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

John B. Jemmott III, PhD; Loretta Sweet Jemmott, PhD, RN, FAAN; Geoffrey T. Fong, PhD

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.

JAMA. 1998;279:1529-1536

©1998 American Medical Association. All rights reserved.

IT IS WELL documented\textsuperscript{1,2} that African American adolescents are at high risk of sexually transmitted infection with human immunodeficiency virus (HIV), which causes acquired immunodeficiency syndrome (AIDS). Although a growing amount of literature\textsuperscript{3,4} suggests that behavioral interventions can reduce adolescents’ self-reported HIV risk-associated sexual behavior, several questions remain unanswered: Which behavioral 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?

For editorial comment see p 1574.

Sexual transmission of HIV is tied to unprotected sexual intercourse—that is, sexual intercourse without the use of a latex condom.\textsuperscript{5} To reduce the risk of sexually transmitted HIV infection, a behavioral intervention must reduce the frequency of unprotected sexual intercourse. This can be achieved in 2 ways: (1) the abstinence strategy, which focuses on reducing the frequency of sexual intercourse, and (2) the safer-sex strategy, which focuses on increasing the frequency of condom use. Whether abstinence or safer sex should be the focus of intervention efforts has been vigorously debated among public health experts, educators, parents, and other advocates for youth.

The abstinence approach has appeal because adolescents, particularly young adolescents, may lack the knowledge and judgment to make informed choices to protect themselves from pregnancy and sexually transmitted diseases (STDs) or to grapple with these adverse consequences of unprotected sexual intercourse. However, evidence for the efficacy of abstinence interventions is meager. Two studies\textsuperscript{6,7} that found significant effects of abstinence interventions were not randomized controlled...
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 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.

<table>
<thead>
<tr>
<th>Method</th>
<th>Received Abstinence Intervention as Allocated (n=215)</th>
<th>Received Safer Sex Intervention as Allocated (n=218)</th>
<th>Received Control Intervention as Allocated (n=214)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eligible Adolescents (n=827)</td>
<td>Did Not Receive Abstinence Intervention as Allocated (n=5)</td>
<td>Did Not Receive Safer Sex Intervention as Allocated (n=3)</td>
<td>Did Not Receive Control Intervention as Allocated (n=4)</td>
</tr>
<tr>
<td>Not Randomized (n=168)</td>
<td>Followed Up at 3 Months (n=213)</td>
<td>Followed Up at 3 Months (n=216)</td>
<td>Followed Up at 3 Months (n=207)</td>
</tr>
<tr>
<td>Randomized (N=659)</td>
<td>Followed Up at 6 Months (n=204)</td>
<td>Followed Up at 6 Months (n=207)</td>
<td>Followed Up at 6 Months (n=211)</td>
</tr>
<tr>
<td></td>
<td>Followed Up at 12 Months (n=200)</td>
<td>Followed Up at 12 Months (n=206)</td>
<td>Followed Up at 12 Months (n=204)</td>
</tr>
<tr>
<td></td>
<td>Completed Trial (n=206)</td>
<td>Completed Trial (n=206)</td>
<td>Completed Trial (n=204)</td>
</tr>
</tbody>
</table>

Progress of participants through the trial. Those not randomized failed to appear for unknown reasons.
healthful behavior might thwart the attainment of their goals. The 2 HIV risk-reduction interventions were based on social cognitive theory,20,21 the theory of reasoned action,23,24 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 abstinence to eliminate 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 hedonistic beliefs to 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 factors,44 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.45,46 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 behavioral, 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 from 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.

**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,28 the theory of planned behavior,31,32 and social cognitive theory20,21 were measured with 5-point Likert scales. We measured 2 behavioral beliefs regarding condoms identified in previous research24,45: (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...
that I can use a condom if I have sex.” Three items measured intention to use condoms if they have sex in the next 3 months (α=.75). Knowledge specific to condom use was assessed with 6 true-false items (α=.53).

We assessed 2 behavioral beliefs regarding abstinence: abstinence prevention beliefs (2 items concerning the belief that abstinence can prevent pregnancy and AIDS; α=.57) and goal attainment beliefs (2 items concerning the belief that abstinence can foster attainment of career goals; α=.80). One item measured attitude toward having sexual intercourse in the next 3 months. One item measured intention to have sexual intercourse in the next 3 months.

