Impact of a school-based AIDS prevention program on risk and protective behavior for newly sexually active students.


Abstract:
This project assessed the impact of a school-based AIDS prevention program on student participation in sexual risk and protective behaviors such as use of condoms and use of condoms with foam and intention to participate in such behaviors. The paper focuses on students who became sexually active for the first time between the seventh and eighth grade (*changers,* n = 312). The school-based intervention was developed using social cognitive theory and the social influences model of behavior change. Using an experimental, longitudinal design, 15 high-risk school districts were divided randomly into two treatment (10 districts) and one control (five districts) conditions. Students in both treatment conditions received a 10-lesson classroom program in the seventh grade with a five-lesson booster in the eighth grade, while control students received basic AIDS education (current practice in their districts) in compliance with state mandates. Results indicated classroom programs had an impact on certain protective behaviors and on frequency of sexual activity the past month. Post-intervention measures also indicated the program affected students' intentions to perform specific protective behaviors. (J Sch Health. 1995;65(4):145-151)

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One major challenge in the battle to slow the spread of HIV, the pathogen that causes AIDS, involves reducing the risk behaviors in young adolescents. However, because the number of AIDS cases diagnosed among teens ages 13-19 remains relatively small (1,412 or 0.42% of the U.S. total),[1] adolescents may believe they face little or no risk of HIV infection. Since most adolescents who become infected with HIV during their teen-age years do not develop symptoms for an average of eight years or more,[2] young people have little direct experience with the devastating effects of HIV/AIDS. This lack of direct, personal exposure to the negative consequences of risky sexual behavior likely reinforces feelings of invulnerability that already commonly influence adolescents' decisions, thereby reducing their motivation to change unsafe behavior. Further, adolescents tend to base their decisions on more immediate gratification than on distant and uncertain consequences of behavior. Consequently, young people may fail either to refrain from having sex or to use protective measures such as condoms and condoms with foam when they are sexually active. The term "foam" is used in this paper as a euphemism for all products containing nonoxynol-9.

Given the long incubation period between initial infection and onset of disease, the relative number of adolescent AIDS cases remains quite small. Thus, the increasing rate of HIV disease and AIDS among young adults more accurately reflects the growing presence of HIV infection in the adolescent population. Data from the past decade indicate that rates of HIV infection among teens vary widely according to ethnicity and gender, and are increasing due to the growth in the number of adolescents engaging in unprotected sexual intercourse and initiating sexual activity at a younger age.[3] Results of a CDC survey show that for large numbers of students, initiation of risk behavior begins prior to their entry into ninth grade and high school. Data from the 1990 survey of a nationally representative sample of students in grades 9-12 indicate that 54.2% of students had experienced sexual intercourse[4] and about one-third (33.5%) of male and 20.0% of female students initiated sexual intercourse before age 15.[5] Data also indicate that African-American students were more likely to have experienced intercourse (72.3%) than White (51.6%) or Hispanic students (53.4%).[4]

Among students who reported they had sexual intercourse during the three months prior to the survey, 44.9% reported they or their partners used a condom at last sexual intercourse. Male students (49.4%) were significantly more likely to report condom use at last sexual intercourse than female students (40.0%). African-Americans were most likely (47.1%) and Hispanics were least likely (38.4%) to report using condoms at last sexual intercourse; while condom use by White students fell between the two groups (45%).[5]

In the absence of a vaccine, education remains the most hopeful strategy to reduce HIV risk behavior and increase protective behavior among adolescents and adults. In recent years, numerous HIV prevention programs were introduced in school settings, but results were mixed. However, current approaches to school-based AIDS education are being developed from a stronger theoretical framework, applying the previous experience of other prevention efforts and program evaluations.[3]

Despite these efforts, relatively few studies have tested HIV risk-reduction interventions with African-American adolescents,[6] a population disproportionately at risk given the high rate of pregnancy and STDs in their communities.[3,7] For example, minorities living in urban poverty have two-three times the rate of STDs than those who have higher incomes and live in suburban or rural locations; and African-American teens have nearly twice the pregnancy rate as White teens.[8] These statistics demonstrate that African-American youth are exposed to increased risk of HIV infection, and they demand that attention be given to developing and evaluating effective interventions for this vulnerable population. The Youth AIDS Prevention Project (YAPP) was conceived to meet this need. Using social cognitive theory[9] and the social influences model of behavior change,[10] the project staff developed and evaluated a school-based intervention directed primarily toward African-American junior high school students.

Characteristics that seem to contribute to and maintain a successful school-based prevention programs for adolescents include peer group activities, skills training, and service adjuncts that enlist family, community, and media support.[11] Information-based interventions can successfully increase student's knowledge, but evidence that knowledge relates to behavior change is weak.[12] In a review of approaches to school-based drug prevention efforts, Perry and Kelder[13] report findings of modest but consistent behavioral effects with programs that use a social influences model of prevention. The social influences model primarily uses peer group discussions and other opportunities for students to
learn and practice social skills.

