Original Contribution

Abstinence and Safer Sex
HIV Risk-Reduction Interventions for African American Adolescents
A Randomized Controlled Trial

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Context.—African American adolescents are at high risk of contracting sexually transmitted infection with human immunodeficiency virus (HIV), but which behavioral interventions to reduce risk are most effective and who should conduct them is not known.

Objective.—To evaluate the effects of abstinence and safer-sex HIV risk-reduction interventions on young inner-city African American adolescents’ HIV sexual risk behaviors when implemented by adult facilitators as compared with peer cofacilitators.

Design.—Randomized controlled trial with 3-, 6-, and 12-month follow-up.


Participants.—A total of 659 African American adolescents recruited for a Saturday program.

Interventions.—Based on cognitive-behavioral theories and elicitation research, interventions involved 8 1-hour modules implemented by adult facilitators or peer cofacilitators. Abstinence intervention stressed delaying sexual intercourse or reducing its frequency; safer-sex intervention stressed condom use; control intervention concerned health issues unrelated to sexual behavior.

Main Outcome Measures.—Self-reported sexual intercourse, condom use, and unprotected sexual intercourse.

Results.—Mean age of the enrollees was 11.8 years; 53% were female and 92.6% were still enrolled at 12 months. Abstinence intervention participants were less likely to report having sexual intercourse in the 3 months after intervention than were control group participants (12.5% vs 21.5%, *P*<.02), but not at 6- or 12-month follow-up (17.2% vs 22.7%, *P*=.14; 20.0% vs 23.1%, *P*=.42, respectively). Safer-sex intervention participants reported significantly more consistent condom use than did control group participants at 3 months (odds ratio [OR]=3.38; 95% confidence interval [CI], 1.25-9.16) and higher frequency of condom use at all follow-ups. Among adolescents who reported sexual experience at baseline, the safer-sex intervention group reported less sexual intercourse in the previous 3 months at 6- and 12-month follow-up than did control and abstinence intervention (adjusted mean days over prior 3 months, 1.34 vs 3.77 and 3.03, respectively; *P*=.01 at 12-month follow-up) and less unprotected intercourse at all follow-ups than did control group (adjusted mean days, 0.04 vs 1.85, respectively; *P*<.001 at 12-month follow-up). There were no differences in intervention effects with adult facilitators as compared with peer cofacilitators.

Conclusion.—Both abstinence and safer-sex interventions can reduce HIV sexual risk behaviors, but safer-sex interventions may be especially effective with sexually experienced adolescents and may have longer-lasting effects.

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Abstinence vs Safer Sex—Jemmott et al

Abstinence and safer-sex intervention strategies are most appropriate and efficacious? Which types of individuals are likely to be the most effective facilitators of HIV-behavioral interventions for adolescents?
trials, and other studies have found that abstinence interventions did not reduce sexual behavior. The rationale for the safer-sex approach is that interventions that try to prevent, eliminate, or even reduce sexual intercourse among adolescents are unrealistic; hence, prevention programs should instead attempt to increase condom use. Several studies have indicated that safer-sex interventions can increase adolescents’ condom use. No randomized controlled trial, however, has considered the efficacy of both intervention approaches.

Although it is often asserted that interventions for adolescents may be especially efficacious if peers implement them, several studies have documented effects of HIV risk-reduction interventions implemented by adults. However, no randomized controlled trial has considered the effects on sexual behavior of peer-led and adult-led HIV interventions.

This randomized controlled trial tested the effects of theory-based abstinence and safer-sex interventions on young inner-city African American adolescents. We hypothesized that, compared with the control group, adolescents who received the abstinence intervention would report less sexual intercourse and adolescents who received the safer-sex intervention would report more condom use. We hypothesized that the abstinence intervention would have the strongest impact on theoretical mediators of abstinence, whereas the safer-sex intervention would have the strongest impact on theoretical mediators of condom use. Finally, we tested whether the effects of the interventions differed with adult facilitators as compared with peer cofacilitators.

