

Awareness and Attitudes Toward HIV Self-Testing in Northern Thailand

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Keywords: HIV, HIV self-testing, attitudes, stigma, Thailand

Posted Date: September 15th, 2020

DOI: <https://doi.org/10.21203/rs.3.rs-74274/v1>

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Version of Record: A version of this preprint was published at International Journal of Environmental Research and Public Health on January 20th, 2021. See the published version at <https://doi.org/10.3390/ijerph18030852>.

Abstract

HIV self-testing (HIVST) was recently introduced in Thailand, but little is known about receptivity among its residents. Because HIV testing is a critical component of HIV prevention, it is important to understand how HIVST is perceived among potential users. The purpose of this study was to examine awareness and attitudes toward HIVST among adults in Northern Thailand. A convenience sample of 403 adult residents of the Sanpatong district, Chiang Mai province was interviewed using a structured questionnaire in 2019. Awareness of HIVST was low (14%), as was the overall HIVST negative attitude score (6.44; possible range of 0-14). The odds of being aware of HIVST were more than twice as high for those with more education compared to those with less (AOR=2.29, 95% CI: 1.22 - 4.30), and roughly half as high for those who expressed HIV stigma compared to those who did not (AOR=0.49, 95% CI: 0.26 - 0.91). Holding negative attitudes towards HIVST also was associated with lower education and expressing HIV stigma, but these relationships disappeared in multivariate analysis. Findings may be used by local health organizations to tailor HIVST education efforts.

Introduction

Although the HIV epidemic is in decline, Thailand has one of the highest levels of HIV prevalence in Asia and the Pacific (1). Owing to Thailand's successful HIV testing programs, however, 94% of people living with HIV were aware of their status as of 2018 (1). Although testing services are readily available in Thailand, among high-risk populations such as men who have sex with men (MSM) and female sex workers (FSW), many (71% and 42%, respectively) have not used testing services within the past year (2).

HIV testing serves as the gateway to HIV treatment and care, as well as the entry point to measuring progress to the UNAIDS 90-90-90 targets. Previous studies have identified many barriers to HIV testing at the patient, health care provider, and institutional levels. These barriers include perception of HIV risk, fear and stigma related to HIV, accessibility to HIV services, and human and financial resources for delivering HIV services (3–9).

To combat the fear of stigmatization and increase testing privacy, in 2016, the World Health Organization (WHO) recommended HIV self-testing (HIVST) as an important approach that should be offered in addition to traditional HIV testing (10). According to WHO, HIVST is a technique that allows people to conduct an HIV test on themselves in a private setting, including collecting their own fluid or blood specimen, testing the specimen for HIV antibodies, and interpreting the result (10). Like most other HIV tests conducted in a laboratory or clinic, the self-testing kit does not provide an HIV diagnosis; rather, it screens for HIV antibodies that may indicate an infection (11). Also included in the WHO report was the first HIVST global guidelines. Several countries have responded to these guidelines, with 28 implementing HIVST, 59 executing HIVST policies, and 53 countries in the process of developing policies (12).

In some countries, HIV self-testing has shown promising results as a gateway to prevention and care; however, barriers to full implementation and access remain (11). One potential barrier to HIVST access is

the cost of the test. Research has indicated that people in Kenya and China would be willing to pay a higher cost for HIVST, while research in the U.S. has shown that people would be willing to purchase HIVST only if the cost is low (13, 14). Other potential barriers include lack of awareness of the availability of self-testing and negative attitudes toward the test (14, 15). Researchers summarizing the arguments for and against HIVST reported empowerment of test users and the normalizing of testing as positive factors, and the high cost, possibility of false-negative results, need for counseling and referrals, and potential for coercion among partners as negative factors (14).

In order for HIVST to fulfill its potential as a tool for reducing HIV transmission, members of the general population must be aware of the test. According to the literature, roughly half of participants in multiple studies had heard of the test, with awareness higher among those with higher education or who were themselves at elevated risk of HIV. Across three studies, 55–77% of at-risk populations were aware of HIVST, with the greatest awareness among MSM, gay, highly educated, and previously tested individuals (16, 17). A study in North Carolina among young, black MSM reported a significant relationship between HIVST awareness and higher income (16). The literature also identified a gap in HIVST awareness among those of different age groups. Given the recent introduction of HIVST to Thailand, it is important to identify population groups that may have lower awareness of the availability of self-testing so they can be prioritized in future interventions and educational campaigns.

