Published in final edited form as:
Arch Sex Behav. 2015 February ; 44(2): 329–340. doi:10.1007/s10508-014-0274-6.

Motivational Interviewing Targeting Risky Sex in HIV-Positive Young Thai Men Who Have Sex with Men

Chokechai Rongkavilit[1], **Bo Wang**[1], **Sylvie Naar-King**[1], **Torsak Bunupuradah**[2], **Jeffrey T. Parsons**[3], **Apirudee Panthong**[2], **Juline A. Koken**[4], **Pichai Saengcharnchai**[5], and **Praphan Phanuphak**[2]

Chokechai Rongkavilit: crongkav@dmc.org

[1]The Carman and Ann Adams Department of Pediatrics, Wayne State University School of Medicine, 3901 Beaubien Blvd., Detroit, MI 48201 [2]HIV Netherlands-Australia-Thailand Research Collaboration (HIV-NAT), Thai Red Cross AIDS Research Centre, Bangkok, Thailand [3]Department of Psychology and Public Health, Hunter College and the Graduate Center of the City University of New York, New York, NY [4]Center for HIV Education Studies and Training (CHEST), New York, NY [5]Department of Psychiatry, Phramongkutklao College of Medicine, Bangkok, Thailand

Abstract

Motivational interviewing (MI) has been shown to reduce sexual risks among HIV-positive men who have sex with men (HMSM) in the U.S. We conducted a randomized trial of Healthy Choices, a 4-session MI intervention, targeting sexual risks among 110 HIV-positive youth ages 16–25 years in Thailand. Risk assessments were conducted at baseline, 1 month, and 6 months post-intervention. This report presents the analysis of 74 HMSM in the study. There were 37 HMSM in the Intervention group and 37 in the control group. The proportions of participants having anal sex and having sex with either HIV-uninfected or unknown partners in past 30 days were significantly lower in Intervention group than in control group at 6 months post-intervention (38% vs. 65%, $p = .04$; and 27% vs. 62%, $p < .01$, respectively). There were no significant differences in general mental health scores and HIV stigma scores between the two groups at any study visit. Thirty-five (95%) HMSM in the Intervention group vs. 31 (84%) in control group attended ≥3 sessions. Loss to follow-up was 8% and 30%, respectively ($p = .04$). Healthy Choices for young Thai HMSM was associated with sexual risk reduction. Improvements in mental health and HIV stigma were noted in Intervention group. Healthy Choices is a promising behavioral intervention and should be further developed to serve the needs of young HMSM in resource-limited countries.

Keywords

HIV; sexual behavior; motivational interviewing; sexual orientation; men who have sex with men; Thailand

INTRODUCTION

Men who have sex with men (MSM) have been recognized worldwide as one of the populations most at risk for human immunodeficiency virus (HIV) infection (Balaji, Bowles, Le, Paz-Bailey, & Oster, 2013; Baral et al., 2011; Barnes et al., 2010; Smith, Tapsoba, Peshu, Sanders, & Jaffe, 2009; van Griensven et al., 2013; Zhang, Chow, & Wilson, 2012). According to the United Nations, there is disturbing evidence suggesting that global HIV prevalence among MSM, particularly young MSM, is increasing (United Nations Program on AIDS, 2012). Worldwide, MSM are approximately 13 times more likely to have HIV than the general population.

In a study conducted in Thailand from 2006 to 2011, the HIV prevalence among MSM was 21% and the overall HIV incidence was 5.9 per 100 person year, with the highest incidence of 8.8 per 100 person year among 18–21 years olds (van Griensven et al., 2013). The risk factors identified in the study included receptive anal sex, drug use for sexual pleasure, especially methamphetamine, and the presence of other sexually transmitted infections (STI), such as herpes simplex and syphilis. These findings indicate the high rates of HIV transmission in the setting of unprotected anal sex under the influence of drugs among young Thai MSM.

While there is clearly an increased need for innovative behavioral and biomedical interventions to prevent HIV infection among uninfected young MSM, preventive strategies for the uninfected individuals will not succeed without simultaneous preventive strategies for the infected individuals. Several studies indicate that a large proportion of HIV+ MSM continued having risky sex even after HIV diagnosis (Crepaz et al., 2009; Gorbach et al., 2011; Tieu et al., 2011). In a recent study of 154 HIV+ Thai MSM, 32% reported unprotected anal sex in past 3 months and 41% were tested positive for STI (Sirivongrangson et al., 2012). Therefore, attention should be equally given to develop effective risk reduction interventions for HIV+ MSM. However, such interventions specifically tailored for HIV+ MSM are limited in the literature and are restricted to those in the developed world (Johnson et al., 2008; Kelly et al., 1993; Morin et al., 2008; Patel et al., 2012; Rosser et al., 2010; Sikkema et al., 2011; Wolitski, Gomez, & Parsons, 2005).

One strategy that shows promise for HIV+ MSM is motivational interviewing (MI). MI is a collaborative, client-centered counseling style designed to increase motivational readiness to behavior change by exploring ambivalence about change, eliciting discrepancies between current behaviors and personal goals, and building self-efficacy (Miller & Rollnick, 2013; Naar-King & Suarez, 2011). Mausbach, Semple, Strathee, Zians, and Patterson (2007) conducted a randomized trial of an individualized, 8-session, MI-based intervention targeting sexual risks among 341 methamphetamine-using HIV+ MSM in California. Participants in the intervention group engaged in significantly more protected sex acts at 4 months and 8 months post-intervention. Valasquez et al. (2009) evaluated an MI-based, 8-session intervention, using both individual counseling and peer group education, targeting alcohol use and risky sex in 253 HIV+ MSM in the U.S.. A significant reduction in the number of drinks and the number of days on which both heavy drinking and unprotected sex occurred was noted in the intervention group as compared to the control group; however, no

significant reduction in unprotected sex was observed. Cosio et al. (2010) compared telephone-delivered MI plus skills-building intervention vs. skills-building only intervention for sexual risk among 79 HIV+ persons (63% MSM) in the rural U.S. Participants in the combined intervention reported a significant increase in protected sex and risk-reduction motivation as compared to those receiving skills-building only. Although the results from these randomized trials indicate the benefits of MI in HIV+ MSM, its effectiveness in sexual risk reduction among HIV+ young MSM in less-developed countries remains unknown.

We formerly demonstrated that an MI-based Healthy Choices intervention was effective in reducing sexual risk, alcohol use, and plasma HIV viral loads among HIV+ youth in the U.S. (Chen, Murphy, Naar-King, & Parsons, 2011; Murphy, Chen, Naar-King, & Parsons, 2012; Naar-King et al., 2009). Moreover, the Healthy Choices intervention was also associated with a significant reduction in depression in this population (Naar-King, Parsons, Murphy, Kolmodin, & Harris, 2010). The prevalence of mental health problems is high among HIV+ youth (Tanney, Naar-King, & MacDonnel, 2012). The high rates of mental health problems may, in part, stem from stigmatization related to HIV infection. Both mental health and HIV stigma are significantly associated with risk-taking behaviors (Hatzenbuehler, O'Cleirigh, Mayer, Mimiaga, & Safren, 2011). Therefore, these factors play a critical role in secondary preventions among HIV+ individuals.

With the promising results in HIV+ youth in the U.S., we adapted Healthy Choices for HIV + youth in Thailand. To ensure social and cultural acceptability, the adaptation process included focus group discussions with HIV+ Thai youth and health care providers about the intervention and the feasibility testing of the adapted intervention in eleven HIV+ youth, five of whom were MSM (Rongkavilit et al., in press). We subsequently conducted a pilot study of the adapted Healthy Choices targeting sexual risk, alcohol use, and medication adherence among 110 HIV+ youth in Thailand (Rongkavilit et al., 2013). The present report is a further analysis of the effect of Healthy Choices among HIV+ young Thai MSM population in the pilot study.

METHOD

The study was conducted at the Thai Red Cross AIDS Research Center in Bangkok. The participant's eligibility criteria were ages 16–25 years, being HIV+, and understanding spoken and written Thai enough to provide informed consent and participate in study assessments and sessions. Potential participants were first informed by their treating physicians about the study. Those who wished to learn more about the study were referred by the physicians to the project manager. The project manager then explained to the potential participants about the study. Voluntary written informed consent was obtained from all potential participants who agreed to participate in the study.

