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EFFICACY OF A MOTIVATIONAL BEHAVIORAL INTERVENTION TO PROMOTE CHLAMYDIA AND GONORRHEA SCREENING IN YOUNG WOMEN: A RANDOMIZED CONTROLLED TRIAL

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Abstract

Background—Seeking screening and treatment for chlamydia (CT) and gonorrhea (GC) by young women is critical to reduction of asymptomatic cervicitis and its complications.

Objectives—To evaluate the efficacy of a client-centered motivational behavioral intervention (MBI), to promote seeking of STI check-ups by young women.

Methods—376 of 770 eligible sexually active, non-pregnant, English-speaking women (mean age 18.5 years) were recruited from an urban reproductive health clinic and randomized to two groups: intervention plus standard care (MBI) or standard-care alone (SC). MBI (two sessions plus booster) was based on the Transtheoretical Model of Change and employed motivational interviewing. Outcome measures monitored for 12 months included: client-initiated clinic visits for STI check-ups in response to seven high-risk sexual behaviors by self report (primary), consistent condom use, number of CT and GC episodes, and movement along the *stages of change* obtained at baseline and 6- and 12-month follow-up assessments (secondary). Analyses included chi square, logistic regression and generalized estimating equations.

Results—At baseline >70% endorsed the *action* stage of change for seeking STI check-ups for three of seven high-risk sexual behaviors. No significant differences were noted between the two groups for the primary or secondary outcomes. Across groups, having multiple partners and being pregnant or thinking one might be pregnant were associated with STI check-ups.

Conclusions—This is the first known client-centered clinical trial to promote STI screening. Risk-taking and health seeking behaviors are complex and interrelated with STI and pregnancy-concerns.

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The intervention may have an effect if it is targeted to women in a less medically connected community-based sample.

INTRODUCTION

In the United States, the prevalence of sexually transmitted infections (STI), including chlamydia (CT) and gonorrhea (GC), remains highest in adolescent and young adult women.

¹ Both CT and GC cervical infections are significant causes of subclinical and clinical pelvic inflammatory disease, impaired fertility, ectopic pregnancy and chronic pain.^{2–8}

CT cervical infections in young women are predominantly asymptomatic and recurrent infection is common.^{9–13} Screening for asymptomatic CT and GC infection promotes early detection and prompt treatment and thereby reduces the duration of infection and the likelihood of adverse sequelae. Since 2002, the Centers for Disease Control and Prevention (CDC) has recommended that health care providers screen all sexually active women under 25 years for CT and GC at least annually.^{3,14,15} In response to CDC recommendations, CT and GC screening programs for young women have been implemented in a variety of public health care settings (e.g., family planning clinics, job corps, juvenile detention centers) and in private settings, such as health maintenance organizations.^{1,16–27} This universal approach to screening has resulted in improved health provider-based screening practices in the public health sector.^{16–20,24,25,27} In contrast, multiple barriers to screening have been observed in private settings, including difficulty obtaining sexual histories, staff reluctance to screen, absence of clinical protocols, and lack of awareness that CT is a problem and that CT urine tests are available.^{21,23,26} There has been a marked absence of behavioral interventions that encourage asymptomatic young women to seek screening for CT and GC in response to their own risk behavior, such as inconsistent condom use or when there have been new or multiple partners.

The Transtheoretical Model of Change (TTM) has been applied to a broad range of health protective behaviors, such as condom use and HIV prevention, in an effort to understand how individuals can adopt/maintain healthy behaviors.^{28–30} Cross sectional studies have applied the TTM to client-initiated STI screening.^{31–36} Reliable measures to assess SOC, *decisional balance*, and *processes of change* in regard to STI screening behavior have been developed; results support the utility of these constructs to explain client-initiated STI screening in young women.^{33,34}

