รายงานวิจัยฉบับสมบูรณ์

การตรวจการติดเชื้อเอชไอวีเชิงรุกและการเข้ารับการรักษาหลังทราบว่าติดเชื้อของชายที่มีเพศสัมพันธ์กับชายในจังหวัดปทุมธานี

Active targeted HIV testing and linkage to care among men who have sex with men in Pathumthani, Thailand

โดย ผศ. นพ. ธนา ขอเจริญพร

ธันวาคม พ.ศ. 2558

สัญญาเลขที่ MRG 5680166

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ผศ. นพ. ธนา ขอเจริญพร
คณะแพทยศาสตร์ มหาวิทยาลัยธรรมศาสตร์

สนับสนุนโดยสำนักงานกองทุนสนับสนุนการวิจัย

คำนำ

รายงานวิจัยฉบับสมบูรณ์นี้จัดทำขึ้นเพื่อประกอบการรายงานและเผยแพร่ผลงานวิจัยที่ได้รับทุนพัฒนาศักยภาพในการทำงานวิจัยของอาจารย์รุ่นใหม่จากการสนับสนุนของ 3 องค์กร ได้แก่ มหาวิทยาลัยธรรมศาสตร์ สำนักงานคณะกรรมการการอุดมศึกษา และ สำนักงานกองทุนสนับสนุนการวิจัย โครงการวิจัย “การตรวจการติดเชื้อเอชไอวีเชิงรุกและการเข้ารับการรักษาหลังทราบว่าติดเชื้อของชายที่มีเพศสัมพันธ์กับชายในจังหวัดปทุมธานี” ที่ได้รายงานในรายงานวิจัยฉบับสมบูรณ์นี้มีจุดประสงค์สำคัญ เพื่อประเมินความเป็นไปได้และการยอมรับการตรวจการติดเชื้อเอชไอวีเชิงรุกในกลุ่มชายที่มีเพศสัมพันธ์กับชายที่มาใช้บริการที่สถานบริการในจังหวัดปทุมธานี ประเมินปัญหาและอุปสรรคของโครงการการตรวจการติดเชื้อเอชไอวีเชิงรุก รวมทั้งประเมินอัตราการติดเชื้อเอชไอวี การรับรู้ความเสี่ยงต่อการติดเชื้อเอชไอวี และการเข้ารับการรักษาหลังทราบว่าติดเชื้อเอชไอวีของกลุ่มชายที่มีเพศสัมพันธ์กับชายดังกล่าว ทางคณะผู้วิจัยหวังว่า รายงานผลการวิจัยฉบับนี้จะเป็นประโยชน์กับผู้เกี่ยวข้อง ได้แก่ บุคลากรทางการแพทย์ที่ให้การดูแลรักษาและป้องกันการติดเชื้อเอชไอวี ผู้วางแผนและออกนโยบายการตรวจการติดเชื้อเอชไอวีและการนำผู้ติดเชื้อเข้าสู่การรักษาในประเทศไทย รวมทั้งบุคคลทั่วไปและองค์กรที่มีความสนใจในการรณรงค์การตรวจและการป้องกันการติดเชื้อเอชไอวี คณะผู้วิจัยขอขอบคุณอาสาสมัครทุกท่านที่เข้าร่วมโครงการวิจัยนี้ บุคลากรในทีมงานวิจัย เจ้าของสถานบริการในจังหวัดปทุมธานี และ 3 องค์กรหลักที่ให้สนับสนุนทุนในการวิจัยครั้งนี้ ซึ่งมีส่วนสำคัญทำให้งานวิจัยนี้สำเร็จลุล่วงลงด้วยดี

ผู้วิจัย

สารบัญ

บทคัดย่อ

รหัสโครงการ : MRG 5680166

ชื่อโครงการ : การตรวจการติดเชื้อเอชไอวีเชิงรุกและการเข้ารับการรักษาหลังทราบว่าติดเชื้อของชายที่มีเพศสัมพันธ์กับชายในจังหวัดปทุมธานี

ชื่อนักวิจัยและสถาบัน : ผศ. นพ. ธนา ขอเจริญพร
มหาวิทยาลัยธรรมศาสตร์

E-mail Address : thanak30@yahoo.com

ระยะเวลาโครงการ: 3 มิถุนายน พ.ศ. 2556 ถึง 2 ธันวาคม พ.ศ. 2558

ความสำคัญและที่มา

การตรวจพบการติดเชื้อเอชไอวีแต่เนิ่นๆ และการเข้ารับการรักษาเร็วเป็นมาตรการสำคัญในการป้องกันการแพร่ระบาดของเชื้อเอชไอวี ถึงแม้ว่ากลุ่มชายที่มีเพศสัมพันธ์กับชายจะเป็นกลุ่มที่มีความเสี่ยงสูงต่อการติดเชื้อเอชไอวีในประเทศไทย ในปัจจุบันยังมีข้อมูลที่จำกัดในเรื่องความเป็นไปได้ในการตรวจการติดเชื้อเอชไอวีเชิงรุกและการเข้ารับการรักษาหลังทราบว่าติดเชื้อในประชากรกลุ่มนี้ โดยเฉพาะในกลุ่มที่มีความเสี่ยงต่อการติดเชื้อสูง

วิธีการศึกษา

การศึกษานี้เป็นการศึกษาแบบติดตามไปข้างหน้าของการตรวจการติดเชื้อเอชไอวีเชิงรุกและการเข้ารับการรักษาหลังทราบว่าติดเชื้อของชายที่มีเพศสัมพันธ์กับชายอายุ 18 ปีขึ้นไป โดยทำที่ซาวน่าสำหรับเกย์ในจังหวัดปทุมธานีระหว่างเดือนพฤศจิกายน พ.ศ. 2556 ถึงเดือนตุลาคม พ.ศ. 2558 อาสาสมัครทุกคนได้รับการประเมินความเสี่ยงต่อการติดเชื้อเอชไอวี การรับรู้ความเสี่ยงต่อการติดเชื้อ ความรู้ที่เกี่ยวข้องกับโรคติดเชื้อเอชไอวี และการยอมรับการตรวจการติดเชื้อเอชไอวีโดยประเมินผ่านแบบสอบถามที่ไม่ระบุชื่อ อาสาสมัครที่เข้ารับการตรวจการติดเชื้อเอชไอวีได้รับการตรวจเลือด การแจ้งผล และการให้คำปรึกษาภายหลังแจ้งผลการตรวจที่ซาวน่า ผู้ให้คำปรึกษาเกี่ยวกับการตรวจการติดเชื้อเอชไอวีทำการนัดหมายให้อาสาสมัครที่ตรวจพบการติดเชื้อเข้ารับการรักษาในสถานพยาบาลที่ตนมีสิทธิการรักษาอยู่ หลังจากนั้นมีการประเมินการเข้ารับการรักษาของอาสาสมัครเหล่านี้

ผลการศึกษา

มีอาสาสมัครเข้าร่วมการศึกษาทั้งหมด 358 คน โดยมีค่ากลางอายุที่ 30 ปี ร้อยละ 42 มีเพศสัมพันธ์กับทั้งเพศชายและเพศหญิง ร้อยละ 58 มีความเสี่ยงสูงต่อการติดเชื้อเอชไอวี อัตราการใช้ถุงยางอนามัยอย่างสม่ำเสมอสำหรับการมีเพศสัมพันธ์ทางทวารหนักและทางปากอยู่ที่ร้อยละ 59 และร้อยละ 33 ตามลำดับ อาสาสมัคร 148 คน (ร้อยละ 41) เข้ารับการตรวจการติดเชื้อเอชไอวี ซึ่งใน 148 คนนี้ ร้อยละ 66 เคยตรวจการติดเชื้อเอชไอวีและพบว่าไม่ติดเชื้อเอชไอวีมาก่อน และร้อยละ 34 ไม่เคยตรวจการติดเชื้อเอชไอวีมาก่อน เหตุผลสำคัญที่อาสาสมัครไม่ยอมรับการตรวจการติดเชื้อเอชไอวีได้แก่ เคยตรวจมาก่อนภายใน 6 เดือน (ร้อยละ 48) ไม่พร้อม (ร้อยละ 19) คิดว่าตนเองไม่มีความเสี่ยง (ร้อยละ 11) สถานที่ตรวจที่ซาวน่าไม่เหมาะสม (ร้อยละ 9) และไม่มีเวลา (ร้อยละ 7) มีอาสาสมัครทั้งหมด 262 คนที่มีความเสี่ยงต่อการติดเชื้อเอชไอวีปานกลางและสูง ในกลุ่มนี้ 172 คน (ร้อยละ 66) มีการรับรู้ความเสี่ยงต่อการติดเชื้อที่ต่ำกว่าความเป็นจริง การรับรู้ความเสี่ยงต่อการติดเชื้อเอชไอวีที่ต่ำกว่าความเป็นจริงนี้มีความสัมพันธ์กับการไม่ยอมรับการตรวจการติดเชื้อเอชไอวีอย่างมีนัยสำคัญทางสถิติ ในกลุ่มอาสาสมัคร 148 คนที่เข้ารับการตรวจการติดเชื้อเอชไอวีนี้ 25 คน (ร้อยละ 17) ได้รับการวินิจฉัยว่าติดเชื้อเอชไอวี โดยปัจจัยอิสระที่สัมพันธ์กับการติดเชื้อเอชไอวีได้แก่ การรับรู้ความเสี่ยงต่อการติดเชื้อที่ต่ำกว่าความเป็นจริง และอายุที่น้อยกว่า 30 ปี ในกลุ่มอาสาสมัคร 25 คนที่ติดเชื้อเอชไอวีนี้ มีเพียง 12 คน (ร้อยละ 48) ที่เข้ารับการักษาการติดเชื้อโดยมีค่ากลางของระยะเวลาตั้งแต่ทราบว่าติดเชื้อจนกระทั่งเข้ารับการรักษาอยู่ที่ 24 วัน อาสาสมัครที่ติดเชื้อเอชไอวีทุกคนได้รับการรักษาด้วยยาต้านไวรัสทันที

บทสรุป

การตรวจการติดเชื้อเอชไอวีเชิงรุกในชายที่มีเพศสัมพันธ์กับชายที่มีความเสี่ยงต่อการติดเชื้อสูงที่ซาวน่าสำหรับเกย์ พร้อมกับการอำนวยความสะดวกในการนัดหมายเพื่อให้เข้ารับการรักษาในสถานพยาบาลหลังทราบว่าติดเชื้อนั้นสามารถทำได้ การรับรู้ความเสี่ยงต่อการติดเชื้อที่ต่ำกว่าความเป็นจริงเป็นปัจจัยสำคัญที่มีความสัมพันธ์กับการไม่ยอมรับการตรวจการติดเชื้อและการติดเชื้อเอชไอวี มาตรการที่ช่วยทำให้การรับรู้ความเสี่ยงต่อการติดเชื้อและการเข้ารับการรักษาหลังทราบว่าติดเชื้อดีขึ้นมีความจำเป็นอย่างยิ่งในกลุ่มชายที่มีเพศสัมพันธ์กับชายที่มีความเสี่ยงสูงกลุ่มนี้

ABSTRACT

Project Code : MRG 5680166

Project Title : Active targeted HIV testing and linkage to care among men who have sex with men in Pathumthani, Thailand

Investigator : Assistant Professor Thana Khawcharoenporn, M.D., M.Sc.
Thammasat University

E-mail Address : thanak30@yahoo.com

Project Period : 3 June 2013 to 2 December 2015

Background: Early detection of HIV infection and linkage to care at the early stage of the disease are key components for HIV transmission prevention. While men who have sex with men (MSM) are amongst high-risk populations for HIV acquisition in Thailand, limited data exists on the feasibility of HIV testing and counseling (HTC) service and linkage to care in MSM in hotspots.

