

EFFECTS OF PEER-EDUCATION INTERVENTION ON CONDOM USE IN HIGH-RISK HETEROSEXUAL MALE UNIVERSITY STUDENTS IN NORTHERN THAILAND

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Abstract. Male university students are vulnerable to HIV and other sexually transmitted diseases (STDs) due to inconsistent condom use. Programs for reducing sexual risk behavior developed on psychological theories and consistent with the needs of this population are scarce. The study tested efficacy of a peer education intervention among high-risk male university students in northern Thailand employing a program based on psychological constructs of psychological theories, namely, health belief model, social cognitive theory and theory of reason action. Six education modules were conducted over a six-week period delivered once a week by peer educators. Primary outcome was “consistent condom use in the past three months”, and other outcomes were “condom use during the last sexual intercourse”, “condom use with regular and casual partner(s) in the past three months” and psychological variables. Post-intervention assessments were conducted at three months and at six months following intervention program. Among 133 participants ($n = 133$), after 6 months post- intervention, “consistent condom use” increased 24-46%, “condom use at last sex” 53-79% and “condom use with regular partner” 24-65%, p -value = 0.023. The intervention program also had a positive influence on perceived susceptibility to HIV/STIs, perceived severity of HIV/STIs, perceived benefits of condom use, self-efficacy of condom use, and subjective norm. In conclusion, the study demonstrates the efficacy of a peer education intervention program for promoting condom use and other HIV/STI behavioral constructs in a population of high-risk heterosexual male students in Thailand.

Keywords: condom use behavior, high-risk heterosexual male, northern Thailand, peer education

INTRODUCTION

Although men who have sex with

men (MSM) form an important target group in the current epidemic of HIV and sexually transmitted infections (STIs) in Thailand, important dynamics in sexual behavior of Thai heterosexual males suggest this group might also be a significant contributor to the spread of HIV and other STIs in the country

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(Chamratrithirong and Kaiser, 2012). Previous studies have shown low condom use among Thai heterosexual males, ranging 20-60% (Janepanish *et al*, 2011). The Thai Working Group on HIV/AIDS Projection predicts an increase in HIV incidence among heterosexual males from 5,261 to 10,853 cases if condom use remains <80% (The Thai Working Group on HIV/AIDS Projections, 2008).

A number of social and contextual factors concur to shape vulnerability of Thai male university students to HIV and STIs, such as decreased peer pressure and family control for those who live away from home (Jahanfar *et al*, 2009; Heeren *et al*, 2013). In a recent study that included heterosexual male Thai university students, a substantially low proportion (35.6%) of students consistently used condoms in the past 12 months and 41% reported at least two sexual partners in the preceding 12 months (Janepanish *et al*, 2011). These findings corroborated previous research in Thailand showing university students engage in a range of risky behaviors including sex without use of condom and multiple and concurrent sexual partners (Khumsaen and Gary, 2008; Chatchawarn, 2011). Frequency of consistent condom use among Thai university students ranged 26-51% (Srisuriyawet, 2006; Khumsaen and Gary, 2008; Chatchawarn, 2011).

Young people tend to be influenced by their peers and believe peer behavior to be the norm (Grossman *et al*, 2008). For this reason, many agencies and organizations have implemented peer-based intervention programs to address a myriad of risky behaviors among adolescents and young people (Caron *et al*, 2004). Peer education interventions implemented worldwide to prevent HIV and other STIs mainly operate at

the individual level through influencing attitudes, norms, beliefs, or behaviors (Ibrahim *et al*, 2012; Menna *et al*, 2015). Youths are more likely to listen to and believe information regarding AIDS and HIV from their peers than from adults or celebrities, probably because the topics under discussion are sensitive and need a high level of trust and comfort from information givers (Campbell and MacPhail, 2002; Sriranganathan *et al*, 2012). Another advantage of peer-education interventions is their more cost effectiveness compared to other types of intervention methods that rely on highly trained professional staff (Maticka-Tyndale and Barnett, 2010).