The TTM was used as the framework for this intervention. It posits a mechanism by which people make purposive behavior change with a central organizing construct called the stages of change (see Table 1 for definitions of key constructs).^{28,29} The purpose of this study was to determine the efficacy of a client-centered, motivational behavioral intervention (MBI) based on the constructs from the TTM^{28,29} and Motivational Interviewing,³⁷ to promote client-initiated CT and GC testing by young, sexually active minority women in response to high-risk sexual behavior (e.g., inconsistent condom use, new sexual partner). The MBI was designed to increase motivation to seek screening in young women who were in *pre-action* for some behaviors and reinforce *maintenance* in young women who were already seeking STI screening for others. It was hypothesized that participants receiving a tailored intervention plus standard care in a clinic setting would be more likely than participants receiving standard care alone to return for STI check-ups in response to high-risk sexual behaviors over a 12-month period.

METHODS

Sample Selection

A randomized, controlled clinical trial was conducted in a community-based, urban clinic that provided free reproductive health care to primarily English-speaking adolescent and young adult women. Services included contraception, well woman examinations, pregnancy testing, and STI testing and treatment. Minors are able to receive confidential diagnosis and treatment for these services without parental consent according to state and federal law. Universal CT and GC screening at this clinic was recommended at least annually for all young women; rescreening was conducted based on reported symptoms or when a STI check was requested.

Study eligibility criteria are listed in Figure 1. All participants including minors gave written, informed, consent; parental consent was not required. The Institutional Review Boards of Baylor College of Medicine and University of Texas Health Science Center-Houston approved the study.

Figure 1 illustrates the sampling frame. Between May 2002 and February 2003, 950 young women in the clinic waiting area were approached by young Caucasian female research staff. A total of 770 young women met study eligibility criteria and 376 (49%) agreed to enroll. The mean age of participants did not differ from the mean age of those who declined to participate. However, a greater proportion of women who refused participation as compared to enrolled were Hispanic (26% vs. 18% respectively). Reasons given for not participating in the study are provided in Figure 1. After completing baseline assessments participants were randomized by the project coordinator to study conditions - intervention plus standard-care (MBI) group or standard-care only (SC) – and asked to return to the clinic 6 and 12 months later. Research, clinic staff and investigators were blind to participant's group assignment. The mean number of weeks to the 6- and 12-month assessments did not differ between groups. Completion rates for the 6-month assessment were significantly higher for the SC group (82%) as compared to the MBI group (70%) ($p=.01$). Baseline demographic and sexual behavior characteristics of the study groups were similar (Table 2).

Procedures (Figure 1)

The baseline assessment administered by a research assistant elicited demographic information including age, race/ethnicity, and education, STI history and contraceptive behavior over the past 30 days and six months, alcohol/drug history and reason for clinic visit. The calendar method, an adaptation of the timeline follow back technique, was used to help recall dates and types of sexual activity, partner relationships and condom use behavior over the past three months.³⁸ Definitions of partner type were: *Old*-a sexual partner with whom the participant had been having sex for more than the past six months; *New*- a sexual partner with whom the participant had been having sex for less than six months; *Main*-a sexual partner that the participant viewed as “a boyfriend or a steady partner”; and *Other*-someone she had sex with occasionally or someone who she did not view as her boyfriend or steady partner. Assessments also measured constructs from the TTM, detailed in Table 1.

Participants assigned to the MBI group were directed to a trained Bachelors- or Masters-level health educator by the project coordinator. The health educator interacted with the MBI group only and arranged all follow- up appointments during the study period. The MBI was provided at baseline, 2 weeks and 6 months. It was designed to increase motivation to seek screening in young women who were in *pre-action* for some behaviors and reinforce *maintenance* in those who were already seeking STI screening for other behaviors. Each woman's intervention was tailored in that various *processes of change* were targeted depending on her SOC for each of the target behaviors. At baseline a fact sheet on seeking STI screening listing the seven target

behaviors (see SOC Assessment Table 1) was introduced; self-evaluation rulers for perceived seriousness and susceptibility to STIs were administered; importance and confidence of screening for each target behavior was assessed and; risk reduction behaviors currently practiced and support from partner and friends were discussed. *Decisional Balance* was assessed and stage-appropriate processes were targeted. Personalized feedback of prior 3-month sexual behavior (obtained at the baseline) was provided at the 2-week visit followed by further assessment and discussion of constructs introduced at the previous visit. A goal statement and change plan were also formulated. Six months later these constructs were briefly revisited. A TTM and MI expert and co-investigator (MV) and her staff listened to audiotapes of the intervention sessions to assess fidelity of implementation and monitor the health educator's adherence to motivational counseling techniques.

