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Attitudes towards, knowledge about, and confidence to prescribe antiretroviral pre-exposure prophylaxis among healthcare providers in Thailand

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Abstract

HIV pre-exposure prophylaxis (HIV-PrEP) is an effective method for preventing HIV transmission, and it is recommended in several international guidelines. Perceptions and knowledge about HIV-PrEP prescription among healthcare providers have not been investigated in Thailand where HIV-PrEP is a novel healthcare topic. The objective of study was to determine healthcare providers' attitudes towards, knowledge about, and confidence to prescribe HIV-PrEP in Thailand.

A questionnaire was administered to Thai healthcare providers during May 1, 2017 to September 5, 2018.

Of the 500 questionnaires that were distributed, 460 were returned (92%). Respondents included 336 physicians (48 infectious disease [ID] physicians, 288 non-ID physicians) and 124 non-physicians (70 nurses, 35 pharmacists, and 19 others). Eighty one percent of respondents had a positive attitude towards HIV-PrEP. Multivariate analysis revealed being a non-ID physician, having prior knowledge about HIV-PrEP, believing that HIV-PrEP can reduce the number of new patients, and believing that HIV-PrEP is not associated with a higher incidence of other sexually transmitted infections were all factors significantly associated with having a positive attitude towards HIV-PrEP. The issue of most concern to respondents who had a negative attitude toward HIV-PrEP was poor patient adherence to antiviral medications. Only 57% of respondents had confidence to prescribe HIV-PrEP. Factors associated with confidence to prescribe HIV-PrEP included being an ID physician, believing that HIV-PrEP can reduce the number of new patients, believing in the safety of antiviral medications, and believing that HIV-PrEP is not associated with increased development of HIV drug resistance. The results of HIV-PrEP knowledge testing (8 questions) were categorized into good score (≥7/8) and fair score (≤6/8). Fifty five percent of participants had a good score result. Using multivariate analysis, the factors associated with a good score result were ID physician, having HIV-PrEP prescription experience, and believing that HIV-PrEP can reduce the number of new patients.

Most Thai healthcare providers (81%) reported having a positive attitude towards HIV-PrEP. Successful HIV-PrEP implementation in Thailand will require steps to mitigate the described barriers, and training for healthcare providers, which will strengthen knowledge and improve both experience with and confidence to prescribe HIV-PrEP.

Abbreviations: HIV-PrEP = human immunodeficiency virus pre-exposure prophylaxis, ID = infectious disease.

Keywords: attitudes, confidence, healthcare providers, HIV, knowledge, pre-exposure prophylaxis

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All data generated or analyzed during this study are included in this published article [and its supplementary information files].

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1. Introduction

Nearly 40 years since HIV infection was discover in 1981, this disease is still incurable and HIV transmission remains common in many countries.[1] Even HIV can be controlled with proper medical care[2] and has become a manageable chronic health condition.[3] In 2020, the number of new HIV-infected individuals was still high as approximately 1.5 million people worldwide.[3] Many strategies for prevention of HIV transmission was applied for medical care include promote safer sexual practices, decrease barrier for HIV testing, male circumcision, and prescription of antiretroviral drugs to HIV-infected individuals for transmission reduction.[4,5]

HIV pre-exposure prophylaxis (HIV-PrEP) is one of the effective strategy according to multiple previous studies show new HIV infection incidences were reduced by HIV-PrEP.[6–8] While adverse effects was not significantly different compare with placebo groups and the concerned adverse effect such as impaired renal function can recovery after discontinuation of HIV-PrEP.[7] Therefore, in 2014, the Centers for Disease Control and Prevention (CDC) released HIV-PrEP guidelines include oral tenofovir disoproxil fumarate/emtricitabine for person who has at risk but not yet infected with HIV according to clinical benefit of HIV-PrEP.[9]

In 2018, Thailand had very high HIV prevalence about 1.1% of adult and the affected population at risk were young people.[10] Although more than 6400 new cases per years, HIV-PrEP is not yet included in Thailand's Universal Coverage Scheme in 2018.[11] Perceptions and knowledge about HIV-PrEP prescription among healthcare providers have not been investigated in Thailand where HIV-PrEP is a novel healthcare topic. Accordingly, the aim of this study was to determine Thai healthcare providers' attitudes towards, knowledge about, and confidence to prescribe HIV-PrEP.