HIV risk-reduction knowledge was measured with 34 items regarding the transmission and consequences of AIDS and STDs (α=.87). So that all participants were asked questions pertaining to their intervention, all participants also completed measures of health knowledge and attitude and intention regarding health-promoting behaviors to assess effects of the control group. However, analyses on these measures are not presented in this article.

On the postintervention questionnaire, a 10-item scale measured how much participants liked the intervention (α=.84). One item measured how much they liked their facilitator. A 3-item scale measured how much they thought they learned from the intervention (α=.80). One item measured the extent to which they would recommend the program to other adolescents. The Marlowe-Crowne Social Desirability Scale included in the preintervention questionnaire assessed the tendency of participants to describe themselves in favorable, socially desirable terms. The scale has been used extensively in studies of adolescents and African American adolescents.41,42

Sample Size and Statistical Analyses

With α=.05, 2-tailed, a total sample size of 550 participants completing the trial was projected to provide power of 80% to detect a .025-SD difference in self-reported sexual behavior between the HIV intervention groups and the control group. We conducted a series of analyses of variance and χ2 tests on baseline measures to determine whether the randomization procedures were successful. We performed χ2 and t tests to analyze attrition. Hypotheses regarding conceptual variables and frequency of sexual behaviors were tested with analyses of covariance, controlling for baseline scores, and planned contrasts of prespecified hypotheses. To test the effects of the abstinence intervention, 1 contrast compared the abstinence group with the control group and another compared the abstinence group with the safer-sex group. To test the effects of the safer-sex intervention, 1 contrast compared the safer-sex group with the control group and another compared the safer-sex group with the abstinence group. Hypotheses regarding sexual behaviors measured with dichotomous variables were tested with logistic regression analyses, controlling for baseline sexual activity. However, baseline scores were not used as a covariate for hypotheses regarding condom use because of the small number of participants who reported sexual intercourse at both baseline and follow-up. Analyses on skewed sexual intercourse frequency and unprotected sexual intercourse frequency were performed after subjecting the data to log (x+1) transformation.43 However, we present the untransformed frequency of sexual intercourse and unprotected sexual intercourse in Tables 1 through 3. All interactions were tested hierarchically, that is, controlling for the main effects of all variables involved in the interaction.44,45 Tests of intervention effects used an intention-to-treat approach in which participants were analyzed in their original randomized groups regardless of the number of intervention sessions they attended.

RESULTS

Baseline Comparability of Intervention Groups

The analyses of variance revealed a significant difference among groups in preintervention condom-use knowledge (P=.05). Contrasts indicated that preintervention condom-use knowledge was greater in the safer-sex group than in the control group (P=.02). No other differences among groups on preintervention measures of conceptual variables, sexual behavior, or demographic variables were significant. Multiple regression revealed that preintervention condom-use knowledge predicted only 3 outcome variables: postintervention attitude toward sexual intercourse (P=.002), intention to have sexual intercourse (P=.006), and HIV risk-reduction knowledge (P=.02), controlling for preintervention measures. Accordingly, preintervention condom-use knowledge was used as a covariate in analyses of these 3 outcome variables.

Quality Assurance

The percentage of intervention activities that the facilitators reported imple-
### Table 2.—Self-reported Sexual Behavior by Intervention Group at 6-Month Follow-up*