Standard care was provided by clinic staff (LVN, medical technician, nurse practitioner) to all patients in the clinic and study participants in both groups (Figure 1). Risk-reduction counseling involved a self assessment of HIV/STI risk and promoting abstinence and consistent condom use. The project coordinator arranged all follow-up appointments for the SC group participants. The participant's preferred appointment reminder method (letters or phone calls) was used for follow-up visits. Queries regarding clinical problems were referred to clinic staff. At 6- and 12-month study visits, the questionnaire (similar to the baseline assessment) was administered to participants in both groups by research staff who had not conducted the participant's baseline assessment. Participants were asked if they had sought STI check-ups during the prior six months at this or another clinic; if so, written permission was obtained to contact other clinics/providers for information.

To determine whether a participant's spontaneous visit to the clinic between scheduled study-related visits was for a STI check-up, participants in both groups were monitored (using project stickers attached to medical charts) between scheduled baseline, 6- and 12-month study visits. Participants who returned to clinic were asked to complete a self-administered questionnaire in private to identify reasons for their clinic visit from a list of response options. If the clinic visit was for a STI check-up, they were prompted to provide reasons for the STI checkup from a list that included the seven risk behaviors (the markers used to assess the primary outcome measure). Participants were also asked if they had been referred by the health department due to exposure to a STI.

Participants were provided cash compensation for their time: \$25 for the completion of the baseline assessment (MBI subjects were given \$15 at baseline and \$10 at 2-weeks) and \$15 at each 6- and 12-month assessment.

Statistical Analysis

Sample size calculations were estimated using the expected distribution and number of clinic visits based on appropriate responses to behavioral cues. A sample size of 141 in each group was estimated to have 80% power to detect a probability of 0.59 that an observation in the SC group is less than an observation in the MBI group using a Wilcoxon rank sum test with a 0.05 one-sided significance level.

Using intention-to-treat analysis principle, all subjects with valid outcomes were included in the analysis and analyzed according to their randomly assigned intervention to ensure protection randomization. The primary outcome variable, number of clinic visits made for STI check-ups, "no STI check-up" versus "at least one STI check-up," in response to high-risk sexual behavior, was compared between the two groups during the 12-month study period. Logistic regression was used to examine the relationship of potential explanatory variables and covariates with the primary outcome between the baseline and 6-month and 6- and 12-month visits. Secondary outcome measures compared between the two groups included: frequency

of condom use, number of episodes of GC or CT cervical infection, and movement in the SOC. In addition, the TTM constructs *decisional balance* and *processes of change* were explored.

Because of repeated assessments of STI-related clinic visits over the 12 month period of observation, we estimated the crude and adjusted odds ratios (aOR) of having a STI check-up by using generalized estimating equations (GEE) assuming an unstructured working correlation matrix. All ORs were adjusted by time-independent variables such as race/ethnicity, age at enrollment and age at coitarche, and time-dependent variables such as partner type within the last six months, use of drugs/alcohol before sexual encounters and the use of birth control during the last 30 days. Chi-square analysis was used to investigate the association of consistent condom use at 6- and 12-months. Multiple logistic regression was used to evaluate the effects of the intervention on subsequent STI infection. Adjusted ORs and their 95% confidence intervals were estimated to test the association between study group assignment and CT and GC infection. Statistical analyses were performed by using SAS (Statistical Analysis System) version 9.1 software for Windows (SAS Institute, Inc., Cary, NC). All *p* values were two sided, and values below 0.05 were considered statistically significant.