Methods: A prospective study of active targeted HTC program and linkage to care after known HIV infection among MSM (≥18 years old) was conducted at a gay sauna in Pathumthani, a province of Bangkok vicinity during the period from November 2013 to October 2015. All participants were evaluated for their HIV risks, risk perception, knowledge about HIV infection and HTC acceptance through an anonymous survey. Participants who accepted HTC underwent HIV testing and received result notification and post-test counseling at the sauna. HIV care establishment appointment for antiretroviral therapy (ART) initiation was arranged by the counselor for HIV-infected participants based on their medical coverage plans. HIV care engagement was subsequently assessed.

Results: There were 358 participants; median age was 30 years; 42% were bisexual; 58% were categorized as high-risk for HIV acquisition. The rates of consistent condom use for anal and oral sex were 59% and 33%, respectively. Of the 358 participants, 148 (41%) accepted HTC, all of whom either had prior negative HIV tests [98/148 (66%)] or had not known their HIV status [50/148 (34%)]. Common reported reasons for not accepting HTC were prior HIV testing within 6 months (48%), not ready (19%), perceiving self as no risk (11%), inappropriate testing place (9%) and time constrain (7%). Among the 262 moderate- and high-risk participants, 172 (66%) had false perception of low HIV risk. Having false perception of low risk was significantly associated with no acceptance of HTC. Of the 148 participants undergoing HTC, 25 (17%) were newly-diagnosed of HIV infection. Independent factors associated with HIV positivity included having false perception of low risk (P=0.004) and age < 30 years (P=0.02). Only 12 of the 25 HIV-infected participants (48%) had established HIV care with the median time of 24 days (range 4-255 days) since knowing HIV results, all of whom received immediate ART.

Conclusions: The active targeted HTC program with facilitating HIV care establishment was feasible among MSM attending the gay sauna. False perception of low HIV risk was the important factor associated with no HTC acceptance and HIV infection. Strategies to improve HIV risk perception and linkage to care are urgently needed among this high-risk population.

INTRODUCTION

Human immunodeficiency virus (HIV) infection and acquired immune deficiency syndrome (AIDS) have become major public health problems causing significant morbidity and mortality in Thai population for the last decades. It was estimated that the prevalence of HIV infection among Thai people aged 15-49 years was 1.1% in 2014[1] while the estimated total number of adults living with HIV was 438,629 and the accumulative AIDS cases was 388,621 in 2014.[2,3] The population groups at high risk for HIV infection in Thailand include men who have sex with men (MSM), commercial sex workers and injection drug users.[4,5] Although the prevalence of HIV infection among Thai MSM has decreased from 13.5% in 2009 to 7.1% in 2012[4], this prevalence was still about 7 times higher than that of general population. In addition, MSM in some provinces of the country including Bangkok, Chiang Mai and Phuket were severely affected by HIV infection with the prevalence of 17-31%[6], and the incidence of new HIV infection between 2005 and 2011 was reported to be 5.9 per 100 person-year in Bangkok.[7] Nonetheless, the data for MSM in other regions has not been reported.

The increase in prevalence and disproportionately higher incidence of HIV infection in Thai MSM compared to general population reflects the ongoing HIV transmission among this population group. These are possibly due to unawareness of their HIV status (given that most of HIV-infected individuals are asymptomatic) and false perception of low HIV risk among MSM which may lead to ongoing risk behaviors, low uptake of preventive measures and strategies, such as condom uses and further transmission of HIV in the communities.[8,9] Thus, the strategies to increase awareness of HIV status and improve risk perception among MSM are needed to halt this HIV epidemic.

HIV universal testing has been recommended by the Centers for Disease Control and Prevention (CDC) of the United States since 2006 to increase awareness of HIV status in the US communities.[8] The recommendations state that universal HIV testing should be offered to everyone aged 13-64 years old who present to healthcare facilities regardless of their complaining and presenting symptoms or HIV risks in areas where HIV prevalence is 0.1% or more, while targeted HIV testing should be performed in subpopulations of persons at higher risk, such as MSM, injection drug users and commercial sex workers. Advantages of early HIV detection as a result of this HIV testing include early engagement of patients into care to prevent subsequent immunosuppression and HIV-related morbidity and mortality and increase in awareness of HIV status which results in actions to prevent HIV transmission in the communities.[8-11] In addition, assessment of risk perception and targeted education to improve risk perception and reduce risk behaviors can be incorporated into this HIV testing program. The HIV testing can be performed with either active approach (in settings outside healthcare facilities) or passive approach (in healthcare facilities).

In Thailand, HIV infection screening and diagnosis are usually done by an antibody-based blood test, which is widely available. All Thai people are allowed to have this blood test free of charge every 6 month supported by The Ministry of Public Health. However, there has not been any official recommendation about how to implement the HIV testing program. Although MSM are known to be targets for the testing, feasibility and client acceptance of the test, and optimal strategies, challenges and obstacles to implement the targeted testing are largely unknown. In addition, HIV risk perception among MSM and its impact on test acceptance and HIV status have not been thoroughly assessed. Given that early detection of HIV infection and linkage to care at the early stage of the disease are key components for

HIV transmission prevention[8-11], a study that evaluate linkage to care after known HIV infection are also required among MSM in Thailand.

METHODS

Study population and setting

The study was conducted among MSM, including gay and bisexual men who attended a gay sauna in Pathumthani, a province of Bangkok vicinity, Thailand during the period from 1 November 2013 to 31 October 2015. This study was conducted in accordance with the amended Declaration of Helsinki and was approved by Faculty of Medicine, Thammasat University Ethics Committee (approval number 074/2556).

Study design and protocol

This is a prospective study of MSM aged at least 18 years old to evaluate feasibility and clients' acceptance of the active targeted HIV testing program established by our facility, HIV/AIDS Care Unit (HCU) of Thammasat University Hospital (TUH) at the gay sauna, to determine challenges and obstacles of implementing the active targeted HIV program, to assess the rate of HIV infection among the MSM, to assess the association between risk perception and HIV status among the MSM and to assess feasibility, challenges and obstacles of linkage to care after known HIV-positive status among the MSM. The study process was divided into steps as follow:

Study preparation HCU of TUH consisted of experienced physicians, nurses, nurse assistants, laboratory technicians, pharmacists and volunteers. These healthcare personnel had worked in the field of HIV/AIDS for many years. HCU of TUH has recently established and run an HTC program successfully in population groups including college students, patients who

presented for acute care at TUH. The team worked closely with and was supported by Pathumthani Province Public Health Office (PHO) in regards to care for HIV-infected patients and several HIV transmission prevention projects. In order to conduct this study, the team collaborated with PHO to prepare the study sites, contacted and asked for co-operation from the owner of the gay sauna and explained reasons and public health benefits of the study to the owner. This gay sauna was selected based on its highest number of clients and previous reported behavioral risks among its clients. Before conducting the study at the fields, all of the team members met and discuss about the rules and regulations of the gay sauna and study process and required documents. The team also worked closely with volunteers from gay community-based organizations who helped facilitating the conduct of the study at the sauna.

Study process at the sauna At the sauna, the research team of HCU, including a research physician, two HIV counselors, a laboratory technician and two volunteers from a gay community-based organization, approached MSM who attended the sauna and asked them to participate in the study. An HIV infection knowledge assessment form was given to the participants to complete. The form asked the participant to answer "true", "false" or "do not know" to the statements about HIV infection. The participants were also asked whether they would like to have HTC on that day and asked for the reason why they accepted or declined HTC. After the knowledge assessment, an anonymous survey form was distributed to the participant. The survey form asked about demographics, HIV risks, risk behaviors and risk perception. Participants self-identified their sexual orientation and HIV risk perception within the survey. To identify their own HIV risks, the participants chose "No risk at all", "A little risk (low-risk)", "More than a little (moderate-risk)" and "A lot of risk (high-risk)". The investigators subsequently evaluated the participants' risk as "low-risk", "moderate-risk" and

"high-risk" based on the pre-specified risk characteristics and behaviors reported in the survey (Table 1). Only one characteristic or behavior that met the certain risk level was required to classify the participants into that risk level. This risk categorization tool was validated in previous studies.[12,13] The moderate or high-risk participants were classified to have false perception of low HIV risk if they perceived their risks as no or low risk. After completing the survey form, a non-cash souvenir was given to each participant. The participants were informed about the correct answers to each statement about HIV infection in the HIV infection knowledge assessment form. Education and brochures about HIV infection and free condoms were then provided. The research counselors invited the participants who accepted HTC to a private counseling area within the sauna for pre-test counseling. A laboratory technician obtained 5 ml of the participants' blood for on-site HIV testing. Three difference antibody-based tests were performed to confirm the results. The participants were informed the test results within 1 hour. Post-test counseling was provided for both HIV-negative and HIV-positive participants. For those with HIV-positive results, their contact information was recorded for subsequent follow-up calling. Plan for HIV continuity care establishment was discussed with HIV-infected participants based on their medical coverage, preference and financial status. The counselors called the participants every one month after notification of the test results and asked whether the participants had already established HIV care and when they did so. Any opportunistic infections and CD4 cell count and percentage at the initial visit at their HIV care facilities were also inquired. If the participants had not established HIV care, the HIV counselors would assess and identify any problems/obstacles faced by the HIV-positive participants every time they did the follow-up calls and help to alleviate those problems/obstacles and further support the referral for care. If the participants had not yet established HIV care after the follow-up calls for 1 year, they would be asked to provide reasons of no care establishment.