A systematic review of peer-education interventions identified a significant association with increased HIV knowledge and condom use and decreased frequency in sexual intercourse (Medley *et al*, 2009), and another systematic review identified interventions based on testable theories are more effective than non-theoretical based interventions (Malow *et al*, 2007). Health belief model (HBM) is the most commonly used theory (Janz and Becker, 1984), often in combination with other theories, such as social cognitive theory (SCT) (Bandura, 1986) and theory of reason action (TRA) (Hardeman *et al*, 2002). Group-based interventions are also practical and effective in reducing sexual risk behavior and in increasing safer sex practices in university students (Chernoff and Davison, 2005).

Most HIV and STI risk-reduction interventions for youth in Thailand have focused on high school students (Tipwareerom *et al*, 2011; Bunnag and Temsirikulchai, 2013) and vocational students (Thato *et al*, 2008). These interventions included informational programs related to sexual transmission

of HIV (Thato and Penrose, 2013), life-skill development (Bunnag *et al*, 2013), combination of life-skill development and participatory sex education (Seangpraw *et al*, 2017), and comprehensive sex education (Thato *et al*, 2008). However, only a few studies have tested the efficacy of an HIV risk-reduction intervention specifically designed for university students (Seangpraw *et al*, 2017). It is also not clear to what extent peer-education interventions that are socially and culturally sensitive to the needs of heterosexual male students are effective in reducing specific risky sexual behavior in this risk population.

Hence, efficacy of a peer-education intervention for HIV prevention in high-risk heterosexual male university students was evaluated with an expectation a significant proportion of heterosexual male students reporting condom use would increase at 3-month and 6-month follow-up assessments.

MATERIALS AND METHODS

Study design, setting and participants

This was a pre-test/post-test quasi-experimental evaluation of a peer-education intervention to increase condom use and improve psychological constructs among high-risk heterosexual male students in a province in northern Thailand. The intervention was conducted between August 2016 and February 2017, and participants were selected from those who participated in a previous survey (Pinyaphong *et al*, 2018) and reported risk behavior of inconsistent condom use and/or having at least two sexual partners in the past 12 months. Sample size of 130 was calculated based on the formula of Chow *et al* (2003). Estimated prevalence of condom uses pre- and post-intervention,

40 and 65% respectively, were based on data from a previous study of a similar study population (LaBrie *et al*, 2008). The final sample size was 135 to allow an equal number ($n = 15$) of participants in nine groups. Peer educators approached these individuals and invited them to participate in the study, with three peer educators per group.

The study protocol was approved by the Human Experimentation Committee, Research Institute for Health Sciences, Chiang Mai University (no. 33/2015). All participants were informed of the study's objectives, confidentiality of the personal data and how study findings would be presented. Written informed consent was obtained from each participant.

Development of intervention program

The intervention program was developed using information from a formative study that included a cross-sectional survey (Pinyaphong *et al*, 2018), focus group discussions (FGDs) and brainstorming sessions with the target population (male university students) and key stakeholders, namely, health care providers at university health centers. Intervention content was based on psychological constructs from HBM, SCT and TRA. HBM constructs were perceived susceptibility of STIs/HIV, perceived severity of STIs/HIV, perceived benefits of condom use, and perceived barriers of condom use. SCT and TRA construct consisted of perceived self-efficacy of condom use and subjective norm respectively. These constructs were employed to develop several behavioral interventions in a variety of settings (Li *et al*, 2011; Heeren *et al*, 2013; Ibrahim *et al*, 2012; Thato and Penrose, 2013). Draft content of the modules was reviewed in a series of meetings between researchers

and peer educators, and the modules were pretested on a group of students ($n = 15$) recruited from another university not participating in the study, who met the same inclusion criteria as study participants. The pre-test curriculum included six sessions and peer educators recorded feedback following each session, which then were further modified by switching the order of some activities, adding educational media and improving skills of the peer educators in conducting sessions effectively.