The distributions of the SOC for each of the seven risk behaviors, at each time point, were compared between the two groups with chi-square methods using *gamma* and *Kendall's Tau-b* measures of association. Since SOC were measured at the ordinal level, Weighted Least Squares (WLS) was used to analyze repeated measures categorical data. Logistic regression was used to test the effect of the intervention on the number of STI check-ups during the study period by the SOC endorsed at baseline.

Group differences on *decisional balance* and *processes of change* (continuous variables) were analyzed using General Linear Model repeated measures. A separate analysis logistic regression was used to predict the number of STI check-ups (categorical variable) during the study period based on *decisional balance* and *processes of change* endorsed at baseline. Statistical analyses for these TTM constructs were performed using SPSS 14.0 (Statistical Package for the Social Sciences).

RESULTS

STI check-ups in response to high-risk sexual behavior

MBI and SC groups made 962 visits to the clinic during the study period. There were no significant differences between the number of visits and the reason for clinic visits between groups. Of the 962 visits, 168 participants made at least one STI-related clinic visit, 46% (78/168) were made by the MBI group and 54% (90/168) made by SC group. Less than 1% reported seeking STI-related care at another clinic. Table 3 lists the reasons for seeking a STI check-up by women in both groups. A differential occurrence of STI check-up in response to high-risk sexual behavior was not observed between the two study groups at either the 6-month assessment (Odds Ratio[OR]=1.25; 95% Confidence Interval[CI]=.72–2.07) or the 12-month assessment (OR=0.85; CI=0.49–1.46).

Evaluation of the relationship of explanatory variables and potential covariates with the number of STI check-ups between baseline and the 6-month assessment, using logistic regression analysis, indicated that for the MBI group, having a partner who refused condoms (aOR=3.13; CI=1.13–8.66) or a history of STI (aOR=2.39; CI=.09–5.2) increased the odds of having a STI check-up. For the SC group, having multiple partners (aOR=2.50; CI=1.13–5.70) or new partners (aOR=2.61; CI=1.22–5.58) significantly increased the odds of a STI check-up. Variables that increased the odds of a STI check-up between the 6- and 12-month visits for both groups were: having multiple partners (MBI group [aOR=4.17; CI=1.61–10.79]; SC group [aOR=3.59; CI=1.49–8.65]) or Other partners (MBI group [aOR=5.64; CI=2.12–15.06]; SC

group [aOR=3.57; CI=1.43–8.91]). Additional significant variables for the SC group included: younger age at coitarche (aOR=0.73; CI=0.58–0.93), a history of STI (aOR=2.72; CI=1.21–6.13), history of drug use (aOR=4.00 [1.17–13.41]), birth control at last sexual intercourse (aOR=0.39; CI=0.17–0.92), thinking one was pregnant (aOR=1.9; CI=1.09–3.34), and number of episodes of vaginal intercourse during the past 3 months (aOR=1.03; CI=1.01–1.05).

Separate GEE models for each study group were constructed to assess each variable and its relationship with repeated STI-related clinic visits over the 12-month period of observation (Table 4). Between groups, there were similarities and differences among variables significantly related to STI-related clinic visits. In the final GEE multivariate model, participant group was not associated with STI check-ups over time. The only variable significant for predicting STI checkups over time for both groups was being or thinking oneself might be pregnant.

Frequency of consistent condom use

No significant differences between the study groups at 6- and 12-month assessments were noted in the frequency of consistent condom during the previous 3 months. Study group was not independently associated with consistent condom use as the outcome variable (aOR=1.4; CI=0.95–2.02) in the longitudinal analysis. While not significant, there was a trend towards an increase in consistent condom use from baseline to 12 months in both groups (MBI 18% to 25%; SC 12% to 26%).

Number of episodes of CT and GC cervical infection

While the frequency of CT and GC decreased from baseline to 12 months for both groups (MBI: 20% to 13%; SC: 24% to 16%, respectively), there were no statistical differences between the groups on the number of episodes of CT and GC.