Statistical analyses

Sample size calculation for this study was based on the estimated rate of HIV infection among MSM in Pathumthani of 16.5%. To detect this rate of HIV infection at the level of significance of 0.05 and error of 6%, the sample size required for participants undergoing HTC was 148. All statistical analyses were performed using SPSS version 15.0 (SPSS, Chicago, Illinois). Descriptive data was present in number (percent), median and interquartile range (IQR). Categorical variables were compared using Pearson's $\chi 2$ or Fisher's exact test as appropriate. Continuous variables were compared using Mann Whitney U test. All p values were 2 tailed; p values less than .05 were considered statistically significant. Adjusted odd ratios (aORs) and 95% confidence intervals (CIs) were determined for factors associated with no acceptance of HTC, false perception of low HIV risk and HIV-infected status in multivariable logistic regression analyses.

RESULTS

Characteristics, HIV risk, risk behaviors, risk perception and knowledge about HIV infection of the study participants

Seven hundred and seventy-seven MSM were approached and asked for study participation during the period from November 1st, 2013 to July 31st, 2015. Of the 777 MSM, 358 (46%) agreed to participate in the study. The study flow is shown in Figure 1. Demographic characteristics, HIV risks, risk behaviors and risk perception of the study participants reported in the anonymous survey are shown in Table 2 and 3. Of the 358 participants, the median age was 30 years (IQR 25-35 years). Most of the participants were company workers (59%), single (74%) and homosexual (58%). More than a half of the participants received a bachelor's degree or higher education. Having vaginal sex, oral sex and anal sex were

reported in 38%, 88% and 96%, respectively with rates of consistent condom use for each type of sex of 64%, 33% and 59%, respectively. Among 151 participants who drank alcohol, 75 (50%) reported history of drinking alcohol with sex within 30 days while 10 of 13 participants using drugs within the last month (77%) reported history of using drugs with sex. Types of illicit drug used among the participants were methamphetamine alone (77%), psychedelics alone (15%) and both (8%). Twenty-two of the 358 participants (6%) reported themselves having sexually-transmitted infections (STIs) within the past year while 18 (5%) reported such history in their sexual partners. The most common reported previous STI among the participants and their sexual partners was gonorrhea while 6 participants reported having HIV-infected sexual partners. By the study risk categorization tool, 56 (16%) and 206 (58%) participants were categorized into moderate- and high-risk groups, respectively. Among the 262 moderate and high-risk participants, 172 (66%) had false perception of low HIV risk. More than 80% of the 358 participants correctly responded to all statements about HIV infection, except for "You can get HIV from oral sex" and "A vaccine that can prevent HIV is currently available" that 77% and 42% of the participants correctly responded to, respectively.

Characteristics, HIV risk, risk behaviors, risk perception and knowledge about HIV infection by HTC acceptance (Table 2, 3 and 4)

Of the 358 participants, 148 (41%) accepted HTC while 210 (59%) declined HTC (Figure 1). Common reported reasons for not accepting HTC were prior HIV testing within 6 months (48%), not ready (19%), perceiving self as no risk (11%), inappropriate testing place (9%) and time constrain (7%) (Figure 2). When compared to participants who accepted HTC, participants who declined HTC were older, more likely to be merchants and born in Bangkok, had higher education and higher monthly household income, had lower actual HIV risks and

less-likely to report risk behaviors for HIV acquisition. Among moderate- and high-risk participants, HTC declining participants were more-likely to have false perception of low HIV risk than those accepting HTC (73% vs. 57%; *P*=0.007). In multivariable logistic regression analysis, Having bachelor's degree education or more, age more than 30 years, low actual risk for HIV acquisition, being a government officer or a merchant, perceiving self as no or low-risk and being born in Bangkok were significantly associated with no acceptance of HTC (Table 5). The proportions of the participants responded correctly to the statements about HIV infection were comparable between those accepting and declining HTC, except for the statement "You can get HIV from vaginal sex" that HTC accepting participants were more-likely to respond correctly and the statements "A mosquito can transmit HIV" and "A vaccine that can prevent HIV is currently available" that HTC declining participants were more-likely to respond correctly.

Characteristics, HIV risk, risk behaviors, and knowledge about HIV infection by HIV risk perception among moderate- and high-risk participants (Table 6, 7 and 8)

Among the 262 moderate- and high-risk participants, 172 (66%) had false perception of low HIV risk. When compared to participants with correct risk perception, participants with false perception of low risk were more-likely to be born in Bangkok, had lower number of different and new sexual partners within the past month, used condom less consistently for anal sex and were less-likely to report history of STIs of self and sexual partners within the past year and history of drug use in sexual partners. There were no independent factors associated with false perception of low HIV risk identified in this study. Knowledge about HIV infection among those with and without false perception of low risk was comparable, except that less proportion of participants with false perception of low risk responded

correctly to the statements “You can get HIV from oral sex” and “Getting high by using drugs increases risk of getting HIV”.

Characteristics, HIV risk perception, and knowledge about HIV infection by HIV test result among participants undergoing HTC (Table 9)

Of the 148 participants undergoing HTC, all of them either had prior negative HIV tests [98 (66%)] or had not known their HIV status [50 (34%)]. The median time since last HIV test among the 98 participants was 6 months (interquartile range 3-12 months). Among the 50 first-time testers, the median age was 25 years (IQR 21-29 years), 27 (54%) were homosexual, 23 (46%) were company officer, 18 (36%) were college/university students, 24 (48%) were originally from Bangkok and 35 (70%) were single. The first-time testers were significantly younger and were more-likely to be college/university students and have false perception of low HIV risk compare to repeat testers (Table 10). The rate of newly-diagnosed HIV infection at the gay sauna was 25/148 (17%). When compared to HIV-negative participants, HIV-positive participants were younger, had lower monthly household income and were more-likely to have false perception of low HIV risk. In multivariable logistic regression analysis, independent factors associated with HIV infection included having false perception of low HIV risk (aOR 4.82, 95% CI 1.67-13.90; *P*=0.004) and age less than 30 years (aOR 6.37, 95% CI 1.33-30.55; *P*=0.02) (Table 11). Knowledge about HIV infection was not significantly different between HIV-positive and HIV-negative participants, except that less proportion of HIV-positive participants responded correctly to the statement “You can get HIV from oral sex” (Table 12).

Test result notification and linkage to care

All of the 148 participants undergoing HTC were informed about their test results and received post-test counseling within the same HTC session. Among the 25 HIV-positive participants, 12 (48%) showed up for HIV continuity care. The median time to show up for care after knowing the test result among these 12 HIV-positive participants was 24 days [interquartile range (IQR) 6-71 days]. Of these 12 participants, 8 (67%) received HIV care at TUH while 4 (33%) received care at other healthcare facilities. The median CD4 cell count when they first received HIV care at these hospitals was 339 cells/μL (IQR 271-400 cells/μL) and the median percentage of CD4 cell was 17% (IQR 13-22%). None of the 12 HIV-positive participants had any opportunistic infections at the time they showed up for HIV care. Of the remaining 13 HIV-positive participants, 11 (85%) could not be reached via a telephone after they knew the test results. Two of the 13 participants could be contacted via a telephone during the 1-year follow-up but they had not shown up for HIV continuity care. The reasons for not showing up among these 2 participants were financial problems, time constrain, inability to be absent from work and being afraid that people might know that they were HIV-infected.

DISCUSSION

Our active targeted HTC incorporating linkage to care facilitation program could be conducted in the gay sauna by good preparation of the study site, collaboration with a responsible authority and relevant organizations, and cooperation from the sauna owner. However, the HTC acceptance rate was 41% in this study which was lower than 97% among MSM actively approached for a venue-based HTC study in Kenya.[14] The difference in the rates of acceptance between the two studies may be due to differences in populations and types and atmospheres of the entertainment venues which affected the decision of the MSM. At the gay sauna, most of the MSM were cautious about exposing their identity public and a

place where they were comfortable to have HTC. Previous studies reported several factors associated with no HTC acceptance. Among studies in general population, low education, female sex, and lower number of sexual partner were associated with no uptake of HTC[15,16] while another study among MSM revealed that perceiving fear of contracting HIV and perceiving HIV stigmatization were associated with no HTC acceptance.[17] In this study, MSM with higher education level, age 30 years or more, being government officer or merchant and be originally from Bangkok might have better access to prior HTC or HTC in healthcare facilities, be more cautious about their health and be afraid to be exposed or stigmatized having HTC in the gay sauna, thus they were more-likely to decline HTC in this study. In addition, false perception of low HIV risk was found to be associated with no HTC acceptance. This suggested the importance of HIV risk and risk perception assessment with feedback interventions to be incorporated in HTC programs. Although most of the participants declined HTC because they reported having prior HTC within 6 months, their reports could not be confirmed due to the survey type of the study. MSM who were not ready and being afraid to know test result should be explained about natural history of HIV/AIDS and treatment plan after being HIV-infected. Those who reported declining HTC due to inappropriate testing place and time constrain should be encouraged that they could have the test elsewhere when they had time and felt comfortable to do so. Among those accepted HTC, the proportion of first-time tester was quite low (34%). The differences in characteristics between the first-time testers and the repeat testers in this study suggest the need to design better interventions to drive younger MSM, especially those who are college/university students, who may not have a correct perception of their HIV risk, but who are practicing unsafe sex, towards HTC. Interventions should also focus on building their skills to correctly assess own HIV risk and generate demand for HIV prevention.

