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Motivational Interviewing Targeting Risk Behaviors for Youth Living with HIV in Thailand

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Abstract

Healthy Choices, a four-session motivational interviewing-based intervention, reduces risk behaviors among US youth living with HIV (YLWH). We randomized 110 Thai YLWH (16–25 years) to receive either Healthy Choices or time-matched health education (Control) over 12 weeks. Risk behaviors were assessed at baseline, 1, and 6 months post-session. The pilot study

was not powered for between-group differences; there were no statistical differences in sexual risks, alcohol use, and antiretroviral adherence between the two groups at any visit. In within-group analyses, Healthy Choices group demonstrated decreases in the proportion of HIV-negative partners (20 vs 8.2 %, $P=0.03$) and HIV sexual risk scores (4.3 vs 3.3, $P=0.04$), and increased trends in the proportion of protected sex (57 vs 76.3 %, $P=0.07$) from baseline to 1 month post-session. These changes were not sustained 6 months later. No changes were observed in Control group. Healthy Choices has potential to improve sexual risks among Thai YLWH.

Keywords

HIV infection; Motivational interviewing; Adolescent; Sexual behavior; Thailand

Introduction

The achievement in controlling the HIV epidemic in Thailand could now be at risk as indicated by an increase in risky sexual behaviors and sexually transmitted infections in young persons and the plateau in the HIV prevalence among adults [1]. The estimated HIV prevalence among Thai people aged 15–49 years is 1.3 % [2]. However, the prevalence is much higher in specific populations including men who have sex with men (MSM) (20 %), intravenous drug users (21.9 %), male sex workers (17.7 %) and female sex workers (1.8 %) [1]. The highest proportion of Thai persons with HIV infection remain in the age group of 25–34 years (45 %), indicating that the time of most HIV acquisition occurs in adolescence and young adulthood [3]. Therefore, secondary preventions for Thai youth living with HIV (YLWH) should be considered a public health priority. In a study of Thai YLWH, only half reported using condoms consistently in the previous 30 days [4].

Because adolescence and young adulthood is a unique time of life defined by developmental, cognitive and social transitions, risk behavior interventions should be reasonably tailored to the YLWH's developmental status and sociocultural dynamics. In spite of the high HIV burden among youth globally [5], prevention research addressing risk behavior interventions for YLWH have been limited only to the US. Teens Linked to Care for YLWH was a 2-module, 23-session small group intervention, based on the Social Action Model, with the focus on coping with HIV diagnosis, implementing daily routines to stay healthy, participating in health care decisions, and reducing substance use and sexual risks [6]. There was a reduction in unprotected sex, the number of sex partners and alcohol/substance use, and an improvement in coping among YLWH who received the intervention. Attendance rate for both modules however was 47 %. Teens Linked to Care was subsequently adapted as a multicenter, 3-module, 18-session intervention being delivered by phone or in-person targeting antiretroviral adherence (module 1), sexual risks and substance use (module 2), and emotional distress and quality of life (module 3) [7]. Attendance rates for at least one session and for all sessions were 78 and 35 %, respectively. Only YLWH in the in-person intervention group demonstrated a reduction in unprotected sex. There were no changes in the number of sexual partners, HIV disclosure to partners, antiretroviral adherence, substance use, or emotional distress scores in any intervention group over time. The single-visit, computer-based, pre-/post-test +CLICK intervention for YLWH, which was based on Social Cognitive Theory and Brief Motivational Enhancement Therapy, provided a sexual risk module, an antiretroviral adherence module and the internet-based activities including animation, interactive activity clusters and videos. YLWH who received the intervention demonstrated significant increases in self-efficacy on condom use, self-efficacy on medication adherence, perceived importance of taking medications on time, and knowledge about medication adherence [8, 9]. However, the number and frequency of the sessions in Teen Linked to Care as well as the computer and internet access required in

+CLICK may hinder their implementation in less-developed countries where youth may encounter financial and/or transportation barriers to attend the sessions, providers may not have ample time and resources to conduct frequent sessions, and the internet access and infrastructures of healthcare facilities may be constrained.

A brief intervention that can increase YLWH's intrinsic motivation toward behavior changes may be appropriate especially for the resource-limited settings. Motivational Interviewing (MI) is a brief, client-centered behavioral counseling designed to increase intrinsic motivation by exploring and resolving ambivalence on behavior changes and fostering self-efficacy [10]. MI can potentially have an impact on the information (through offering advice and personalized feedbacks with a permission), the motivation (by engaging in a collaborative partnership, expressing empathy, and enhancing personal values, optimism and goals), and the behavioral skills (through supporting self-efficacy) necessary to achieve a behavior change according to the Information-Motivation-Behavioral Skills model [11]. The intervention has been shown to successfully reduce risky behaviors among youth in developed countries [12–15]. Specifically, Healthy Choices, a four-session MI-based intervention, has resulted in improvements in condom use, alcohol use, HIV viral loads, depression and motivational readiness for behavior changes among YLWH in the US [16, 17]. The efficacy observed and the less number of sessions required in Healthy Choices make this intervention ideal for adaptation in resource-limited settings.