Attitudes toward HIVST vary across different demographic characteristics and can impact individual's willingness to utilize self-testing services (13). Across various studies, positive attitudes towards HIVST have been most prevalent among men having sex with men and among those who were female, married, of rural backgrounds, of higher education or income, and who had previously been tested for HIV (13, 18). Findings about the level of acceptance of HIVST among different age groups has varied, with some research reporting a greater relative acceptance among older, and other research reporting greater acceptance among younger, age groups (18, 19). Given that awareness and attitudes vary across risk and demographic groups, it is important to understand existing attitudes and possible barriers to HIVST among local Thai populations to develop the most effective public health programs promoting the adoption of HIVST in Thailand.

Research has shown that one's attitudes toward HIV testing may be impacted by one's own stigmatizing attitude toward people living with HIV (PLHIV). For example, a study of individuals in Cape Town found that those with stigmatizing attitude toward PLHIV had higher negative attitudes towards HIV testing than those without indicated stigma (15). In parallel, another study conducted in Ghana reported an indirect relationship between stigmatizing attitude and overall uptake of testing (20). In simpler terms, those with more stigmatizing attitudes toward PLHIV were less likely to use testing services. A study in Nigeria reported that women from rural areas with lower education levels held beliefs about HIV that were more negative than the beliefs of women from other areas. These more negative beliefs were associated with higher levels of stigma and a decreased likelihood of testing (21). Given these associations, it is essential to examine the role of HIV stigma and its relationship with HVST awareness and attitudes to better understand how people may react to the availability of HIVST.

The current study explores HIVST awareness and attitudes in a rural region of Thailand. Given the recent implementation of HIVST in Thailand, the purpose of this study was to: (1) examine awareness and attitudes toward HIVST among residents of Northern Thailand, and (2) understand how these constructs, along with other covariates are related in this community. This investigation contributes to existing literature on HIVST and to our knowledge, is the first study of HIVST awareness and attitudes in Northern Thailand. In Thailand, although the FDA approved selling HIVST kits in Thai pharmacies in April 2019, little research has been conducted to date, and awareness and attitudes related to HIVST among members of the Thai general public remain unknown (22). Understanding perceived barriers to HIVST, including lack of awareness, negative attitudes toward HIVST, and HIV stigma may be helpful in developing effective health education programs promoting HIVST in Thailand. Thus, developing greater understanding of how Thai people may respond to the availability of HIVST is essential.

Methods

Study Context

This cross-sectional study was a collaborative project between Chiang Mai University (CMU), Thailand and California State University, Fullerton (CSUF), USA. Data were collected from residents of the Ban Khlang subdistrict of the Sanpatong district in Chiang Mai province, Northern Thailand in June, 2019.

Compliance with Ethical Standards

The research was reviewed and approved by CSUF Institutional Review Board (#HSR-18-19-712, 6/21/19), and participants provided informed consent. The research was performed in accordance with the ethical standards as laid down in the 1964 Declaration of Helsinki and its later amendments.

Sample

Convenience sampling was used to recruit participants from 5 of the 11 villages within the subdistrict. The villages were chosen based on their larger proportion of adult members of the population. To be included in the study, individuals must have been: (1) at least 18 years of age and (2) able to speak and understand Thai. All invited villagers (100%) agreed to participate in the study. The Taro Yamane formula was used to calculate the minimum sample size, which was determined to be a minimum of 356 participants (23). Of the 407 residents who agreed to participate, 403 completed the questionnaire.

Measures

Data were collected using a face-to-face survey questionnaire that was translated to Thai by CMU and CSUF faculty who are native speakers of the Thai language who speak, read, and write in English. The Thai version of the questionnaire was then translated back to English using the forward-backward translation method to ensure the original meaning was preserved (24).

Demographics and HIV Information. Demographic characteristics and HIV testing status were collected using nominal and ordinal scales as appropriate.