Recruitment and training of peer educators

Peer educators were male university students recruited from different disciplines, were not included in the sampling frame of the actual subjects and nominated by their teachers and fellow students. Qualifications of a good peer educator were active class participation, good communication skills, a helping mindset, and ability to pass on knowledge to the others (Borgia *et al*, 2005; Mason-Jones *et al*, 2011). One member of the research team interviewed all prospective peer educators to ascertain their willingness to be trained and serve as peer educators, and chose 27 peer educators.

All peer educators attended a two-day training facilitated by the principal investigator and an experienced expert in youth sexual health from the Research Institute for Health Sciences, Chiang Mai University. Various topics, backed by scientific research, related to HIV transmission, methods of HIV prevention and risky sexual behaviors relevant to university students were presented. Training techniques allowed peer educators to gain skills and confidence to deliver and conduct intervention sessions. Information and techniques included HIV prevention strategies,

condom use, communication strategies (active listening, encouraging questions, visual and vocal dynamics, and initiation of conversation), role-playing, skill building, and public speaking techniques. Pre- and post-training evaluations on knowledge improvement and attitudes were conducted.

Delivery of intervention

Six modules were conducted over a six-week period delivered once a week by peer educators. Each session lasted about 2 hours, conducted in private rooms at the university. Peer education sessions were monitored to ensure the same information was delivered to all groups. Peer educators collected information of each session using an activity report form, which included information on date of the session, number of participants, length of session time, and topics covered during the session. Participants were asked to evaluate each session by commenting on activities, benefits, how much they thought they learnt, and to what extent they would recommend the program to others.

Peer educators were supervised throughout the intervention period. Before starting each session, the research team provided additional guidance to peer educators regarding purpose and details of each session. A debriefing meeting with the research team was conducted at the end of each session. The aim was to obtain feedback from peer educators and to address any challenges encountered during the current session to improve the next session.

Data collection

Questionnaire data were collected confidentially using a computer assisted self-interviewing (CASI) in a computer laboratory of the university. Data were

collected at baseline, immediately after the intervention sessions, and three and six months later. Sexual behavior data were collected at baseline and at three and six months after the sessions, while psychological variables were measured at all four assessments.

Measurements taken

Primary outcome. Condom use during the previous three months was assessed using the question: "How frequently did you use a condom during sexual intercourse during the previous three months?" Response options were: "every time", "sometimes" and "never". Response options were dichotomized into "consistent condom use" for participants who used condoms every time, and "inconsistent condom use" for those who never or sometimes used condoms. Reporting of condom use over a brief timeframe (such as the previous three months) was shown a decreased risk of recall bias and improves the validity of self-reported condom use behavior (Kauth *et al*, 1991). A calendar was displayed directly at the front of the computer laboratory to clearly highlight the intervention period (*eg* January to March). This strategy was used to assist participants to accurately recall their behavior within the timeframe of interest to the study.

Secondary outcomes. These were: "condom use during the last sexual intercourse", "condom use with regular partner during the previous three months", "condom use with casual partner(s) during the previous three months", "number of sexual partners during the previous three months", and psychological variables [employing four HBM constructs (perceived susceptibility, perceived severity, perceived benefits, and perceived barriers), one SCT construct (perceived self-efficacy) and one TRA (subjective norm)] likely to impact effects

of the peer-education intervention on condom use.

Perceived susceptibility. Perceived likelihood of contracting HIV and STIs was measured using a 10-item scale (Mahoney *et al*, 1995) administered with a 5-point Likert scale (Thato *et al*, 2003) ranging from strongly disagree (score = 0) to completely agree (score = 4), higher scores indicating higher degrees of susceptibility. Internal consistency based on Cronbach's alpha value (Cortina, 1993) ranged 0.77-0.78 at baseline and at subsequent post-intervention measurements.

Perceived severity. Perceived severity of contracting HIV and STIs was measured with a 12-item scale (Thato *et al*, 2003) administered using a 5-point Likert scale, with higher scores suggesting higher degrees of perceived severity. Internal consistency based on Cronbach's alpha value (Cortina, 1993) ranged 0.84-0.88 at baseline and at subsequent post-intervention measurements.