We previously demonstrated that Healthy Choices was feasible and acceptable for Thai YLWH [18]. This led to the development of the present pilot study. We hypothesized that Thai YLWH receiving the Healthy Choices intervention will demonstrate an increase in consistent condom use as compared to the control group. Consistent condom use was defined as using a condom with every sex act (oral, vaginal or anal sex) in the past 30 days as measured by the Timeline Follow-Back interview procedure (see Methods). Condom use was our primary outcome because of the low rate of consistent condom use among Thai YLWH [4]. Our secondary hypothesis is that YLWH receiving the intervention will use less alcohol and have a better adherence to antiretroviral medications than the control group.

Methods

Participants

Thai YLWH attending the Thai Red Cross AIDS Research Centre clinics in Bangkok, who were interested in participation in the study, were referred by their physicians to the study team. Approximately 10 % of YLWH in Bangkok were being followed at the clinics (T. Bunupuradah, personal communication; Thai National Health Security Office unpublished data). The eligibility criteria included HIV seropositivity, age of 16–25 years, and ability to understand Thai. Upon completion of consent, participants were randomized 1:1 to receive either Healthy Choices (intervention group) or general health education (control group). The ethical review boards of all affiliated institutions approved the study. A waiver of parental consent was permitted for participants <18 years of age.

Procedures

At the baseline visit, participants completed the assessments listed in Measures below. After the baseline visit, participants began to attend either four Healthy Choices sessions (intervention group) or four general health education sessions (control group), based on randomization. The sessions in both groups occurred at 1, 2, 6 and 12 weeks after the baseline visit. Each session took approximately 60 min. The assessments similar to the baseline visit were conducted at 1 month after the fourth session (i.e., 4 months from the baseline visit) and again at 6 months after the fourth session (i.e., 9 months from the baseline

visit) in both groups. Participants received 200 Bahts (US\$7) for each session, and 700 Bahts (US\$23) at baseline, 1 and 6-month visits as a compensation for transportation and time.

Intervention Group—The intervention group received Healthy Choices, a four-session individual MI counseling that targeted two of three risk behaviors including sexual risks, alcohol use, and antiretroviral adherence [16]. As condom use was the primary outcome in the study, sexual risk behavior was targeted for all participants in this group. The second targeted behavior (alcohol use or antiretroviral adherence) was selected based on the severity of the risk identified at the baseline assessment (i.e., self-report of using alcohol or self-report of less than 95 % antiretroviral adherence). If participants had no risk behaviors, the second behavior was selected by the participant and the counselor jointly to maintain his/her healthy behavior. The intervention was delivered by a psychologist who was trained in MI by members of the Motivational Interviewing Network of Trainers. The MI strategies of reflective listening, asking open-ended questions, affirmation, summarizing, and elicitation of self-motivational statements were used throughout all sessions. Session 1 focused on eliciting the participant's view of the behavior, exploring barriers, facilitators and other sociocultural factors affecting risks and building motivation to initiate and maintain changes. The session also incorporated the provision of personalized feedback including quantitative information on the individual's level of risk behaviors obtained during the baseline assessment; this provided the "information" aspect of the Information-Motivation-Behavioral Skills model for behavior change. The session closed with the consideration of a behavioral change plan as appropriate given the participant's stage of readiness to change. Session 2 followed a similar format with the focus on the second target behaviors. Sessions 3 and 4 were to formalize the personalized behavior change plan, monitor progress, renew motivation, reinforce commitment to change, and identify strategies to maintain healthy behaviors and to prevent relapse. Causal links between target behaviors were also addressed. All sessions were taped. One-third of the session tapes were randomly selected weekly throughout the study to evaluate the counselor's adherence to MI using the Motivational Interviewing Treatment Integrity (MITI 3.0) coding system based on the model previously described [19, 20]. The counselor met weekly with the supervisor to review MITI feedback and discuss case issues in order to enhance the counselor's MI skills.

Control Group—The control group received 4 individualized sessions of general health education. Session 1 focused on healthy diet, session 2 on exercise, session 3 on smoking and healthy sleep habits. Session 4 was an overall review of the participant's knowledge learned during sessions 1–3. The contents of the session manual were from the health education materials published by the Thai Ministry of Public Health. All sessions were delivered didactically by the research assistant who read the contents of health education in the manual to the participants. In order to maintain distinctiveness between the intervention condition and the control condition, the research assistant received no MI training and the research assistant was instructed to avoid discussing HIV-related topics including sexual behavior, HIV disclosure, alcohol/substance use, and medication adherence with participants. All sessions were taped and reviewed by a research staff to ensure the research assistant's fidelity to the control conditions. Participants in this group were instructed to communicate with their physicians regarding any HIV-related health concerns they might have.

Measures—The following measures were assessed in both study groups at baseline, 1 and 6 months after the fourth session. Data collection for all measures except sexual behaviors and alcohol/substance use was conducted through a computer-assisted self-interview in a private room.

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 successfully used with Thai YLWH [4, 21]. 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 included types of sexual acts; condom use; the number, the gender and the HIV status of partners; and HIV disclosure to partners.

