CGR, Zamani R, Akrami M. Evaluating the Impact of the COVID-19 Pandemic on Accessing HIV Services in South Africa: A Systematic Review. *IJERPH*. 2022 Sep 21; 19(19): 11899. doi: 10.3390/ijerph191911899
15. Javanbakht M, Rosen A, Ragsdale A, et al. Interruptions in Mental Health Care, Cannabis Use, Depression, and Anxiety during the COVID-19 Pandemic: Findings from a Cohort of HIV-Positive and HIV-Negative MSM in Los Angeles, California. *J Urban Health*. 2022 Apr;99(2):305-315. doi: 10.1007/s11524-022-00607-9
16. Cerecero-Garcia D, Vermandere H, Bojorquez I, et al. Profiles of Depressive Symptoms Among Men Who Have Sex with Men and Transgender Women During the COVID-19 Outbreak in Mexico: A Latent Class Analysis. *Front Public Health*. 2021 Jun 7;9:1-8. doi: 10.3389/fpubh.2021.598921
17. Cusini M, Benardon S, Vidoni G, et al. Trend of main STIs during COVID-19 pandemic in Milan, Italy. *Sex Transm Infect*. 2021 Mar;97(2):99. doi: 10.1136/sextrans-2020-054608
18. Stephenson R, Chavanduka TMD, Rosso MT, et al. Sex in the Time of COVID-19: Results of an Online Survey of Gay, Bisexual and Other Men Who Have Sex with Men's Experience of Sex and HIV Prevention During the US COVID-19 Epidemic. *AIDS Behav*. 2021 Jan;25(1):40-48. doi: 10.1007/s10461-020-03024-8
19. Starks TJ, Jones SS, Sauerlich D, et al. Evaluating the impact of COVID-19: A cohort comparison study of drug use and risky sexual behavior among sexual minority men in the U.S.A. *Drug Alcohol Depend*. 2020 Nov;216:108260. doi: 10.1016/j.drugaldep.2020.108260
20. McKay T, Henne J, Gonzales G, et al. Sexual Behavior Change Among Gay and Bisexual Men During the First COVID-19 Pandemic Wave in the United States. *Sex Res Soc Policy*. 2023 Jun;20(2):438-452. doi: 10.1007/s13178-021-00625-3
21. Pampati S, Emrick K, Siegler AJ, et al. Changes in Sexual Behavior, PrEP Adherence, and Access to Sexual Health Services Because of the COVID-19 Pandemic Among a Cohort of PrEP-Using MSM in the South. *JAIDS J Acquir Immune Defic Syndr*. 2021 May 1;87(1):639-643. doi: 10.1097/QAI.0000000000002640
22. Santos G, Ackerman B, Rao A, et al. Economic, Mental Health, HIV Prevention and HIV Treatment Impacts of COVID-19 and the COVID-19 Response on a Global Sample of Cisgender Gay Men and Other Men Who Have Sex with Men. *AIDS Behav*. 2021 Feb;25(2):311-321. doi: 10.1007/s10461-020-02969-0
23. Rosenstock IM, Strecher VJ, Becker MH. The Health Belief Model and HIV Risk Behaviour Change. In: DiClemente RJ, Peterson JL, editors. *Preventing AIDS Theories and Methods of Behavioral Interventions*. New York: Plenum Press; 1994. p. 5-24.

24. Liu H, Lai G, Shi G, et al. The Influencing Factors of HIV-Preventive Behavior Based on Health Belief Model among HIV-Negative MSMs in Western China: A Structural Equation Modeling Analysis. *IJERPH*. 2022 Aug 17;19(16):10185. doi: 10.3390/ijerph191610185
25. Malakouti J, Alizade M, Farshbaf-Khalili A, et al. Predictors of preventive behaviors of AIDS/HIV based on Health Belief Model constructs in women with high-risk sexual behaviors: A cross-sectional survey. *J Edu Health Promot*. 2021; 10(1):446. doi: 10.4103/jehp.jehp\_1046\_20
26. Rosenstock IM, Strecher VJ, Becker MH. Social Learning Theory and the Health Belief Model. *Health Educ Q*. 1988 Jun;15(2):175-183. doi: 10.1177/109019818801500203.