Overall, these programs appear effective in preventing or delaying onset of risky behavior and enhancing drug-related protective behavior. Their results also indicate program effectiveness increases in situations that reinforce "normative" aspects of the adolescent's environment, such as family and community supports that exhibit or model the promoted behavior. Programs are less effective when family or community members are engaged in problem behavior themselves, as when smoking is prevalent or alcohol and marijuana use is accepted. Perry and Kelder also found that positive effects decline with time, suggesting repeated intervention sessions and boosters in later grades may be necessary for sustaining behavior change and promoting program success. Similarly, following computerized personal interviews with 300 African-American adolescents ages 9-15, Romer and colleagues[7] concluded interventions should begin at earlier ages and be targeted simultaneously to significant adults and friends in the children's social network.

Although changes in established behavior patterns are possible, previous research demonstrated that once patterns of sexual intercourse and contraceptive use are established, they can be difficult to change.[12] Therefore, it is important to reach students at an early age, before they establish their behavioral patterns. Although the main study followed and the authors briefly describe students who remained abstinent and those who were sexually active at the start of the program through the eighth grade posttest, this article focuses on students whose transition to becoming sexually active occurred between seventh and eighth grade - changers. Studying program effects on changers is critically important because it seems to be a developmental prerogative that by the end of high school, most students eventually will become sexually active. If a program can be shown to increase the likelihood of a person adopting protective behaviors regarding sexual activity, then that program may interrupt transmission of the AIDS virus. This paper reports, in a sample of students who became sexually active for the first time between the seventh and eighth grades, the impact of a school-based AIDS risk reduction program on: 1) participation in sexual intercourse and protective behaviors such as use of condoms and use of condoms with foam, and 2) intentions in the next 12 months to have sexual intercourse and, for those who plan to have sex, intentions to use condoms or condoms with foam.

METHODS

Subjects

The Youth AIDS Prevention Project (YAPP) is a school-based, multiple risk reduction program designed to prevent STDs, HIV/AIDS, and substance abuse among young teens attending junior high school. The project was conducted in the Chicago metropolitan area and tested in high-risk schools. The 15 participating school districts were recruited from 45 districts likely to be at greatest risk for high prevalence of HIV infection and transmission based on variables such as percent of the population in poverty, proportion of minorities, rates of reported STDs and adolescent pregnancies, school dropout rates or truancy, and aggregate reading scores recorded by the schools from state exams.

The 15 school districts randomly were assigned to one of three conditions: parent-interactive treatment (five districts), parent noninteractive treatment (five districts), and delayed treatment/control (five districts). Control schools were given pretest and posttest surveys concurrently with intervention schools. In the control schools, the cohort one year younger than the students reported in this study received the seventh and eighth grade interventions in the next academic year after data collection was complete. The program began during the 1991-1992 school year (seventh grade portion of the program) and continued through the 1992-1993 school year (eighth grade portion of the program). During the year of intervention and measurement, control students received basic AIDS education (current practice in their districts) provided by their schools in compliance with state mandates. Although the project staff could not precisely document the nature of AIDS education in each control school, no control school implemented a comprehensive skills-based program similar to YAPP. Anecdotal information from administrators and teachers in the control schools reveal that most students typically received either: 1) a short (half-day to one-day) workshop-type, information-based program which was not integrated well with other school health programs such as drug use and human sexuality, or 2) were limited to a rudimentary field trip to a health museum to fulfill state AIDS education requirements.

The YAPP classroom intervention was the same in the two experimental conditions. It used an integrated approach to multiple risk reduction and prevention using knowledge transfer, active learning and skills-building techniques to influence student knowledge, attitudes, intentions, and behavior and to affect peer norms. Topics included HIV/AIDS, pregnancy and STD prevention, and enhancement of decision-making and resistance/negotiation skills (Table 1). Specific activities consisted of lectures, class discussions, video presentations, small group exercises, role plays, brainstorming, educational competitions, and discussion of anonymous questions from students. The classroom program included 10 sessions (one per day over a two-week period during a regularly scheduled health or science class) in seventh grade and five additional sessions (one week) in eighth grade. All sessions were conducted by professional master's level health educators who received extensive training in delivery of the program and HIV/AIDS.

Students in both experimental conditions were required to complete homework assignments and all parents were invited to attend a YAPP orientation meeting. In the parent-interactive condition, students were required to complete homework assignments with a parent or guardian, who also was encouraged to attend more intensive parent meetings about the program, to become involved with the school program, and to discuss HIV/AIDS with their children. Since it proved difficult, despite multiple attempts and numerous incentives including raffles, awards, student presentations, child care, and refreshments, to get large numbers of parents actively involved in the program, the level of parental participation became very similar in the two experimental conditions, except for the above-mentioned homework. Analyses showed no significant differences between the two experimental conditions so they were combined into a single experimental condition for the following analyses.