HIVST Awareness. Awareness of HIVST was measured by asking, “Have you heard about HIV self-testing?” This was rated on a nominal scale with “no”, “yes”, and “not sure” response categories, and then recoded to a dichotomous variable, with “not sure” responses set to missing. After asking participants about their awareness of HIVST, the interviewer read a formal definition of HIVST before asking about their attitudes:

HIV self-testing allows people to test themselves for HIV. An HIV self-test kit can be purchased from a pharmacy, clinic, or hospital without a prescription. The person collects their own saliva or blood. Then, the person uses the test kit to perform the test and can interpret the result within 20 to 40 minutes.

HIVST Attitudes. Fourteen HIVST attitude questions from the Health Care Users (HCU) HIV Self-Testing (HIVST) Attitudes Questionnaire were adapted to the Thai context (25). These included seven positive and seven negative attitudes toward the HIVST, with nominal response choices of “disagree” and “agree.” The seven positive attitudes were reverse coded, and the negative responses were summed to yield a total negative attitude score ranging from 0 to 14, reflecting the total number of negative attitudes with which respondents expressed agreement.

HIV Stigma. HIV stigma was measured by creating a composite variable combining responses to two items adopted from the UNAIDS Global Indicator for Discriminatory Attitudes toward People Living with HIV (PLHIV): “You feel too disgusted to buy fresh food or ready-to-eat food from a shopkeeper or vendor whom you know has HIV or AIDS” and “You think that children living with HIV or AIDS should not attend the same classroom with other children” (26). Agreement with either of these items indicated discriminatory attitude toward PLHIV. (See Table 3.)

Procedure

Interviews were confidential and were conducted by students and faculty from Chiang Mai University as well as faculty from California State University, Fullerton. Training included review of the study purpose and the research protocol, an item-by-item questionnaire review, and supervised role play. Individuals were invited to participate in the study by community health volunteers and were asked to gather at a designated location and time to participate. Informed consent was obtained immediately prior to conducting the interview, which took place in a private, face-to-face setting. The consent form was read verbatim in Thai, and participants were given the opportunity to ask questions before signing the form; a printed copy was offered to participants. Interviews took approximately 20 minutes to complete. A small gift valued around \$1 USD was given to participants to thank them for their time.

Data were entered, cleaned, and analyzed using SPSS version 25.0. Descriptive statistics included frequencies/percentages, means, ranges, and standard deviations; inferential statistics included the chi-square test, independent samples *t*-test, multiple logistic regression, and multiple linear regression.

Results

Of the 403 subjects who completed the survey, 73% were women. Age ranged from 21 to 89 years, with a median of 61 years. Nearly three-quarters of the sample (72%) completed primary school or had no education; more than half (60%) earned 5,000 Baht (฿\$150 USD) per month or less. More than half (61%) were married, and nearly all (98%) were Buddhist. The majority indicated they had no friends (66%) or family members (86%) with HIV. Just over half (52%) reported they had never been tested for HIV, and of those who had been tested, the large majority (96%) had tested negative. (See Table 1.)

Descriptive Results

HIVST Awareness and Negative Attitudes. Awareness of HIVST in this community was fairly low, with only 14% of participants indicating they were aware of its existence (56/403). More than three-quarters (86%, 345/403) reported being unaware, and the remainder (<1%, 2/403) were unsure. The mean HIVST negative attitude score was 6.44 ($SD = 2.11$), reflecting agreement with less than half of the 14 negative attitudes included in the scale. Eighty nine percent of the sample believed that people may not be able to read the instructions of the HIVST kit properly. Table 2 includes a summary of responses to individual scale items.

HIV Stigma. With regard to stigma, less than half (44%) felt "...too disgusted to buy fresh food or ready-to-eat food from a shopkeeper or vendor [known to have] HIV or AIDS." Almost a quarter (24%) felt "...that children living with HIV or AIDS should not attend the same classroom with other children." About half the sample (51%) agreed with one or both of these discriminatory attitude items. (See Table 3.)

Bivariate Results

HIVST Awareness. The association between demographic characteristics and HIVST awareness was tested using chi-square. HIVST awareness was significantly associated with key demographic factors. Age group was significantly associated with HIVST awareness, with those under 60 years of age more likely to be aware than those 60 and over, $\chi^2(1) = 9.64, p = 0.002$. Education level also was significantly associated with HIVST awareness; those with secondary, certificate, or higher education more likely to be aware of the test than those with less or no education, $\chi^2(1) = 10.66, p = 0.001$. Finally, stigma was significantly associated with HIVST awareness, with those with discriminatory stigma toward HIV less likely to be aware of HIVST than those without, $\chi^2(1) = 5.98, p = .014$. Having a higher monthly income (i.e., 10,001 Baht or more) was associated with HIVST awareness, but this only approached statistical significance, $\chi^2(1) = 2.92, p = 0.088$. (See Table 4.)