<table>
<thead>
<tr>
<th>Sexual Behavior in Past 3 Months</th>
<th>Abstinence (n = 204)</th>
<th>Safer Sex (n = 207)</th>
<th>Control (n = 211)</th>
<th>P Values for Contrasts</th>
</tr>
</thead>
<tbody>
<tr>
<td>% Who had sexual intercourse</td>
<td>17.2 (30/174)</td>
<td>15.0 (25/167)</td>
<td>22.7 (39/172)</td>
<td>.14 .18 .92</td>
</tr>
<tr>
<td>Adjusted mean (SD) frequency† of intercourse, d</td>
<td>1.24 (5.86)</td>
<td>0.48 (5.86)</td>
<td>1.61 (5.86)</td>
<td>.44 .06 .33</td>
</tr>
<tr>
<td>Sexually inexperienced at preintervention</td>
<td>0.41 (4.77)</td>
<td>0.41 (4.77)</td>
<td>0.68 (4.77)</td>
<td>.56 .52 .95</td>
</tr>
<tr>
<td>Sexually experienced at preintervention</td>
<td>2.12 (4.89)</td>
<td>0.55 (4.84)</td>
<td>4.46 (4.85)</td>
<td>.31 &lt;.001 .02</td>
</tr>
<tr>
<td>% Reporting consistent condom use</td>
<td>44.4 (12/27)</td>
<td>50.0 (14/28)</td>
<td>37.5 (15/40)</td>
<td>.56 .29 .67</td>
</tr>
<tr>
<td>Mean (SD) frequency of condom use‡</td>
<td>3.77 (1.19)</td>
<td>3.99 (1.22)</td>
<td>3.25 (1.60)</td>
<td>.13 .03 .56</td>
</tr>
<tr>
<td>% Reporting unprotected sexual intercourse</td>
<td>7.4 (16/163)</td>
<td>7.1 (12/169)</td>
<td>10.8 (18/166)</td>
<td>.49 .34 .61</td>
</tr>
<tr>
<td>Sexually inexperienced at preintervention</td>
<td>3.2 (4/125)</td>
<td>4.0 (5/124)</td>
<td>4.8 (6/124)</td>
<td>.51 .76 .72</td>
</tr>
<tr>
<td>Sexually experienced at preintervention</td>
<td>27.6 (6/29)</td>
<td>18.8 (6/32)</td>
<td>32.4 (12/37)</td>
<td>.85 .28 .40</td>
</tr>
<tr>
<td>Adjusted mean (SD) frequency† of unprotected sexual intercourse, d</td>
<td>0.25 (0.98)</td>
<td>0.17 (0.98)</td>
<td>0.29 (0.98)</td>
<td>.57 .26 .59</td>
</tr>
<tr>
<td>Sexually inexperienced at preintervention</td>
<td>0.14 (0.99)</td>
<td>0.14 (0.99)</td>
<td>0.15 (0.99)</td>
<td>.85 .92 .93</td>
</tr>
<tr>
<td>Sexually experienced at preintervention</td>
<td>0.73 (1.00)</td>
<td>0.33 (1.01)</td>
<td>0.81 (1.05)</td>
<td>.57 .03 .14</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).

### 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>Abstinence (n = 200)</th>
<th>Safer Sex (n = 206)</th>
<th>Control (n = 204)</th>
<th>P Values for Contrasts</th>
</tr>
</thead>
<tbody>
<tr>
<td>% Who had sexual intercourse</td>
<td>20.0 (35/175)</td>
<td>16.5 (27/164)</td>
<td>23.1 (40/173)</td>
<td>.42 .37 .91</td>
</tr>
<tr>
<td>Adjusted mean (SD) frequency† of intercourse, d</td>
<td>0.62 (2.97)</td>
<td>0.58 (2.97)</td>
<td>1.15 (2.97)</td>
<td>.75 .36 .54</td>
</tr>
<tr>
<td>Sexually inexperienced at preintervention</td>
<td>0.27 (2.81)</td>
<td>0.22 (2.81)</td>
<td>0.30 (2.80)</td>
<td>.95 .84 .79</td>
</tr>
<tr>
<td>Sexually experienced at preintervention</td>
<td>3.03 (2.88)</td>
<td>1.34 (2.84)</td>
<td>3.77 (2.87)</td>
<td>.59 .002 .01</td>
</tr>
<tr>
<td>Reporting consistent condom use</td>
<td>41.2 (14/34)</td>
<td>62.5 (20/32)</td>
<td>51.2 (21/41)</td>
<td>.38 .35 .09</td>
</tr>
<tr>
<td>Mean (SD) frequency of condom use‡</td>
<td>3.94 (1.28)</td>
<td>4.15 (1.21)</td>
<td>3.16 (1.69)</td>
<td>.02 .004 .55</td>
</tr>
<tr>
<td>% Reporting unprotected sexual intercourse</td>
<td>9.8 (16/163)</td>
<td>5.4 (9/167)</td>
<td>10.8 (18/167)</td>
<td>.89 .16 .13</td>
</tr>
<tr>
<td>Sexually inexperienced at preintervention</td>
<td>5.6 (7/126)</td>
<td>3.2 (4/124)</td>
<td>4.8 (6/124)</td>
<td>.80 .52 .37</td>
</tr>
<tr>
<td>Sexually experienced at preintervention</td>
<td>32.1 (9/29)</td>
<td>9.7 (3/31)</td>
<td>31.6 (12/38)</td>
<td>.81 .06 .05</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>
<td>0.51 (2.26)</td>
<td>.88 .13 .17</td>
</tr>
<tr>
<td>Sexually inexperienced at preintervention</td>
<td>0.13 (2.23)</td>
<td>0.07 (2.23)</td>
<td>0.15 (2.23)</td>
<td>.99 .54 .54</td>
</tr>
<tr>
<td>Sexually experienced at preintervention</td>
<td>1.09 (2.26)</td>
<td>0.04 (2.23)</td>
<td>1.85 (2.38)</td>
<td>.85 &lt;.001 &lt;.001</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).