27. Tajeri moghadam M, Raheli H, Zarifian S, et al. The power of the health belief model (HBM) to predict water demand management: A case study of farmers' water conservation in Iran. *J Environ Manage*. 2020 Jun;263:110388. doi: 10.1016/j.jenvman.2020.110388
28. Faul F, Erdfelder E, Lang A, et al. G\*Power 3: A flexible statistical power analysis program for the social, behavioral, and biomedical sciences. *Behav Res Methods*. 2007 May; 39(2): 175-191. doi: 10.3758/bf03193146
29. Thato S, Charron-Prochownik D, Dorn LD, et al. Predictors of condom use among adolescent Thai vocational students. *J Nurs Scholarsh*. 2003;35(2):157-163. doi: 10.1111/j.1547-5069.2003.00157.x
30. Malik S, Ullah I, Irfan M, et al. Fear of COVID-19 and workplace phobia among Pakistani doctors: A survey study. *BMC Public Health*. 2021 Apr 30;21(1):833-841. doi: 10.1186/s12889-021-10873-y
31. Kyi NEMM, Chuemchit M. Knowledge, attitude, and preventive practices concerning HIV/AIDS among men who have sex with men (MSM) in Yangon, Myanmar. *J Health Res*. 2018 ;32(Suppl.1):S96-S103.
32. Wayal S, Reid D, Weatherburn P, et al. Association between knowledge, risk behaviours, and testing for sexually transmitted infections among men who have sex with men: findings from a large online survey in the United Kingdom. *HIV Med*. 2019 Sep;20(8):523-533. doi: 10.1111/hiv.12753
33. Srisawat N, Iamsirithaworn S, Tantawichiein T, et al. COVID-19: Lessons from Thailand. *Ann Acad Med Singap*. 2021 Jan 31;50(1):96-97. doi: 10.47102/annals-acadmedsg.2020408
34. Khumsaen N, Peawnalaw S, Sripituk S, et al. Factors Influencing Mental Health Status of Residents in U-thong District, Suphanburi Province during the Covid-19 Pandemic. *J Health and Nurs Res*. 2021;37(1):36-50. (in Thai).
35. Fan W, Lu R, Wu G, et al. Alcohol drinking and HIV-related risk among men who have sex with men in Chongqing, China. *Alcohol*. 2016 Feb;50:1-7. doi: 10.1016/j.alcohol.2015.09.004
36. Kahler CW, Wray TB, Pantalone DW, et al. Daily Associations Between Alcohol Use and Unprotected Anal Sex Among Heavy Drinking HIV-Positive Men Who Have Sex with Men. *AIDS Behav*. 2015 Mar;19(3):422-430. doi: 10.1007/s10461-014-0896-7
37. Liu Y, Ruan Y, Strauss SM, et al. Alcohol misuse, risky sexual behaviors, and HIV or syphilis infections among Chinese men who have sex with men. *Drug Alcohol Depend*. 2016 Nov;168:239-246. doi: 10.1016/j.drugalcdep.2016.09.020
38. Ossa-Giraldo AC, Correa JS, Moreno CL, et al. Sexual Behaviors and Factors Associated with Condomless Sexual Practice in Colombian Men Who Have Sex with Men at High Risk of HIV Transmission. *Arch Sex Behav*. 2021 Oct; 50(7): 3175-3190. doi: 10.1007/s10508-020-01856-y
39. Yi S, Tuot S, Chhoun P, et al. Factors Associated with Inconsistent Condom Use among Men Who Have Sex with Men in Cambodia. *PLoS One*. 2015 Aug 19;10(8):e0136114. doi: 10.1371/journal.pone.0136114
40. Gizaw AT, Abreha GK, Legesse T, et al. Predictors of HIV/AIDS preventive behavior among college students in Gambella town, Southwest Ethiopia using health belief model. *J AIDS HIV Res*. 2018;10(2):13-21. Doi:10.5897/JAHR2016.0413