HIVST Negative Attitudes. The relationship between HIVST negative attitudes and participant characteristics was tested using independent samples *t*-tests. The only demographic factor significantly associated with negative attitudes towards HIVST was education, which had an inverse relationship. The mean negative attitude score for HIVST was higher among those with lower education ($M = 6.59, SD = 2.08$) than among those with higher education ($M = 6.05, SD = 2.16$), $t(398) = 2.27, p = 0.024$.

Additionally, having discriminatory stigma toward HIV was significantly related to having negative attitudes towards HIVST. The mean negative attitude score for HIVST was higher among those with HIV stigma ($M = 6.66$, $SD = 2.05$) than among those without ($M = 6.22$, $SD = 2.17$), $t(398) = 2.08$, $p = 0.038$. According to Cohen, these are considered “small” effects (27). (See Table 4.)

Multivariate Results

Logistic regression was performed to assess the impact of multiple factors on the likelihood that respondents were aware of HIVST, and ordinary least squares multiple linear regression was used to test correlates of HIVST negative attitudes. Education, gender, income, marital status, having been tested for HIV, and discriminatory attitude toward HIV were included in the models; age was highly correlated with education and was removed.

The overall multiple logistic regression equation identifying correlates of HIVST awareness was statistically significant, $X^2(6, N=394) = 16.21$, $p = .013$ and correctly classified 86.3% of the cases. Education and HIV stigma each made unique statistically significant contributions to the model. The strongest predictor of HIVST awareness was education, with an adjusted odds ratio (AOR) of 2.29, indicating that the odds of being aware of HIVST for those with higher education were more than twice the odds for those with lower or no education. The AOR for HIV stigma was 0.49, indicating that among those with discriminatory attitude toward PLHIV, the odds of being aware of HIVST were roughly half the odds as for those without HIV stigma. According to Cohen, these can be considered small to medium effects (27). (See Table V.)

The overall multiple linear regression equation testing correlates of HIVST negative attitudes was not statistically significant, $F(6,387) = 1.50$, $p = .178$, with education ($t = 1.82$, $p = .069$) and stigma ($t = 1.84$, $p = .066$) only approaching statistical significance.

Discussion

Summary. In general, awareness of HIVST in this sample was low. Residents of rural Northern Thailand were older with limited education. Consequently, they may have been unaware of current HIV testing options. The mean score for negative attitude towards HIV self-testing also was low. Responses to individual attitude items are revealing. Most participants (89.1%) felt that “people may not be able to read instructions properly”, and 87.3% felt that “people could read/interpret results incorrectly.” These concerns may reflect the relatively low education of the overall sample.

Awareness of HIVST varied by age, education, and HIV stigma in this sample. Those who were older, those who had lower education, and those expressed discriminatory attitude towards PLWHIV were less aware of the availability of self-testing for HIV, confirming some prior research (16, 17, 28) but contradicting other research (29, 30). In multivariate analyses, education level and HIV stigma were the two key predictors of HIVST awareness that emerged, controlling for other variables. It is possible that those with formal knowledge of HIV may know more about different HIV testing options, including self-

testing, and because of their HIV knowledge, they may be less discriminatory toward people living with HIV. Having been tested for HIV, which would suggest some basic level of HIV knowledge, was not a significant correlate of HIVST awareness, however.

Negative attitudes towards HIV self-testing were more common among people with lower levels of education and those who held stigmatizing attitudes towards PLHIV. Having discriminatory attitudes towards PLHIV may be due to lack of exposure to PLHIV or limited knowledge about the disease, and it seems reasonable that such stigma would be correlated with negative attitudes towards HIV self-testing. Prior research has found that older individuals and those with lower income levels were less likely to accept and use HIVST (31). In contrast, other research has reported moderate awareness and high acceptability of HIVST in Kenya (32), Singapore (17), and Zambia (33) across various education and income levels. Multivariate analyses only approached statistical significance, suggesting a more complicated pattern of inter-relationships among these factors may exist.