Alcohol/Substance Use: Alcohol and substance use in the past 30 days was assessed using the Timeline Follow-Back interview procedure described above. The data collected included the number of days using alcohol and/or substance, the type of alcohol/substance used, the quantity used, and whether the use occurred while engaging in sex.

Antiretroviral Adherence: Participants completed Adherence Interview measure, which contains a visual analog scale from 0 to 100 [22]. 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.

Plasma HIV Viral Load: Blood for plasma HIV viral load was obtained and analyzed by COBAS AmpliPrep/Amplior HIV-1 Monitor Test, version 1.5 (Roche Molecular Systems, Branchburg, NJ), with the lower limit of detection at 50 copies/ml.

In addition, mental health, health concerns, motivational readiness and self-efficacy were assessed because these factors have been found to be associated with risk behaviors in YLWH [17].

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 [23]. All items are rated on a 4-point Likert scale, ranging from 1 (not at all) to 4 (much more than usual). The scores were averaged and the mean score of 2 and above was considered clinically significant. The Cronbach's α was 0.85 in the present study.

Health Concerns: Participants completed the 4-item Health Anxiety questionnaire inquiring their health concern and its effect on their sleep, appetite, socialization, and school/work performance [24]. All items are rated on a 5-point Likert scale, ranging from 1 (not at all) to 5 (always); the total score is the sum of all four items. The measure has good reliability (Cronbach's α = 0.85) in the present study.

Motivational Readiness: Intentions or readiness to change behaviors were assessed with Rollnick's Readiness Ruler [25]. 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 marked their readiness on a 10-point Likert Scale, ranging from 1 (not ready to change) to 10 (already changing). The measure has been found to be correlated with actual condom use, alcohol/substance use and medication adherence in YLWH [26–28]. The Cronbach's α was 0.44 in the present study.

Self-Efficacy: Self-efficacy is the individual's belief that he/she 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/substance use, and 3 items on confidence in taking antiretroviral medications [27]. Items are rated on a 5-point Likert scale ranging from 1 (very sure I cannot) to 5 (very sure I can). The measure showed good reliability in the present study (Cronbach's $\alpha = 0.89$).

Statistical Analysis

Demographic and risk behavior data were analyzed using descriptive statistics. Differences in demographic variables between the two study groups were examined using Chi square test (for categorical variables) or Student's *t* test (for continuous variables). Student's *t* test or Wilcoxon Rank Sum test, when the population was non-normally distributed, was used to examine the difference in risk behaviors between the two study groups at each visit (i.e., baseline, 1 and 6 months post-session). For within-group analyses, McNemar's test (for categorical variables), paired *t* test (for normally distributed continuous variables), or Wilcoxon Signed Ranks test (for non-normally distributed continuous variables) was used to compare risk behaviors at baseline versus those at 1 month and baseline versus 6 months post-session.

An HIV sexual risk scoring system was 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 (Table 1). 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. For example, a participant who used condoms consistently with a single partner would have a lower sexual risk (i.e., lower sexual risk score) than another participant who used condoms inconsistently with multiple partners and used alcohol while engaging in sex. Wilcoxon Rank Sum test was used to examine the differences in HIV sexual risk scores between the two groups at each study visit. The estimated effect sizes for the differences in HIV sexual risk scores between the two groups were also calculated. Within each study group, Wilcoxon Signed Ranks test was used to examine the difference in HIV sexual risk scores between baseline and 1 month post-session and between baseline and 6 months post-session. All analyses were performed using the SAS 9.2 software (SAS Institute, Cary, NC).

Results

Participant Characteristics

One hundred and fourteen Thai YLWH were approached; 110 agreed to participate and were enrolled between September 2008 and September 2010. Two males randomized to the control group were excluded from the study; one had an anxiety disorder and was unable to complete the baseline visit, and the other did not return for the baseline visit. There were 88 men and 20 women included in the final analysis. The mean age was 21.7 years, ranging from 16.1 to 25.9 years. Approximately 70 % were MSM. Most (79.4 %) had been diagnosed with HIV infection within the past 2 years; the majority (70.4 %) were either asymptomatic or mildly symptomatic based on the HIV classification by the Centers for Disease Control and Prevention [29]. Male participants were older, had higher education levels, were more likely to acquire HIV through sex, more likely to be single, and less likely to be on antiretroviral medications than female participants (Table 2). There were no statistical differences in demographic characteristics between the two study groups (Table

2). The follow-up rates at each visit were not statistically different between the two groups (Fig. 1). The proportions of participants who completed 4 sessions were 78.2 % in the intervention group and 77.4 % in the control group ($P = 0.94$); loss to follow-up before the last study visit were 10.9 and 20.8 %, respectively ($P = 0.16$).