Stage of change for seeking STI screening

No group differences were found at baseline and the two follow-up assessments for distribution of SOC across the seven risk behaviors. At baseline, many participants in both groups were already seeking STI screening (in action) for: “You think your partner may have an STD” (85%), “You think you may have an STD” (82%), “You have sex with more than one partner” (72%), “You have a partner who you think has other partners” (65%), “You have a condom break or slip” (63%), “You do not use condoms every time you have sex?” (59%), and “You have sex with a new partner?” (57%). No significant differences were found in stage endorsement between baseline and follow-up assessments in either group.

Decisional balance of seeking STI screening

Group differences were not found at baseline for the *pros* and *cons* subscale mean scores. For both groups, the *pros* had a higher mean score ($4.34 \pm .67$) than the *cons* ($2.33 \pm .91$). The MBI group had a higher mean *pros* score for seeking STI screening than the SC group baseline to six months ($p=.05$) and baseline to 12 months ($p=.04$).

Processes of change and seeking STI screening

There was no difference in mean scores between the *processes of change* for the two groups at baseline except for *dramatic relief*, which was significantly more likely to be endorsed by the MBI group than the SC group ($p=.04$). Although logistic regression indicated that the *processes of change* at baseline were predictive of STI-related clinic visits for each group at both follow-up assessments, observed differences between groups were not significant.

DISCUSSION

This study represents a first attempt to examine the effectiveness of a TTM – guided motivational behavioral intervention to encourage young women in a clinic setting to return for STI check-ups in response to high-risk sexual behavior. While differential rates of STI check-ups (primary outcome) among participants in the MBI and SC groups were not observed in this clinical trial, several interesting findings emerged. In both groups, a woman's having high-risk sexual behavior - multiple partners or a history of STIs - were significantly associated with her receiving STI check-ups over time. One possible explanation is that women in both groups may be seeking STI check-ups as a result of their inability to negotiate condom use with their partner.³⁹

A second noteworthy finding was that in both groups a participant's being or thinking that she might be pregnant, after enrolling in the study, was significantly associated with STI check-ups over time. Reasons for clinic visit (e.g., STI check-up, pregnancy testing) were obtained at the start of each client-initiated clinic visit occurring between scheduled 6- and 12-month assessments. This approach decreased the likelihood that provider-initiated clinical questions about STI testing prompted a request for pregnancy testing. It is possible that increased awareness of the negative effect of STIs on a fetus and a desire for a healthy pregnancy³⁶ may have motivated participants who were using contraception inconsistently to seek STI testing.

A third finding was that although the difference was not statistically significant, consistent condom use increased by 7% and 13%, respectively, and number of CT/GC episodes decreased by 7% and 8%, respectively, for the MBI and SC groups. This suggests that participants in both groups received and acted on risk reduction messages delivered by the clinic staff.

Although the behavioral intervention in this study was carefully developed, theory-based, delivered using motivational interviewing, an approach found to be very effective in prior studies,³⁷ there are several potential intervention-specific reasons for the observed lack of difference in STI check-ups between the two groups. Specifically, the intervention may have targeted too many behaviors, the dose of the intervention may have been inadequate to affect behavior change, and participants in the intervention group may have been unable to act on their decisions. Finally a bias was likely introduced by a different type of provider providing the MBI versus SC intervention.

It is also possible that STI-seeking behavior was not adequately captured. The measurement of the primary outcome may not have been as precise as we had expected if some participants did not feel comfortable informing research assistants that they were there for STI check-ups. Participants' STI screening behavior may also have been impacted by repeated assessments. Unfortunately, data on the mean number of STI-related visits made by young women who did not participate in the study during the same period are not available for comparison, so we cannot evaluate possible measurement effects.