2. Materials and methods

2.1. Sample population and data collection

We conducted a questionnaire-based descriptive study among Thai healthcare providers, including physicians (infectious disease [ID] physicians and non-ID physicians) and non-physicians (nurses, pharmacists, and others). The sample size that we need was calculated for the response rate of completing the survey at 75% with margin of error at 5% and the confidence level at 95%. We desired 500 survey distribution. At first, healthcare providers were recruited at conferences and other meetings held at Siriraj Hospital (Bangkok, Thailand) and at conferences organized by the Infectious Diseases Association of Thailand. After that, healthcare providers were invited by email or social media platforms to complete a web-based survey. Data was collected during May 1, 2017 to September 5, 2018. Healthcare providers working in every level of the Thai healthcare system (from primary to tertiary medical care centers) were invited to participate in this study. The eligible participants for this study included

1. 18 years old or older.
2. A licensed healthcare provider comprised of physician, nurse, pharmacist and other who take care of patient.

We excluded the incomplete survey information and the participant who is not health care provider.

2.2. Survey

The questionnaire included 3 parts. In the first part, healthcare providers were asked about baseline characteristics, including gender, age, type of healthcare provider, specialty, and work setting. The second part included short answer questions about current HIV service, HIV-PrEP prescription experience, attitude towards and confidence to prescribe antiviral PrEP prescription, and issues of concern regarding HIV-PrEP. The third part consisted of 8 questions that were designed to test background knowledge of HIV-PrEP. Most of the questions were adapted from previous publications[12–15] and some questions were developed based on the experience our research team within the context Thai healthcare. To minimize potential sources of bias in this study, the questionnaire was designed to be a concise three-page document in Thai language, which is the native language of healthcare providers in Thailand (the average time for completing the study questionnaire was around 5 minutes) and was disseminated widely via social media (Facebook and LINE applications) that commonly used in Thailand. Our locally developed questionnaire was evaluated for its validity and reliability before using in this study. The index of concordance of the study questionnaire was 0.95 and the alpha-coefficient of the study questionnaire was 0.87.

To ensure confidentiality, the participants were invited via social media and the completion of the survey was absolutely voluntary. We informed the participants by the sentence "This is a confidential survey. The data will not be used for any other purposes than for this research" at the first page of our web-based survey. The participant can withdraw consent by not completing the survey. The protocol for this study was approved by the Siriraj Institutional Review Board (SIRB) of the Faculty of Medicine Siriraj Hospital, Mahidol University, Bangkok, Thailand (COA no. 329/2017).

2.3. Data management and outcome

Descriptive statistics were used to summarize healthcare provider demographic data and conclusion of the primary outcome. Participant demographic data were categorized into physicians and non-physicians (nurses, pharmacists, and others), and the physician group was further categorized into infectious disease [ID] physicians and non-ID physicians.

The primary outcome was overall attitude toward, knowledge about, and confidence to prescribe HIV-PrEP. Regarding attitude towards HIV-PrEP, respondents answering "PrEP should be prescribed (to at-risk population)" were considered to have a positive attitude, and respondents answering "PrEP should not be prescribed (to at-risk population)" were considered to have a negative attitude. Respondent confidence to prescribe HIV-PrEP was derived from the respondent's choice of answer from the following options:

1. confidence, and
2. no confidence.

To determine the result of HIV-PrEP knowledge testing using the median score as the cutoff, background knowledge was categorized as a good score result ($\geq$7 points) or a fair score result ($\leq$6 points).