Risk Behavior Outcomes

There were no statistical differences in sex risk variables between the two groups at baseline, 1, and 6 months post-session (Table 3). The between-group estimated effect sizes of the intervention based on HIV sexual risk scores were 0.02 at 1 month and 0.21 at 6 months post-session. In within-group analyses, there was a significant reduction in HIV sexual risk scores from baseline to 1 month post-session in the intervention group ($P = 0.04$) (Table 3). The proportion of HIV-negative sex partners also significantly decreased during the same period in the intervention group ($P = 0.03$). There was a trend for an increase in the proportions of protected sex acts from baseline (57.0 %) to 1 month post-session (76.3 %) in the intervention group ($P = 0.07$). However, the changes were not sustained through 6 months post-intervention. There were no significant differences in any sex risk variables between baseline and 1 month post-session or between baseline and 6 month post-session in the control group.

While the rates of HIV disclosure to partners between the two study groups did not differ at any study visit, the self-efficacy regarding HIV disclosure to partners was significantly higher in the intervention group than the control group at 6 months post-session ($P = 0.04$) (Table 3). There were no differences in self-efficacy regarding condom use and avoidance of having multiple sex partners between the two study groups at any study visit. We also found no differences in sexual behavior-related motivational readiness between the two groups. However, in within-group analysis, the readiness to use condoms with every sex act decreased from baseline to 1 month post-session in the control group ($P = 0.03$) (Table 3).

The proportions of participants who used alcohol were similar between the two groups at all study visits (Table 3). The frequency and amount of alcohol consumption between the two groups were also comparable, and there were no changes in alcohol consumption within either group over the study period (Table 3). Motivational readiness to reduce alcohol use, however, was higher in the intervention group than in the control group at 1 month post-session ($P = 0.03$) (Table 3); this difference was no longer observed at 6 months post-session. The prevalence of substance use was very low in this study (0 % in the intervention group and 3.8 % in the control group) and there were no differences between the two groups at any study visit.

Among participants who were receiving antiretroviral therapy, the 1-month global adherence scores and plasma HIV viral loads were not significantly different between the two study groups at any study visit (Table 3). In within-group comparisons, there were no statistical differences in adherence scores or plasma HIV viral loads between baseline and 1 month or between baseline and 6 months in either group. It should be noted that adherence rates were high and the plasma HIV viral load values were low among those on antiretroviral therapy in both study groups (Table 3). We also found no differences in self-efficacy and motivational readiness related to medication adherence between the two groups. Nevertheless, the within-group analysis demonstrated an increase in self-efficacy regarding taking antiretroviral medications as prescribed from baseline to 6 months post-session in the intervention group ($P = 0.03$) (Table 3).

The mental health scores and the health concern scores were not significantly different between the two groups at any visit (Table 3). However, the mental health scores and the health concern scores in the intervention group significantly improved from baseline to 1

month post-session ($P < 0.01$) and from baseline to 6 months post-session ($P < 0.01$). There were no significant changes in mental health scores and health concern scores in the control group over the same periods.

Counselor's Fidelity to MI

A total of 66 intervention session tapes were randomly selected for MITI 3.0 coding to assess the counselor's adherence to MI approach. Twenty minute segments of each of the hour long sessions were selected at random for MITI coding [20]. MITI has two components: the global ratings (MI spirit, empathy, and direction) and the behavior counts (MI adherent behaviors, questions, and reflections). The counselor's scores for each component are rated as 'solid competence', 'beginning proficiency', or 'below proficiency'. On the global ratings, the counselor's demonstration of global MI spirit (an average of the collaboration, evocation, and autonomy scales) was rated as in the 'solid competence' range in 100 % of the 66 sessions coded. For the empathy scale, she was also rated as demonstrating 'solid competence' 100 % of the time. On maintaining the direction of the session on the target behavior, she was rated as 'solid competence' 97 % of the time.

On the behavior counts, the counselor's ratings on "MI adherent" behaviors (expressions of support, affirmations of client's positive behaviors, reinforcing client autonomy, and asking permission before giving information or advice) were in the range of "solid competence" 100 % of the 66 sessions coded. For the proportion of "complex reflections" to "simple reflections", the counselor was rated as 'solid competence' (giving 50 % or more complex reflections) 77.3 % of the time, 'beginning proficiency' (40–49 % complex reflections) 15.2 % of the time, and 'below proficiency' (less than 40 % complex reflections) 7.6 % of the time. On the proportion of "open questions" to "closed questions", she was rated as 'solid competence' (70 % open questions or higher) 42.4 % of the time, as 'beginning proficiency' (50–69 % open questions) 42.4 % of the time, and as 'below proficiency' (less than 50 % open questions) 15.2 % of the time. Finally, her reflection-to-question ratio fell in the 'solid competence' (two or more reflections to every question) 25.8 % of the time, 'beginning proficiency' (one to two reflections for each question) 45.5 % of the time, and 'below proficiency' (less than one reflection for each question) 28.8 % of the time.