A total of 74 HIV+ MSM participated in the study. The majority (62%) were diagnosed with HIV infection within the past 12 months. Seventy-one (96%) reportedly acquired the infection by sexual transmission, two (3%) by mother-to-child transmission, and one (1%) by blood transfusion. Most (69%) were either asymptomatic (Class N) or mildly symptomatic (Class A) based on the 1993 revised HIV disease classification (Centers for

Disease Control and Prevention, 1992) and 77% had not started antiretroviral therapy at study entry (Table 1).

Upon completing the consent, the participants were randomly assigned to receive either a 4-session MI-based Healthy Choices intervention (Intervention group) or a 4-session control condition (Control group). The sessions in both groups occurred at 1, 2, 6, and 12 weeks after the baseline visit. All participants also had study assessments that included the measures identified below at baseline (1 week before the 1st session), 1 month after the 4th session, and 6 months after the 4th session. Participants were contacted by phone 3 days before each visit as a reminder. All participants received 200 Bahts (approximately $7 U.S.) for each intervention or control session and 700 Bahts ($23 U.S.) for baseline, 1-month, and 6 months follow-up visits as a compensation for transportation and time. The study was approved by the ethical review boards of all affiliated institutions. By the local regulation, parental or legal guardian's permissions are required for Thai participants younger than 18 years of age to participate in research. However, a waiver of parental or legal guardian's permission was granted for participants younger than 18 years of age in this study because the ethical review boards and the study team considered protection of participant confidentiality related to HIV and the sensitive risk behaviors as the priority and the most crucial.

Procedure

Intervention Group—The intervention group received Healthy Choices, a 4-session individual-level MI counseling that targeted two of three possible risk behaviors, including sexual risks, alcohol use, and antiretroviral adherence. We targeted only two behaviors because the original Healthy Choices focused on two of the most problematic of the three behaviors above for each participant (Naar-King et al., 2009). It is more feasible to address two instead of three behaviors in the four sessions. Additionally, some participants were not prescribed antiretroviral treatment at the time of the study and, therefore, not all three behaviors were relevant to an individual. We selected condom use as the primary outcome; therefore, sexual risk was targeted for all participants. The second targeted behavior (alcohol use or antiretroviral adherence) was selected based on the severity of the risk identified at baseline. If the participant had no risk behaviors, the second behavior was selected by the participant and the interventionist jointly to maintain the healthy behavior. The intervention was delivered in Thai by an MI-trained interventionist. The details of the intervention have been published elsewhere (Rongkavilit et al., 2013). Session 1 focused on eliciting the participant's view of the behavior, exploring barriers as well as sociocultural factors affecting risks and building motivation to initiate the change plan. Session 2 followed a similar format with a focus on the second targeted behaviors. Sessions 3 and 4 were to formalize the personalized behavior change plan, reinforce commitment to change, and identify strategies to maintain healthy behaviors and to prevent relapse. All MI strategies to enhance motivation were used throughout all sessions (Miller & Rollnick, 2013). The interventionist's fidelity to MI was systematically evaluated and maintained to ensure adherence to the protocol. In brief, all sessions were taped. One-third of the tapes were randomly selected weekly to evaluate the interventionist's adherence to MI using the Motivational Interviewing Treatment Integrity (MITI) coding system version 3.0 (Moyers,

Martin, Manuel, Miller, & Ernst, 2007). The interventionist met weekly with the Thai supervisor to review MITI feedback and discuss case issues, with guidance from the U.S. team, in order to enhance the interventionist's MI skills (Koken et al., 2012; Rongkavilit et al., 2013).

Control Group—The control group received 4 individualized sessions of general health education unrelated to HIV risk behaviors. Session 1 focused on healthy diet, Session 2 on exercise, and Session 3 on smoking and healthy sleep habits. Session 4 was an overall review of the participant's knowledge learned during the prior sessions. The contents of the sessions were adapted from the health education materials published by the Thai Ministry of Public Health. All sessions were delivered didactically by a research assistant who read the contents of the health education manual to the participant. The research assistant received no MI training and was instructed to avoid discussing HIV-related topics, including sexual behavior, HIV disclosure, alcohol/substance use, and medication adherence with the participant.

Measures

The following measures were assessed at baseline, 1 month follow-up, and 6 months follow-up in both study groups. The original English-version measures were translated to Thai by the first author, back-translated to English by an independent translator, and assessed for accuracy to the original intent. Data collections for all measures, except sexual behaviors and alcohol/drug use, were conducted through a computer-assisted self interview in a private room. All data collection and assessments were conducted in Thai and took 1–1.5 hours to complete.

Demographics—These included age, gender, sexual orientation, marital status, education, occupation, employment status, income, and the route of HIV acquisition. These data were collected at the baseline visit only.

Sexual behaviors—Detailed sexual behaviors in the past 30 days were assessed using the Timeline Follow-Back interview procedure which has been conducted successfully with HIV+ Thai youth (Rongkavilit et al., 2007; Sobell & Sobell, 1992). The interview was conducted by a research nurse and a calendar was used to assist participants in recalling detailed sexual activities on a day-by-day basis over the past 30 days. The data collected for each sex act included the type of the sex act, directionality (insertive or receptive), condom use, the gender and the HIV status of the partner, and HIV disclosure to the partner.

Alcohol/drug use—Alcohol and illicit drug use in the past 30 days was assessed using the Timeline Follow-Back interview procedure described above. The data collected included whether the participant used alcohol and/or drugs on each day, the type of alcohol/drugs used, and whether the participant used alcohol and/or drugs on the same day that he had sex.

Antiretroviral adherence—Participants completed an Adherence Interview measure, which contains a visual analog scale from 0 to 100 (Walsh, Mandalia, & Gazzard, 2002). Participants rated the percentage of antiretroviral medications being taken, the percentage of

the time when every dose for the day was taken, and the percentage of the medications being taken according to the directions in the past 30 days. The three responses were averaged for a global adherence score.

Mental health—Participants completed the 12-item Thai General Health Questionnaire, which was developed from the full 60-item version, covering depression, anxiety, social impairment, and somatic complaints (Nilchaikovit, Sukying, & Silpakit, 1996). All items were rated on a 4-point Likert scale, ranging from 1 (not at all) to 4 (much more than usual). The scores were averaged and a mean score > 2 was considered clinically significant. Cronbach's α was 0.85 in the present study.

HIV stigma—Participants completed the 12-item HIV Stigma Scale, which was developed from Berger's 40-item HIV Stigma Scale (Berger, Ferrans, & Lashley, 2001). The 12-item version was highly correlated with the full 40-item version in our previous study in HIV+ Thai youth (r = 0.85) (Rongkavilit et al., 2010). The measure contains four stigma subscales, with three items per each subscale, representing personalized stigma, disclosure concerns, negative self-image, and public attitude stigma. Cronbach's α was 0.80 in the present study.

HIV information—The participant's HIV knowledge was assessed using the 18-item HIV Knowledge Questionnaire (Carey & Schroder, 2002). The items were rated as true, false, and don't know. The measure has good psychometric properties in young adults. Cronbach's α was 0.60 in the present study.

Motivational readiness—Intentions or readiness to change behaviors were assessed with the Readiness Ruler (Stott, Rollnick, Rees, & Pill, 1995) The measure contains 4 items, each corresponding to each of the following risk behaviors: condom use, HIV disclosure to partners, avoidance of alcohol/substance use, and taking antiretroviral medications as prescribed. Participants scored their readiness on a 10-point Likert Scale, ranging from 1 (not ready to change) to 10 (already changing). The measure was correlated with actual condom use, alcohol/drug use, and medication adherence among HIV+ youth in the U.S. (Macdonell, Naar-King, Murphy, Parsons, & Harper, 2010; Naar-King et al., 2006a, 2006b). Cronbach's α was 0.44 in the present study.

Self-efficacy—Self-efficacy is an individual's belief that he can successfully perform a desired behavior and is often considered as a proxy measure of behavioral skills. The Self-Efficacy for Health Promotion and Risk Reduction questionnaire contains 6 items on confidence in using a condom, 3 items on confidence in HIV disclosure to partners, 3 items on confidence in avoiding sex with multiple partners, 6 items on confidence in avoiding alcohol/drug use, and 3 items on confidence in taking antiretroviral medications (Naar-King et al., 2006a). Items were rated on a 5-point Likert scale ranging from 1 (very sure I cannot) to 5 (very sure I can). Cronbach's α was 0.89 in the present study. HIV information, motivational readiness, and self-efficacy measures correspond to the three constructs of the Information-Motivation-Behavioral Skills (IMB) model for behavior change (Fisher & Fisher, 1992).