Further analysis on HIV risk and risk behaviors among the MSM revealed that the overall rates of consistent condom use were 64% for vaginal sex, 33% for oral sex and 59% for anal sex. Although these rates were significantly higher than those reported among high-risk attendees of a STI clinic in the US (15%, 7%, and 6%, respectively)[11] and among MSM in a study from Thailand (39% for anal sex),[18] the rates were not high enough for preventing the MSM from HIV acquisition. This finding suggested that inconsistent condom use was still a potential HIV risk behaviors among the MSM and strategies to improve condom use or adjunctive preventive methods, such as pre-exposure prophylaxis, are needed.[19,20] Up to a third of the MSM in this study reported that they were uncertain about their sexual partners' risk behaviors. This may represent the practice of having multiple and casual sexual partners of the MSM. Only 4% of our study participants reported illicit drug use within the past month. This rate was significant lower than that of MSM recruited from gay entertain venues in another study (19%).[21] The difference in the rates of reported illicit drug use may be due to the actual lower rate of drug use or underreporting of this behavior among our MSM. In regards HIV infection knowledge, the assessment through the survey statement questions showed the overall good level of knowledge among the MSM in this study. Nonetheless, education interventions are required for topics of HIV risk with oral sex and HIV vaccine.

Risk perception was assessed among moderate- and high-risk MSM in this study. We found that 66% of the MSM had false perception of low HIV risk. Although independent factors or characteristics associated with false perception of low risk could not be identified in this study, MSM with false perception of low risk had overall lower risk for HIV acquisition compared to those with correct risk perception. This finding indicated that the MSM might only perceive their risks if the risks were only obvious or at high level. Risk behaviors that the MSM did not recognize included the high number of different or new sexual partners in

the last 30 days, inconsistent condom use for any types of sex, exchanging sex for money, drinking alcohol with sex and being uncertain about their sexual partners' risk behaviors. Detailed assessment of risk perception in regards to the MSM risk and risk behaviors is thus necessary to correct the MSM's misunderstanding about their HIV risks. It should be noted that the MSM with and without false perception of low HIV risk had comparable knowledge about HIV infection. The underlying mechanisms for false perception of low HIV risk despite the good knowledge may include the MSM's risk assessment in light of remote or past low-risk behaviors despite current high-risk behaviors, the thought that monogamous relationship with unknown or high-risk sexual partner was safe, optimistic bias that the risk behaviors they engaged in were at no or low-risk, denial or suppression mechanism and anchoring bias that the MSM did not use facts in their judgment about risk perception but used certain cues inherent in the questions asked.[22] Further studies are needed to determine the exact mechanisms of this dissociation between HIV knowledge and risk perception.

All of the HIV-positive MSM were newly diagnosed of the infection. The rate of HIV infection was 17% which was significantly higher than the prevalence of Thai general population and the overall prevalence among Thai MSM.[1,4] Although Pathumthani is not considered a big and heavily-populated city in Thailand, the rate of infection among MSM in this study was comparable to those reported in metropolitan cities such as Bangkok, Chiang Mai and Phuket.[6,18] This finding suggested the need for HIV prevalence study in different regions of Thailand to guide focused implementation of interventions to reduce HIV transmission. Our study demonstrated that false perception of low HIV risk and age younger than 30 years old were associated with having HIV infection. MSM who had false perception of low HIV risk might have ongoing risk behaviors that put them at-risk for acquiring HIV while the increased risk of HIV acquisition among young MSM in this study was consistent

with the results from previously published studies[7,23] and suggested the need for innovative and acceptable HIV prevention interventions among young MSM in Thailand.

The Test-and-Treat strategy has been recommended as a new effective tool for HIV prevention. This study assessed HTC and linkage to HIV care which were the two main components of this strategy.[24] Although our HTC program incorporated the facilitation of linkage to care for HIV-infected MSM, less than 50% of the MSM had showed up for HIV care during the 1-year follow-up period. Most of the MSM who did not show up could not be contacted again by the counselors due to unknown reasons while a few reported financial problems, time constrain, the need to work and stigmatization as reasons preventing them from establishing HIV care. These findings suggested the need for interventions to overcome these obstacles of linkage to care among the MSM. Proposed interventions may include point-of-care CD4 testing at the time of HTC,[25] on-site HIV care providers to perform focused OI screening and immediate antiretroviral therapy initiation for eligible HIV-infected MSM, obtaining primary and alternative contact information of the MSM using for reminding their appointments, use of non-cash financial incentives for linkage to care,[21] more emphasis and clear message to the MSM on the importance of linkage to care, antiretroviral therapy adherence and care retention, addressing plan for long-term care based on the MSM's medical coverage, preference and financial status and use of case management model. Among the HIV-infected MSM who had showed up for continuity care in our study, the median baseline CD4 cell count was significantly higher than that of regular HIV-infected individuals who attended an HIV clinic in Thailand (339 vs. 102 cells/μL)[26] and none of the MSM had OI at their first presentation for care. These findings indicated the benefits of our active targeted HTC in early detection of HIV infection and prevent the infected individuals from development of AIDS and related morbidity and mortality.

There were notable limitations in this study. First, the results may have limited generalizability to moderate to high-risk MSM attending a gay sauna in a suburban area of Thailand. Second, given the cross-sectional assessment of HIV risks and risk behaviors, we could not determine whether the participants' risks and risk behaviors preceded or were consequences of their false perception of low HIV risk. Third, the high rate of declining study participation among the MSM attending the gay sauna that were approached by our research team may preclude generalizability of the results. Lastly, the reasons why most of the HIV-infected MSM had not showed up for continuity care could not be determined in this study.

CONCLUSIONS

Active targeted HTC among MSM attending the gay sauna was feasible with the significant rate of new HIV diagnosis. However, improving HTC acceptance and linkage to continuity care after the diagnosis required strategies to correct HIV risk perception and appropriate responses to the reported reasons for declining HTC and linkage to care. Assessment of HIV risk and risk perception with prompt feedback among MSM should be incorporated into HIV education and HTC programs to increase acceptance of HTC, reduce ongoing HIV risks and risk behaviors and prevent further HIV transmission. Further studies are needed to evaluate strategies and interventions to improve HTC acceptance, HIV risk perception and linkage to HIV care among MSM in Thailand.

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REFERENCES

1. UNAIDS. HIV and AIDS Estimates 2014. Available at http://www.unaids.org/en/regionscountries/countries/thailand/. Accessed 20 November 2015.
2. Bureau of Epidemiology, Ministry of Public Health. AIDS status report 2014. Available at http:// http://www.boe.moph.go.th/files/report/20141128_61345755.pdf. Accessed 20 November 2015.
3. UNAIDS. 2015 Thailand AIDS Response Progress Report. Available at http:// http://www.unaids.org/sites/default/files/country/documents/THA_narrative_report_2015.pdf. Accessed 20 November 2015.
4. UNAIDS. UNAIDS Report on the Global AIDS Epidemic 2013. Available at http://www.unaids.org/en/resources/campaigns/globalreport2013/globalreport. Accessed 20 November 2015.
5. Dokubo EK, Kim AA, Le LV, Nadol PJ, Prybylski D, Wolfe MI. HIV incidence in Asia: a review of available data and assessment of the epidemic. AIDS Rev 2013; 15: 67-76.
6. van Griensven F, de Lind van Wijngaarden JW. A review of the epidemiology of HIV infection and prevention responses among MSM in Asia. AIDS 2010; 24 Suppl 3: S30-40.
7. van Griensven F, Thienkrua W, McNicholl J, Wimonsate W, Chaikummao S, Chonwattana W, et al. Evidence of an explosive epidemic of HIV infection in a cohort of men who have sex with men in Thailand. AIDS 2013; 27: 825-32.
8. Center for Disease Control and Prevention (CDC). Revised Recommendations for HIV Testing of Adults, Adolescents, and Pregnant Women in Health-Care Settings. MMWR 2006; 55 (RR14); 1-17.

9. Marks G, Crepaz N, Senterfitt JW, Janssen RS. Meta-analysis of high-risk sexual behavior in persons aware and unaware they are infected with HIV in the United States: implications for HIV prevention programs. J Acquir Immune Defic Syndr 2005; 39: 446-53.
10. Beckwith CG, Flanigan TP, del Rio C, Simmons E, Wing EJ, Carpenter CC, et al. It is time to implement routine, not risk-based, HIV testing. Clin Infect Dis 2005; 40: 1037-40.
11. Bozzette SA. Routine screening for HIV infection---timely and cost-effective. N Engl J Med 2005; 352: 620-1.
12. Khawcharoenporn T, Kendrick S, Smith K. HIV Risk Perception and Preexposure Prophylaxis Interest Among a Heterosexual Population Visiting a Sexually Transmitted Infection Clinic. AIDS Patient Care STDS 2012; 26: 222-33.
13. Khawcharoenporn T, Kendrick S, Smith K. Does HIV risk perception affect condom use and pre-exposure prophylaxis (PrEP) interest? An examination of sexually transmitted infection clinic attendees and Black Gay Pride Event participants. In: the 6th International AIDS Society Conference on HIV Pathogenesis, Treatment and Prevention. July 17-20, 2011. Rome, Italy. Abstract 656.
14. Singh K, Brodish P, Mbai F, Kingola N, Rinyuri A, Njeru C, et al. A venue-based approach to reaching MSM, IDUs and the general population with VCT: a three study site in Kenya. AIDS Behav 2012; 16: 818-28.
15. Isingo R, Wringe A, Todd J, Urassa M, Mbata D, Maiseli G, et al. Trends in the uptake of voluntary counseling and testing for HIV in rural Tanzania in the context of the scale up of antiretroviral therapy. Trop Med Int Health 2012; 17: e15-25.
16. Baisley K, Doyle AM, Changalucha J, Maganja K, Watson-Jones D, Hayes R, et al. Uptake of voluntary counseling and testing among young people participating in an

HIV prevention trial: comparison of opt-out and opt-in strategies. PLoS One 2012; 7: e42108.