Review of the TTM constructs may provide further insight into the study's findings. At enrollment, greater than 70% endorsed being in the *action* stage for three of the seven target behaviors: seeking screening after "*you think you may have an STD*," "*you think your partner may have an STD*" and "*sex with more than one partner*." While this suggests that client-initiated screening might have been a learned response for these target behaviors, there was no forward movement in the stages of change for the remaining four behaviors. A primary focus of the MBI intervention was to affect the decision-making process of seeking STI check-ups in response to high-risk sexual behaviors utilizing *decisional balance* and *processes of change*. At 6- and 12-month assessments, the women in the MBI group endorsed a significantly greater number of "*pros*" for STI screening than did women in the SC group, but this did not translate into behavior that we were able to measure. Use of the *processes of change*

significantly increased over the study period for both groups as well, which suggests that participants in the SC group may have been contaminated by the MBI group, or became sensitized through the assessment measures, thus increasing their awareness of STI screening over the study period.

Limitations

Several limitations should be noted. The study eligibility criteria may have been too inclusive by including “all comers” and therefore diluted the effectiveness of the study. Data on “newcomers” to the clinic and whether the intervention was more likely to impact them are unavailable. Inclusion of young women in *action* for STI screening for any of the seven target behaviors may be a limitation. However, perceived risk for each of these seven conditions potentially varied and so did readiness to seek STI screening. The high refusal rate to participate in the study (51%) is also a limitation and may have rendered a sample that did not represent all young women who generally seek services at the clinic. While mean age of participants did not differ from the mean age of those who declined to participate, there may have been other participant and systems-related characteristics that impacted sample selection but were not evaluated in this study. The series of rulers used to assess SOC may not have been a sensitive indicator of stage and socially desirable responses may have been provided at 6- and 12-month assessments. Despite extensive efforts to create a sensitive outcome measure, some subjects who returned for STI testing between assessment visits may have felt uncomfortable disclosing this to research personnel. Unfortunately client medical records were not screened after each visit to validate the reasons for the clinic visits. Thus, the true number of STI-related clinic visits may have been under-reported. However, the method used was carefully planned so as to minimize any influence by clinic staff on participant responses.

Conclusion and implications

This is the first known client-centered clinical trial to promote STI screening by young women. While differential rates of STI check-ups (primary outcome) among participants in the two groups were not observed, a woman’s having multiple partners and being or thinking that she might be pregnant were significantly associated with her receiving more STI check-ups in both groups. Thus, risk-taking and service seeking behaviors are complex and interrelated with STI and pregnancy-concerns. Many young women were already seeking STI screening in this clinical setting, and a less medically connected community that is more difficult to recruit may be more influenced by the intervention. In this clinical setting perceived seriousness of acquiring a STI from a new partner may need to be enhanced,⁴⁰ and different *processes of change* may need to be emphasized depending on the type of high-risk sexual behavior reported. For example, experiential processes may need to be emphasized in order to increase the awareness of STI risk and the impact on self and others. Finally, to minimize condition contamination the study should be conducted in two clinics where the clinic is the unit of randomization.

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Figure 1.

Table 1

Definitions and Assessment of Transtheoretical Model of Change (TTM) constructs for seeking STI screening