Participants’ evaluations of the interventions were very favorable (means greater than 4.0 on 5-point scales) and did not differ among the 3 interventions. However, there were 2 significant effects of facilitator type. Participants who had peer cofacilitators liked their interventions (means, 4.22 vs 4.01; P = .007) and their facilitators (means, 4.32 vs 4.03; P < .001) more than did those who had an adult facilitator.

### Attrition

As shown in the Figure, there was little attrition. About 96.5% of the original participants attended the 3-month follow-up, 94.4% attended the 6-month follow-up, and 92.6% attended the 12-month follow-up. χ² Tests indicated that the intervention groups did not differ significantly in the percentage of participants retained at 3-month follow-up (P = .27), 6-month follow-up (P = .16), or 12-month follow-up (P = .51).

There were only 3 significant differences between returnees (ie, adolescents who attended the follow-up) and nonreturnees (ie, adolescents who failed to attend the follow-up) on key preintervention variables. Returnees at the 3-month follow-up scored higher in condom prevention beliefs than did nonreturnees (means, 3.67 vs 3.26; P = .05). Returnees at the 6-month follow-up scored higher in abstinence prevention beliefs than did nonreturnees (means, 3.30 vs 2.75; P = .004). Returnees at the 6-month follow-up scored lower in condom-use knowledge than did nonreturnees (means, 1.68 vs 2.15; P = .02). 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.

### 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% confi...
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 had 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 intervention group were less likely to report having sexual intercourse at the 3-month follow-up than were their counterparts in the control group (OR, 0.26; 95% CI, 0.08-0.83) and marginally less than those in the safer-sex group (OR, 0.32; 95% CI, 0.10-0.4). The group and sexual experience interaction was significant on unprotected sexual intercourse ($P=.002$). Among sexually inexperienced adolescents, there were no significant effects of the interventions on unprotected sexual intercourse. In contrast, among sexually experienced adolescents, those who received the safer-sex intervention reported less unprotected sexual intercourse than did 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 marginally fewer days on which they had 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 ($P=.009$) and unprotected intercourse ($P=.06$). Among participants who reported preintervention sexual experience, the safer-sex intervention caused less self-reported sexual intercourse than did the control or abstinence intervention and less self-reported unprotected sexual intercourse than did the control group. Among the sexually inexperienced participants, the differences were nonsignificant.

At the 12-month follow-up, the abstinence intervention did not reduce self-reported sexual behavior compared with the other interventions. However, adolescents in the safer sex and abstinence interventions reported more frequent condom use than did those in the control group. There were also significant group and sexual experience interactions on frequency of intercourse ($P=.007$) and frequency of unprotected intercourse ($P=.002$). Among adolescents with preintervention 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.