METHODS

Participants

The participants were 659 African American adolescents (mean age, 11.8 years) recruited from sixth and seventh grade classes of 3 middle schools serving low-income African American communities in Philadelphia, Pa, via announcements in assemblies, classrooms, and cafeterias and letters to parents or guardians. They volunteered for the ‘‘Spruce Adolescent Health Promotion Project’’ designed to reduce the chances that teenagers will develop devastating health problems, including cardiovascular diseases, cancer, and AIDS. About 53.0% were female and 26.8% lived with both of their parents. On the preintervention questionnaire, 25.2% of respondents reported ever having sexual intercourse and 15.4% of respondents reported having sexual intercourse in the previous 3 months. Few respondents (1.8%) reported having same-gender sexual relationships. The adolescents were offered $100 for participating; $40 at the end of the 2-session intervention and an additional $20 for each of the 3 follow-ups.

Procedures

The study was approved by the Institutional Review Panel of Princeton University. African American adolescents from the 3 middle schools who had signed parent or guardian consent forms were eligible to participate. The study was a randomized controlled trial. The adolescents were stratified by gender and age, and based on computer-generated random number sequences, were randomly assigned to 1 of 3 interventions: an abstinence HIV intervention, a safer-sex HIV intervention, or a health promotion intervention that served as the control group. They were also randomized into groups of 6 to 8 adolescents led by (1) 1 male or female adult facilitator or (2) 2 male, 2 female, or 1 male and 1 female peer cofacilitators. (The results did not differ as a function of facilitator gender or matching facilitator gender with participant gender.) One researcher conducted the computer-generated random assignment and others executed the assignments. Adolescents were enrolled in the study in 3 cycles or replications, 1 at each school. The Figure shows the number of adolescents randomized to each group. The sample sizes are smaller in some analyses because of attrition or participants’ failure to respond to questions.

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A healthy behavior might thwart the attainment of their goals. The 2 HIV risk-reduction interventions were based on social cognitive theory,26-28 the theory of reasoned action,29-30 its extension, the theory of planned behavior,31-32 and information gathered from elicitation research and focus groups with adolescents from the study population.

The abstinence intervention acknowledged that condoms can reduce risks but emphasized abstinence to eliminate the risk of pregnancy and STDS, including HIV. It was designed to (1) increase knowledge of HIV and STDS, (2) strengthen behavioral beliefs supporting abstinence, including the belief that abstinence can prevent pregnancy, STDS, and HIV, and the belief that abstinence can foster attainment of future goals, and (3) increase self-efficacy and skills regarding the ability to resist pressure to have sexual intercourse and the ability to negotiate abstinence.

The safer-sex intervention indicated that abstinence is the best choice but emphasized the importance of using condoms to reduce the risk of pregnancy and STDS, including HIV, if participants were to have sex. It was designed to (1) increase HIV/STD knowledge and the specific belief that using condoms could prevent pregnancy, STDS, and HIV, (2) enhance health behaviors that allay participants' fears regarding adverse effects of condoms on sexual enjoyment, and (3) increase skills and self-efficacy regarding their ability to use condoms, including confidence that they could negotiate condom use with sexual partners.

To control for “Hawthorne effects” to reduce the likelihood that effects of the HIV interventions could be attributed to nonspecific features,33 including group interaction and special attention, the participants in the control group received a health promotion intervention designed to be as valuable and enjoyable as the HIV interventions. It focused not on AIDS or sexual behavior, but on behaviors associated with risk of cardiovascular disease, stroke, and certain cancers—health problems that are among the 7 leading causes of premature death among African Americans.34-36 It was designed to increase knowledge and motivation regarding healthful dietary practices, aerobic exercise, and breast and testicular self-examination, and to discourage cigarette smoking.

Facilitators and Facilitator Training

The adult facilitators were 25 (10 men and 15 women) African Americans (mean age, 39.5 years). Their median level of education was a master’s degree. They had a median of 8 years of experience working with African American adolescents. We began with adults who had the skills to implement any of the 3 interventions. After stratifying them by age and gender, we randomly assigned them to receive 2.5 days of training to implement 1 of the 3 interventions.