The secondary outcomes were the factors associated with positive attitude, confidence to prescribe HIV-PrEP, and a good HIV-PrEP knowledge score result as determined by univariate

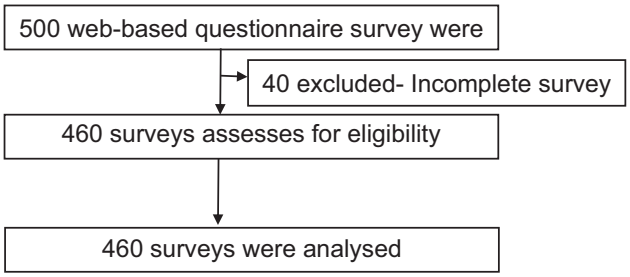

Figure 1. Diagram of study participants.

logistic regression. Factors from univariate analysis with a *P* value <.05 were entered into multivariate logistic regression. Results of that analysis are shown as adjusted odds ratio and 95% confidence interval. Issues of concern that led to negative attitudes towards HIV-PrEP were derived from groups of similar answers given to an open-ended question. SPSS 18.0 software (SPSS Inc, Chicago, IL) was used for all data analyses, and a *P* value <.05 was considered statistically significant for all tests. Multivariated analysis was used to control confounders in the study

3. Results

A total of 500 web-based surveys were distributed to invited healthcare providers. The response rate was 92% (460/500) (Fig. 1). Participant demographic data are demonstrated in Table 1. More than half of participants were female (57.4%). Median age was within the range of 25 to 30 years old (60.4%). Participants included 336 physicians (73.6%) and 124 non-physicians (70 nurses, 35 pharmacists, and 19 others). Among the physicians, there were 48 ID physicians and 288 non-ID physicians. Participants were licensed healthcare providers in Thailand for a median of <5 years (65%). A majority of participants worked at an academic center (46.4%) that is located in Bangkok (47.2%). Most respondents (52.0%) reported taking care of 0-5 HIV-infected patients per month. Over half (56%) of participants described taking care of high-risk persons as being part of their job responsibility. Most participants (79.1%) had prior knowledge about HIV-PrEP. Approximately half (51.5%) of participants assessed their self-rated HIV-PrEP knowledge as fair. Regarding prior experience, 44.7% and 23.8% of respondents reported having HIV-PrEP counseling and prescription experience, respectively.

Regarding healthcare providers' beliefs about HIV-PrEP, 61.0% of respondents believe that the antiretroviral medication in the HIV-PrEP regimen is safe. About 69.3% of respondents believe that HIV-PrEP can reduce the number of new infections. More than half of study participants (59.3%) believe that HIV-PrEP is associated with an increase in sexual behavior without the use of condoms, an increase in the number of persons who have multiple sexual partners (50.5%), a higher incidence of other sexually transmitted infections (58.3%), and that HIV-PrEP is associated with increased development of HIV drug resistance (63.2%).

Most participants (81.3%) agreed with prescribing HIV-PrEP to persons at substantial risk for HIV infection, and this reflected an overall positive attitude towards HIV-PrEP. In contrast, confidence to prescribe HIV-PrEP and good knowledge score was observed in 56.5% and 55.2% of respondents, respectively.

Table 1

Baseline characteristics of study participants (n=460).