17. Gu J, Lau JT, Tsui H. Psychological factors in association with uptake of voluntary counseling and testing for HIV among men who have sex with men in Hong Kong. Public Health 2011; 125: 275-82.
18. Chariyalertsak S, Kosachunhanan N, Saokhieo P, Songsupa R, Wongthanee A, Chariyalertsak C, et al. HIV incidence, risk factors, and motivation for biomedical intervention among gay, bisexual men, and transgender persons in Northern Thailand. PLoS One 2011; 6: e24295.
19. World Health Organization. Guideline on when to start antiretroviral therapy and on pre-exposure prophylaxis for HIV. Available at http:// http://www.who.int/hiv/pub/guidelines/earlyrelease-arv/en/. Accessed 20 November 2015.
20. Department of Disease Control, Ministry of Public Health. Thailand National Guidelines on HIV/AIDS Treatment and Prevention 2014 Available at http://thaiaidssociety.org/images/PDF/hiv_guideline_2557.pdf. Accessed 20 November 2015.
21. Newman PA, Lee SJ, Roungprakhon S, Tepjan S. Demographic and behavioral correlates of HIV risk among men and transgender women recruited from gay entertainment venues and community-based organizations in Thailand: implications for HIV prevention. Prev Sci 2012; 13: 483-92.
22. Ndugwa Kabwama S, Berg-Beckhoff G. The association between HIV/AIDS-related knowledge and perception of risk for infection: a systematic review. Perspect Public Health 2015; 135: 299-308.

23. van Griensven F, Holtz TH, Thienkrua W, Chonwattana W, Wimonsate W, Chaikummao S, et al. Temporal trends in HIV-1 incidence and risk behaviours in men who have sex with men in Bangkok, Thailand, 2006-13: an observational study. Lancet HIV 2015; 2: e64-70.
24. Berkelman R. The United States government's response to HIV/AIDS today: 'Test and treat' as prevention. J Public Health Policy 2012; 33: 337-43.
25. McNairy ML, Gachuhi AB, Lamb MR, Nuwagaba-Biribonwoha H, Burke S, Ehrenkranz P, et al. The Link4Health study to evaluate the effectiveness of a combination intervention strategy for linkage to and retention in HIV care in Swaziland: protocol for a cluster randomized trial. Implement Sci 2015; 10: 101.
26. Kyaw NL, Thanachartwet V, Kiertiburanakul S, Desakorn V, Chamnanchanunt S, Chierakul W, et al. Baseline CD4 cell counts and outcomes among adult treatment naïve HIV patients after taking fixed dose combination GPO-VIR-S and GPO-VIR-Z in Thailand. Southeast Asian J Trop Med Public Health 2013; 44: 232-43.

Table 1 Human immunodeficiency virus (HIV) risk stratification according to the pre-specified reported characteristics and behaviors of the participants

Characteristics and behaviors	HIV risk		
	Low	Moderate	High
Number of different sexual partners within 30 days			
0-1	√		
2-3		√	
>3			√
Number of new sexual partners within 30 days			
0-1	√		
2-3		√	
>3			√
Using condom with vaginal sex			
Always	√		
Most of the time	√		
About a half of time		√	
Sometimes			√
Never			√
Using condom with oral sex			
Always	√		
Most of the time	√		
About a half of time		√	
Sometimes		√	
Never		√	
Using condom with anal sex			
Always	√		
Most of the time	√		
About a half of time		√	
Sometimes			√
Never			√
Exchanging sex for money			
No	√		
Yes			√

Characteristics and behaviors	HIV risk		
	Low	Moderate	High
Drinking alcohol with sex within 30 days			
Never	√		
Sometimes		√	
About a half of time			√
Most of the time			√
Always			√
Using drug with sex within 30 days			
Never	√		
Sometimes		√	
About a half of time			√
Most of the time			√
Always			√
Ever injected drug with needles			
No	√		
Yes			√
Ever shared needle to inject drugs			
Never	√		
Sometimes			√
About a half of time			√
Most of the time			√
Always			√
Ever been in a jail or a prison			
No	√		
Yes			√
History of STIs within the past year			
No	√		
Yes/Not sure			√
Sexual partner had STIs within the past year			
No	√		
Yes/Not sure			√
Sexual partner had exchanged sex for money or drugs within 30 days			
No	√		
Yes/Not sure			√

Characteristics and behaviors	HIV risk		
	Low	**Moderate**	**High**
Sexual partner had used drug within 30 days			
No	√		
Yes/Not sure			√
Sexual partner had been in a jail or a prison			
No	√		
Yes/Not sure			√

NOTE: STIs = sexually-transmitted infections.

Table 2 Demographic characteristic of all study participants categorized by HTC acceptance

Characteristic	All (N = 358)	Accepted HTC (N = 148)	Declined HTC (N = 210)	*P*[a]
Age (year, median, IQR)	30 (25-35)	26 (22-32)	32 (27-36)	**<0.001**
Occupation				**<0.001**
Company worker	203 (57)	83 (56)	120 (57)	
Merchant	54 (15)	13 (9)	41 (20)	
College/University student	51 (14)	33 (22)	18 (9)	
Government officer	39 (11)	11 (7)	28 (13)	
Unemployed	10 (3)	8 (5)	2 (1)	
Housemaid	1 (0.3)	0 (0)	1 (0.5)	
Birthplace				**0.002**
Bangkok	169 (47)	56 (38)	113 (54)	
Central Western and Eastern Thailand	73 (20)	29 (20)	44 (21)	
Northeastern Thailand	60 (17)	37 (25)	23 (11)	
Northern Thailand	42 (12)	21 (14)	21 (10)	
Southern Thailand	14 (4)	5 (3)	9 (4)	
Marital status				0.64
Single	264 (74)	105 (71)	159 (76)	
Living separate with partner	49 (14)	21 (14)	28 (13)	
Living with domestic partner	31 (9)	16 (11)	15 (7)	
Married	14 (4)	6 (4)	8 (4)	
Highest education				**<0.001**
Less than primary school	7 (2)	6 (4)	1 (0.5)	
Primary school	8 (2)	8 (5)	0 (0)	
High school	101 (28)	58 (39)	43 (21)	
Bachelor's degree	177 (49)	63 (43)	114 (54)	
Higher than bachelor's degree	65 (18)	13 (9)	52 (25)	
Monthly household income				**<0.001**
Less than $US450	37 (10)	26 (18)	11 (5)	
$US450 - $US1800	182 (51)	77 (52)	105 (50)	
$US1801 - $US4500	84 (24)	33 (22)	51 (24)	
More than $US4500	55 (15)	12 (8)	43 (21)	

NOTE:
Data are in numbers (%) unless otherwise indicated.
a = comparison between participants who accepted and declined HTC
HTC = human immunodeficiency virus testing and counseling; IQR = interquartile range.

Table 3 HIV risk, risk behaviors and risk perception of all study participants categorized by HTC acceptance

Characteristics	All (N = 358)	Accepted HTC (N = 148)	Declined HTC (N = 210)	*P*[a]
Sexual orientation				0.44
Homosexual	207 (58)	82 (55)	125 (60)	
Bisexual	151 (42)	66 (45)	85 (40)	
Number of different sexual partners for the last month (median, IQR)	1 (1-3)	2 (1-6)	1 (0-2)	**<0.001**
Number of new sexual partners for the last month (median, IQR)	1 (1-2)	2 (1-6)	0 (0-2)	**<0.001**
Having vaginal sex	135 (38)	61 (41)	74 (35)	0.25
Condom use with vaginal sex				**0.04**
Always	86/135 (64)	31/61 (51)	55/74 (74)	
Most of the time	25/135 (19)	14/61 (23)	11/74 (15)	
About a half of time	9/135 (7)	5/61 (8)	4/74 (5)	
Sometimes	8/135 (6)	5/61 (8)	3/74 (4)	
Never	7/135 (5)	6/61 (10)	1/74 (1)	
Having oral sex	316 (88)	138 (93)	178 (85)	**0.01**
Condom use with oral sex				**0.03**
Always	103/316 (33)	32/138 (23)	71/178 (40)	
Most of the time	66/316 (21)	34/138 (25)	32/178 (18)	
About a half of time	40/316 (13)	17/138 (12)	23/78 (13)	
Sometimes	62/316 (20)	33/138 (24)	29/178 (16)	
Never	45/316 (14)	22/138 (16)	23/78 (13)	
Having anal sex	345 (96)	142 (96)	203 (97)	0.72
Condom use with anal sex				**0.001**
Always	202/345 (59)	68/142 (48)	134/203 (66)	
Most of the time	68/345 (20)	43/142 (30)	25/203 (12)	
About a half of time	37/345 (11)	17/142 (12)	20/203 (10)	
Sometimes	28/345 (8)	11/142 (8)	17/203 (8)	
Never	10/345 (3)	3/142 (2)	7/203 (3)	
Exchanging sex for money	62 (17)	55 (37)	7 (3)	**<0.001**
Drinking alcohol with sex within 30 days				0.64
Never	76/151 (50)	38/72 (53)	38/79 (48)	
Sometimes	42/151 (28)	19/72 (26)	23/79 (29)	
About a half of time	17/151 (11)	6/72 (8)	11/79 (14)	
Most of the time	12/151 (8)	6/72 (8)	6/79 (8)	
Always	4/151 (3)	3/72 (4)	1/79 (1)	

Characteristics	**All (N = 358)**	**Accepted HTC (N = 148)**	**Declined HTC (N = 210)**	***P*[a]**
Using drug with sex within 30 days				0.57
Never	3/13 (23)	2/8 (25)	1/5 (20)	
Sometimes	7/13 (54)	5/8 (63)	2/5 (40)	
About a half of time	2/13 (15)	1/8 (13)	1/5 (2)	
Most of the time	0/13 (0)	0/8 (0)	0/5 (0)	
Always	1/13 (8)	0/8 (0)	1/5 (0)	
History of STIs within the past year				**0.008**
Yes	22 (6)	14 (10)	8 (4)	
Not sure	13 (4)	9 (6)	4 (2)	
Type of STIs within the past year[b]				
Gonorrhea	12/22 (55)	9/14 (64)	3/8 (38)	0.38
Herpes simplex infection	6/22 (27)	3/14 (21)	3/8 (38)	0.62
Genital wart	4/22 (18)	2/14 (14)	2/8 (25)	0.60
Syphilis	1/22 (5)	1/14 (7)	0/8 (0)	1.00
Unknown	1/22 (5)	0/14 (0)	1/8 (13)	0.32
Sexual partner had STIs within the past year				**<0.001**
Yes	18 (5)	8 (5)	10 (5)	
Not sure	107 (30)	66 (45)	41 (20)	
Type of STIs within the past year of sexual partner[b]				
Gonorrhea	8/18 (44)	2/8 (25)	2/10 (20)	0.05
HIV	6/18 (33)	1/8 (13)	5/10 (50)	0.15
Genital wart	2/18 (11)	0/8 (0)	2/10 (20)	0.48
Herpes simplex infection	1/18 (6)	0/8 (0)	1/10 (10)	1.00
Syphilis	1/18 (6)	1/8 (13)	0/10 (0)	0.44
Unknown	1/18 (6)	0/8 (0)	1/10 (10)	1.00
Sexual partner had exchanged sex for money within 30 days				**<0.001**
Yes	9 (3)	8 (5)	1 (1)	
Not sure	89 (25)	50 (34)	39 (19)	
Sexual partner had used drug within 30 days				**0.001**
Yes	6 (2)	3 (2)	3 (1)	
Not sure	87 (24)	51 (35)	36 (17)	
Sexual partner had been in a jail or a prison				**0.02**
Yes	1 (0.3)	0 (0)	1 (1)	
Not sure	62 (17)	35 (24)	27 (13)	
Perceiving own HIV risk as				**<0.001**
No risk	133 (37)	34 (23)	99 (47)	
Low risk	134 (37)	60 (41)	74 (35)	
Moderate risk	73 (20)	45 (30)	28 (13)	
High risk	18 (5)	9 (6)	9 (4)	