The peer facilitators were 45 Philadelphia high school students (mean age, 15.6 years). We selected them based on letters of recommendation and interviews; about 56% were female. They participated in a 3-day intensive leadership training retreat on the basic skills of small-group facilitation. They were then stratified by age and gender and randomly assigned to receive 4 days of training to implement 1 of the 3 interventions.

The adult and peer intervention training stressed the importance of implementation fidelity. Implementation fidelity was also emphasized before each intervention session when the facilitators met with their facilitator trainers to review the modules to be implemented. Several procedures were used to monitor the interventions. The facilitator trainers continually, and unobtrusively, monitored how each facilitator delivered the intervention. Facilitators recorded any intervention activities they did not cover and reported their reactions and participants' reactions to the intervention. In addition, we recorded the number of sessions participants attended and collected participants' confidential evaluative ratings of the interventions.

Primary Outcome Measures

Participants in all 3 groups completed confidential questionnaires before intervention, immediately after intervention, and at 3-, 6-, and 12-month follow-ups. All questions had been pilot tested to ensure that they were clear and that the phrasing of all items was appropriate for the study population. The preintervention and follow-up questionnaires assessed sexual behavior, demographic variables, and mediator variables. The postintervention questionnaire assessed mediator variables and participants' evaluative ratings of the interventions.

The primary outcomes were self-reported sexual behaviors in the previous 3 months, including sexual intercourse, condom use, and unprotected sexual intercourse. Frequency of sexual intercourse was the number of days on which the participants had sexual intercourse. Frequency of condom use was rated on a scale from 1 (indicating never) to 5 (indicating always). Consistent condom use was defined as using a condom during every instance of sexual intercourse. Frequency of unprotected sexual intercourse was the number of days on which the participants had sexual intercourse without using a condom.

We took several steps to increase the validity of self-reported sexual behavior. To reduce potential memory problems, we asked adolescents to report their behaviors over a relatively brief period (ie, 3 months).37 We wrote the dates constituting the period on the blackboard in the questionnaire administration room, and gave participants calendars on which the period was demarcated. To reduce the likelihood of demand for giving their responses to the same individuals from whom they received an intervention, the data were collected by proctors who were blind to the participants' intervention group. Proctors emphasized to participants the importance of responding honestly. For instance, they informed them that their responses would be used to develop programs for other African American adolescents in Philadelphia and that the programs would be successful only if they answered the questions truthfully. In this sense, we attempted to arouse the “social responsibility motive” to counteract any possible social desirability motive. The proctors also assured the participants that their responses were confidential and that code numbers rather than names would be used on the questionnaires. Participants signed an agreement pledging to answer the questions honestly, a procedure that has been shown38 to yield more valid self-reports on sensitive issues.

Secondary Outcome Measures

The secondary outcomes included potential mediators of the effects of interventions on HIV risk-associated sexual behavior. Several variables from the theory of reasoned action,39 the theory of planned behavior,31,32 and social cognitive theory20-22 were measured with 5-point Likert scales. We measured 2 behavioral beliefs regarding condoms identified in previous research41-42: (1) condom-use prevention beliefs (5 items concerning the belief that condoms prevent pregnancy, STDS, and AIDS; Cronbach α = .76) and (2) condom-use hedonistic beliefs (7 items concerning the belief that condoms do not interfere with sexual enjoyment; α = .74). Five items measured condom availability beliefs (participants' confidence that they could have access to condoms when they needed them; α = .75). Three items measured condom-use technical skills beliefs (participants' confidence that they could use condoms skillfully; α = .76). Three items measured condom-use impulse control beliefs (participants' confidence that they could control themselves enough to use condoms; α = .73). Three items measured condom-use negotiation beliefs (α = .77). One item measured condom-use self-efficacy, “I am sure
The percentage of intervention activities that the facilitators reported imple-
menting ranged from 89% to 100%, with a mean of 99%. The percentage of activities implemented did not differ among the 3 intervention groups. About 98.2% of adolescents attended both intervention sessions, and attendance did not differ by intervention group.