To our knowledge, this article is the first to report the results of overall awareness and attitudes toward HIVST in Thailand. Results of this study indicated that HIVST awareness is low. Lack of awareness or knowledge of HIV testing methods may decrease utilization. Prior research indicates that a low percentage of at-risk populations utilize testing services despite ready availability (34); our results found that nearly half of the sample (46.9%) had been tested. It is likely that respondents had low HIV perceived risk. Just a quarter (28%) knew a friend with HIV, and only 13% knew a family member. Of those who had been tested, the vast majority (96%) reported a negative HIV status. Prior research has found an association between higher perceived HIV risk and greater intention to use HIVST (35).

Implications for Practice. There are multiple implications of this study. Given the relatively low level of HIVST awareness in the community, findings highlight the need for developing effective HIVST educational campaigns. It is possible that the rural residency of the study sample contributed to the low level of awareness, and programs should be designed to address the unique needs of individuals in rural regions, in addition to those residing in more urban areas. Additionally, it is important to recognize the relationship between negative attitudes toward HIVST and covariates such as having a lower educational background and discriminatory attitude toward PLHIV in designing educational campaigns. The recent implementation of HIVST in Thailand and introduction of test kits in local pharmacies eventually may lead to more positive attitudes towards HIVST, and ultimately, to an increase in the proportion of residents who learn their status and consequently prevent HIV transmission. Although local pharmacies can now sell HIV self-testing kits, because of the relatively low level of HIVST awareness, purchase and uptake of pharmacy-based kits may be limited. Thus, it is not only critical to raise awareness about the existence of HIVST, but also to provide information about where and how to access the test kits, as well as how to use them. Many respondents indicated concerns about HIVST related to people's ability to read HIVST instructions properly and to interpret the results correctly, possibly reflecting their own lower self-efficacy for managing these tasks. Thus, providing information about proper use of HIVST kits is essential.

Many studies have investigated awareness and attitudes toward HIV testing among populations across the globe; however, there is more limited research on these topics in relation to the more recently developed technique of HIVST. Of the studies focusing on HIVST, none have focused on Thailand. This research provides an initial descriptive analysis of HIVST awareness and attitudes in Northern Thailand. The importance of using research evidence to guide the development of educational campaigns is heightened given that Thailand has one of the highest HIV prevalence rates in Asia (1). Thirteen Asian countries including China, Indonesia, and Malaysia, where HIV infection continue to rise, do not have policies to implement HIV self-testing at scale, thus explaining the lack of literature on HIVST in this region. As a result, the Joint United Nations Programme on HIV/AIDS (UNAIDS), World Health Organization (WHO), and other partners have emphasized the importance of HIVST and are working toward an HIVST scale-up program across these countries (36). Thus, the results of this study contribute to the growing body of research on HIVST in Asia.

Limitations. The non-probability study sample was drawn from a specific rural region in Northern Thailand and consisted primarily of older adult, heterosexual members of the general population. Thus, results cannot be generalized to other regions in Thailand or to key populations that have higher risks for HIV infection who may be targeted for HIVST. Also, because the sample was composed primarily of older adults with lower levels of education and income, overall negative attitudes toward HIVST may be elevated.

Future Research. Future research should examine other geographic regions within and across Thailand and across different demographic and risk groups to provide a more comprehensive understanding of HIVST knowledge and attitudes. Research also should examine knowledge about HIVST in general and as related to demographic and risk factors.

Conclusions

Findings from this study suggest HIVST awareness is fairly low among members of this community, especially among those with less education and those who hold discriminatory stigma towards PLWHIV. Given the recent availability of over-the-counter testing kits in Thailand, educational campaigns are urgently needed, particularly in rural areas, to help increase awareness, knowledge, and uptake of HIVST among residents of Thailand.

Declarations

ACKNOWLEDGMENTS

Research reported in this publication was supported by *the LA Basin Minority Health and Health Disparities Research Training Program, National Institute on Minority Health and Health Disparities* of the National Institutes of Health under award number T37MD001368. This research work was partially

supported by Chiang Mai University. The content is solely the responsibility of the authors and does not necessarily represent the official views of the National Institutes of Health.