Blood samples for plasma HIV viral loads were obtained at baseline, 1 month follow-up, and 6 months follow-up in both study groups and were analyzed by COBAS AmpliPrep/ Amplicor HIV-1 Monitor Test, version 1.5 (Roche Molecular Systems, Branchburg, NJ), with the lower limit of detection at 50 copies/ml.

Statistical Analysis

First, baseline differences between the intervention group and the control group were examined using a chi-square test or a *t*-test. Second, differences in sexual behaviors, alcohol and drug use, antiretroviral adherence, mental health, HIV stigma, HIV information, motivational readiness, self-efficacy, and log-transformed plasma HIV viral loads between the two groups at baseline, 1 month and 6 months follow-ups were assessed using bivariate statistics. An HIV sexual risk scoring system was empirically created based on eight sexual behavior characteristics: sexual intercourse, condom use, number of partners, HIV status of partners, anal sex, receptive anal sex, receptive vaginal sex, and alcohol use with sex (Appendix) (Rongkavilit et al., 2013). A score (ranging from 1 to 13) was calculated for each participant at each study visit based on the individual's sexual activities in the previous 30 days. The purpose of the scoring system was to provide a broad view of the quantifiable magnitude of an individual's sexual risk. A *t*-test was used to examine the differences in HIV sexual risk scores between the two groups at each study visit. Finally, the effect of the intervention on HIV sexual risk was assessed using ANOVA with a repeated-measures factor (Group) and a between-subjects factor (Time). The intervention effect on having HIV-negative or unknown partners was examined using generalized estimating equation (GEE) analysis, adjusting for the correlation among the repeated measures. All analyses were performed using the SAS 9.3 software (SAS Institute, Cary, NC).

RESULTS

Participant Characteristics

There were 37 HIV+ MSM in each study group. No significant differences in baseline characteristics and risk behaviors were noted between the two groups (Tables 1 and 2). Thirty-five (95%) participants in the intervention group vs. 31 (84%) in the control group attended at least 3 sessions. Loss to follow-up before completing the 6 months follow-up was 8% in the intervention group and 30% in the control group ($p = .04$). Although not statistically significant, participants in the control group who were lost to follow-up were more likely to have unprotected anal sex, to have multiple sex partners, and to report more days of drinking alcohol at baseline than those who remained in the study (57% vs. 21%, $p = .07$; 27% vs. 12%, $p = .18$; and 1.6 ± 2.0 days vs. 0.8 ± 1.4 days, $p = .08$, respectively).

Outcomes

The proportion of HIV+ MSM who reported having sex in the past 30 days, all of which were anal sex, was significantly lower in the intervention group than in the control group at 6 months follow-up (38% vs. 65%, $p = .04$) (Fig. 1). The proportions of participants having unprotected anal sex, defined as no condom use with at least one anal sex act in the past 30 days, were low and were not significantly different between the two groups throughout the study (Table 2). The proportion of participants who had sex with either HIV-uninfected or

unknown partners at 6 months follow-up was lower in the intervention group as compared to the control group (26% vs. 62%, $p < .01$) (Fig. 2). GEE model for having HIV-uninfected or unknown partners indicated that the proportions of participants having HIV-uninfected or unknown partners decreased over time ($z = -2.33$, $p = .02$) (Table 3). There was a significant interaction between Group and Time, $z = 2.11$, $p = .03$, indicating that the proportions of participants having HIV-uninfected or unknown partners were similar for the two groups at baseline and 1 month follow-up, but it was significantly lower for the intervention group than the control group at 6 months follow-up.

The mean HIV sexual risk score, although not reaching statistical significance, was lower in the intervention group than in the control group at 6 months follow-up (3.6 vs. 5.5, $p = .06$) (Table 2). Two-way ANOVA with repeated measures yielded a marginal effect of the Group X Time interaction, $F(2, 116) = 2.57$, $p = .08$, indicating that the two study groups were equivalent at baseline and 1 month follow-up. Contrasts showed that the intervention resulted in a marginal difference in HIV sexual risk scores at 6 months follow-up, $F(1, 58) = 3.12$, $p = .08$, with the score in the intervention group being lower (Table 4).

The prevalence of seroadaptation practice among the study participants was low and was not statistically different between the study groups. At baseline, two participants in the control group reported seropositioning (i.e., unprotected anal sex with HIV+ partners and receptive unprotected anal sex with HIV-negative or unknown partners) and one participant in each study group reported pure serosorting (i.e., unprotected anal sex with HIV+ partners). At 1 month follow-up, one participant in the intervention group reported condom serosorting (i.e., unprotected anal sex with HIV+ partners and condom use with HIV-negative or unknown partners). At 6 months follow-up, one participant in the intervention group reported seropositioning. Oral sex serosorting (i.e., unprotected anal sex with HIV+ partners and oral sex with HIV-negative or unknown partners) and condom seropositioning (i.e., unprotected anal sex with HIV+ partners, condom use in insertive positions with HIV-negative or unknown partners) were not reported by any participant at any study visit. It should be noted that seroadaptation practice was discussed in the MI sessions on a case-by-case basis when the topic was relevant to the participant.

Alcohol use in the past 30 days at baseline was reported in 38% in the intervention group and 46% in the control group (Table 2). There were no significant differences in the proportions of participants who used alcohol, the proportions of participants who used alcohol while engaging in sex, and the numbers of drinks between the two groups at all study visits. The prevalence of illicit drug use was very low in both groups throughout the study (Table 2). The reported antiretroviral adherence rates were high and were not statistically different between the two groups at any visit. In addition, the plasma HIV viral loads were low in correspondence to the high reported adherence rates (Table 2). It should be noted that only 23% of HIV+ MSM were on antiretroviral therapy in the study (Table 1).

In regard to the constructs within the IMB model, motivation readiness to improve alcohol use was higher in the intervention group than in the control group at 1 month follow-up (9.1 vs. 7.5, $p = .01$) (Table 2). No significant differences in HIV knowledge scores, sexual risk-

related motivational readiness, adherence-related motivational readiness, and self-efficacy scores were observed between the two study groups.

Two mediators related to the IMB model including mental health and stigma, were assessed in the study (Naar-King et al., 2008). We observed no significant differences in general mental health scores and HIV stigma scores between the two groups at any visit (Table 2). The calculated effect sizes of the intervention on the general mental health scores were 0.2 at 1 month follow-up and 0.1 at 6 months follow-up. The effect sizes of the intervention on the HIV stigma scores were 0 at 1 month follow-up and 0.1 at 6 months follow-up. It should be noted that, by within-group analyses, mental health scores in Intervention group improved from baseline to 1 month (1.9 vs. 1.7, $p = .03$) and from baseline to 6 months (1.9 vs. 1.7, $p < .01$); no changes were observed in Control group.

DISCUSSION

We observed a reduction in anal sex and in having sex with HIV-uninfected or unknown partners among HIV+ young Thai MSM at 6 months after receiving Healthy Choice intervention as compared to those in the control condition. Anal sex and having sex with seronegative or serostatus-unknown partners are considered high-risk practices for HIV transmission, especially when sex acts are unprotected (Baggaley, White, & Boily, 2010); reductions in anal sex or having sex with partners at risk for HIV acquisition noted in the study hold epidemiologic importance as this could lessen the number of new HIV infections among young MSM. The present findings were different from our prior report of the pilot study in which heterosexual males and females were included in the analysis (Rongkavilit et al., 2013). There were no significant differences in having sex or in having sex with HIV-uninfected or unknown partners between the two study groups in that report. This could be due to the possibility that the heterosexual participants in general did not practice anal sex or engage in having sex with serodiscordant or serostatus-unknown partners.

In the current report, it is unclear why the difference between the two study groups was evidenced at the 6 months follow-up but not at the 1 month follow-up. The frequent sessions and detailed behavior assessments between baseline and the 1 month follow-up in the control group may have resulted in a subject reactivity effect to reduce risky sexual behaviors, which could have obscured the differences between the intervention group and the control group (Clifford & Davis, 2012). As there were no more visits or contacts with the research team between the 1 month and 6 months follow-ups, we postulate that the reactivity effect in the control group diminished and the behaviors gravitated back to baseline whereas the intervention group continued to demonstrate the intervention effect in reducing sexual risks through 6 months follow-up.

