



Original article

## An Abstinence and Safer Sex Intervention for Adolescents Attending the Public Sexually Transmitted Infection Clinic in Singapore

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### ABSTRACT

**Purpose:** The objective of this study was to evaluate the efficacy of a behavioral intervention in increasing secondary abstinence and safer sex among heterosexually active adolescents aged 16–19 years.

**Methods:** This was a randomized controlled trial conducted at the only national sexually transmitted infection clinic in Singapore. The intervention focused on information giving, motivation, and skills building to abstain or practice safer sex. The outcome measures were self-reported secondary abstinence, consistent condom use, and keeping to one partner in the past 6 months over a 12-month period. We recruited 688 adolescents, with 337 participants receiving intervention and 351 receiving standard care (control).

**Results:** At the 12-month follow-up, 187 (56%) intervention participants and 189 (54%) control participants were retained. Over the 12-month period, the intervention had a significant effect on secondary abstinence in adolescent boys (42% vs. 27%, adjusted risk ratio [aRR] 1.80, 95% confidence interval [CI] 1.29–2.34) but not in adolescent girls (21% vs. 24%, aRR 1.10, 95% CI .68–1.66). Consistent condom use was higher among intervention adolescent girls than control adolescent girls (40% vs. 20%, aRR 2.01, 95% CI 1.32–2.82), but this effect was not evident in adolescent boys (51% vs. 43%, aRR 1.27, 95% CI .78–1.88). Intervention effect on keeping to one partner was evident in both adolescent boys (76% vs. 45%, aRR 1.35, 95% CI 1.06–1.50) and adolescent girls (79% vs. 65%, aRR 1.20, 95% CI 1.02–1.23).

**Conclusions:** An intervention targeting adolescents in a clinical care setting did achieve an increase in secondary abstinence in adolescent boys, consistent condom use in adolescent girls, and keeping to one partner in both genders at 1-year assessment.

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### IMPLICATIONS AND CONTRIBUTION

Few sexual behavioral interventions in Asia were found to increase secondary abstinence and safer sex behaviors among adolescents. This intervention produced a sustained effect on secondary abstinence, consistent condom use, and keeping to one partner, compared with usual care, among adolescents attending the public sexually transmitted infection clinic in Singapore.

**Conflicts of Interests:** The authors have no conflicts of interest to disclose.

**Clinical Trial Registration:** This trial has been registered at [www.clinicaltrials.gov](http://www.clinicaltrials.gov) (identifier NCT02461940).

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Asia has been consistently seeing 50,000 newly HIV-infected adolescents every year for the past decade [1]. However, few sexual health interventions were implemented for Asian adolescents and almost all were implemented in schools [2–4]. Of the few trials of comprehensive sex education conducted in Asia [5–7], only one quasi-experimental study conducted in a school reported an increase in secondary abstinence and a reduction in the frequency of sexual intercourse among a sample of 68 sexually active adolescents aged 13–18 [5]. The rest reported no impact on sexual behaviors in school [6] and clinic [7] settings. The only study conducted in clinic setting was targeted at 197 HIV-infected adolescents, of which only 5% were sexually active at baseline [7].

In the United States [2,8] and in other Western countries [9,10], clinic-based sexual risk reduction interventions have been shown to be effective in reducing recurrent sexually transmitted infection (STI) and the number of sexual partners, and in increasing condom use for vaginal sex among adolescents. Most interventions focused on adolescent girls [11–16]; only a few were male specific [17,18] or delivered to both genders [19,20]. Most trials involving adolescent girls reported a significant increase in consistent condom use [11–16], and a few reported a reduction in the number of partners [14] or STI rates [13,14]; trials involving adolescent boys only generally impacted condom use [17,18] but not STI reduction [17]. For trials involving both genders [19,20], combined gender analysis found intervention effects on secondary abstinence [20], condom use [20], and number of partners [19]. Gender-stratified analysis showed a stronger effect on adolescent boys than on adolescent girls. Whereas one study showed a reduction in the number of partners among adolescent boys but not among adolescent girls [19], another was able to reduce unprotected anal intercourse among adolescent boys only [20]. Both studies had no impact on condom use for vaginal sex for both genders [19,20].