Perceived benefits of condom use. A 24-item scale was employed using a 5-point Likert scale, higher scores indicating higher degrees of perceived benefits. Internal consistency based on Cronbach's alpha value (Cortina, 1993) was 0.92 both at baseline and subsequent post-intervention measurements.

Perceived barriers of condom use. A 14-item scale was used with a 5-point Likert scale, ranging from completely disagree to completely agree. Higher scores indicated higher degrees of perceived barriers to condom use. Internal consistency based on Cronbach's alpha value (Cortina, 1993) ranged 0.89-0.96 at baseline and at subsequent post-intervention measurements.

Perceived self-efficacy of condom use. A 14-item scale employing a 5-point

Likert-scale, ranging from completely disagree to completely agree, the higher scores indicating higher degrees of self-efficacy. Internal consistency based on Cronbach's alpha value (Cortina, 1993) ranged 0.87-0.89 and 0.87-0.96 at baseline and at subsequent post-intervention measurements respectively.

Subjective norm. Three items were employed to assess participant belief of whether partner's, parents' and close friends' condoned unprotected sexual intercourse (Srisuriyawet, 2006). Response options ranged from completely disapproved (score = 0) to approved (score = 3).

Other variables. Information on other important covariates related to condom use behavior were participation in activities to reduce sexual risk behaviors during three months prior to each study evaluation, substance use (alcohol and drugs) and length of time having relationship with partner.

Data analysis

Data analysis was performed using Statistical Package for the Social Science (SPSS) for Windows version 17.0. Descriptive analysis was used to obtain statistics of selected variables. Analysis of variance (ANOVA) was employed to detect changes in psychological variables at baseline, immediately after the program, and three and six months post-intervention. McNemar test was carried out to compare proportion of condom use at baseline and at three and six months post-intervention.

RESULTS

Demographics and baseline sexual behavior

Average age $\pm$ SD of participants ($n = 135$) was 20 ± 1 years and average age

at first sexual intercourse 17 ± 2 years, with 65% reporting using a condom and 84% having sexual intercourse with their current partner (Table 1). In the three months prior to study enrollment, 75% of participants reported having had sex, among whom 53% used condom at the last sexual intercourse, 24% consistently used condoms and had 1 ± 0.5 sexual partner.

Effects of intervention program

The proportion of participants reporting "consistent condom use during the previous three months", the primary outcome of the study, significantly increased at 6-month post-intervention compared to baseline, but no significant difference in the proportion of consistent condom use at 3-month post-intervention (Table 2). The proportion of participants reporting "condom use during the last sexual intercourse" and "condom use with regular partner during the previous three months" significantly increased at both the 3- and 6-month post-intervention, but no significant difference in the "number of sexual partners during the previous three months" and "consistent condom use with casual partner(s)" between baseline and post-intervention assessments.

Perceived susceptibility to HIV/STIs, perceived severity of HIV/STIs, perceived benefits of condom use, self-efficacy of condom use, and subjective norm significantly improved at 3-month and/or 6-month post-intervention compared to baseline (Table 3). Perceived susceptibility to HIV/STIs, perceived benefits of condom use and subjective norm changed in a direction supportive of condom use immediately following the intervention program.

DISCUSSION

The study demonstrates peer-

Table 1
Baseline sociodemographic characteristics of male heterosexual participants at a university in northern Thailand (2016 -2017).