Our results were comparable to the 4-session U.S. Healthy Choices which demonstrated progressive reductions in risky sex up to 15 months post-intervention in HIV+ U.S. youth (Chen et al., 2011). Our results were also similar to the 8-session, MI-based study which showed a reduction in unprotected sex up to 8 months among HIV+ U.S. MSM (Mausbach et al., 2007). Adding booster MI sessions to the 4-session Healthy Choices may further enhance its long-term effect and should be considered in future research.

Seroadaptation has been proposed as a way to reduce HIV transmission risk among MSM; however, its effectiveness remains debatable (Cassels, Menza, Goodreau, & Golden, 2009; Philip, Yu, Donnell, Vittinghoff, & Buchbinder, 2010). Seroadaptation practices in our study population were uncommon. This is in contrast to the reports from Western countries where seroadaptive behaviors are widely adopted and practiced among HIV+ MSM (McFarland et al., 2011; Parsons et al., 2005). Our findings, however, were in agreement with an online-survey study among HIV+ MSM in seven Asian countries, including Thailand (Wei, Guadamuz, Lim, & Koe, 2012). The study revealed a high prevalence of serodiscordant partnership (69%) and a low rate (59–64%) of protected anal sex with serodiscordant partners, suggesting that serosorting, a form of seroadaptive behaviors, may be less common among HIV+ Asian MSM. For seroadaptive behaviors to be prevalent in a community, there must be frequent and accessible HIV testing, widespread knowledge of HIV transmission risk, and an existing culture of serostatus disclosure (Philip et al., 2010). Such factors are uncommon in the setting of MSM in Thailand. The presence of HIV stigma observed in our study could also contribute to a lack of voluntary HIV testing, serostatus disclosure, and a healthy discussion about HIV transmission risk among partners. The limited empowerment and the lack of safer sex skills in young MSM may further hamper their ability to negotiate and plan safe sex as well as seroadaptation effectively with their partners. Therefore, combining MI-based Healthy Choices with cognitive behavioral skills building should be considered for HIV+ young MSM in resource-limited settings in future studies. In addition, the integration of seroadaptation practices, of which the effectiveness remains uncertain, in risk-reduction interventions should be further explored in HIV+ young MSM in these settings.

The positive effect of MI on mental health, although small, among HIV+ young Thai MSM receiving Healthy Choices intervention is clinically important. Current literature indicates that mental health, particularly depression, is associated with several aspects of HIV care in HIV+ MSM populations, including risky sexual behaviors (Blashill, O'Cleirigh, Mayer, Goshe, & Safren, 2012; Chin-Hong et al., 2005; Parsons, Halkitis, Wolitski, & Gomez, 2003), alcohol/substance use (Semple, Strathdee, Zians, & Patterson, 2010), antiretroviral non-adherence (Du Bois & McKirnan, 2012), impulsivity (Semple, Zians, Grant, & Patterson, 2006), functional impairment (O'Cleirigh, Skeer, Mayer, & Safren, 2009), HIV stigma (Dowshen, Binns, & Garofalo, 2009), and non-retention in care (Traeger, O'Cleirigh, Skeer, Mayer, & Safren, 2012; Wohl et al., 2011). The positive impact of MI on mental health was consistent with the findings in the U.S. Healthy Choices study (Naar-King et al., 2010), and it could be directly related to the client-centered styles of MI, including being collaborative and nonjudgmental and expressing empathy and positive regard, which are thought to facilitate client-interventionist alliance and rapport (Lovejoy, 2012). If MI potentially benefits mental health, it could lead to healthier behaviors and a better quality of life among HIV+ young Thai MSM overall. Future studies need to directly examine the effect of MI on mental health in this population.

Several limitations existed in the study. The sample size was small, resulting in an insufficient power of the study to detect the intervention effects on other key risk behaviors. The study was conducted at the Thai Red Cross AIDS Research Center where access to HIV counseling, testing, and care is available; such a setting is different from other parts of

Thailand or Southeast Asia where access is likely more limited. Therefore, the results may not be generalized to HIV+ young MSM in other settings. The study relied on a self-report and recall which could lead to reporting bias as well as the tendency to give socially desirable answers, particularly for a highly stigmatized condition such as HIV infection and homosexuality. The repeated assessments and interviews over time may have prompted participants in the control group to improve their risk behaviors. It should also be noted that two risk behaviors were targeted in MI sessions even when all three risk behaviors were present in a participant.

Only one-fourth of participants were on antiretroviral therapy in the study. As access to antiretroviral drugs increases worldwide and the newer treatment guidelines broaden the recommendations for antiretroviral therapy (World Health Organization, 2013), it is imperative to evaluate the effect of Healthy Choices on medication adherence among HIV+ young MSM in the setting of widespread use of antiretroviral treatment. The HIV sexual risk scoring system empirically created in the study requires a further evaluation for its validity and correlations with the transmission risks. The high attrition rate noted in the control group could be because of the lack of interactions and rapport building between the research staff and the participant due to the didactic nature of health education sessions. Attention should be given in future studies to maintain the retention of this group perhaps by designing the sessions to be more interactive and by asking for other means to contact the participants, such as social network accounts, while protecting participant privacy. It should be noted that the participants in the control group who were lost to follow-up reported more risk-taking behaviors at their baseline visit than those who remained in the study. As a result, the effect of Healthy Choices intervention may perhaps be even greater had those participants remained in the study.

The strength of the study included the presence of a time-matched control group who received a similar number of sessions and assessments. The high retention rate, with 95% of the participants attending at least three of four Healthy Choices sessions, was encouraging and suggests that the MI-based Healthy Choices, which emphasizes non-possessive and nonjudgmental client-interventionist relationships, was well received by HIV+ young Thai MSM and it should be incorporated as part of a multilevel intervention strategy to maintain these individuals along the HIV care continuum.

In conclusion, a reduction in certain risky sex was observed among HIV+ young Thai MSM receiving the MI-based Healthy Choices intervention. Improvements in mental health and HIV-related negative self-image stigma were also noted. Since behavioral intervention strategies to synergistically complement biomedical interventions for HIV+ young MSM in less-developed countries are currently lacking, Healthy Choices should be critically considered for further development to serve this rapidly growing population globally.

ACKNOWLEDGMENTS

The authors thank Supalak Klungkang, R.N., Theshinee Chuenyam, R.N., Supaporn Pengsuma, R.N., Pairat Seekam, R.N., Wanida Thainsanguankul, R.N., the staff at HIV-NAT and CHEST, and all study participants. The study was funded by the U.S. National Institute of Mental Health (R34MH077523).

APPENDIX

HIV sexual risk scoring

Behaviors in the past 30 days	Score
Abstinence	1
100% condom use with one partner who is HIV-positive	2
100% condom use with multiple partners, all of whom are HIV-positive	3
100% condom use with one partner who is either HIV-negative or unknown	4
100% condom use with multiple partners, at least one of whom is either HIV-negative or unknown	5
Less than 100% condom use with one partner who is HIV-positive	6
Less than 100% condom use with multiple partners, all of whom are HIV-positive	7
Less than 100% condom use with one partner who is either HIV-negative or unknown	8
Less than 100% condom use with multiple partners, at least one of whom is either HIV-negative or unknown	9
Add 1 point for having anal sex	
Add 1 point for being a receiver in anal sex	
Add 1 point for being a receiver in vaginal sex	
Add 1 point for using alcohol with sex	

REFERENCES

Baggaley RF, White RG, Boily MC. HIV transmission risk through anal intercourse: Systematic review, meta-analysis and implications for HIV prevention. International Journal of Epidemiology. 2010; 39:1048–1063. [PubMed: 20406794]

Balaji AB, Bowles KE, Le BC, Paz-Bailey G, Oster AM. High HIV incidence and prevalence and associated factors among young MSM, 2008. AIDS. 2013; 27:269–278. [PubMed: 23079807]

Baral S, Burrell E, Scheibe A, Brown B, Beyrer C, Bekker LG. HIV risk and associations of HIV infection among men who have sex with men in peri-urban Cape Town, South Africa. BMC Public Health. 2011; 11:766. [PubMed: 21975248]

Barnes W, D'Angelo L, Yamazaki M, Belzer M, Schroeder S, Palmer-Castor J, Ellen JM. Identification of HIV-infected 12- to 24-year-old men and women in 15 US cities through venue-based testing. Archives of Pediatrics & Adolescent Medicine. 2010; 164:273–276. [PubMed: 20194262]

Berger BE, Ferrans CE, Lashley FR. Measuring stigma in people with HIV: psychometric assessment of the HIV stigma scale. Research in Nursing & Health. 2001; 24:518–529. [PubMed: 11746080]

Blashill AJ, O'Cleirigh C, Mayer KH, Goshe BM, Safren SA. Body mass index, depression and sexual transmission risk behaviors among HIV-positive MSM. AIDS and Behavior. 2012; 16:2251–2256. [PubMed: 21983696]

Carey MP, Schroder KE. Development and psychometric evaluation of the brief HIV Knowledge Questionnaire. AIDS Education and Prevention. 2002; 14:172–182. [PubMed: 12000234]

Cassels S, Menza TW, Goodreau SM, Golden MR. HIV serosorting as a harm reduction strategy: Evidence from Seattle, Washington. AIDS. 2009; 23:2497–2506. [PubMed: 19834319]

Centers for Disease Control and Prevention. 1993 revised classification system for HIV infection and expanded surveillance case definition for AIDS among adolescents and adults. MMWR Recommendations and Reports. 1992; 41(RR-17):1–19.