TTM CONSTRUCT	DEFINITION	ASSESSMENT
STAGES OF CHANGE (SOC): 28,29	<p><i>Precontemplation</i> - individuals do not recognize a need to change;</p> <p><i>Contemplation</i> - marked by growing concern and weighing of the risks and rewards of changing;</p> <p><i>Preparation</i>- individuals make commitment to change and initiate plans;</p> <p><i>Action</i> - steps taken to implement the plan and adopt the behavior;</p> <p><i>Maintenance</i> - the new behavior becomes normative.</p>	<p>Series of separate readiness “rulers” were used to guide participants in determining their <i>stage of change</i> for seven different conditions - “How ready are you to get screened for gonorrhea and Chlamydia even when you do not have vaginal symptoms if...”;</p> <p>1) “<i>You have a partner who you think has other partners?</i>” 2) “<i>You have sex with more than one partner?</i>” 3) “<i>You have sex with a new partner?</i>” 4) “<i>You do not use condoms every time you have sex?</i>” 5) “<i>You have a condom break or slip?</i>” 6) “<i>You think you may have an STD?</i>” and 7) “<i>You think your partner may have an STD.</i>” Perceived risk and readiness was expected to vary for each condition.</p>
DECISIONAL BALANCE: 28,29,33	Cognitive appraisal/ evaluation of positives (<i>pros</i>) and negatives (<i>cons</i>) of a behavior and reasons to change/not change behavior	10-item measure with a 5-point Likert scale; participants indicate importance of <i>pros</i> and <i>cons</i> in making decision to adopt screening in high risk situations. Cronbachs alpha for the five <i>pros</i> and five <i>cons</i> statements were 0.79 and 0.70, respectively. Sample <i>pros</i> item: “ <i>I would not have to worry about having a sexually transmitted disease;</i> ” Sample <i>cons</i> item: “ <i>It takes a long time.</i> ”
PROCESSES OF CHANGE: 29,34	<p>Strategies and behavioral mechanisms that facilitate movement through the stages; useful in developing interventions;</p> <p>Experiential processes - more salient in the early SOC, relate to person's thought processes and ways in which she experiences her own particular situation;</p> <p>Behavioral processes - more important in the later SOC, more action oriented.</p>	<p>32-item measure with four experiential processes and four behavioral processes; a 5-point Likert Scale (1=“never” to 5=“repeatedly”) was used to best describe how often participants made use of each process when adopting the behavior of seeking testing for GC and CT in high risk situations. Cronbachs alpha ranged from 0.85 for the experiential processes to 0.90 for the behavioral processes.</p> <p>Experiential processes - Sample items: “<i>I read articles about the high numbers of Chlamydia and gonorrhea infections in young women;</i>”; “<i>I am frightened after unprotected sex that I may have gotten gonorrhea or Chlamydia;</i>”; “<i>When I am afraid to get tested for gonorrhea and Chlamydia I remind myself that no matter the result it is always better to know;</i>”; and “<i>I am aware more and more people around me are finding it important to get tested for gonorrhea and Chlamydia.</i>”</p> <p>Behavioral processes - Sample items: “<i>I have someone I can trust when I need to talk about testing for gonorrhea and Chlamydia;</i>”; “<i>I tell myself that I can call and make an appointment to get tested for gonorrhea and Chlamydia;</i>”; “<i>One of the benefits of getting tested for</i></p>

TTM CONSTRUCT	DEFINITION	ASSESSMENT
		<i>gonorrhea and Chlamydia regularly is that I do not have to spend time worrying about them"; "I have ways to remind myself to get tested for gonorrhea and Chlamydia."</i>

Table 2

Baseline Demographic and Sexual Behavior Characteristics of Study Participants by Group Assignment

Characteristics	Total (N= 376)	Intervention (N = 192)	Standard Care (N = 184)
Age (years)			
Range	16 – 21	16 – 21	16 – 21
Mean $\pm$ std dev	18.5 $\pm$ 1.4	18.6 $\pm$ 1.4	18.4 $\pm$ 1.4
Race/ethnic distribution			
African American	252 (67%)	131 (68%)	121 (66%)
Hispanic	68 (18%)	31 (6%)	37 (20%)
Non-Hispanic White	42 (11%)	23 (12%)	19 (10%)
Other	14 (4%)	7 (4%)	7 (4%)
Age-appropriate education *	258 (69%)	133 (69%)	126 (68%)
Age of coitarche (years)			
Range	9 – 20	9 – 20	11–20
Mean $\pm$ std dev	15.3 $\pm$ 1.6	15.5 $\pm$ 1.5	15.3 $\pm$ 1.7
Lifetime sexual partners			
Range	1–300	1–300	1–55
Mean $\pm$ std dev	6.4 $\pm$ 18.0	7.4 $\pm$ 24.2	5.3 $\pm$ 7.3
Median	4.0	4.0	4.0
Total # Partner(s) past 6 months			
1–2	316 (84%)	164 (85%)	152 (83%)
> 2	44 (12%)	20 (10%)	24 (13%)
# Main partners past 6 months			
1	308 (82%)	159 (83%)	149 (81%)
>1	42 (11%)	19 (10%)	23 (12%)
# Other partners past 6 months			
1	58 (15%)	33 (17%)	25 (13%)
>1	38 (10%)	17 (9%)	21(11%)
# New partners past 6 months			
1–2	162 (43%)	77 (40%)	85 (46%)
>2	30 (8%)	15 (8%)	15 (8%)
Ever had a STI	190 (50%)	100 (52%)	90 (49%)