Characteristics	**All (N = 358)**	**Accepted HTC (N = 148)**	**Declined HTC (N = 210)**	***P*[a]**
HIV risk determined by the study tool				**<0.001**
Low risk	96 (27)	21 (14)	75 (36)	
Moderate risk	56 (16)	19 (13)	37 (18)	
High risk	206 (58)	108 (73)	98 (47)	
False perception of low HIV risk				
Among high-risk participants	131/206 (64)	62/108 (57)	69/98 (70)	0.05
Among moderate- and high-risk participants	172/262 (66)	73/127 (57)	99/135 (73)	**0.007**

NOTE:
Data are in numbers (%) unless otherwise indicated.
a = comparison between participants who accepted and declined HTC
b = one participant could have more than one type of STIs.
HTC = human immunodeficiency virus testing and counseling; IQR = interquartile range; STI = sexually-transmitted infection.

Table 4 Multivariable logistic regression analysis of characteristics associated with no HTC acceptance

Characteristics	Adjusted odds ratio (95% confidence interval)	*P*
Bachelor's degree and higher education	2.47 (1.47-4.16)	**0.001**
Age more than 30 years	1.91 (1.17-3.13)	**0.01**
Low actual risk for HIV	2.16 (1.18-3.97)	**0.01**
Government officer and merchant	2.08 (1.16-3.71)	**0.01**
Perceiving self as no or low risk for HIV	2.02 (1.15-3.53)	**0.01**
Born in Bangkok	1.63 (1.01-2.63)	**0.04**
Monthly household income $US450 and more	1.90 (0.82-4.36)	0.13

NOTE:
HTC = human immunodeficiency virus voluntary testing and counseling.

Table 5 Knowledge about HIV infection among all study participants categorized by HTC acceptance

Statement (correct answer)	All (N = 358)	Accepted HTC (N = 148)	Declined HTC (N = 210)	P^a
HIV infection causes by a virus (True)	350 (98)	145 (98)	205 (98)	1.00
A Mosquito can transmit HIV (False)	286 (80)	108 (73)	178 (85)	**0.006**
You can get HIV from dining with an infected person (False)	309 (86)	123 (83)	186 (89)	0.14
You can get HIV from vaginal sex (True)	336 (94)	144 (97)	192 (91)	**0.03**
You can get HIV from anal sex (True)	343 (96)	144 (97)	199 (95)	0.29
You can get HIV from oral sex (True)	275 (77)	108 (73)	167 (80)	0.15
Having multiple sexual partners increases risk of getting HIV (True)	348 (87)	145 (98)	203 (97)	0.53
Consistent condom use with sex decreases risk of getting HIV (True)	353 (99)	145 (98)	208 (99)	0.41
Exchanging sex for money increases risk of getting HIV (True)	340 (95)	141 (95)	199 (95)	0.83
Getting high by using drugs increases risk of getting HIV (True)	294 (82)	118 (80)	176 (84)	0.32
You can get HIV from tattooing (True)	320 (90)	132 (89)	189 (90)	0.80
You can get HIV from using a shared needle (True)	349 (98)	145 (98)	204 (97)	0.74
An HIV-infected person can be asymptomatic for many years (True)	327 (91)	137 (93)	190 (91)	0.49
An asymptomatic HIV-infected person can transmit HIV (True)	336 (94)	139 (94)	197 (94)	0.97
A blood test is required for HIV diagnosis (True)	292 (82)	121 (82)	171 (81)	0.94
A vaccine that can prevent HIV is currently available (False)	151 (42)	48 (32)	103 (49)	**0.002**
Antiretroviral therapy can increase lifespan of an HIV-infected person (True)	304 (85)	131 (89)	173 (82)	0.11

NOTE:
Data are in numbers (%) of participants with a correct answer for each statement.
a = comparison between participants who accepted and declined HTC
HIV = human immunodeficiency virus.

Table 6 Demographic characteristic of moderate- and high-risk participants categorized by risk perception

Characteristic	All (N = 262)	False perception of low HIV risk (N = 172)	Correct risk perception (N = 90)	*P*[a]
Age (year, median, IQR)	29 (24-35)	29 (24-35)	30 (24-34)	0.61
Occupation				0.71
Company worker	148 (57)	97 (56)	51 (57)	
College/University student	41 (16)	27 (16)	14 (16)	
Merchant	38 (15)	27 (16)	11 (12)	
Government officer	26 (10)	14 (8)	12 (13)	
Unemployed	8 (3)	6 (4)	2 (2)	
Housemaid	1 (0.4)	1 (1)	0 (0)	
Birthplace				**0.007**
Bangkok	121 (46)	86 (50)	35 (39)	
Northeastern Thailand	52 (20)	24 (14)	7 (8)	
Central Western and Eastern Thailand	51 (20)	36 (21)	5 (6)	
Northern Thailand	29 (11)	22 (13)	28 (31)	
Southern Thailand	9 (3)	4 (2)	15 (17)	
Marital status				0.14
Single	189 (72)	132 (77)	5 (6)	
Living separate with partner	37 (14)	20 (12)	57 (63)	
Living with domestic partner	26 (10)	15 (9)	17 (19)	
Married	10 (4)	5 (3)	11 (12)	
Highest education				0.48
Less than primary school	7 (3)	6 (4)	1 (1)	
Primary school	7 (3)	4 (2)	3 (3)	
High school	83 (32)	52 (30)	31 (34)	
Bachelor's degree	124 (47)	86 (50)	38 (42)	
Higher than bachelor's degree	41 (16)	24 (14)	17 (19)	
Monthly household income				0.81
Less than $US450	30 (12)	20 (12)	10 (11)	
$US450 - $US1800	137 (52)	87 (51)	50 (56)	
$US1801 - $US4500	58 (22)	41 (24)	17 (19)	
More than $US4500	37 (14)	24 (14)	13 (14)	

NOTE:
Data are in numbers (%) unless otherwise indicated.
a = comparison between participants with false perception of low HIV risk and correct risk perception
HIV = human immunodeficiency virus; IQR = interquartile range.

Table 7 HIV risk, risk behaviors and risk perception moderate- and high-risk participants categorized by risk perception

Characteristics	All (N = 262)	False perception of low HIV risk (N = 172)	Correct risk perception (N = 90)	*P*[a]
Sexual orientation				0.67
Homosexual	156 (60)	104 (61)	52 (58)	
Bisexual	106 (40)	68 (39)	38 (42)	
Number of different sexual partners for the last month (median, IQR)	4 (2-10)	3 (2-10)	5 (2-11)	**0.002**
Number of new sexual partners for the last month (median, IQR)	3 (1-10)	2 (1-10)	5 (2-10)	**0.001**
Having vaginal sex	95 (36)	61 (36)	34 (68)	0.71
Condom use with vaginal sex				0.52
Always	52/95 (55)	34/61 (56)	18/34 (53)	
Most of the time	19/95 (20)	10/61 (16)	9/34 (27)	
About a half of time	9/95 (10)	6/61 (10)	3/34 (9)	
Sometimes	8/95 (8)	7/61 (12)	1/34 (3)	
Never	7/95 (7)	4/61 (7)	3/34 (9)	
Having oral sex	240 (92)	156 (91)	84 (93)	0.47
Condom use with oral sex				0.17
Always	56/240 (23)	37/156 (24)	19/84 (23)	
Most of the time	42/240 (17)	22/156 (14)	20/84 (24)	
About a half of time	37/240 (15)	27/156 (17)	10/24 (12)	
Sometimes	62/240 (26)	45/156 (29)	17/24 (20)	
Never	43/240 (18)	25/156 (16)	18/24 (21)	
Having anal sex	257 (98)	168 (98)	89 (99)	0.50
Condom use with anal sex				**0.02**
Always	126/257 (49)	82/168 (49)	44/89 (49)	
Most of the time	56/257 (22)	28/168 (17)	28/89 (32)	
About a half of time	37/257 (14)	27/168 (16)	10/89 (11)	
Sometimes	28/257 (11)	23/168 (14)	5/89 (6)	
Never	10/257 (4)	8/168 (5)	2/89 (2)	
Exchanging sex for money	62 (24)	34 (20)	28 (31)	**0.04**
Drinking alcohol with sex within 30 days				0.98
Never	57/130 (44)	39/89 (44)	18/41 (44)	
Sometimes	41/130 (32)	29/89 (37)	12/41 (29)	
About a half of time	17/130 (13)	11/89 (12)	6/41 (15)	
Most of the time	11/130 (9)	7/89 (8)	4/41 (10)	
Always	4/130 (3)	3/89 (3)	1/41 (2)	