### Table 4.—Adjusted Postintervention Means (SDs) on Conceptual Variables by Intervention Group*

<table>
<thead>
<tr>
<th>Conceptual Variable</th>
<th>Abstinence (n = 215)</th>
<th>Safer Sex (n = 218)</th>
<th>Control (n = 214)</th>
<th>Abstinence vs Control</th>
<th>Safer Sex vs Control</th>
<th>Abstinence vs Safer Sex</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abstinence prevention beliefs</td>
<td>3.49 (0.98)</td>
<td>3.26 (0.98)</td>
<td>3.11 (0.98)</td>
<td>&lt;.001</td>
<td>.12</td>
<td>.02</td>
</tr>
<tr>
<td>Abstinence goal-attainment beliefs</td>
<td>3.20 (1.11)</td>
<td>3.07 (1.11)</td>
<td>2.97 (1.11)</td>
<td>.04</td>
<td>.36</td>
<td>.24</td>
</tr>
<tr>
<td>Attitudes toward sexual intercourse</td>
<td>2.06 (0.93)</td>
<td>2.35 (0.94)</td>
<td>2.49 (0.95)</td>
<td>&lt;.001</td>
<td>.15</td>
<td>.002</td>
</tr>
<tr>
<td>Intentions to have sexual intercourse</td>
<td>2.10 (1.00)</td>
<td>2.32 (1.01)</td>
<td>2.34 (1.01)</td>
<td>.02</td>
<td>.86</td>
<td>.03</td>
</tr>
<tr>
<td>Condom use-related conceptual variables</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Condom-use knowledge</td>
<td>2.49 (1.30)</td>
<td>3.79 (1.30)</td>
<td>2.54 (1.30)</td>
<td>.72</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Condom prevention beliefs</td>
<td>3.52 (0.79)</td>
<td>3.91 (0.79)</td>
<td>3.63 (0.79)</td>
<td>.13</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Condom hedonistic beliefs</td>
<td>3.53 (0.66)</td>
<td>3.79 (0.65)</td>
<td>3.51 (0.65)</td>
<td>.77</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Condom availability control beliefs</td>
<td>3.54 (0.66)</td>
<td>3.80 (0.66)</td>
<td>3.63 (0.66)</td>
<td>.17</td>
<td>&lt;.01</td>
<td>&lt;.001</td>
</tr>
<tr>
<td>Impulse control beliefs</td>
<td>3.67 (0.77)</td>
<td>3.74 (0.78)</td>
<td>3.55 (0.78)</td>
<td>.13</td>
<td>.02</td>
<td>.34</td>
</tr>
<tr>
<td>Negotiation skill beliefs</td>
<td>3.85 (0.81)</td>
<td>3.88 (0.81)</td>
<td>3.86 (0.81)</td>
<td>.87</td>
<td>.77</td>
<td>.65</td>
</tr>
<tr>
<td>Technical skill beliefs</td>
<td>3.64 (0.78)</td>
<td>3.72 (0.78)</td>
<td>3.61 (0.78)</td>
<td>.76</td>
<td>.16</td>
<td>.26</td>
</tr>
<tr>
<td>Self-efficacy to use condoms</td>
<td>3.85 (0.80)</td>
<td>3.93 (0.80)</td>
<td>3.76 (0.80)</td>
<td>.30</td>
<td>.05</td>
<td>.33</td>
</tr>
<tr>
<td>Intentions to use condoms</td>
<td>4.00 (0.81)</td>
<td>4.06 (0.81)</td>
<td>4.01 (0.81)</td>
<td>.85</td>
<td>.49</td>
<td>.38</td>
</tr>
<tr>
<td>Abstinence-related and condom use–related conceptual variable</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Knowledge about HIV risk reduction</td>
<td>21.78 (5.75)</td>
<td>25.40 (5.77)</td>
<td>19.15 (5.76)</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
<td>&lt;.001</td>
</tr>
</tbody>
</table>

*For each variable, the preintervention measure is partialled out of the postintervention measure.

†P values are from F tests. Condom-use knowledge could range from 0 to 6. Human immunodeficiency virus (HIV) risk-reduction knowledge could range from 0 to 34. All other conceptual variables are measured on 5-point scales, with higher score indicating more of the construct.

‡For attitudes and intentions regarding sexual intercourse and knowledge about HIV risk reduction, preintervention condom-use knowledge is also partialled out of the postintervention measure.
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. Even though each intervention had the predicted positive impact on its targeted outcome, only the safer-sex intervention significantly reduced unprotected sexual intercourse—the outcome most closely linked to the risk of exposure to HIV and other STDs.

This is the first randomized controlled trial of an abstinence intervention. We based our abstinence intervention on cognitive-behavioral theory and information gathered during formative research with adolescents from the study population. Our intervention is not vulnerable to many of the criticisms leveled against abstinence programs. It provided accurate information, did not portray sex in a negative light, and was not moralistic. Although the abstinence intervention was effective in the short term, its effects diminished with longer-term follow-up. Future research must seek to increase the longevity of these promising effects.