Sociodemographic parameter	Number (%) (<i>n</i> = 133)
Age (years)	
<20	95 (71)
≥20	38 (29)
Age at first sexual intercourse	
Mean ± SD (years)	17 ± 2
Median (range) (years)	17 (13-21)
First sexual intercourse partner	
Romantic	120 (90)
Friend	4 (3)
Acquaintance	9 (7)
Condom use at first sex (<i>n</i> = 139)	
Yes	86 (65)
No	53 (35)
Currently have regular partner	
Yes	97 (73)
No	36 (27)
Had sexual intercourse with regular partner (<i>n</i> = 97)	
Yes	82 (84.5)
No	15 (15.5)
Have been drunk before having sex	
Yes	96 (72)
No	37 (28)
Had any signs and/or symptom of STIs	
Yes	11 (8)
No	122 (92)
Had sexual intercourse during previous three months	
Yes	100 (75)
No	33 (25)
Number of sexual partners during previous three months	
Mean ± SD	1.0±0.5
Median	1
Condom use in last sexual intercourse during previous three months (<i>n</i> = 100)	
Yes	53 (53)
No	47 (47)
Consistent condom use during previous three months (<i>n</i> = 100)	
Yes	24 (24)
No	76 (76)

Table 2
Sexual behavior following peer-education intervention of male heterosexual participants at a university in northern Thailand (2016 - 2017).

Sexual behavior	Baseline	Three-month post-intervention	Six-month post-intervention	Statistical test
	Number (%)	Number (%)	Number (%)	
Condom use				
Consistent condom use during previous three months	24 (24) (n = 100)	39 (40) (n = 98)	41 (46) (n = 90) ^a	McNemar
Condom use at latest sexual intercourse	53 (53) (n = 100)	59 (60) (n = 98) ^a	71 (79) (n = 90) ^a	McNemar
Condom use with regular partner(s)	22 (24) (n = 90)	33 (35) (n = 94) ^a	86 (65) (n = 90) ^{a,b}	McNemar
Condom use with casual partner(s)	18 (75) (n = 24)	18 (75) (n = 24)	19 (100) (n = 19)	McNemar
Number of sexual partners				
Mean (SD)	1.0 (0.5)	1.0 (0.5)	1.0 (0.5)	Paired t
Median (range)	1 (1-3)	1 (1-3)	1 (1-4)	

^ap-value <0.05 compared to Baseline; ^bp-value <0.05 compared to Three-month post-intervention.

Table 3
Psychological outcomes of peer-education prevention on heterosexual male participants at a university in northern Thailand (2016 -2017).

Psychological outcome	Mean (SD)			
	Before intervention	Immediately post-intervention	Three months post-intervention	Six months post-intervention
Perceived susceptibility	36 (8)	38 (7) ^a	40 (7) ^a	40.1 (5.6) ^a
Perceived severity	38 (8)	40 (6)	42 (5) ^{a,b}	41.5 (7.2) ^a
Perceived benefits of condom use	99 (14)	102 (10)	106 (10) ^a	105.6 (11.8) ^a
Perceived barriers to condom use	48 (11)	42 (12)	42 (15)	42.8 (14.5)
Perceived self-efficacy of condom use	51 (7)	50 (6)	53 (5) ^b	52.3 (6.7) ^b
Subjective norm	8 (3)	7 (2) ^a	7 (3) ^a	7.7 (2.7)

^ap-value <0.05 compared to Before intervention; ^bp-value <0.05 compared to Immediately post-intervention.

education intervention was effective in improving condom use behavior as evidenced by the increase in the proportion of participants reporting using condom and using condom at the previous sexual intercourse when interviewed at three and six months after the intervention sessions.

The mechanisms through which peer-education intervention lead to safer sexual behavior are multiple, and largely depend on content of the intervention program, format of delivery and intended outcomes. Concerted efforts were made to design an intervention program that was not only socio-culturally sensitive but also reflected the context-specific behavioral barriers of safer sexual practices. The intervention was able to capture the needs of the target population as the peer educators participated in the design of the intervention activities that, importantly, were based on an integrated theoretical framework and behavioral constructs using tested and proven theories. The delivery format, a small ratio of participants to peer educator (5:1) was in line with previous studies reporting small-group interventions are more effective in behavioral change than large group interventions (Chernoff and Davison, 2005). Continuous close monitoring and supervision by the research team might also have enhanced exposure to the content of the intervention. Overall, participants endorsed psychological variables supportive of condom use.