References

1. Avert HIV. and AIDS in Thailand Brighton, UK: Avert.org; 2019 [updated 2/20/20]. Available from: <https://www.avert.org/professionals/hiv-around-world/asia-pacific/thailand>.
2. UNAIDS, HIV and AIDS Data Hub for Asia-Pacific. Thailand country snapshot Geneva, Switzerland: UNAIDS; 2018 [Available from: <https://www.aidsdatahub.org/resource/thailand-country-snapshot-2018>].
3. Johnston LG, Steinhaus MC, Sass J, et al. Recent HIV testing among young men who have sex with men in Bangkok and Chiang Mai: HIV testing and prevention strategies must be enhanced in Thailand. *AIDS Behav.* 2016;20(9):2023–32.
4. MacIntosh JM. HIV/AIDS stigma and discrimination: A Canadian perspective and call to action. *Interamerican Journal of Psychology.* 2007;41(1):93–102.
5. Joint United Nations Programme on HIV/AIDS. 90-90-90: An ambitious treatment target to help end the AIDS epidemic. Geneva: UNAIDS; 2014.
6. Lee JJ, Zhou Y. Facilitators and barriers to HIV testing among Asians in the United States: A systematic review. *AIDS Care.* 2019;31(2):141–52.
7. Wise JM, Ott C, Azuero A, et al. Barriers to HIV testing: Patient and provider perspectives in the Deep South. *AIDS Behav.* 2019;23(4):1062–72.
8. Weber M, Barrett A, Finnerty F, Richardson D. Identifying barriers to HIV testing in hospital admissions to improve HIV testing. *J Public Health.* 2019;41(2):e216-e.
9. Hamilton A, Shin S, Taggart T, et al. HIV testing barriers and intervention strategies among men, transgender women, female sex workers and incarcerated persons in the Caribbean: A systematic review. *Sexually Transmitted Infections.* 2020;96(3):189–96.
10. World Health Organization. HIV/AIDS: HIV self-testing Geneva: Author; 2019 [Available from: <https://www.who.int/hiv/topics/self-testing/en/>].
11. UNAIDS. HIV self-testing: What you need to know Geneva: Author; 2018 [Available from: <https://www.unaids.org/en/resources/infographics/hiv-self-testing-what-you-need-to-know>].
12. Unitaid & World Health Organization. Market and technology landscape: HIV rapid diagnostic tests for self-testing. Geneva: Unitaid; 2018.
13. Figueroa C, Johnson C, Verster A, Baggaley R. Attitudes and acceptability on HIV self-testing among key populations: A literature review. *AIDS Behav.* 2015;19(11):1949–65.
14. Wood BR, Ballenger C, Stekler JD. (Auckland. Arguments for and against HIV self-testing. *HIV/AIDS. NZ).* 2014;6:117.
15. Kalichman SC, Simbayi LC. HIV testing attitudes, AIDS stigma, and voluntary HIV counselling and testing in a black township in Cape Town, South Africa. *Sexually Transmitted Infections.*