Characteristics	n (%)
Male	196 (42.6%)
Female	264 (57.4%)
Age	
≤24	10 (2.2%)
25–30	275 (60.4%)
31–35	48 (10.5%)
36–60	116 (25.5%)
>60	6 (1.3%)
Type of healthcare provider	
Physician	336 (73.6%)
Infectious disease physician	48 (10.4%)
Internal medicine physician	146 (32.0%)
General practice physician	69 (15.2%)
Other specialists	73 (16.0%)
Non-physician	120 (26.4%)
Nurse	70 (15.4%)
Pharmacist	35 (7.7%)
Others	15 (3.3%)
Clinical practice experience (years)	
≤5	299 (65.0%)
6–9	64 (13.9%)
10–15	51 (11.1%)
16–19	19 (4.1%)
≥ 20	27 (5.9%)
Workplace	
Academic center	212 (46.4%)
Center hospital	78 (17.1%)
General hospital	53 (11.6%)
Community hospital	69 (15.1%)
Private hospital	38 (8.3%)
Others	7 (1.5%)
Region	
Bangkok	217 (47.2%)
Central	47 (10.2%)
Northeastern	65 (14.1%)
Eastern	10 (2.2%)
Western	23 (5.0%)
Northern	24 (5.2%)
Southern	74 (16.1%)
Number of HIV infected patients seen per month	
0–5	239 (52.0%)
6–50	149 (32.4%)
50–100	28 (6.1%)
>100	44 (9.6%)
Responsible for taking care of high-risk persons	257 (56.0%)
Having prior knowledge about HIV-PrEP	363 (79.1%)
Having HIV-PrEP counseling experience	205 (44.7%)
Having HIV-PrEP prescription experience	109 (23.8%)
Self-rated knowledge about HIV-PrEP	
Good	64 (13.9%)
Fair	237 (51.5%)
Poor	159 (34.6%)

HIV-PrEP = human immunodeficiency virus pre-exposure prophylaxis

The issues of concerns relating to HIV-PrEP prescription reported by participants included poor adherence to antiretroviral medications by high-risk persons (42.0%), increased development of HIV drug resistance (20.0%), an increase in other sexually transmitted diseases (14.0%), increased frequency of unsafe sex (8.0%), concern about efficacy of HIV-PrEP (8.0%), concerns about safety and the side effects of ART (6.0%), and high cost of HIV-PrEP (2.0%).

Table 2

Factors associated with a positive attitude towards human immunodeficiency virus pre-exposure prophylaxis prescription.

Factors	Crude OR	95% CI	*P* value*	Adjusted OR†	95% CI	*P* value‡
Non-infectious disease physician	3.4	1.8–6.5	<.001	2.8	1.1–7.0	.032
Having prior knowledge about HIV-PrEP	1.5	0.9–2.6	.128	2.5	1.2–5.5	.019
Believing that HIV-PrEP can reduce the number of new patients	4.1	2.4–6.8	<.001	3.9	2.0–7.5	<.001
Believing that using HIV-PrEP is not associated with having sex without a condom	3.4	1.9–6.0	<.001	1.3	0.5–1.5	.228
Believing that using HIV-PrEP is not associated with having multiple sex partners	2.2	1.4–3.6	.001	0.9	0.03–1.9	.861
Believing that HIV-PrEP is not associated with higher incidence of other sexually transmitted infections	3.9	2.2–7.0	<.001	3.1	1.5–6.5	.003
Believing that HIV-PrEP is not associated with increased development of HIV-PrEP drug resistance	5.6	2.8–11.1	<.001	1.6	0.7–2.5	.201

CI = confidence interval, HIV-PrEP = human immunodeficiency virus pre-exposure prophylaxis, OR = odds ratio.

* A *P* value <.05 indicates statistical significance in univariate regression analysis

† Variables were adjusted for characteristics found to be significant ($P < .05$) in univariate analysis

‡ A *P* value <.05 indicates statistical significance in multivariate regression analysis.

Logistic regression analyses were performed to identify factors significantly associated with a positive attitude towards HIV-PrEP, confidence to prescribe HIV-PrEP, and a good result of HIV-PrEP knowledge testing. Regarding a positive attitude towards HIV-PrEP, univariate logistic regression showed several factors to be significantly associated with this parameter (Table 2). When those factors were entered into multivariate analysis, being a non-ID physician, having prior knowledge about HIV-PrEP, believing that HIV-PrEP can reduce the number of new patients, and believing that HIV-PrEP is not associated with a higher incidence of other sexually transmitted infections were the independent factors associated with a positive attitude towards HIV-PrEP.