Discussion

The present study demonstrated the potential effect of Healthy Choices on sexual risk behaviors in Thai YLWH based on the within-group analyses. There was a decrease in HIV sexual risk scores and a trend for increased condom use 1 month after the intervention. However, the lack of persisting intervention effects 6 months later may indicate a need for periodic booster sessions to maintain as well as enhance behavior changes in future studies. We also noted an improvement in self-efficacy regarding HIV disclosure to partners in the intervention group. Similar to the US Healthy Choices, readiness to reduce alcohol use was higher in the intervention group at 1 month post-intervention [17]. In contrast to the US Healthy Choices, we found no effect of Healthy Choices in regard to medication adherence or plasma HIV viral loads in this study [16]. This could be due to the small sample size (one-third of participants were on antiretroviral treatment), and the already high adherence rates which likely resulted in the low plasma viral loads in both study groups. However, the self-efficacy on medication adherence increased over time among participants in the intervention group. Comparisons of the results of the study to those of other YLWH interventions are difficult secondary to the differences in the sexual risk definitions, the participants' baseline characteristics, the number of the session, the length of follow-up, and the outcome variables being measured.

With the majority of HIV-positive youth living in resource-limited settings, effective risk reduction interventions for YLWH must be developed and must be feasible and acceptable for implementation in those settings. The retention rates in this study, with 91 % attending at least three sessions and 78 % attending all four sessions, were higher than those in the US Healthy Choices [17]. This likely reflects the acceptability of Healthy Choices and an MI approach among Thai YLWH. It is also possible that the sessions might be the only outlet for youth to talk about their experiences of living with a highly stigmatized disease. In addition, there were improvements in general mental health and health concerns in the intervention group. This finding is important since mental health has been associated with risk-taking behaviors in Thai YLWH [30, 31]. The effect of Healthy Choices on mental health and health concerns could be secondary to better coping with HIV diagnosis after the intervention and may indirectly result in improvements in risk behaviors. The findings of the high proportion of sex partners being HIV-unknown and the low HIV disclosure rates to partners, which may imply casual sex, are concerning as this could potentially fuel further HIV transmission in the community. Although MI supports self-efficacy in HIV disclosure as seen in the study, specific skill building may be required to assist Thai YLWH on communicating HIV status effectively under the tempting situation of casual sex. The decrease in the proportions of HIV-negative partners from 20 to 8 % after the intervention raises the possibility of considering Healthy Choices as a tool in efforts aimed at ‘prevention for positives’ to curb the HIV epidemic among youth.

We previously described our method for assuring fidelity to the MI intervention and the MITI rating system in the Thai language and cultural milieu [19]. In the present study, the counselor who administered the intervention had very strong adherence to MI styles as demonstrated by her ‘solid competence’ ratings on all MI global measures (spirit, empathy, and direction) and on MI adherent behaviors, the ratio of open to closed questions, and the ratio of complex to simple reflections. The only area where the counselor did not score in the ‘solid competence’ range the majority of the time was in her ratio of reflections to questions, which scored in the range of ‘beginning proficiency’. The strong MITI ratings indicate that the intervention was delivered with high adherence to MI styles, supporting the feasibility of training Thai counselors to deliver MI with high fidelity in future intervention trials.

Several limitations are worth discussing in the study. As this is a pilot study, the sample size was small and was not adequately powered to detect the between-group differences. The participants were recruited from a clinic setting; recruitment of youth from a different setting could change the intervention outcomes. There was the underrepresentation of female youth, thus specific attention should be given to ensure the balance in gender in future studies. The demographic differences between males and females in the study, particularly the education level and the marital status, raise questions about the applicability of MI in youth with various education backgrounds and how to tailor the MI approach for sexual risk in the setting of stable partnership (i.e., married female YLWH) versus casual partnership (i.e., single male YLWH, mostly MSM) in future studies. As youth in the control group were aware of what risk behaviors were being evaluated through the description in the informed consent, they may try to reduce the behaviors of their own accord. Other non-intervention factors, such as the repeated assessments and the interview over time, may prompt youth in the control group to reduce their risk behaviors. Such factors may explain why there were no differences observed between the two study groups and there was a decreased trend in having HIV-negative partners over time in the control group. Also, we selected only two of the three target behaviors when three problem behaviors were present. Although all HIV disease classification groups were included, the data on CD4 T-lymphocyte counts were not collected therefore the applicability of the intervention across the range of immune suppression is not known. We did not quantitatively evaluate the participant’s religious

belief, which was found to be an important factor in risk behavior prevention in Thai YLWH; [32] qualitative analyses of MI sessions may help reveal the roles of spirituality and its applicability within MI for Thai YLWH. Although the Timeline Follow-Back interview has been shown to provide valid estimates of health risk behaviors [21, 33, 34], its reliance on a self report and an in-person interview can potentially lead to the bias in reporting and the reluctance of an individual to give socially undesirable answers. The use of self-administered, computer-based Timeline Follow-Back which is private and anonymous may help reduce this limitation and should to be further evaluated in future studies [35]. The study strength includes the presence of the control group which received a similar number of time-matched sessions and assessments. The intervention was systematically adapted for Thai YLWH through local focus group discussions and pilot testing [18]. The model for monitoring intervention fidelity was methodically developed prior to the execution of the present randomized trial [19]. The fewer number of the sessions as compared to other published interventions for YLWH makes this more realistic for applying in the real world setting where resources are limited. The high proportion of young MSM in our study reflects the population presently most affected by HIV in Thailand [36], and thus makes this study pertinent to the current epidemic.