- 2003;79(6):442–7.
16. Hurt CB, Karina S, Miller WC, Hightow-Weidman LB. HIV testing practices and interest in self-testing options among young, black men who have sex with men in North Carolina. *Sex Transm Dis.* 2016;43(9):587.
 17. Ng OT, Chow AL, Lee VJ, et al. Accuracy and user-acceptability of HIV self-testing using an oral fluid-based HIV rapid test. *PLoS One.* 2012;7(9):e45168.
 18. Han L, Candidate B, Bien CH, et al. HIV self-testing among online MSM in China: Implications for expanding HIV testing among key populations. *J Acquir Immune Defic Syndr.* 2014;67(2):216.
 19. Choko AT, MacPherson P, Webb EL, et al. Uptake, accuracy, safety, and linkage into care over two years of promoting annual self-testing for HIV in Blantyre, Malawi: A community-based prospective study. *PLoS Medicine.* 2015;12(9):e1001873.
 20. Djan D. Factors affecting the attitude of young people towards HIV testing uptake in rural Ghana. *J HIV Retrovirus.* 2018;4(2):13.
 21. Odimegwu C, Adedini SA, Ononokpono DN. HIV/AIDS stigma and utilization of voluntary counselling and testing in Nigeria. *BMC Public Health.* 2013;13(1):465.
 22. Tun-atiruj C. Thailand's pharmacies can now legally sell HIV self-test kits: Making testing possible in the privacy of your own home. *BK.* April 19, 2019.
 23. Yamane T. *Statistics: An introductory analysis* Harper and row. New York, Evanston and London and John Weather Hill. Inc, Tokyo. 1967.
 24. Behling O, Law KS. *Translating questionnaires and other research instruments: Problems and solutions:* Sage; 2000.
 25. Gumede SD, Sibiya MN. Health care users' knowledge, attitudes and perceptions of HIV self-testing at selected gateway clinics at eThekweni district, KwaZulu-Natal province, South Africa. *SAHARA-J: Journal of Social Aspects of HIV/AIDS.* 2018;15(1):103-9.
 26. Srithanaviboonchai K, Chariyalertsak S, Nontarak J, et al. Stigmatizing attitudes toward people living with HIV among general adult Thai population: Results from the 5th Thai National Health Examination Survey (NHES). *PloS one.* 2017;12(11):e0187231.
 27. Cohen J. *Statistical power analysis for the behavioral sciences.* 2nd ed. Hillsdale: Lawrence Erlbaum Associates; 1988.
 28. Flowers P, Riddell J, Park C, et al. Preparedness for use of the rapid result HIV self-test by gay men and other men who have sex with men (MSM): A mixed methods exploratory study among MSM and those involved in HIV prevention and care. *HIV Med.* 2017;18(4):245–55.
 29. Belza MJ, Figueroa C, Rosales-Statkus ME, et al. Low knowledge and anecdotal use of unauthorized online HIV self-test kits among attendees at a street-based HIV rapid testing programme in Spain. *International Journal of Infectious Diseases.* 2014;25:196–200.
 30. Koutentakis K, Rosales-Statkus ME, Hoyos J, et al. Knowledge and use of unauthorized HIV self-test kits among men who have sex with men in Spain, following approval of an over-the-counter self-test

- in the US: A cross-sectional study. *BMC Public Health*. 2016;16(1):532.
31. Myers JE, Bodach S, Cutler BH, Shepard CW, Philippou C, Branson BM. Acceptability of home self-tests for HIV in New York City, 2006. *Am J Public Health*. 2014;104(12):e46-e8.
 32. Kurth AE, Cleland CM, Chhun N, et al. Accuracy and acceptability of oral fluid HIV self-testing in a general adult population in Kenya. *AIDS Behav*. 2016;20(4):870–9.
 33. Zanolini A, Chipungu J, Vinikoor MJ, et al. HIV self-testing in Lusaka Province, Zambia: Acceptability, comprehension of testing instructions, and individual preferences for self-test kit distribution in a population-based sample of adolescents and adults. *AIDS Res Hum Retroviruses*. 2018;34(3):254–60.
 34. UNAIDS. *HIV in Asia and the Pacific*. Geneva: Joint United Nations Programme on HIV/AIDS (UNAIDS); 2013.
 35. Lau CY, Wang Z, Fang Y, et al. Prevalence of and factors associated with behavioral intention to take up home-based HIV self-testing among male clients of female sex workers in China—an application of the Theory of Planned Behavior. *AIDS Care*. 2020:1–10.
 36. Thirteen countries from. Asia and the Pacific plan scale-up of PrEP and HIV self-testing [press release]. Geneva: World Health Organization, 11/1/2018 Nov. 1, 2018.

Tables

Table I. Sample characteristics (*N*=403)

Variable	<i>n</i>	(%)
Gender		
Men	108	26.8
Women	295	73.2
Age (years) ^a		
Under 60	181	44.9
60 and Over	222	55.1
Education		
Low (No Education or Primary School)	292	72.5
High (Jr./Sr. High, Vocational Certificate, Bachelor, etc.)	110	27.3
Refused	1	0.2
Income (Baht)		
≤5,000	242	60.0
5,001 - 10,000	101	25.1
≥10,001	37	9.2
Don't know/Refuse to answer	23	5.7
Marital Status		
Married	245	60.8
Single/Divorced/Separated/Widowed	158	39.2
Religion		
Buddhist	394	97.8
Refused	9	2.2
Friends with HIV		
No	264	65.5
Yes	114	28.3
Don't Know	25	6.2
Family with HIV		
No	347	86.1
Yes	53	13.2

Don't Know	3	0.7
Tested for HIV		
No	211	52.4
Yes	189	46.9
Don't Know	3	0.7
HIV Status (of those tested)		
Negative	182	96.3
Positive	4	2.1
Don't Know	3	1.6
^a Age ranged from 21 to 89 years (M=59.64, SD=11.94).		