Characteristics	All (N = 262)	False perception of low HIV risk (N = 172)	Correct risk perception (N = 90)	*P*[a]
Using drug with sex within 30 days				0.21
Never	3/13 (23)	2/6 (33)	1/7 (14)	
Sometimes	7/13 (54)	2/6 (33)	5/7 (71)	
About a half of time	2/13 (15)	2/6 (33)	0/7 (0)	
Most of the time	0/13 (0)	0/6 (0)	0/7 (0)	
Always	1/13 (8)	0/6 (0)	1/7 (14)	
History of STIs within the past year				**0.009**
Yes	22 (8)	10 (6)	12 (13)	
Not sure	13 (5)	5 (3)	8 (9)	
Type of STIs within the past year[b]				
Gonorrhea	12/22 (55)	5/10 (50)	7/12 (58)	1.00
Herpes simplex infection	6/22 (27)	4/10 (40)	2/12 (17)	0.46
Genital wart	4/22 (18)	1/10 (10)	3/12 (25)	0.35
Syphilis	1/22 (5)	1/10 (10)	0/12 (0)	0.59
Unknown	1/22 (5)	0/10 (0)	1/12 (8)	1.00
Sexual partner had STIs within the past year				**0.003**
Yes	18 (7)	9 (5)	9 (10)	
Not sure	107 (41)	60 (35)	47 (52)	
Type of STIs within the past year of sexual partner[b]				
Gonorrhea	8/18 (44)	5/9 (56)	3/9 (33)	0.64
HIV	6/18 (33)	2/9 (22)	4/9 (44)	0.62
Genital wart	2/18 (11)	0/9 (0)	2/9 (22)	1.00
Herpes simplex infection	1/18 (6)	0/9 (0)	1/9 (11)	1.00
Syphilis	1/18 (6)	1/9 (11)	0/9 (0)	0.47
Unknown	1/18 (6)	1/9 (11)	0/9 (0)	1.00
Sexual partner had exchanged sex for money within 30 days				0.14
Yes	9 (3)	5 (3)	4 (4)	
Not sure	89 (34)	52 (30)	37 (41)	
Sexual partner had used drug within 30 days				**0.01**
Yes	6 (2)	2 (1)	4 (4)	
Not sure	87 (33)	49 (29)	38 (42)	
Sexual partner had been in a jail or a prison				**0.02**
Yes	1 (0.4)	0 (0)	1 (1)	
Not sure	62 (24)	33 (19)	29 (32)	

NOTE:
Data are in numbers (%) unless otherwise indicated.
a = comparison between participants with false perception of low HIV risk and correct risk perception
b = one participant could have more than one type of STIs.
HIV = human immunodeficiency virus; IQR = interquartile range; STI = sexually-transmitted infection.

Table 8 Knowledge about HIV infection among moderate- and high-risk participants categorized by risk perception

Statement (correct answer)	All (N = 262)	False perception of low HIV risk (N = 172)	Correct risk perception (N = 90)	*P*[a]
HIV infection causes by a virus (True)	256 (98)	167 (97)	89 (99)	0.36
A Mosquito can transmit HIV (False)	207 (79)	133 (77)	74 (82)	0.36
You can get HIV from dining with an infected person (False)	224 (86)	146 (85)	78 (87)	0.70
You can get HIV from vaginal sex (True)	249 (95)	163 (95)	86 (96)	0.78
You can get HIV from anal sex (True)	252 (96)	165 (96)	87 (97)	0.77
You can get HIV from oral sex (True)	196 (75)	120 (70)	76 (84)	**0.009**
Having multiple sexual partners increases risk of getting HIV (True)	255 (97)	166 (97)	89 (99)	0.26
Consistent condom use with sex decreases risk of getting HIV (True)	258 (99)	169 (98)	89 (99)	0.69
Exchanging sex for money increases risk of getting HIV (True)	249 (95)	163 (95)	86 (96)	0.78
Getting high by using drugs increases risk of getting HIV (True)	212 (81)	132 (78)	80 (89)	**0.02**
You can get HIV from tattooing (True)	231 (88)	147 (86)	84 (93)	0.06
You can get HIV from using a shared needle (True)	254 (97)	167 (97)	87 (97)	0.85
An HIV-infected person can be asymptomatic for many years (True)	236 (90)	153 (89)	83 (92)	0.40
An asymptomatic HIV-infected person can transmit HIV (True)	245 (94)	161 (94)	84 (93)	0.93
A blood test is required for HIV diagnosis (True)	214 (82)	146 (85)	68 (76)	0.06
A vaccine that can prevent HIV is currently available (False)	99 (38)	66 (38)	33 (37)	0.79
Antiretroviral therapy can increase lifespan of an HIV-infected person (True)	225 (86)	149 (87)	76 (84)	0.63

NOTE:
Data are in numbers (%) of participants with a correct answer for each statement.
a = comparison between participants with false perception of low HIV risk and correct risk perception
HIV = human immunodeficiency virus.

Table 9 Demographic characteristic, HIV risk and risk perception of the 148 participants who underwent HTC, categorized by the test result

Characteristic	HIV-positive participant (N = 25)	HIV-negative participant (N = 123)	*P*[a]
Age (year, median, IQR)	23 (21-26)	27 (22-29)	**0.004**
Occupation			0.11
Company worker	13 (52)	70 (57)	
College/University student	10 (40)	23 (19)	
Merchant	1 (4)	12 (10)	
Government officer	0 (0)	11 (9)	
Unemployed	1 (4)	7 (6)	
Birthplace			0.10
Bangkok	7 (28)	49 (40)	
Northeastern Thailand	4 (16)	33 (27)	
Central Western and Eastern Thailand	7 (28)	22 (18)	
Northern Thailand	7 (28)	14 (11)	
Southern Thailand	0 (0)	5 (4)	
Marital status			0.18
Single	22 (88)	83 (68)	
Living separate with partner	1 (4)	20 (16)	
Living with domestic partner	2 (8)	14 (11)	
Married	0 (0)	6 (5)	
Highest education			0.06
Less than primary school	0 (0)	6 (5)	
Primary school	3 (12)	5 (4)	
High school	14 (56)	44 (36)	
Bachelor's degree	8 (32)	55 (45)	
Higher than bachelor's degree	0 (0)	13 (11)	
Monthly household income			**0.008**
Less than $US450	9 (36)	17 (14)	
$US450 - $US1800	12 (48)	65 (53)	
$US1801 - $US4500	3 (12)	30 (24)	
More than $US4500	1 (4)	11 (9)	
Sexual orientation			0.17
Homosexual	17 (68)	65 (53)	
Bisexual	8 (32)	58 (47)	
Having vaginal sex	6 (24)	55 (45)	0.06
Having oral sex	24 (96)	114 (93)	1.00
Having anal sex	25 (100)	117 (95)	0.59
HIV risk determined by the study tool			0.07
Low risk	0 (0)	21 (17)	
Moderate risk	3 (12)	16 (13)	
High risk	22 (88)	86 (70)	
False perception of low HIV risk	19 (76)	54 (44)	**0.003**

NOTE:
Data are in numbers (%) unless otherwise indicated.
a = comparison between HIV-positive and HIV-negative participants
HTC = human immunodeficiency virus testing and counseling; IQR = interquartile range.

Table 10 Demographic characteristic, HIV risk and risk perception of the 148 participants who underwent HTC, categorized by testing frequency

Characteristic	First-time tester (N = 50)	Repeat tester (N = 98)	*P*[a]
Age (year, median, IQR)	25 (21-29)	28 (22-34)	**0.01**
Occupation			0.07
Company worker	23 (46)	60 (61)	
College/University student	18 (36)	15 (15)	
Merchant	3 (6)	10 (10)	
Government officer	3 (6)	8 (8)	
Unemployed	3 (6)	5 (5)	
Birthplace			0.42
Bangkok	24 (48)	32 (33)	
Northeastern Thailand	11 (22)	22 (22)	
Central Western and Eastern Thailand	7 (14)	26 (27)	
Northern Thailand	6 (12)	15 (15)	
Southern Thailand	2 (4)	3 (3)	
Marital status			0.79
Single	35 (70)	70 (71)	
Living separate with partner	6 (12)	15 (15)	
Living with domestic partner	6 (12)	10 (10)	
Married	3 (6)	3 (3)	
Highest education			0.07
Less than primary school	1 (2)	5 (5)	
Primary school	5 (10)	3 (3)	
High school	23 (46)	35 (36)	
Bachelor's degree	20 (40)	43 (44)	
Higher than bachelor's degree	1 (2)	12 (12)	
Monthly household income			0.60
Less than $US450	11 (22)	15 (15)	
$US450 - $US1800	25 (50)	52 (53)	
$US1801 - $US4500	9 (18)	24 (26)	
More than $US4500	5 (10)	7 (7)	
Sexual orientation			0.81
Homosexual	27 (54)	55 (56)	
Bisexual	23 (46)	43 (44)	
HIV risk determined by the study tool			**0.05**
Low risk	11 (22)	10 (10)	
Moderate risk	3 (6)	16 (16)	
High risk	36 (72)	72 (74)	
False perception of low HIV risk among moderate- and high-risk participants	28/39 (72)	45/88 (51)	**0.03**

NOTE:
Data are in numbers (%) unless otherwise indicated.
a = comparison between first-time testers and repeat testers
HTC = human immunodeficiency virus testing and counseling; IQR = interquartile range.

Table 11 Multivariable logistic regression analysis of characteristics associated with HIV-positive result

Characteristics	Adjusted odds ratio (95% confidence interval)	*P*
False perception of low HIV risk	4.82 (1.67-13.90)	**0.004**
Age less than 30 years	6.37 (1.33-30.55)	**0.02**
Monthly household income less than $US450	2.65 (0.90-7.84)	0.81
College/University student	1.71 (0.60-4.88)	0.31

NOTE:
HIV = human immunodeficiency virus.