Chen X, Murphy DA, Naar-King S, Parsons JT. A clinic-based motivational intervention improves condom use among subgroups of youth living with HIV. Journal of Adolescent Health. 2011; 49:193–198. [PubMed: 21783053]

Chin-Hong PV, Deeks SG, Liegler T, Hagos E, Krone MR, Grant RM, Martin JN. High-risk sexual behavior in adults with genotypically proven antiretroviral-resistant HIV infection. Journal of Acquired Immune Deficiency Syndromes. 2005; 40:463–471. [PubMed: 16280703]

Clifford PR, Davis CM. Alcohol treatment research assessment exposure: a critical review of the literature. Psychology of Addictive Behaviors. 2012; 26:773–781. [PubMed: 22905899]

Cosio D, Heckman TG, Anderson T, Heckman BD, Garske J, McCarthy J. Telephone-administered motivational interviewing to reduce risky sexual behavior in HIV-infected rural persons: A pilot randomized clinical trial. Sexually Transmitted Diseases. 2010; 37:140–146. [PubMed: 20118830]

Crepaz N, Marks G, Liau A, Mullins MM, Aupont LW, Marshall KJ, Wolitski RJ. Prevalence of unprotected anal intercourse among HIV-diagnosed MSM in the United States: A meta-analysis. AIDS. 2009; 23:1617–1629. [PubMed: 19584704]

Dowshen N, Binns HJ, Garofalo R. Experiences of HIV-related stigma among young men who have sex with men. AIDS Patient Care & STDs. 2009; 23:371–376. [PubMed: 19320600]

Du Bois SN, McKirnan DJ. A longitudinal analysis of HIV treatment adherence among men who have sex with men: A cognitive escape perspective. AIDS Care. 2012; 24:1425–1431. [PubMed: 22292512]

Fisher JD, Fisher WA. Changing AIDS-risk behavior. Psychological Bulletin. 1992; 111:455–474. [PubMed: 1594721]

Gorbach PM, Weiss RE, Jeffries R, Javanbakht M, Drumright LN, Daar ES, Little SJ. Behaviors of recently HIV-infected men who have sex with men in the year postdiagnosis: Effects of drug use and partner types. Journal of Acquired Immune Deficiency Syndromes. 2011; 56:176–182. [PubMed: 21119524]

Hatzenbuehler ML, O'Cleirigh C, Mayer KH, Mimiaga MJ, Safren SA. Prospective associations between HIV-related stigma, transmission risk behaviors, and adverse mental health outcomes in men who have sex with men. Annals of Behavioral Medicine. 2011; 42:227–234. [PubMed: 21533623]

Johnson WD, Diaz RM, Flanders WD, Goodman M, Hill AN, Holtgrave D, McClellan WM. Behavioral interventions to reduce risk for sexual transmission of HIV among men who have sex with men. Cochrane Database of Systematic Reviews. 2008 CD001230.

Kelly JA, Murphy DA, Bahr GR, Kalichman SC, Morgan MG, Stevenson LY, Bernstein BM. Outcome of cognitive-behavioral and support group brief therapies for depressed, HIV-infected persons. American Journal of Psychiatry. 1993; 150:1679–1686. [PubMed: 8214177]

Koken JA, Naar-King S, Umasa S, Parsons JT, Saengcharnchai P, Phanuphak P, Rongkavilit C. A cross-cultural three-step process model for assessing motivational interviewing treatment fidelity in Thailand. Health Education & Behavior. 2012; 39:574–582. [PubMed: 22228776]

Lovejoy TI. Telephone-delivered motivational interviewing targeting sexual risk behavior reduces depression, anxiety, and stress in HIV-positive older adults. Annals of Behavioral Medicine. 2012; 44:416–421. [PubMed: 22956397]

Macdonell KE, Naar-King S, Murphy DA, Parsons JT, Harper GW. Predictors of medication adherence in high risk youth of color living with HIV. Journal of Pediatric Psychology. 2010; 35:593–601. [PubMed: 19755495]

Mausbach BT, Semple SJ, Strathdee SA, Zians J, Patterson TL. Efficacy of a behavioral intervention for increasing safer sex behaviors in HIV-positive MSM methamphetamine users: Results from the EDGE study. Drug and Alcohol Dependence. 2007; 87:249–257. [PubMed: 17182196]

McFarland W, Chen YH, Raymond HF, Nguyen B, Colfax G, Mehrtens J, Truong HM. HIV seroadaptation among individuals, within sexual dyads, and by sexual episodes, men who have sex with men, San Francisco, 2008. AIDS Care. 2011; 23:261–268. [PubMed: 21347888]

Miller, WR.; Rollnick, S. Motivational interviewing: Helping people change. 3rd ed.. New York: Guilford Press; 2013.

Morin SF, Shade SB, Steward WT, Carrico AW, Remien RH, Rotheram-Borus MJ, Chesney MA. A behavioral intervention reduces HIV transmission risk by promoting sustained serosorting practices among HIV-infected men who have sex with men. Journal of Acquired Immune Deficiency Syndromes. 2008; 49:544–551. [PubMed: 18989221]

Moyers TB, Martin T, Manuel JK, Miller WR, Ernst D. Revised Global Scales: Motivational Interviewing Treatment Integrity 3.0 (MITI 3.0). 2007 Retrieved from http://casaa.unm.edu/codinginst.html.

Murphy DA, Chen X, Naar-King S, Parsons JT. Alcohol and marijuana use outcomes in the Healthy Choices motivational interviewing intervention for HIV-positive youth. AIDS Patient Care & STDs. 2012; 26:95–100. [PubMed: 22191456]

Naar-King S, Parsons JT, Murphy D, Kolmodin K, Harris DR. A multisite randomized trial of a motivational intervention targeting multiple risks in youth living with HIV: Initial effects on motivation, self-efficacy, and depression. Journal of Adolescent Health. 2010; 46:422–428. [PubMed: 20413077]

Naar-King S, Parsons JT, Murphy DA, Chen X, Harris DR, Belzer ME. Improving health outcomes for youth living with the human immunodeficiency virus: A multisite randomized trial of a motivational intervention targeting multiple risk behaviors. Archives of Pediatrics & Adolescent Medicine. 2009; 163:1092–1098. [PubMed: 19996045]

Naar-King S, Rongkavilit C, Wang B, Wright K, Chuenyam T, Lam P, Phanuphak P. Transtheoretical model and risky sexual behaviour in HIV+ youth in Thailand. AIDS Care. 2008; 20:198–204. [PubMed: 18293130]

Naar-King, S.; Suarez, M. Motivational interviewing with adolescents and young adults. New York: Guilford Press; 2011.

Naar-King S, Wright K, Parsons JT, Frey M, Templin T, Ondersma S. Transtheoretical model and condom use in HIV-positive youths. Health Psychology. 2006a; 25:648–652. [PubMed: 17014283]

Naar-King S, Wright K, Parsons JT, Frey M, Templin T, Ondersma S. Transtheoretical model and substance use in HIV-positive youth. AIDS Care. 2006b; 18:839–845. [PubMed: 16971296]

Nilchaikovit T, Sukying C, Silpakit C. Reliability and validity of the Thai version of the General Health Questionnaire. Journal of the Psychiatric Association of Thailand. 1996; 41:1–17.