Characteristics	Total (N= 376)	Intervention (N = 192)	Standard Care (N = 184)
Had STI in past 12 months	105 (28%)	52 (27%)	53 (29%)
Reasons for the clinic visit**			
Annual well woman exam/Pap smear	156 (41%)	80 (42%)	76 (41%)
Oral contraceptive pills	120(32%)	63 (39%)	56 (30%)
Depo-Provera shot	73(25%)	34 (18%)	39 (21%)
STI check/vaginal discharge/odor	65 (17%)	33 (17%)	32 (17%)
Pregnancy test	25 (7%)	12 (6%)	13 (7%)
STI medication	16 (4%)	7 (4%)	9 (5%)
Contraception used in past 30 days			
Condoms	201 (53%)	97 (50%)	104 (36%)
Oral contraceptive pills	87 (23%)	39 (20%)	48 (25%)
Depo-Provera	92 (24%)	47 (24%)	45 (24%)
Withdrawal	47(13%)	26 (13%)	21 (11%)
Condom use at last sex	224 (59.5%)	108 (56%)	116 (63%)

* Age appropriate education – Completed at least 10th grade by 16 years; 11th grade by 17 years; 12th grade, high school or GED by 18 years

** Some of subjects came in for > one reason.

Table 3

Reasons for STI-Related Clinic Visits for Each Study Group During 12 Month Follow-up Period

Reason for STI Visit	Total (N=168) N (%)	Intervention (N=78) N (%)	Standard Care (N=90) N (%)	<i>p</i> -value
Sex without a condom	132 (78.5)	59 (35.1)	73 (43.4)	0.38
Sex with a new partner	70 (41.6)	35 (21.0)	35 (20.8)	0.43
Thinks partner has a STI	50 (29.7)	27 (16.1)	23 (13.7)	0.20
Sex with >1 partner	25 (14.8)	9 (5.3)	16 (9.5)	0.25
Condom broke	19 (11.0)	10 (5.9)	9 (5.3)	0.56
Condom slipped	10 (5.9)	4 (2.4)	6 (3.5)	0.67
Exposure to a STI (informed by Health Department)	9 (5.3)	5 (2.9)	4 (2.4)	0.57
Referred by an infected partner	8 (4.7)	4 (2.4)	4 (2.4)	0.83

Table 4

Efficacy of Intervention to Promote STI Screening in Young Women: Adjusted Odds Ratios (aOR),* with 95 % Confidence Intervals (CI), for STI-related Visits over 12-month Study Period

	Intervention Group		Standard-Care Group	
	aOR	95% CI	aOR	95% CI
Multiple Partners	2.21	1.20–4.06	1.19	1.01–1.39
Other Partner	2.71	1.49–4.93	2.13	1.23–3.66
Think is Pregnant	4.04	1.64–9.96	1.81	1.04–3.16
Lifetime STI	2.07	1.20–3.57	2.13	1.21–3.74
			2.38	1.23–4.60
			4.44	2.25–8.76

* Calculated by using generalized estimating equations for logistic regression models. All variables are dichotomous (Y/N) and use the negative response as the referent group except Age at 1st sex, which models the increase in the aOR with each 1 year age increase. Odds ratios are adjusted for all other variables in the model.