We demonstrated the potential of Healthy Choices to improve sexual risks and mental health among Thai YLWH. Its person-centered, individualized approach was well accepted by youth. With the increasing emphasis on a greater implementation of the prevention for HIV seropositives worldwide, clearly there is a need for multi-sector commitments and policy actions to address as well as to scale up comprehensive YLWH-focused preventive health programs globally. The MI-based protocol such as Healthy Choices could be adapted as a brief session incorporated within routine visits in a high patient load clinic setting commonly seen in less-developed countries. Standardized MI trainings, which have been developed in some countries, should be provided to peer advocates, lay counselors and health personnel at all levels [37, 38]. Utilization of MI, fidelity to MI and clinic client outcomes should be systematically evaluated to inform further needs for enhanced trainings and/or program adjustments. Organizational support at policy maker and community levels for MI implementation will be essential for the program success. Integration of Healthy Choices in standard care for YLWH in resource-limited settings is now feasible and should be critically considered.

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Fig. 1.
Flowchart of study participants throughout the study

Table 1

HIV sexual risk scoring

Behaviors in 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	

Table 2

Baseline demographics of youth participants

Characteristics	Intervention group (n = 55)	Control group (n = 53)	P value	Males (n = 88)	Females (n = 20)	P value
Age in years (mean ± SD)	21.5 ± 2.7	21.8 ± 2.7	0.55	21.9 ± 2.6	20.6 ± 2.9	0.04
Males (n, %)	46, 83.6	42, 79.2	0.56			
Sexual orientation (n, %)						
Heterosexual	18, 32.7	14, 26.4	0.22	13, 14.8	19, 95.0	< 0.01
Bisexual	8, 14.5	14, 26.4		21, 23.9	1, 5.0	
Homosexual	29, 52.7	25, 47.2		54, 61.3	0, 0	
Routes of HIV acquisition (n, %)						
Sexually-acquired	43, 78.2	44, 83.0	0.43	77, 87.5	10, 50.0	< 0.01
Perinatally-acquired	11, 20.0	7, 13.2		10, 11.4	8, 40.0	
Tattoo	0, 0	1, 1.9		0, 0	1, 5.0	
Blood transfusion	0, 0	1, 1.9		1, 1.1	0, 0	
Unknown	1, 1.8	0, 0		0, 0	1, 5.0	
Living in Bangkok (n, %)	43, 78.2	35, 66.0	0.16	66, 75.0	12, 60.0	0.18
Highest education (n, %)						
Grade 1–6	3, 5.6	2, 3.8	0.19	3, 3.4	2, 10.5	0.01
Grade 7–9	13, 24.1	5, 9.4		11, 12.5	7, 36.8	
Grade 10–12	22, 40.7	24, 45.3		38, 43.2	8, 42.1	
Bachelor degree or higher	16, 29.6	22, 41.5		36, 40.9	2, 10.5	
Marital status (n, %)						
Single	46, 83.6	48, 90.6	0.36	84, 95.5	10, 50.0	< 0.01
Married	7, 12.7	4, 7.5		2, 2.3	9, 45.0	
Unknown	2, 3.6	1, 1.9		2, 2.3	1, 5.0	
When HIV diagnosis was made (n, %)						
Within 6 months	25, 45.5	21, 39.6	0.37	39, 44.3	7, 35.0	0.09
7–11 months	8, 14.5	4, 7.5		12, 13.6	0, 0	
1–2 years	13, 23.6	14, 26.4		22, 25.0	5, 25.0	
More than 2 years	8, 14.5	14, 26.4		14, 15.9	8, 40.0	
No answer	1, 1.8	0, 0		1, 1.1	0, 0	
HIV classification (n, %)						

Characteristics	Intervention group (<i>n</i> = 55)	Control group (<i>n</i> = 53)	<i>P</i> value	Males (<i>n</i> = 88)	Females (<i>n</i> = 20)	<i>P</i> value
N	4, 7.3	4, 7.5	0.87	4, 4.5	4, 20.0	0.11
A	35, 63.6	33, 62.3		56, 63.6	12, 60.0	
B	8, 14.5	9, 17.0		15, 17.0	2, 10.0	
C	8, 14.5	7, 13.9		13, 14.8	2, 10.0	
Taking antiretroviral drugs (<i>n</i> , %)	21, 38.2	18, 34.0	0.65	26, 29.5	13, 65.0	< 0.01
Plasma HIV viral loads (log ₁₀ copies/ml)	3.6 ± 1.4	3.6 ± 1.3	0.94	3.7 ± 1.3	3.0 ± 1.4	0.03

Comparisons of sexual behaviors, alcohol use, antiretroviral adherence, mental health, motivational readiness, and self-efficacy between the intervention group and the control group at baseline, 1, and 6 months post-session