O'Cleirigh C, Skeer M, Mayer KH, Safren SA. Functional impairment and health care utilization among HIV-infected men who have sex with men: The relationship with depression and post-traumatic stress. Journal of Behavioral Medicine. 2009; 32:466–477. [PubMed: 19526337]

Parsons JT, Halkitis PN, Wolitski RJ, Gomez CA. Correlates of sexual risk behaviors among HIV-positive men who have sex with men. AIDS Education and Prevention. 2003; 15:383–400. [PubMed: 14626462]

Parsons JT, Schrimshaw EW, Wolitski RJ, Halkitis PN, Purcell DW, Hoff CC, Gomez CA. Sexual harm reduction practices of HIV-seropositive gay and bisexual men: Serosorting, strategic positioning, and withdrawal before ejaculation. AIDS. 2005; 19(Suppl. 1):S13–S25. [PubMed: 15838191]

Patel P, Bush T, Mayer K, Milam J, Richardson J, Hammer J, Brooks JT. Routine brief risk-reduction counseling with biannual STD testing reduces STD incidence among HIV-infected men who have sex with men in care. Sexually Transmitted Diseases. 2012; 39:470–474. [PubMed: 22592834]

Philip SS, Yu X, Donnell D, Vittinghoff E, Buchbinder S. Serosorting is associated with a decreased risk of HIV seroconversion in the EXPLORE Study Cohort. PLoS One. 2010; 5(9):e12662. [PubMed: 20844744]

Rongkavilit C, Naar-King S, Chuenyam T, Wang B, Wright K, Phanuphak P. Health risk behaviors among HIV-infected youth in Bangkok, Thailand. Journal of Adolescent Health. 2007; 40:e351–e358.

Rongkavilit C, Naar-King S, Koken JA, Bunupuradah T, Chen X, Saengcharnchai P, Parsons JT. A feasibility study of motivational interviewing for health risk behaviors among Thai youth living with HIV. Journal of the Association of Nurses in AIDS Care. 2014; 25:92–97. [PubMed: 22683198]

Rongkavilit C, Naar-King S, Wang B, Panthong A, Bunupuradah T, Parsons JT, Phanuphak P. Motivational interviewing targeting risk behaviors for youth living with HIV in Thailand. AIDS and Behavior. 2013; 17:2063–2074. [PubMed: 23325376]

Rongkavilit C, Wright K, Chen X, Naar-King S, Chuenyam T, Phanuphak P. HIV stigma, disclosure and psychosocial distress among Thai youth living with HIV. International Journal of STD & AIDS. 2010; 21:126–132. [PubMed: 20089999]

Rosser BR, Hatfield LA, Miner MH, Ghiselli ME, Lee BR, Welles SL. Effects of a behavioral intervention to reduce serodiscordant unsafe sex among HIV positive men who have sex with men: The Positive Connections randomized controlled trial study. Journal of Behavioral Medicine. 2010; 33:147–158. [PubMed: 20101454]

Semple SJ, Strathdee SA, Zians J, Patterson TL. Factors associated with sex in the context of methamphetamine use in different sexual venues among HIV-positive men who have sex with men. BMC Public Health. 2010; 10:178. [PubMed: 20359362]

Semple SJ, Zians J, Grant I, Patterson TL. Methamphetamine use, impulsivity, and sexual risk behavior among HIV-positive men who have sex with men. Journal of Addictive Diseases. 2006; 25:105–114. [PubMed: 17088230]

Sikkema KJ, Hansen NB, Kochman A, Santos J, Watt MH, Wilson PA, Mayer G. The development and feasibility of a brief risk reduction intervention for newly HIV-diagnosed men who have sex with men. Journal of Community Psychology. 2011; 39(6):717–732. [PubMed: 22228917]

Sirivongrangson P, Lolekha R, Charoenwatanachokchai A, Siangphoe U, Fox KK, Jirarojwattana N, McConnell M. HIV risk behavior among HIV-infected men who have sex with men in Bangkok, Thailand. AIDS and Behavior. 2012; 16:618–625. [PubMed: 21274611]

Smith AD, Tapsoba P, Peshu N, Sanders EJ, Jaffe HW. Men who have sex with men and HIV/AIDS in sub-Saharan Africa. Lancet. 2009; 374:416–422. [PubMed: 19616840]

Sobell, LC.; Sobell, MB. Timeline follow-back: A technique for assessing self-reported alcohol consumption. In: Litten, RZ.; Allen, J., editors. Measuring alcohol consumption: Psychosocial and biological methods. Totowa, NJ: Humana Press; 1992. p. 41-72.

Stott NC, Rollnick S, Rees MR, Pill RM. Innovation in clinical method: diabetes care and negotiating skills. Family Practice. 1995; 12:413–418. [PubMed: 8826057]

Tanney MR, Naar-King S, MacDonnel K. Depression and stigma in high-risk youth living with HIV: A multi-site study. Journal of Pediatric Health Care. 2012; 26:300–305. [PubMed: 22726715]

Tieu HV, Xu G, Bonner S, Spikes P, Egan JE, Goodman K, Koblin BA. Sexual partner characteristics, serodiscordant/serostatus unknown unprotected anal intercourse and disclosure among human immunodeficiency virus-infected and uninfected black men who have sex with men in New York City. Sexually Transmitted Diseases. 2011; 38:548–554. [PubMed: 21217419]

Traeger L, O'Cleirigh C, Skeer MR, Mayer KH, Safren SA. Risk factors for missed HIV primary care visits among men who have sex with men. Journal of Behavioral Medicine. 2012; 35:548–556. [PubMed: 22068878]

United Nations Program on AIDS. UNAIDS World AIDS Day Report 2012. 2012 Retrieved from http://www.unaids.org/en/media/unaids/contentassets/documents/epidemiology/2012/gr2012/JC2434_WorldAIDSday_results_en.pdf.

van Griensven F, Thienkrua W, McNicholl J, Wimonsate W, Chaikummao S, Chonwattana W, Tappero JW. Evidence of an explosive epidemic of HIV infection in a cohort of men who have sex with men in Thailand. AIDS. 2013; 27:825–832. [PubMed: 23169330]

Velasquez MM, von Sternberg K, Johnson DH, Green C, Carbonari JP, Parsons JT. Reducing sexual risk behaviors and alcohol use among HIV-positive men who have sex with men: A randomized clinical trial. Journal of Consulting and Clinical Psychology. 2009; 77:657–667. [PubMed: 19634959]

Walsh JC, Mandalia S, Gazzard BG. Responses to a 1 month self-report on adherence to antiretroviral therapy are consistent with electronic data and virological treatment outcome. AIDS. 2002; 16:269–277. [PubMed: 11807312]

Wei C, Guadamuz TE, Lim SH, Koe S. Sexual transmission behaviors and serodiscordant partnerships among HIV-positive men who have sex with men in Asia. Sexually Transmitted Diseases. 2012; 39:312–315. [PubMed: 22421700]

Wohl AR, Galvan FH, Myers HF, Garland W, George S, Witt M, Lee ML. Do social support, stress, disclosure and stigma influence retention in HIV care for Latino and African American men who have sex with men and women? AIDS and Behavior. 2011; 15:1098–1110. [PubMed: 20963630]

Wolitski RJ, Gomez CA, Parsons JT. Effects of a peer-led behavioral intervention to reduce HIV transmission and promote serostatus disclosure among HIV-seropositive gay and bisexual men. AIDS. 2005; 19(Suppl. 1):S99–S109. [PubMed: 15838199]

World Health Organization. Consolidated guidelines on the use of antiretroviral drugs for treating and preventing HIV infection: Recommendations for a public health approach. Geneva: Author; 2013.