Table 12 Knowledge about HIV infection among the 148 participants who underwent HTC, categorized by the test result

Statement (correct answer)	HIV-positive participant (N = 25)	HIV-negative participant (N = 123)	*P*[a]
HIV infection causes by a virus (True)	25 (100)	120 (98)	1.00
A Mosquito can transmit HIV (False)	18 (72)	90 (73)	0.90
You can get HIV from dining with an infected person (False)	23 (92)	100 (81)	0.25
You can get HIV from vaginal sex (True)	25 (100)	119 (97)	1.00
You can get HIV from anal sex (True)	25 (100)	119 (97)	1.00
You can get HIV from oral sex (True)	13 (52)	95 (77)	**0.01**
Having multiple sexual partners increases risk of getting HIV (True)	24 (96)	121 (98)	0.43
Consistent condom use with sex decreases risk of getting HIV (True)	25 (100)	120 (98)	1.00
Exchanging sex for money increases risk of getting HIV (True)	23 (92)	118 (96)	0.34
Getting high by using drugs increases risk of getting HIV (True)	18 (72)	100 (81)	0.29
You can get HIV from tattooing (True)	22 (88)	110 (89)	0.74
You can get HIV from using a shared needle (True)	24 (96)	121 (98)	0.43
An HIV-infected person can be asymptomatic for many years (True)	21 (84)	116 (94)	0.09
An asymptomatic HIV-infected person can transmit HIV (True)	23 (92)	116 (94)	0.65
A blood test is required for HIV diagnosis (True)	20 (80)	101 (82)	0.80
A vaccine that can prevent HIV is currently available (False)	6 (24)	42 (34)	0.82
Antiretroviral therapy can increase lifespan of an HIV-infected person (True)	22 (88)	109 (89)	1.00

NOTE:
Data are in numbers (%) of participants with a correct answer for each statement.
a = comparison between HIV-positive and HIV-negative participants
HTC = human immunodeficiency virus testing and counseling

FIGURE 1 LEGEND

Study flow of the 358 participants
HTC = human immunodeficiency virus testing and counseling

FIGURE 1

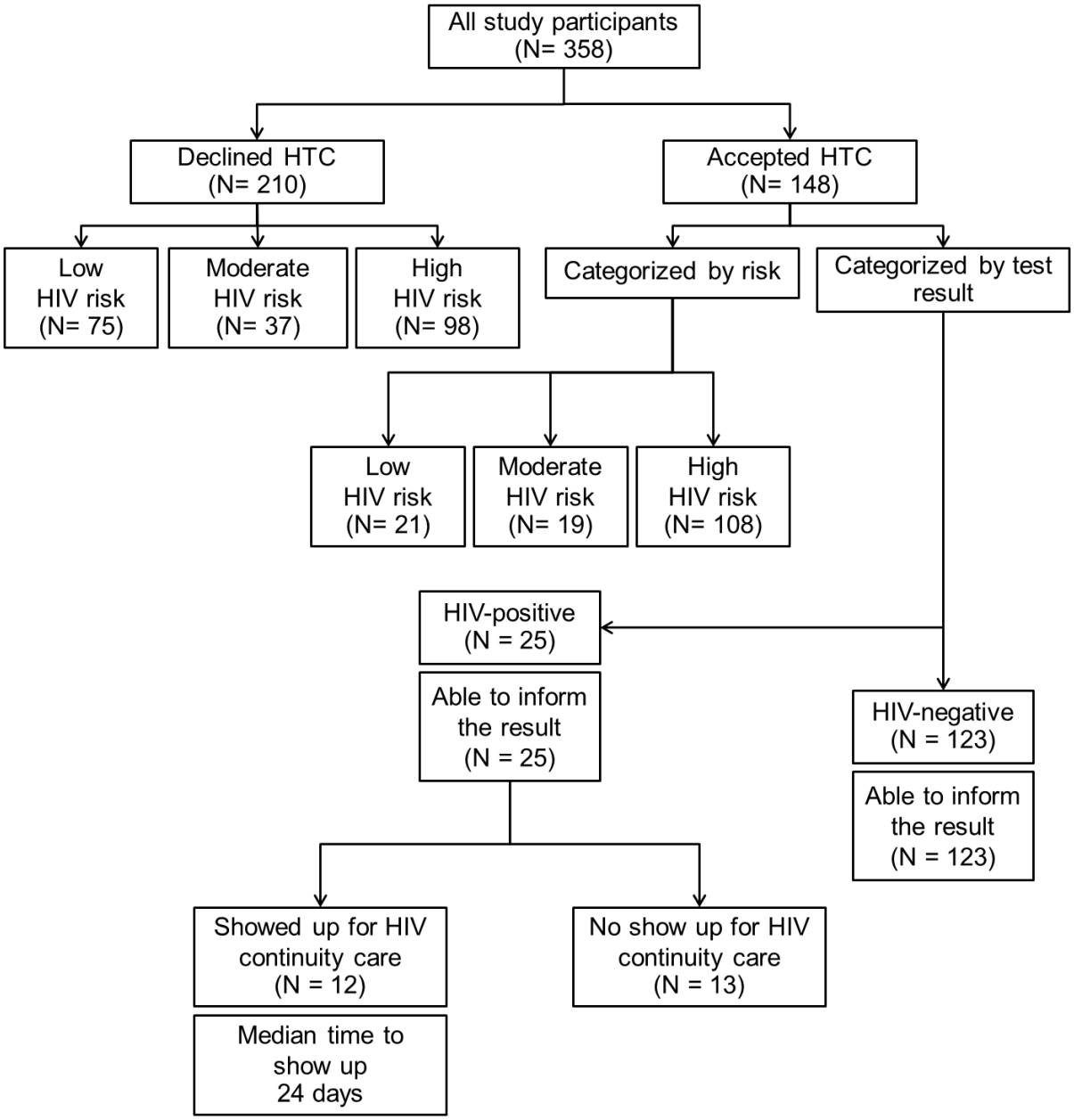
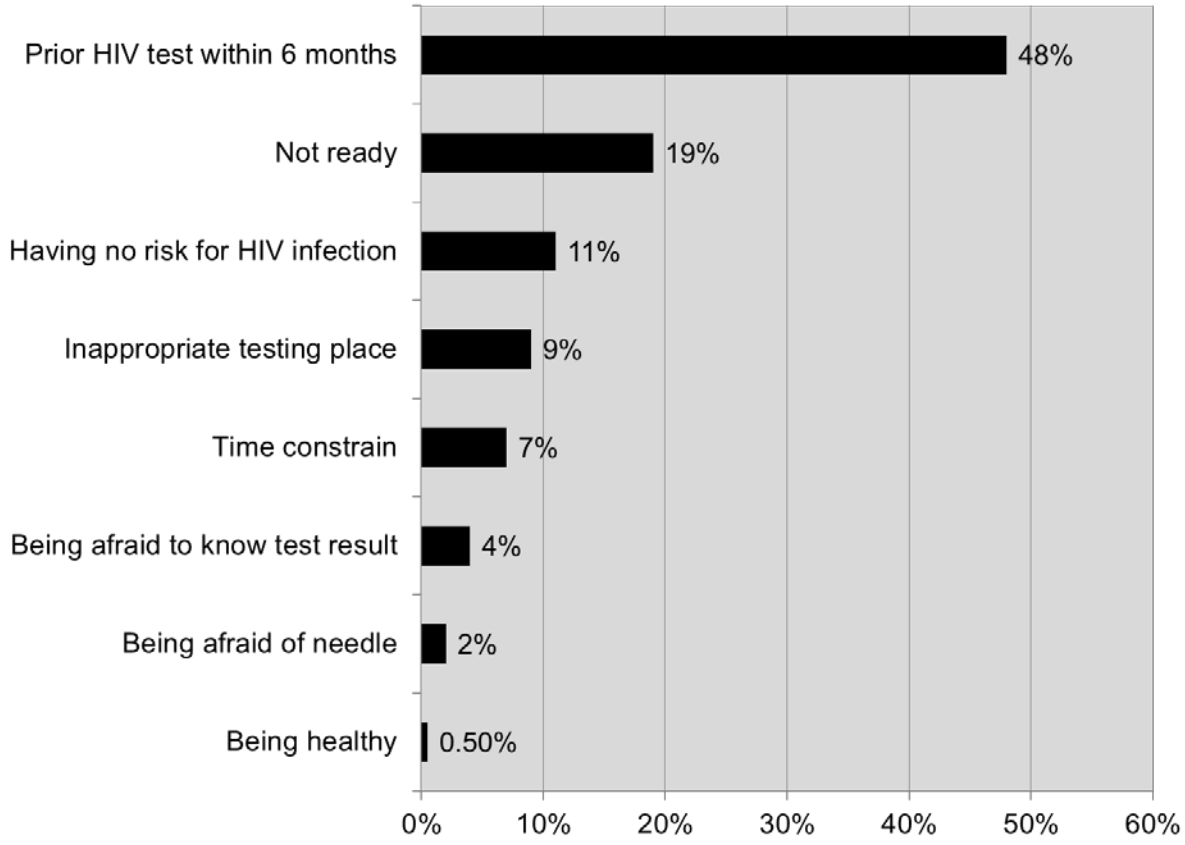

All study participants
(N= 358)
Declined HTC
(N= 210)
Accepted HTC
(N= 148)
Low
HIV risk
(N= 75)
Moderate
HIV risk
(N= 37)
High
HIV risk
(N= 98)
Categorized by risk
Categorized by test result
Low
HIV risk
(N= 21)
Moderate
HIV risk
(N= 19)
High
HIV risk
(N= 108)
HIV-positive
(N = 25)
Able to inform
the result
(N = 25)
HIV-negative
(N = 123)
Able to inform
the result
(N = 123)
Showed up for HIV
continuity care
(N = 12)
No show up for HIV
continuity care
(N = 13)
Median time to
show up
24 days

FIGURE 2 LEGEND

Reasons for declining HTC among the 358 participants
HTC = human immunodeficiency virus testing and counseling

FIGURE 2


Prior HIV test within 6 months
48%
Not ready
19%
Having no risk for HIV infection
11%
Inappropriate testing place
9%
Time constrain
7%
Being afraid to know test result
4%
Being afraid of needle
2%
Being healthy
0.50%
0%
10%
20%
30%
40%
50%
60%

KEYWORDS

Human immunodeficiency virus; testing and counseling; active targeted testing; men who have sex with men; gay entertainment venue; risk perception; linkage to care

คำสำคัญ

เชื้อไวรัสเอชไอวี; การให้คำปรึกษาและตรวจการติดเชื้อเอชไอวี; การตรวจเชิงรุกและเน้นกลุ่มเป้าหมาย; ชายที่มีเพศสัมพันธ์กับชาย; สถานบันเทิงของเกย์; การรับรู้ความเสี่ยง; การเข้ารับการรักษาหลังทราบว่าติดเชื้อเอชไอวี

ภาคผนวก

Output จากโครงการวิจัยที่ได้รับทุนจาก สกว.

ผลงานวิจัยนี้อยู่ระหว่างการเตรียมเพื่อส่งพิจารณาตีพิมพ์ในวารสารวิชาการนานาชาติ