The safer-sex intervention’s effects on condom use were sustained 6 and 12 months after intervention. Its efficacy in reducing unprotected sexual intercourse varied depending on the adolescents’ preintervention sexual experience. At the 3-month follow-up, the safer-sex intervention was significantly more effective in reducing unprotected sexual intercourse among adolescents who were sexually experienced before the intervention than among those not sexually experienced before the intervention. At the 6- and 12-month follow-up, the safer-sex intervention still had significant effects on unprotected sexual intercourse among adolescents who reported preintervention sexual experience.

This is the first randomized controlled trial to examine whether adults or peers are more effective facilitators of HIV risk-reduction interventions for adolescents. Although the participants who had peer facilitators evaluated the interventions and their facilitators more favorably, this did not translate into stronger intervention effects for any of the interventions. In this respect, our results affirm the value of both peer and adult facilitators of HIV interventions.

It is commonly believed that matching the gender of the facilitator and the gender of the participants may enhance the effects of HIV interventions. However, consistent with a recent randomized trial, we found no support for this matching hypothesis (data not shown).

This is also the first randomized controlled trial on any population in any setting to evaluate the long-term effects of HIV-prevention interventions using a control group that received an intervention of comparable duration to the experimental group. All previous studies of the long-term effects of HIV-prevention interventions have used no-treatment or wait-list control groups or control groups that received substantially shorter interventions than the experimental group. Our intervention effects cannot be explained as a simple result of Hawthorne effects or social interaction and special attention received by adolescents in any particular intervention.

One common argument against AIDS education programs that emphasize condom use has been that they encourage adolescents to engage in sexual activity. In the present study, however, the adolescents who received the safer-sex intervention, which emphasized condom use, were not more likely to report having sexual intercourse at the follow-ups than were adolescents in the control group. Indeed, among adolescents who reported preintervention sexual experience, those in the safer-sex group reported less frequent sexual intercourse than did those in the control group at the 6-month and 12-month follow-ups, thus providing evidence contrary to the common belief that sex education increases sexual activity. Moreover, safer-sex intervention participants who did report having sexual intercourse reported using condoms more frequently than did their counterparts in the control group at all 3 follow-ups.

A limitation of this study is that the primary outcome was measured with participants’ self-reports, which might have been unintentionally or intentionally inaccurate. Although we cannot definitely rule out this possibility, several aspects of our methods and findings make self-reported self-reports a less likely explanation for our results. We used several strategies, described above, to increase participants’ ability to recall and to motivate them to respond honestly. Moreover, if participants’ self-reports were biased, the intervention effects should be strongest among those participants with the greatest tendency to give socially desirable responses. Contrary to this, self-reported sexual behavior and changes in self-reported sexual behavior were unrelated to a standard measure of social desirability response bias, a finding that dovetails with those reported in at least 2 other recent studies.

It should be noted that the present findings may not generalize to all young inner-city African American adolescents. Also unclear is whether the present intervention effects would be observed in other populations, for instance, older African American adolescents or suburban white adolescents.

CONCLUSIONS

Our study supports several conclusions. Intensive theory-based culture-sensitive interventions designed to increase mediators of abstinence or condom use, including HIV knowledge, behavioral beliefs, self-efficacy, and skills, whether implemented by adult facilitators or peer cofacilitators, can reduce the HIV

JAMA, May 20, 1998—Vol 279, No. 19

Abstinence vs Safer Sex—Jemmott et al 1535

©1998 American Medical Association. All rights reserved.
risk-associated sexual behavior of young inner-city African American adolescents. By using theory-based interventions, 2 important goals of HIV prevention—reduced 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.

This research was supported by grant R01 MH52635 from the National Institute of Mental Health. Some of the data reported in this article were presented at the 124th Annual Meeting of the American Public Health Association, New York, NY, November 1996.

The authors gratefully acknowledge the contributions to this research of Konstance McKeefry, PhD, Stephanie Bray, Greer D. Wilson, EdD, Leonard W. Johnson, DO, Gladys V. Lockman, MSW, MBA, Fredericka Waugh, MSW, James M. multiplayer, Rhonda Wise, Nicee Russell, MA, Karen Amanda Williams, Kathleen Quinan, and Zilda Amalar. The authors would like to express their appreciation to Paula K. Braverman, MD, Ann O. Meyy, PhD, and Antonia Villarelli, PhD, EN, FAAN, for their comments on a draft of this article.

References