Zhang L, Chow EP, Wilson DP. Distributions and trends in sexual behaviors and HIV incidence among men who have sex with men in China. BMC Public Health. 2012; 12:546. [PubMed: 22828173]

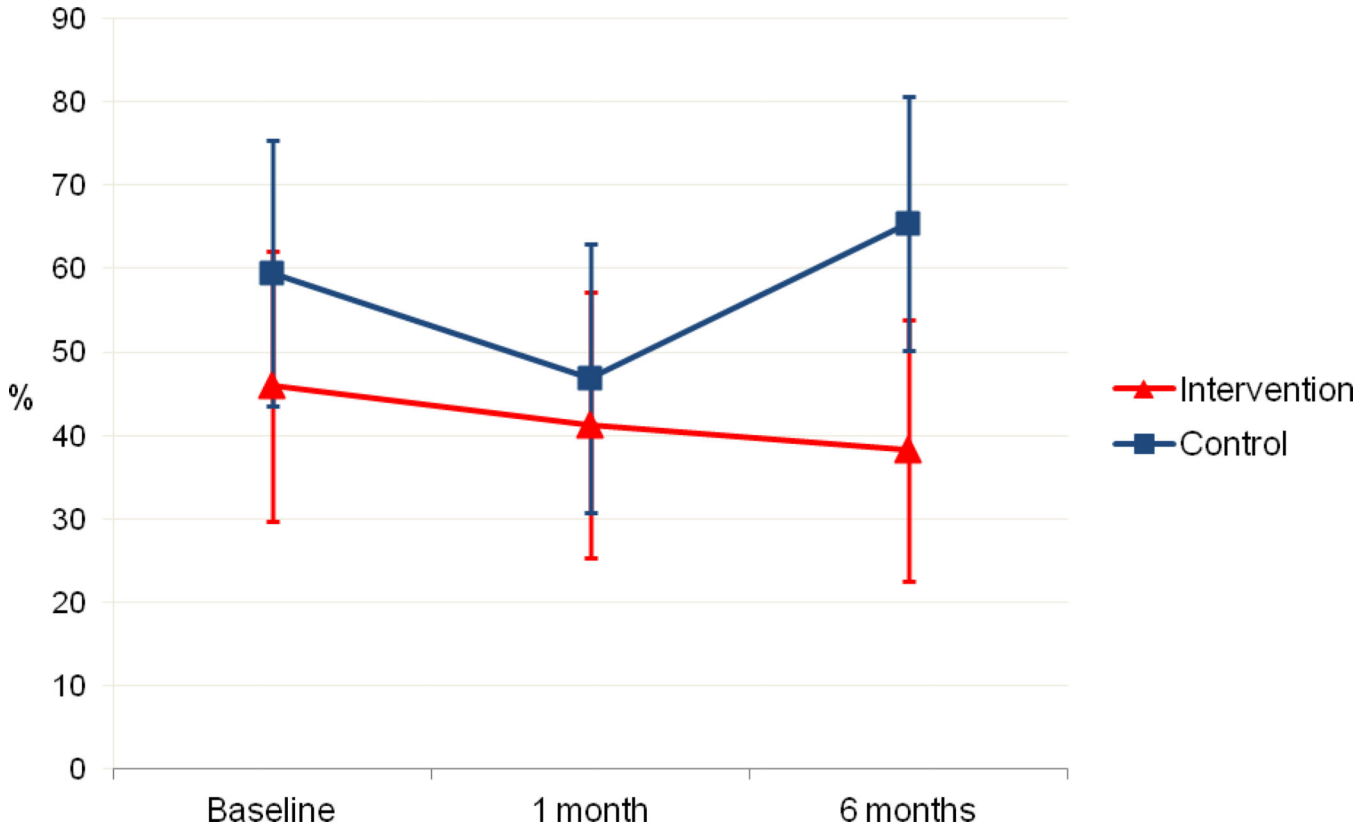

Figure 1.
Proportions of participants having anal sex in the past 30 days in the two study groups.

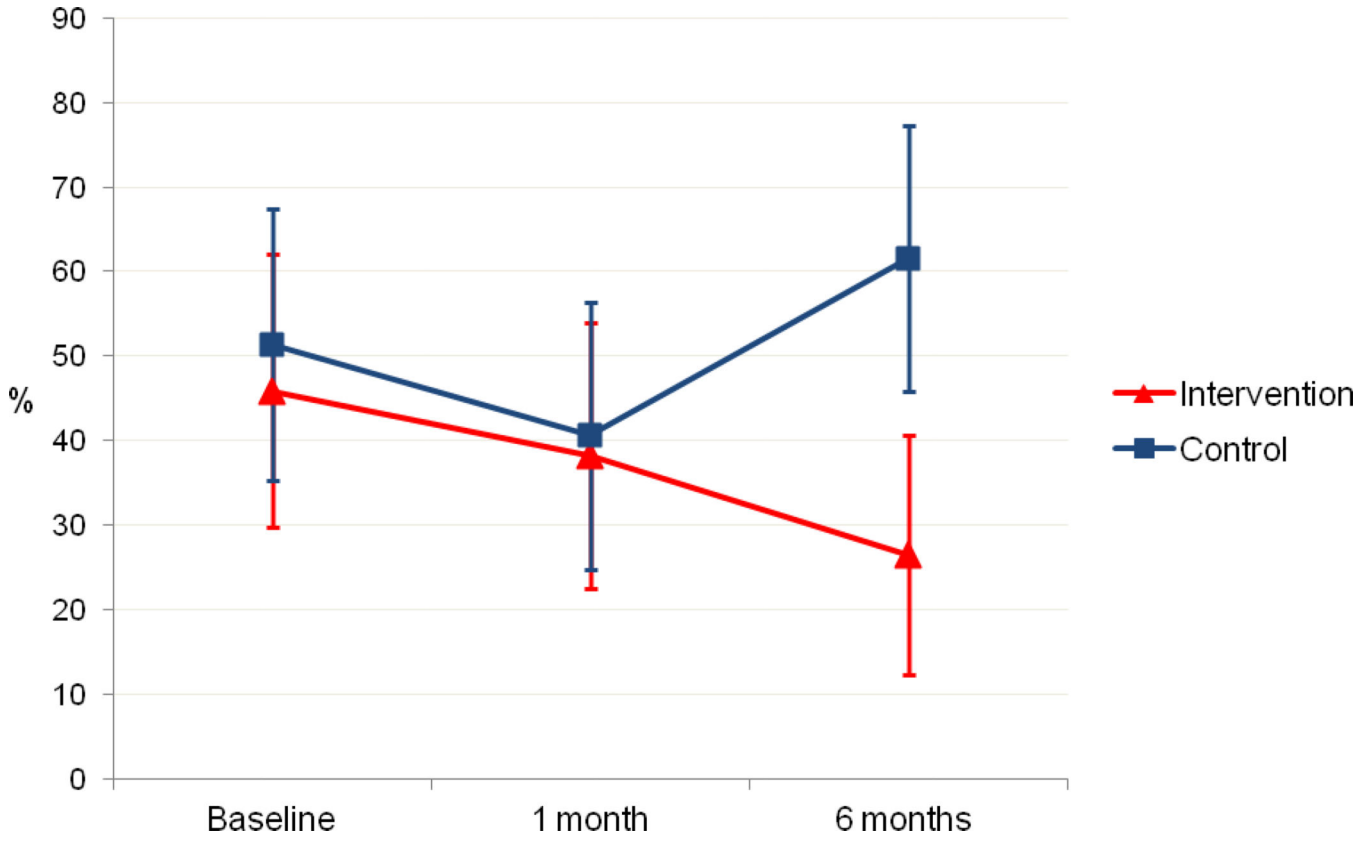

Figure 2.
Proportions of participants having sex with either HIV-negative or unknown partners in the past 30 days in the two study groups.

Table 1

Baseline characteristics of HIV-positive young Thai men who have sex with men

	Total (n = 74)	**Intervention (n = 37)**	**Control (n = 37)**	***t* or χ^2**	***p* value**
Age (in years) (M ± SD)	22.5 ± 2.1	22.2 ± 2.2	22.7 ± 2.0	<1	ns
Sexual orientation (n, %)					
Homosexual	58, 78.4	29, 78.4	29, 78.4	<1	ns
Bisexual	16, 21.6	8, 21.6	8, 21.6		
Living in Bangkok (n, %)	55, 74.3	30, 81.1	25, 67.6	1.77	ns
Highest level of education (n, %)					
Grade 1–6	1, 1.4	1, 2.7	0, 0	4.74	ns
Grade 7–9	3, 4.1	3, 8.1	0, 0		
Grade 7–12	35, 47.3	18, 48.6	17, 45.9		
Bachelor degree or higher	35, 47.3	15, 40.5	20, 54.1		
Time of HIV diagnosis (n, %)					
Within prior 6 months	35, 47.3	19, 51,4	16, 43.2	5.85	ns
7–11 months	11, 14.9	8, 21,6	3, 8.1		
1–2 years	19, 25.7	7, 18.9	12, 32.4		
More than 2 years	9, 12.2	3, 8.1	6, 16.2		
CDC HIV classification (n, %)					
N	4, 5.4	3, 8.1	1, 2.7	1.50	ns
A	47, 63.5	24, 64.9	23. 62.2		
B	13, 17.6	6, 16.2	7, 18.9		
C	10, 13.5	4, 10.8	6, 16.2		
Currently on HIV drugs (n, %)	17, 23.0	8, 21.6	9, 24.3	<1	ns
Know your HIV status (n, %)					
Parents	27, 37.5	15, 41.7	12, 33.3	<1	ns
Siblings	20, 27.8	10, 27.8	10, 27.8	<1	ns
Relatives	7, 9.7	3, 8.3	4, 11.1	<1	ns
Friends	40, 55.6	19, 52.8	21, 58.3	<1	ns
No one	12, 16.7	5, 13.9	7, 19.4	<1	ns