Participants' evaluations of the interventions were very favorable (means, 4.22 vs 4.01; P < .001) more than did those who had an intervention than were those in the control group were significantly less likely to report having sexual intercourse at any follow-up.

Effects of Behavioral Interventions on Sexual Behavior

Tables 1, 2, and 3 present the effects of the interventions on self-reported sexual behavior at the 3 follow-ups. As hypothesized, adolescents in the abstinence group were significantly less likely to report having sexual intercourse in the 3 months after the intervention than were those in the control group (odds ratio [OR], 0.45; 95% confidence interval 0.31 to 0.99). The generalizability of findings would be limited if a variable related to attrition interacted with the interventions to affect outcome measures. However, hierarchical multiple regression analyses revealed no such interaction on any self-reported sexual behavior outcome at any follow-up.

Table 3.—Self-reported Sexual Behavior by Intervention Group at 12-Month Follow-up

<table>
<thead>
<tr>
<th>Sexual Behavior in Past 3 Months</th>
<th>Intervention Group</th>
<th>P Values for Contrasts</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Abstinence (n = 200)</td>
<td>Safer Sex (n = 204)</td>
</tr>
<tr>
<td>% Who had sexual intercourse</td>
<td>20.0 (35/175)</td>
<td>16.5 (27/164)</td>
</tr>
<tr>
<td>Adjusted mean (SD) frequency of intercourse, d</td>
<td>0.82 (2.97)</td>
<td>0.58 (2.97)</td>
</tr>
<tr>
<td>Sexually inexperienced at preintervention</td>
<td>0.27 (2.81)</td>
<td>0.22 (2.81)</td>
</tr>
<tr>
<td>Sexually experienced at preintervention</td>
<td>3.03 (2.88)</td>
<td>1.34 (2.84)</td>
</tr>
<tr>
<td>Reporting consistent condom use</td>
<td>41.2 (14/34)</td>
<td>62.5 (20/32)</td>
</tr>
<tr>
<td>Mean (SD) frequency of condom use</td>
<td>3.94 (1.28)</td>
<td>4.15 (1.21)</td>
</tr>
<tr>
<td>% Reporting unprotected sexual intercourse</td>
<td>9.8 (16/163)</td>
<td>5.4 (9/167)</td>
</tr>
<tr>
<td>Sexually inexperienced at preintervention</td>
<td>5.6 (7/126)</td>
<td>3.2 (4/124)</td>
</tr>
<tr>
<td>Sexually experienced at preintervention</td>
<td>32.1 (9/28)</td>
<td>9.7 (3/31)</td>
</tr>
<tr>
<td>Adjusted mean (SD) frequency of unprotected sexual intercourse, d</td>
<td>0.29 (2.25)</td>
<td>0.17 (2.26)</td>
</tr>
<tr>
<td>Sexually inexperienced at preintervention</td>
<td>0.13 (2.23)</td>
<td>0.07 (2.23)</td>
</tr>
<tr>
<td>Sexually experienced at preintervention</td>
<td>1.09 (2.26)</td>
<td>0.04 (2.23)</td>
</tr>
</tbody>
</table>

*P values for percentages are from χ² tests; all others are from F tests. Consistent condom use is the use of condoms on all instances of sexual intercourse. Frequency of intercourse is the number of days on which the adolescent had sexual intercourse. Frequency of unprotected sexual intercourse is the number of days on which the adolescent had sexual intercourse without using a condom. Analyses by preintervention sexual experience exclude participants who did not report whether they had preintervention sexual experience. †The preintervention measure is partialled out of the follow-up measure. ‡The rating is measured on a scale of 1 (never) to 5 (always).
The interaction between intervention group and preintervention sexual experience on self-reported abstinence was nonsignificant ($P=.28$), indicating that the effects of the interventions on abstinence did not differ between adolescents who were sexually experienced at pre-intervention (ie, those who reported having sexual intercourse at least once before the intervention) and those who were sexually inexperienced at pre-intervention. Among adolescents who reported no preintervention sexual experience, those in the abstinence intervention were less likely to report having sexual intercourse at the 3-month follow-up than were their counterparts in the control group (OR, 0.38; 95% CI, 0.19-0.73). Self-reported frequency of sexual intercourse was also significantly higher in the safer-sex group than in the control group. Among sexually experienced adolescents, those who received the safer-sex intervention reported less unprotected sexual intercourse than those in the control group or the abstinence group.