Behaviors in past 30 days (mean ± SD unless stated otherwise)				Intervention group			Control group				
	Baseline (time 1)	1 month post-session (time 2)	6 months post-session (time 3)	Within-group comparison			Baseline (time 1)	1 month post-session (time 2)	6 months post-session (time 3)	Within-group comparison	
				Time 1 vs 2	Time 1 vs 3					Time 1 vs 2	Time 1 vs 3
Sample size (<i>n</i>)	55	49	49				53	47	42		
Sexual behaviors											
Abstinence (%)	45.5	55.1	59.2	$\chi^2 = 1.80, P = 0.18$	$\chi^2 = 2.27, P = 0.13$		50.9	57.4	50.0	$\chi^2 = 0.67, P = 0.41$	$\chi^2 = 0.40, P = 0.53$
Consistent condom use ^a (%)	53.3	63.6	50.0	$\chi^2 = 1.29, P = 0.26$	$\chi^2 = 0.00, P = 1.00$		65.4	75.0	47.6	$\chi^2 = 0.33, P = 0.5$	$\chi^2 = 3.00, P = 0.08$
Proportion of protected sex acts ^b (%)	57.0 ± 46.0	76.3 ± 34.0	69.1 ± 36.0	$t = -1.90, P = 0.07$	$t = -0.62, P = 0.54$		87.2 ± 25.2	84.9 ± 28.4	75.3 ± 31.4	$t = 0.47, P = 0.65$	$t = 1.16, P = 0.26$
Number of sex partners	0.7 ± 1.0	0.6 ± 0.9	0.5 ± 0.7	$t = 0.53, P = 0.60$	$t = 1.15, P = 0.26$		0.7 ± 0.8	0.6 ± 0.9	0.7 ± 0.8	$t = 0.48, P = 0.64$	$t = -0.52, P = 0.61$
Having >1 partner (%)	9.1	4.1	6.1	$\chi^2 = 2.00, P = 0.16$	$\chi^2 = 0.33, P = 0.56$		13.2	6.4	11.9	$\chi^2 = 1.29, P = 0.26$	$\chi^2 = 0.14, P = 0.71$
Having HIV+ partners (%)	12.7	12.2	14.3	$\chi^2 = 1.00, P = 0.32$	$\chi^2 = 0.00, P = 1.00$		15.1	12.8	7.1	$\chi^2 = 1.00, P = 0.32$	$\chi^2 = 2.67, P = 0.10$
Having HIV– partners (%)	20.0	8.2	8.2	$\chi^2 = 5.00, P = 0.03$	$\chi^2 = 3.57, P = 0.06$		18.9	10.6	11.9	$\chi^2 = 2.00, P = 0.16$	$\chi^2 = 0.67, P = 0.41$
Having HIV-unknown partners (%)	25.5	26.5	20.4	$\chi^2 = 0.50, P = 0.48$	$\chi^2 = 0.09, P = 0.76$		24.5	21.3	31.0	$\chi^2 = 0.00, P = 1.00$	$\chi^2 = 2.78, P = 0.09$
Proportion of partners being aware of subject's HIV status (%)	40.0	55.7	57.5	$S = -1.51, P = 0.13$	$S = -1.66, P = 0.10$		38.5	47.5	38.1	$S = -0.38, P = 0.71$	$S = -0.55, P = 0.58$
Having insertive anal sex (%)	18.2	22.5	18.4	$\chi^2 = 0.14, P = 0.71$	$\chi^2 = 0.14, P = 0.71$		22.6	17.0	21.4	$\chi^2 = 0.50, P = 0.48$	$\chi^2 = 0.00, P = 1.00$
Having receptive anal sex (%)	16.4	12.2	14.3	$\chi^2 = 0.40, P = 0.53$	$\chi^2 = 0.11, P = 0.74$		30.2	21.3	21.4	$\chi^2 = 2.00, P = 0.16$	$\chi^2 = 1.29, P = 0.26$
Having receptive vaginal sex (female only) (%)	77.8	50.0	83.3	$\chi^2 = 1.00, P = 0.32$	$\chi^2 = 1.00, P = 0.32$		27.3	27.3	36.4	$\chi^2 = 0.00, P = 1.00$	$\chi^2 = 0.33, P = 0.56$
Having sex with alcohol use (%)	5.5	2.0	6.1	$\chi^2 = 1.00, P = 0.32$	$\chi^2 = 0.00, P = 1.00$		7.6	2.1	7.1	$\chi^2 = 1.00, P = 0.32$	$\chi^2 = 0.33, P = 0.56$
HIV sexual risk score	4.3 ± 3.6	3.3 ± 3.1	3.4 ± 3.4	$S = 54, P = 0.04$	$S = 29, P = 0.32$		3.9 ± 3.5	2.9 ± 2.7	4.3 ± 3.8	$S = 35.5, P = 0.10$	$S = 39.5, P = 0.11$