There were 11 factors found to be significantly associated with confidence to prescribe HIV-PrEP in univariate analysis, but only the following 4 factors were identified as independent predictors of confidence to prescribe HIV-PrEP in multivariate analysis: being an ID physician, believing that HIV-PrEP can reduce the number of new patients, believing in the safety of antiviral medications, and believing that HIV-PrEP is not associated with increased development of HIV drug resistance (Table 3).

Factors associated with a good result of knowledge testing about HIV-PrEP after adjustment for significant factors in a multivariate regression model were being an ID physician, having HIV-PrEP prescription experience, and believing that HIV-PrEP can reduce the number of new patients (Table 4). The strongest of those independent factors (by 4-fold) was being an ID physician (adjusted odd ratio [aOR]: 4.4, 95% confidence interval [CI]: 1.9–49.8; $P < .001$).

4. Discussion

HIV pre-exposure prophylaxis (HIV-PrEP) has the potential to reduce new HIV infections in high-risk persons. Thailand currently has a high prevalence of both HIV infection and persons that are considered to be at high risk for becoming infected. However, HIV-PrEP is not currently offered as part of Thailand's Universal Coverage Scheme, and HIV-PrEP is only available from some hospitals with a physician's prescription. To the best of our knowledge, this is the first study in Thailand to investigate attitudes towards, knowledge about, and confidence to prescribe HIV-PrEP among Thai healthcare providers. We found that 79.1% of participants had prior knowledge about HIV-PrEP; however, only 23.8% had HIV-PrEP prescription experience, and 86.1% had poor to fair self-rated knowledge about HIV-PrEP.

Although a majority of participants were generally had positive attitudes toward HIV-PrEP for at-risk populations, non-ID physicians was one of the significant factors associated with positive attitude toward HIV-PrEP instead of ID physician. This finding may be explained by that ID physician possibly had more HIV-PrEP concerning issues about the medication adhernce behavior and risk of developing of HIV drug resistance in real-life clinical practice. Other significant factors for positive attitude

Table 3

Factors associated with confidence to prescribe human immunodeficiency virus pre-exposure prophylaxis.

Factors	Crude OR	95% CI	*P* value*	Adjusted OR†	95% CI	*P* value‡
Infectious disease physician	6.1	2.5–14.9	<.001	7.0	2.5–20.0	<.001
Responsible for taking care of high-risk persons	1.9	1.4–2.9	<.001	1.8	0.7–3.0	.316
Having prior knowledge about HIV-PrEP	2.8	1.7–4.4	<.001	2.0	0.8–2.2	.3
Good self-rated knowledge	15.4	6.5–36.0	<.001	3.0	0.9–9.4	.058
Having HIV-PrEP prescription experience	2.1	1.3–3.4	.001	2.1	0.6–3.4	.09
Believing that HIV-PrEP can reduce the number of new patients	9.3	5.7–15.2	<.001	6.6	3.1–14.0	<.001
Believing that using HIV-PrEP is not associated with having sex without a condom	1.9	1.3–2.8	.001	1.3	0.4–1.5	.87
Believing that using HIV-PrEP is not associated having multiple sex partners	1.8	1.2–2.6	.002	1.0	0.9–1.7	.194
Believing that HIV-PrEP is not associated with higher incidence of other sexually transmitted infections	1.7	1.1–2.4	.01	1.7	0.6–2.5	.416
Believing in the safety of antiviral medications	15.0	9.2–24.42	<.001	7.5	4.0–14.1	<.001
Believing that HIV-PrEP is not associated with increased development of HIV drug resistance	2.9	1.9–4.4	<.001	2.6	1.4–5.0	.003

HIV-PrEP = human immunodeficiency virus pre-exposure prophylaxis, OR = odds ratio, CI = confidence interval.