Procedures

Approximately one week prior to the seventh grade pretest, "passive" informed consent forms were mailed to students' parents or guardians in accordance with Illinois law. The form briefly described the intervention and informed parents that the project fulfilled the AIDS education requirements for their child's school. Parents/guardians were instructed to return the consent form only if they did not want their child to participate in the program or if they did not want their child to complete a confidential, self-administered questionnaire. Students also were given the option of non-participation in any part of the project. Parent and student refusal rates each were less than 1%. All participating students completed a paper-and-pencil survey under the supervision of trained data collectors in the seventh grade and again after completion of the intervention in eighth grade.
The questionnaire focused on decision-making, refusal skills, knowledge and intention regarding protective behaviors, prevalence estimates of risk behaviors among peers, participation in risk behaviors such as drug use and sexual activity and protective behaviors, attitudes toward people with AIDS, knowledge of AIDS facts, and feelings about family rules and parental opinions. Students also were asked about a number of demographic characteristics. This paper focuses on questions concerning: 1) participation in sexual intercourse and, for those sexually active, participation in protective behaviors including condom use and use of condoms with form, and 2) intentions in the next 12 months to have sexual intercourse and, for those who plan on having sex, whether or not they intend on using condoms or condoms with foam.

A total of 2,392 seventh grade students (1,459 treatment and 933 control) completed the preintervention survey. Due to family mobility, student dropout rates, and absenteeism, and missing posttest data, the number of cases with matching posttest data decreased to 1,669 (1,001 treatment and 668 control) by the end of eighth grade, resulting in 32.4% attrition for the treatment group and 29.6% for the control group. Based on seventh grade pretest data, significant behavioral differences occurred in terms of licit drug use and sexual activity between students lost at follow-up and those who remained in the project. However, students in both treatment and control groups who were lost at follow-up appeared similar in terms of demographic and behavioral variables (data not shown). In this article, licit drug use is defined as cigarettes and alcohol to distinguish from illicit drugs such as cocaine and heroin.

In the final matched dataset, baseline racial differences existed between the treatment and control groups (Table 2). Since previous research[14-16] indicates race can be related to participation in risk and protective behaviors, this variable was controlled for in the analyses.

**RESULTS**

Table 2 shows no differences existed in terms of participation in risk behavior between treatment and control groups in either seventh or eighth grade. Approximately one-third of students were sexually active by the seventh grade. However, one-half remained abstinent by the eighth grade posttest (abstainers) and roughly 19% of students became sexually active for the first time between seventh and eighth grades (changers). These patterns of sexual activity did not vary by treatment condition. In terms of protective behaviors, control group students were slightly more likely to report ever using a condom in both seventh and eighth grades, and they also were more likely to report ever using condoms with foam in the seventh grade.

Table 3 provides demographic profiles for the student groups, classifying them by their sexual behavior. Changers looked very similar to the overall matched student population in terms of demographic characteristics. Table 4 provides demographic and behavioral information on students who became sexually active between the seventh and eighth grades (changers). Data indicate no significant gender, racial, or behavioral differences between the treatment and control group changers.

Analyses

Analyses were conducted to assess the effect of the YAPP intervention on participation in risk and protective behaviors - use of condoms and use of condoms with foam - for students who became sexually active for the first time between the seventh and eighth grade surveys. Analyses were conducted at both the bi-variable and multi-variable levels. At the bi-variable level, a series of cross-tabulations involving categorical and ordinal level risk/protective behaviors and treatment condition were performed. Additionally, for continuous level data number of sexual partners in the past year - a t-test was conducted using treatment condition as the independent variable.

**Table 3**

Demographic Profile of Sexual Activity Groups

<table>
<thead>
<tr>
<th>Demographics</th>
<th>Sexual activity</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Abstainers (n = 775)</td>
<td>Changers (n = 312)</td>
<td>Active by Seventh (n = 582)</td>
</tr>
<tr>
<td>Gender (% male)</td>
<td>33.9</td>
<td>48.6</td>
<td>70.2</td>
</tr>
<tr>
<td>Race</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>African-American</td>
<td>44.6%</td>
<td>62.7%</td>
<td>77.7%</td>
</tr>
<tr>
<td>White</td>
<td>34.2%</td>
<td>19.9%</td>
<td>11.4%</td>
</tr>
<tr>
<td>Hispanic</td>
<td>17.6%</td>
<td>12.0%</td>
<td>7.1%</td>
</tr>
<tr>
<td>Other</td>
<td>4.2%</td>
<td>5.5%</td>
<td>3.8%</td>
</tr>
</tbody>
</table>