Changes in these psychological constructs (perceived susceptibility and severity of STIs/HIV, perceived benefits and barriers of condom use, perceived self-efficacy of condom use, and subjective norm) were most likely pathways through which the intervention improved condom use behavior among

the participants. Notably, condom use with casual partners did not significantly change, probably due to the small number of students who reported involvement in casual sex in the previous three months. That peer-education intervention led to increase in consistent use of condom with regular partner was reassuring as several studies reported adolescents and young people are less likely to report condom use with regular partners (Jenkins *et al*, 2002; Thato *et al*, 2003; Chamrathirong and Kaiser, 2012) and HIV/STI risk perception with regular partners have been consistently reported as low (Haque and Soonthorndhada, 2009; Tangmunkongvorakul *et al*, 2010). The findings from the present study suggest appropriate communication strategies delivered by peers emphasizing the risks associated with sex without use of condom regardless of the type of partner (regular or casual) should be promoted among youths in other parts of Thailand and in other similar settings in the Southeast Asian region.

Peer-education intervention did not affect perceived barriers to condom use despite the program inclusion of dedicated activities intended to remove perceived barriers. One possible explanation is that the peer-education intervention focused on removing barriers that could be altered at the individual level, *eg* belief that condom use reduces sexual pleasure or shame associated with carrying or buying condoms. However, other contextual and structural barriers were not addressed in the intervention program. Studies have identified factors such as a lack of financial resources, cost of condoms and limited access to condoms as important barriers to condom use (Drazin *et al*, 2007; Scott-Sheldon *et al*, 2011; Chamrathirong and Kaiser, 2012). Negative attitudes towards

carrying or buying condoms, although operating at the individual level, are rooted in much broader social norms, eg in Thailand condoms are associated with commercial sex work, which has rendered promotion of condom use difficult among normal sex partners (Janepanish *et al*, 2011; Tangmunkongvorakul *et al*, 2012).

Studies testing efficacy of peer-education interventions to improve safe sexual practices have produced mixed results: some found that peer-education intervention is effective in improving behavioral outcomes such as condom use, HIV knowledge and HIV-related attitudes (Medley *et al*, 2009; Scott-Sheldon *et al*, 2011; Ibrahim *et al*, 2012), while others reported either no change or just a moderate improvement in sexual behavioral outcomes (Ozcebe *et al*, 2004; Jahanfar *et al*, 2009; Thato and Penrose, 2013). Thus, there is a need for most rigorous study designs to answer this particular question. There was only one previous study in Thailand evaluating effectiveness of a theory-based HIV prevention program delivered by peers among college students (Thato and Penrose, 2013), reporting intervention produces improved knowledge, motivation and behavioral skills, but is ineffective in improving acceptance of condom use.

The present study is the first to document effectiveness of a peer-education intervention in improving acceptance of condom use in a population of heterosexual male students. This might be because the students were able to develop trust and comfortably discuss sensitive topics to peer educators who were similar in characteristics to themselves (Medley *et al*, 2009). The study suffers from two weaknesses. Firstly, there was a lack of a comparison group as

the choice of a one-group pre- and post-test design was mainly made due to the limited number of participants, making it is difficult to rule out the possibility changes observed in the outcomes were not related to factors external to the intervention program. Research employing randomized controlled design would have provided additional support of the results from the peer-education intervention in our setting. And secondly, there exists the possibility of social desirability bias in the reporting of the outcomes due to the sensitive nature of the questions posed and the taboos associated with sexual issues in the Thai culture.

In conclusion, the peer-education intervention developed to target high-risk Thai heterosexual male university students is effective in improving condom use, a key HIV/STI preventive behavior. The intervention program applies key theoretical constructs known to shape preventive behavior such as condom use, which included perceived susceptibility to HIV/STI, perceived severity of HIV/STI, perceived benefits of condom use, self-efficacy of condom use, and subjective norm. The change in condom use behavior may necessitate a longer term intervention and/or a follow-up study to confirm its sustainability. In addition, further investigations conducted in other populations, such as females, men who have sex with men and youths outside the education system, are necessary to validate the appropriateness of peer-education interventions.

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