Behaviors in past 30 days (mean $\pm$ SD unless stated otherwise)	Intervention group				Control group			
	Baseline (time 1)		1 month post-session (time 2)		Baseline (time 1)		1 month post-session (time 2)	
	Time 1 vs 2	Time 1 vs 3	Time 1 vs 2	Time 1 vs 3	Time 1 vs 2	Time 1 vs 3	Time 1 vs 2	Time 1 vs 3
Alcohol use								
Using alcohol (%)	36.4	32.7	40.8	$\chi^2 = 0.43, P = 0.51$	35.8	42.6	35.7	$\chi^2 = 1.33, P = 0.25$
Number of days drinking	0.7 $\pm$ 1.2	1.0 $\pm$ 3.3	1.0 $\pm$ 1.7	$S = -0.64, P = 0.52$	1.2 $\pm$ 3.6	1.4 $\pm$ 3.4	0.9 $\pm$ 1.5	$S = -1.22, P = 0.22$
Number of drinks	2.2 $\pm$ 4.1	4.3 $\pm$ 11.4	14.6 $\pm$ 80.0	$S = -0.33, P = 0.74$	6.3 $\pm$ 22.4	7.4 $\pm$ 17.4	5.0 $\pm$ 11.3	$S = -1.32, P = 0.19$
Antiretroviral adherence (%)	84.0	80.3	89.4	$S = -0.85, P = 0.40$	91.7	79.0	87.6	$S = -0.89, P = 0.37$
Plasma HIV viral load in subjects on antiretroviral drugs ($\log_{10}$ copies/ml)	2.3 $\pm$ 1.2	2.0 $\pm$ 0.8	2.2 $\pm$ 1.0	$t = 0.75, P = 0.47$	2.2 $\pm$ 1.2	2.1 $\pm$ 0.9	2.1 $\pm$ 1.0	$t = 1.13, P = 0.28$
Mental health score	1.9 $\pm$ 0.3	1.7 $\pm$ 0.4	1.7 $\pm$ 0.3	$t = 2.86, P < 0.01$	1.8 $\pm$ 0.5	1.8 $\pm$ 0.4	1.7 $\pm$ 0.4	$t = -0.25, P = 0.80$
Health concern score	7.8 $\pm$ 3.7	6.3 $\pm$ 3.2	6.0 $\pm$ 2.7	$t = 3.55, P < 0.01$	7.1 $\pm$ 3.4	7.5 $\pm$ 4.0	6.5 $\pm$ 3.4	$t = -0.23, P = 0.82$
Motivational readiness								
To take antiretroviral medications 100 %	8.7 $\pm$ 1.8	8.9 $\pm$ 1.5	9.1 $\pm$ 1.6	$t = -1.09, P = 0.28$	9.1 $\pm$ 1.2	8.7 $\pm$ 2.1	9.3 $\pm$ 1.1	$t = 1.29, P = 0.20$
To use condoms in all sex acts	8.8 $\pm$ 1.8	9.1 $\pm$ 1.6	9.3 $\pm$ 1.6	$t = -1.14, P = 0.26$	9.4 $\pm$ 1.0	8.8 $\pm$ 2.0	9.4 $\pm$ 1.1	$t = 2.20, P = 0.03$
To disclose HIV status to all partners	5.1 $\pm$ 3.0	5.5 $\pm$ 3.4	6.2 $\pm$ 3.5	$t = -0.55, P = 0.58$	5.2 $\pm$ 3.6	4.4 $\pm$ 3.3	5.6 $\pm$ 3.5	$t = 1.59, P = 0.12$
To improve alcohol use	8.5 $\pm$ 2.2	9.0 $\pm$ 1.9 ^c	8.6 $\pm$ 2.4	$t = -0.80, P = 0.43$	8.2 $\pm$ 2.6	7.9 $\pm$ 2.7	8.9 $\pm$ 2.1	$t = 1.05, P = 0.30$
Self-efficacy								
Taking antiretroviral medications	4.2 $\pm$ 0.8	4.4 $\pm$ 0.7	4.5 $\pm$ 0.6	$t = -1.00, P = 0.32$	4.3 $\pm$ 0.7	4.4 $\pm$ 0.6	4.4 $\pm$ 0.7	$t = -1.17, P = 0.25$
Condom use	4.4 $\pm$ 0.8	4.5 $\pm$ 0.7	4.7 $\pm$ 0.6	$t = -0.87, P = 0.39$	4.6 $\pm$ 0.7	4.7 $\pm$ 0.6	4.6 $\pm$ 0.7	$t = -0.51, P = 0.61$
Avoiding multiple partners	4.3 $\pm$ 0.9	4.5 $\pm$ 0.7	4.5 $\pm$ 0.7	$t = -1.00, P = 0.32$	4.3 $\pm$ 0.9	4.5 $\pm$ 0.7	4.2 $\pm$ 0.9	$t = -1.39, P = 0.17$
HIV disclosure to partners	3.3 $\pm$ 1.2	3.5 $\pm$ 1.2	3.6 $\pm$ 1.3 ^d	$t = -0.18, P = 0.86$	3.0 $\pm$ 1.5	3.1 $\pm$ 1.4	3.0 $\pm$ 1.5	$t = -0.87, P = 0.39$

χ^2 McNemar Chi-square, ^cpaired t test, ^dWilcoxon signed rank test

^aCondom use with every sex act (oral, vaginal or anal sex) in the past 30 days

^bOnly those who reported having sex in the past 30 days are included. The between-group analyses for all variables above yield P values of 0.05, except

^c $P = 0.03$ and

^d $P = 0.04$