Table II. HIVST negative attitude scale items (N=403)

Item	<i>n</i> (Agreed)	% Negative Attitude
People may not be able to read instructions properly	359	89.1
People could read/interpret results incorrectly ^a	352	87.3
People could intentionally infect others if not properly counseled before the test ^b	333	82.6
Should a person who has not received counselling test positive, he/she may commit suicide	301	74.7
Children and workers could be tested against their will	270	67.0
Family members could be tested against their will, which could result in abuse	255	63.3
People could blame others should they test positive	231	57.3
Privacy is ensured	305	24.3
There could be less transmission of HIV to other people	313	22.3
More people can know their status	325	19.4
People who are scared to go to the clinics can test at home	341	15.4
Less time is spent in clinics and hospitals	343	14.9
People could be tested more frequently	347	13.9
People can get ARVs before they can get sicker	353	12.4
^a <i>N</i> =401; 2 respondents skipped this item.		
^b <i>N</i> =402; 1 respondent skipped this item.		

Table III. HIV stigmatizing attitude items (*N*=403) ^a

Item	<i>n</i>	% Agree
1. You feel too disgusted to buy fresh food or ready-to-eat food from a shopkeeper or vendor whom you know has HIV or AIDS.	179	44.4
2. You think that children living with HIV or AIDS should not attend the same classroom with other children.	95	23.6
3. Participant agrees with either or both items, above.	205	50.9
<p>^a Stigma items in this table were drawn from prior research conducted by Srithanaviboonchai and colleagues.⁽²⁶⁾ Agreement with either of these statements is a UNAIDS global indicator for discriminatory attitudes toward PLHIV.</p>		

Table IV. Bivariate relationships between demographics and both HIVST awareness and negative attitudes

Demographic characteristic	HIVST Awareness			HIVST Negative Attitude		
	<i>N</i>	%	χ^2 (<i>p</i>)	<i>N</i>	<i>M</i> (SD)	<i>t</i> -score (<i>p</i>)
Gender						
Men	401	13.1	0.09 (.759)	400	6.42 (1.92)	0.148 (.882)
Women		14.3		6.45 (2.18)		
Age						
Under 60	401	19.9	9.64 (.002)	400	6.36 (2.15)	0.723 (.470)
60 and older		9.1		6.51 (2.09)		
Education						
Low (none/primary)	400	10.3	10.66 (.001)	400	6.59 (2.08)	2.271 (.024)
High (secondary/certificate or above)		22.9		6.05 (2.16)		
Monthly income						
Low (\leq 10,000)	398	12.9	2.92 (.088)	397	6.48 (2.17)	0.737 (.462)
High (\geq 10,001)		21.4		6.25 (1.74)		
Marital status						
Married	401	14.6	0.08 (.783)	400	6.48 (2.12)	0.479 (.632)
Single/divorced/separated/ widowed		13.6		6.38 (2.11)		
Friends with HIV						
No	376	12.5	0.49 (.484)	376	6.42 (2.05)	0.464 (.643)
Yes		15.2		6.53 (2.25)		
Family with HIV						
No	398	13.9	0.02 (.890)	397	6.43 (2.12)	0.310 (.757)
Yes		13.2		6.53		

						(2.01)	
Tested for HIV							
No	398	13.9	0.00 (.973)	397	6.43 (2.09)	0.102 (.919)	
Yes		13.8			6.45 (2.16)		
HIV Stigma							
No	401	18.3	5.98 (.014)	400	6.22 (2.17)	2.077 (.038)	
Yes		9.8			6.66 (2.05)		

Table V. Logistic regression predicting likelihood of HIVST awareness (N=394)

Correlates ^a	B	S.E.	Wald	<i>p</i>	AOR	95% CI
Education	0.83	0.32	6.62	.010	2.29	1.22 – 4.30
HIV stigma	-0.72	0.32	5.10	.024	0.49	0.26 – 0.91
Constant	-1.61	0.34	23.00	<.001	0.20	-

^a Control variables included gender, income, marital status, and having been tested for HIV; none were statistically significant correlates of HIVST awareness. Age was removed from the model because it was highly correlated with education level.