Table 2

Sexual behaviors, alcohol/drug use, medication adherence, and psychosocial measures among HIV-positive young Thai men who have sex with men in the Intervention group and the Control group

Variables	Baseline			1-month follow-up			6-months follow-up		
	Intervention n = 37	Control n = 37	t or χ^2	Intervention n = 34	Control n = 32	t or χ^2	Intervention n = 34	Control n = 26	t or χ^2
Sexual behaviors in past 30 days									
Having sex (n, %)	20, 54.1	23, 62.2	<1	16, 47.1	17, 53.1	<1	13, 38.2	17, 65.4	4.34[a]
Number of sex partners	0.8 ± 1.1	0.9 ± 0.9	<1	0.7 ± 1.0	0.8 ± 1.0	<1	0.5 ± 0.8	0.9 ± 0.9	1.62
Having >1 partner (%)	4, 10.8	7, 18.9	<1	2, 5.9	3, 9.4	<1	3, 8.8	4, 15.4	<1
Having HIV-negative or unknown partners (n, %)	17, 45.9	19, 51.4	<1	13, 38.2	13, 40.6	<1	9, 26.5	16, 61.5	7.45[b]
Proportion of partners being aware of subject's HIV status	35.0 ± 46.2	34.8 ± 43.8	<1	45.3 ± 50.2	44.1 ± 49.6	<1	50.0 ± 50.0	35.3 ± 49.3	<1
Having anal sex (n, %)	17, 45.9	22, 59.5	1.36	14, 41.2	15, 46.9	<1	13, 38.2	17, 65.4	4.34[a]
Having unprotected anal sex (n, %)	3, 8.1	4, 10.8	<1	1, 2.9	0, 0	-	2, 5.9	1, 3.8	<1
Having unprotected anal sex with HIV-negative or unknown partners (n, %)	2, 5.4	3, 8.1	<1	0, 0	0, 0	-	2, 5.9	1, 3.8	<1
HIV sexual risk score	4.4 ± 3.7	4.8 ± 3.6	0.51	3.9 ± 3.5	3.9 ± 3.3	0.03	3.6 ± 3.7	5.5 ± 3.9	1.96[a]
Alcohol and drug use in past 30 days									
Using alcohol (n, %)	14, 37.8	17, 45.9	<1	11, 32.4	17, 53.1	2.91	14, 41.2	12, 46.2	<1
Number of days drinking	0.8 ± 1.5	1.0 ± 1.6	<1	0.7 ± 1.4	1.9 ± 4.0	1.64	0.9 ± 1.3	1.1 ± 1.5	<1
Using alcohol while having sex (n, %)	2, 5.4	4, 10.8	<1	1, 2.9	1, 3.1	<1	2, 5.9	2, 7.7	<1
Using illicit drugs (n, %)	0, 0	2, 5.4	-	0, 0	1, 3.1	-	1, 2.9	0, 0	-
Antiretroviral adherence in past 30 days									
Global adherence rate	87.3 ± 16.5	95.1 ± 5.7	1.27	85.0 ± 24.9	79.1 ± 39.2	<1	88.2 ± 18.3	93.7 ± 13.3	<1
HIV RNA $\log_{10}$ copies/ml in all subjects (mean ± SD)	4.0 ± 1.2	3.7 ± 1.2	<1	3.7 ± 1.2	3.7 ± 1.3	<1	3.8 ± 1.3	3.2 ± 1.4	1.76
HIV RNA $\log_{10}$ copies/ml in those on treatment (mean ± SD)	2.2 ± 1.1	2.0 ± 1.0	<1	1.8 ± 0.3	1.9 ± 0.4	<1	2.2 ± 0.9	1.9 ± 0.4	<1
General mental health score	1.9 ± 0.3	1.8 ± 0.5	1.07	1.7 ± 0.4	1.8 ± 0.4	<1	1.7 ± 0.3	1.7 ± 0.4	<1
HIV stigma									
Personalized stigma	7.3 ± 2.5	6.9 ± 2.2	<1	7.3 ± 2.2	6.4 ± 2.2	1.61	6.6 ± 2.9	7.0 ± 2.0	<1
Disclosure stigma	6.3 ± 1.3	6.6 ± 1.2	1.01	6.5 ± 1.3	6.5 ± 1.6	<1	6.4 ± 1.2	6.6 ± 1.1	<1
Negative self-image	7.0 ± 2.4	7.1 ± 2.0	<1	6.2 ± 1.8	7.1 ± 2.4	1.58	6.4 ± 2.3	7.4 ± 2.3	1.54
Public attitude stigma	5.2 ± 1.8	5.8 ± 1.6	1.53	5.1 ± 1.6	5.3 ± 1.9	<1	5.1 ± 2.1	5.6 ± 1.8	<1

Variables	Baseline			1-month follow-up			6-months follow-up		
	Intervention n = 37	Control n = 37	t or χ^2	Intervention n = 34	Control n = 32	t or χ^2	Intervention n = 34	Control n = 26	t or χ^2
Total stigma score	25.9 ± 6.2	26.5 ± 4.5	<1	25.1 ± 5.1	25.3 ± 6.6	<1	24.5 ± 6.9	26.5 ± 5.6	1.19
IMB Model constructs									
HIV knowledge score	83.1 ± 10.7	80.2 ± 15.7	<1	84.9 ± 10.8	84.5 ± 8.2	<1	84.7 ± 9.9	79.8 ± 16.3	1.33
Motivational readiness									
To use condoms all the time	9.1 ± 1.4	9.4 ± 0.9	1.06	9.3 ± 1.3	8.5 ± 2.3	1.69	9.4 ± 1.1	9.3 ± 1.2	<1
To disclose HIV status to partners	4.7 ± 2.7	4.6 ± 3.6	<1	5.4 ± 3.3	4.0 ± 3.1	1.74	5.5 ± 3.4	4.6 ± 3.2	<1
To improve alcohol use	8.5 ± 1.9	8.1 ± 2.6	<1	9.1 ± 1.6	7.5 ± 3.0	2.65[a]	8.3 ± 2.8	8.8 ± 1.9	<1
To adhere to antiretrovirals	8.5 ± 1.9	9.0 ± 1.3	1.17	8.8 ± 1.4	8.6 ± 2.2	<1	9.0 ± 1.6	9.3 ± 1.2	<1
Self-efficacy									
Condom use	4.4 ± 0.9	4.7 ± 0.5	1.65	4.5 ± 0.6	4.6 ± 0.6	<1	4.6 ± 0.5	4.7 ± 0.5	<1
HIV disclosure to partners	3.2 ± 1.2	3.0 ± 1.5	<1	3.3 ± 1.0	2.8 ± 1.4	1.73	3.3 ± 1.3	2.7 ± 1.4	1.72
Avoiding multiple partners	4.1 ± 1.0	4.2 ± 0.8	<1	4.4 ± 0.6	4.3 ± 0.7	<1	4.4 ± 0.7	4.2 ± 0.7	1.08
Antiretroviral adherence	4.2 ± 0.8	4.3 ± 0.5	<1	4.3 ± 0.6	4.5 ± 0.5	<1	4.5 ± 0.6	4.5 ± 0.5	<1

[a] $p < .05$;

[b] $p < .01$

Table 3

Generalized estimating equation (GEE) analysis for having HIV-negative or unknown partners

	Parameter	Estimate	SE	*z*	*p* value
Having HIV-negative or unknown partners	Group	−0.585	0.673	−0.87	ns
	Time	−1.013	0.435	−2.33	.02
	Group × Time	0.590	0.279	2.11	.03

ns, not statistically significant ($p > .05$)

Table 4

ANOVA with repeated-measures factor and between-subjects factor for HIV sexual risk scores

Source	SS	df	MS	*F*	*p* value
Between subjects					
Group	23.31	1	23.31	<1	ns
Residual between	1483.90	58	25.58		
Within Subjects					
Time	13.53	2	6.77	1.12	ns
Group × Time	31.18	2	15.59	2.57	.08
Residual within	704.02	116	6.07		

ns, not statistically significant ($p > .05$)