41. Iriyama S, Nakahara S, Jimba M, et al. AIDS health beliefs and intention for sexual abstinence among male adolescent students in Kathmandu, Nepal: A test of perceived severity and susceptibility. *Public Health*. 2007 Jan;121(1):64-72. doi: 10.1016/j.puhe.2006.08.016
42. Abebe A, Mitikie G. Perception of high school students towards voluntary HIV counselling and testing, Using Health Belief Model in Butajira, SNNPR. *Eth J Health Dev*. 2009;23:148-153. DOI: 10.4314/ejhd.v23i2.53232
43. Huang S, Huang J, Chu J. Health Beliefs Linked to HIV Pre-Exposure Prophylaxis Use Intention Among Young Men Who Have Sex with Men in Taiwan. *AIDS Patient Care STDS*. 2021 Dec 1;35(12):474-480. doi: 10.1089/apc.2021.0146
44. Huang Y, Yu B, Jia P, et al. Association between Psychological Factors and Condom Use with Regular and Nonregular Male Sexual Partners among Chinese MSM: A Quantitative Study Based on the Health Belief Model. *Biomed Res Int*. 2020 Sep 28;2020:1-10. doi: 10.1155/2020/5807162
45. Zimmermann HM, van Bilsen WP, Boyd A, et al. Prevention challenges with current perceptions of HIV burden among HIV-negative and never-tested men who have sex with men in the Netherlands: a mixed-methods study. *J Int AIDS Soc*. 2021 Aug;24(8):1-8. doi: 10.1002/jia2.25715
46. Bauermeister JA, Hickok AM, Meadowbrooke C, et al. Self-Efficacy Among Young Men Who have Sex with Men: An Exploratory Analysis of HIV/AIDS Risk Behaviors Across Partner Types. *AIDS Behav*. 2014 Jan;18(1):69-77. doi: 10.1007/s10461-013-0481-5
47. Klein H. Condom Use Self-Efficacy and HIV Risk Practices Among Men Who Use the Internet to Find Male Partners for Unprotected Sex. *Am J Mens Health*. 2014 May;8(3):190-204. doi: 10.1177/1557988313492172
48. Lee Y, Salman A, Fitzpatrick JJ. HIV/AIDS preventive self-efficacy, depressive symptoms, and risky sexual behavior in adolescents: A cross-sectional questionnaire survey. *Int J Nurs Stud*. 2009 May;46(5):653-660. doi: 10.1016/j.ijnurstu
49. Kasen S, Vaughan RD, Walter HJ. Self-Efficacy for AIDS Preventive Behaviors among Tenth Grade Students. *Health Educ Q*. 1992 Jul;19(2):187-202. doi: 10.1177/109019819201900204
50. Prati G, Breveglieri M, Lelleri R, et al. Psychosocial correlates of HIV testing among men who have sex with men in Italy: a cross-sectional study. *Int J STD AIDS*. 2014 Jun;25(7):496-503. doi: 10.1177/0956462413515193
51. Sohn A, Cho B. Knowledge, Attitudes, and Sexual Behaviors in HIV/AIDS and Predictors Affecting Condom Use among Men Who Have Sex with Men in South Korea. *Osong Public Health Res Perspect*. 2012 Sep;3(3):156-164. doi: 10.1016/j.phrp.2012.07.001
52. Brown MJ, Serovich JM, Kimberly JA, et al. Disclosure and Self-Efficacy Among HIV-Positive Men Who Have Sex with Men: A Comparison Between Older and Younger Adults. *AIDS Patient Care STDS*. 2015 Nov;29(11):625-633. doi: 10.1089/apc.2015.0133
53. Arogundade OT, Faloore OO. HIV/AIDS Awareness as a Predictor of University Students' Dating Behaviour in South - Western Nigeria. *Int J Psychol Behav Sci*. 2012;2(1):9-14. doi:10.5923/j.ijpbs.20120201.02
54. Nigussie T, Mamo Y, Qanche Q, et al. HIV Preventive Behaviors and Associated Factors among Gold Mining Workers in Dima District, Southwest Ethiopia, 2019: Community-Based Cross-Sectional Study. *Biomed Res Int*. 2021 Oct 18;2021:1-9. doi: 10.1155/2021/4797590