Behavioral interventions conducted in the West focus mainly on condom use and may not be suitable for Asian settings because of the latter's inclination toward sexual abstinence [3] due to religion [21] or cultural norms [22]. In this article, we evaluated the sexual health outcomes of a 12-month individualized intervention for sexually active adolescents attending the only national STI clinic in Singapore, a country with a population of 3.8 million consisting of mainly Chinese (74%), Malays (13%), and Indians (9%). It is important to target adolescent STI clinic attendees in Asia, as unlike schools [5,6], STI clinics have a higher proportion of sexually active adolescents at high risk of transmitting STIs. An evaluation of this intervention conducted 6 months post-baseline found a significantly higher proportion of secondary abstinence in adolescent boys and keeping to one partner in adolescent girls in the intervention group compared with the group receiving usual care [23]. We hypothesized the sustained effects of the intervention on these outcomes at a 12-month assessment.

## Methods

### Participants

The participants were 688 heterosexually active adolescents aged 16–19 and were first-time attendees at the Department of STI Control clinic. The participants were approached by a research assistant between November 2009 and December 2014 and were brought to a quiet corner of the clinic. The participants signed informed consent forms after being explained with

a participant information sheet that the study involved randomization to intervention or usual care, completing self-administered surveys, and undergoing STI screening at the time of recruitment, and 6- and 12-month post baseline. The participants could withdraw at any point of the study. The participants received standard medical care if they were diagnosed as STI positive. The study was approved by the National Healthcare Group review board in Singapore. There were no differences between participants and nonparticipants at recruitment in terms of age ( $p = .69$ ), gender ( $p = .10$ ), and ethnicity ( $p = .85$ ).

### Design and procedures

This randomized controlled trial with a 1:1 allocation ratio compared participants receiving intervention with those receiving only usual care (controls) over a 12-month period. Given the small number of eligible adolescents (median per day 1, interquartile range [IQR]: 1–2) attending this predominantly adult clinic, adolescents might congregate and communicate with each other while waiting at the clinic. We randomized the days of clinic operation [24], with participants attending the clinic on the same day being allocated to the same study group to reduce contamination bias.

### Intervention

This behavioral intervention was based on the Green PRECEDE-PROCEED framework [25], the Bandura self-efficacy theory and [26] findings from local studies on premarital intercourse [27], and condom use [28]. The behavioral intervention consisted of three on-site individual counseling sessions<sup>1</sup> and two online sessions delivered over 8 months (Supplementary Figure S1, which can be found in the online version of this article).

*First on-site session was held at the time of enrollment.* Counselors first guided participants to self-reflect and increase awareness about influences on their risk behaviors, and then educated them on STI using interactive flip charts and videos [27]. The participants were also encouraged to share their views on love and sex.

*Second on-site session was held 2 weeks after enrollment.* The counselor used motivational interviewing [29] to assess their motivation to change and identify barriers to practicing abstinence or safer sex. The participants were trained in skills and strategies on negotiating sexual abstinence and condom usage using videos and role-play and on condom application using a model aid. Alternative or delay strategies to abstain from sex were shared. Thereafter, the participants set goals for reducing sexual risk behaviors.

*Third on-site session was held 6 months after enrollment.* The participant, together with the counselor, reviewed their strategies on sexual risk reduction or triggers for relapse. Success stories, gathered from their fellow peers, were also shared by counselors and in videos.

<sup>1</sup> In the clinical trial registry, the intervention was described as four on-site sessions instead of three. The last on-site session was conducted after the participant completed the 12-month assessment questionnaire and hence did not contribute to any intervention effect. This session aimed to review and reinforce the knowledge and skills acquired during the 12-month intervention.

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