At the 6-month follow-up, the abstinence intervention did not reduce self-reported sexual behavior compared with the other interventions. However, adolescents in the safer-sex group reported less sexual intercourse and significantly more frequent condom use than did those in the control group. There were also group and sexual experience interactions on frequency of intercourse ($P=.002$) and frequency of unprotected intercourse ($P=.002$). Among adolescents with pre-intervention sexual experience, the safer-sex intervention caused lower reported frequency of sexual intercourse and unprotected sexual intercourse than did the control or abstinence intervention. Among sexually inexperienced adolescents, there were no differences.

### Effects of Behavioral Interventions on Conceptual Variables

As shown in Table 4, immediately after the intervention, the adolescents in the abstinence group believed more strongly that practicing abstinence would help them achieve their career goals than did those in the control group. Adolescents in the abstinence group also believed more strongly that practicing abstinence would prevent pregnancy and AIDS, expressed less favorable attitudes toward sexual intercourse, and reported weaker intentions of having sexual intercourse in the next 3 months than did those in the control group or the safer-sex group. Adolescents in the abstinence group also believed more strongly that practicing abstinence would help them achieve their career goals than did those in the control group.

Immediately after the intervention, the adolescents in the safer-sex group scored significantly higher in condom-use knowledge; believed more strongly that condoms can prevent pregnancy, STDs, and HIV; believed more strongly...
that using condoms would not interfere with sexual enjoyment; and expressed greater confidence that they could have condoms available when they needed them than did those in the control group or the abstinence group. Adolescents in the safer-sex group reported greater confidence that they could exercise sufficient impulse control to use condoms and greater self-efficacy for using condoms than did those in the control group, but not more than those in the abstinence group. Adolescents in the safer-sex group did not differ from those in the other 2 groups in technical skills belief, negotiation skills belief, or condom-use intentions.

Adolescents in both HIV-prevention groups scored significantly higher in HIV risk-reduction knowledge than did those in the control group. In addition, adolescents in the safer-sex group scored significantly higher than did those in the abstinence group.

Other Outcomes

The group and type of facilitator interactions on the primary outcome measures and the mediators were nonsignificant, indicating that the intervention effects did not differ depending on whether the groups were implemented by an adult vs peer cofacilitators. Hierarchical multiple regression analyses revealed that Marlowe-Crowne Social Desirability Scale scores did not interact with intervention group to influence sexual behavior reported at any of the follow-ups. Analyses on the subsample of adolescents in the 2 HIV interventions also revealed that social desirability scores were unrelated to self-reported sexual behavior at the follow-ups.

COMMENT

The results demonstrate that culture-sensitive cognitive-behavioral interventions stressing abstinence or condom use can reduce HIV risk-associated sexual behavior among young African American adolescents. The abstinence intervention caused positive changes on theory-based mediators of abstinence at the immediate postintervention assessment and increased self-reported abstinence at the 3-month follow-up. The safer-sex intervention increased mediators of condom use postintervention and self-reported condom use at 3-month follow-up. Although each intervention had been implemented by an adult vs peer cofacilitators, can reduce the HIV

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risk-associated sexual behavior of young inner-city African American adolescents. By using theory-based interventions, 2 important goals of HIV prevention—decreasing sexual behavior and increased condom use—can be achieved. Our finding that the safer-sex intervention curbed unprotected sexual intercourse, whereas the abstinence intervention did not, suggests that if the goal is reduction of unprotected sexual intercourse, the safer-sex strategy may hold the most promise, particularly with those adolescents who are already sexually experienced. Moreover, safer-sex interventions may have longer-lasting effects than abstinence interventions. These results must be replicated in other adolescent populations and settings. By conducting such research, it may be possible to reduce the risk of sexually transmitted HIV infection that adolescents may face as they prepare for adulthood.

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