* A *P* value <.05 indicates statistical significance in univariate regression analysis

† Variables were adjusted for characteristics found to be significant ($P < .05$) in univariate analysis

‡ A *P* value <.05 indicates statistical significance in multivariate regression analysis.

Table 4

Factors associated with a good result of knowledge testing about human immunodeficiency virus pre-exposure prophylaxis.

Factors	Crude OR	95% CI	*P* value*	Adjusted OR†	95% CI	*P* value‡
Infectious disease physician	2.6	1.3–5.2	.007	4.4	1.9–9.8	<.001
Responsible for taking care of high-risk persons	1.5	1.5–2.1	.041	1.1	0.3–2.2	.576
Good self-rated knowledge	3.0	1.6–5.9	.001	2.0	0.3–2.3	.153
Having HIV-PrEP prescription experience	1.6	1.1–2.5	.024	2.2	1.2–3.9	.007
Believing that HIV-PrEP can reduce the number of new patients	1.7	1.2–2.8	<.001	2.7	1.5–4.7	.001

CI = confidence interval, HIV-PrEP = human immunodeficiency virus pre-exposure prophylaxis, OR = odds ratio.

* A *P* value <.05 indicates statistical significance in univariate regression analysis.

† Variables were adjusted for characteristics found to be significant ($P < .05$) in univariate analysis.

‡ A *P* value <.05 indicates statistical significance in multivariate regression analysis.

toward HIV-PrEP by univariate analysis were believing in the efficacy of PrEP and PrEP were not cause significant negative treatment outcome.

Major identified issues of concern in our study corresponded with those identified in other surveys/studies. Our participants reported poor patient adherence to antiretroviral medication (42%), development of HIV drug resistance (20%), and an increase in the incidence of other sexual transmitted diseases (14%) to be the most important topics of concern. Other studies reported increased development of antiretroviral resistance, lack of patient adherence, and HIV-PrEP toxicity to be the most important issues of concern.[12–21] Other studies reported a high incidence of sexual transmitted infections both before and after the initiation of PrEP.[22,23]

The results of the present study revealed that 56.5% of participants had confidence to prescribe HIV-PrEP, and that 55.2% of respondents had good knowledge about HIV-PrEP. Previous study showed that daily tenofovir/emtricitabine reduced HIV risk by 86% among HIV-PrEP users,[24] with rates of serious adverse events that were similar to the placebo group.[25] However, not being an ID physician and not having a sufficient understanding of HIV-PrEP efficacy and safety were still factors that lowered confidence to prescribe HIV-PrEP in our study. Good prior knowledge about HIV-PrEP and HIV-PrEP prescription experience were both reported to be associated with increased confidence and knowledge.[20] This study was limited by the fact that most surveys were distributed to staff working in academic hospitals located in Bangkok, so our data may not reflect or be generalizable to other care settings or to other regions of Thailand. Further study that includes a larger sample, and representation from all types of centers from all regions of Thailand is warranted.

Regarding evidence specific to the effectiveness of HIV prevention strategies in Thailand, HIV-PrEP was reported to be a novel and not very well-known treatment, especially among inexperienced healthcare providers.[26] Although HIV-PrEP is one of the strategies of Thailand National Guidelines on HIV/AIDS Diagnosis, Treatment, and prevention 2017, national guideline-based training to demonstrate high efficacy and safety of HIV-PrEP should be done to strengthen and enhance attitudes towards, knowledge about, and confidence to prescribe HIV-PrEP prior to nationwide implementation.

5. Conclusion

The vast majority of the Thai healthcare providers surveyed in this study reported having a positive attitude towards HIV-PrEP; however, some important barriers to the successful implementation of HIV-PrEP were identified. Successful HIV-PrEP implementation in Thailand will require steps to mitigate the described barriers, and training for healthcare providers, which will strengthen knowledge and improve both experience with and confidence to prescribe HIV-PrEP.

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