**RESULTS**

Table 5 examines behaviors and intentions by treatment condition for students who became sexually active between the seventh and eighth grade. Following the intervention, no behavioral differences existed between treatment and control groups in terms of number of sexual partners and ever use of condoms. However, significant differences occurred between treatment and control groups with respect to ever using condoms with foam. Students in the treatment condition were significantly more likely to report ever using condoms with foam, and they been sexually active marginally less often the past 30 days than control students. Furthermore, of students who were sexually active the past month, treatment students...
were more likely to have engaged in protective behaviors during that time than control students. However, due to the small size of this subsample of students who were sexually active in the past month, these relatively large differences for protective behaviors in the past 30 days were not statistically significant.

Table 5 also indicated that treatment and control groups did not differ in their intentions to have sex or to use condoms in the next 12 months. The outcome for intention to use condoms was most likely the result of a ceiling effect, given that more than 97% of students in both treatment and control groups stated they intended to use a condom if they planned on having sex in the next 12 months. In contrast, treatment and control groups differed significantly with respect to their intentions to use condoms with foam. Treatment students indicated, by answering yes or maybe, that they were significantly more likely to consider using condoms with foam if they planned on being sexually active in the next 12 months. Multi-variable logistic regression analyses predicted protective behaviors for changers in the past 12 months and for changers who were sexually active in the past 30 days (Table 6). Gender and race were significant predictors of condom with foam use in the past year, with males and Hispanics significantly more likely to report use of condoms with foam. Also, YAPP students were marginally more likely than controls to report use of condoms with foam. For changers who were sexually active in the past month, YAPP students were marginally more likely than controls, and males were almost 3.5 times as likely as females to report using condoms with foam.

Table 7 presents results for an ordinal-level logistic regression examining frequency of sexual intercourse the past 30 days. Results indicate significant racial effects with respect to frequency of sexual activity the past month. Students in the "other" racial category had the highest frequency of sexual activity the past 30 days. YAPP students had a marginally lower frequency of sexual activity in the past month than control students.

Table 7 also presents findings of the multi-variable logistic regression analysis that show Hispanics were significantly less and males were marginally more intent on having sex in the next 12 months. For those students who planned on being sexually active in the next 12 months, gender, race, and treatment condition did not predict intent to use condoms only. However, gender and treatment condition were significant predictors of intent to use condoms with foam in the next year, with males and YAPP students significantly more likely to say they intended to use these protective measures if they had sex in the next year.

[TABULAR DATA FOR TABLE 5 OMITTED]

DISCUSSION

At a time when AIDS and other STDs are increasing worldwide, earlier initiation of sexual activity among adolescents poses a serious threat to young people's health and to public health in general. A goal of this project was to develop and evaluate a school-based HIV prevention program that could be implemented with primarily lower income African-American junior high school students. It especially addressed the young age of the target audience, and the needs and experiences particular to their peer group.

At seventh grade pretest, approximately one-third of students in both the treatment and control conditions reported they already had sexual intercourse. Previous studies found that once adolescents establish behavioral patterns of sexual intercourse and contraceptive use, these patterns can be difficult to modify. At seventh grade, 31.4% of students who already were sexually active by seventh grade indicated they had no sexual partners during the 12 months preceding the eighth grade posttest. Furthermore, as expected, students who were sexually active by the seventh grade were very resistant to behavior change. Separate analyses on the subset of students already sexually active by seventh grade indicate the intervention had no significant [TABULAR DATA FOR TABLE 6 OMITTED] impact on these students' behavior (data not shown).

School-based programs are more likely to affect students who are not sexually active at the start of the program. Thus, results presented in this article focus on the group of students termed changers - or those who became sexually active between the seventh and eighth grades. Analyses demonstrate the YAPP program did produce effects on the behavior of "changers" in the treatment condition. Studying program effects on changers is particularly important because almost all students will eventually make the transition to becoming sexually active. Furthermore, if these youth establish a pattern of protective behaviors, they may continue to use those behaviors in the future.

Frequency of sexual activity the past 30 days was marginally less for changers in the treatment group than for those in the control group. Although a statistically marginal result, this finding is especially of note, given that previous findings failed to demonstrate an impact on reducing frequency of sexual activity. Frequency of sexual intercourse was addressed in the YAPP curriculum as a risk factor that could increase not only the possibility of HIV infection, but of other STDs and pregnancy.

Although abstinence was stressed by the YAPP program, the fact that it did not affect onset of sexual behavior is not surprising, as these results are consistent with past research. In contrast to this finding, Kirby et al.[12] suggest it may be easier to delay the onset of sexual intercourse than to increase contraceptive practice. It is possible [TABULAR DATA FOR TABLE 7 OMITTED] that the differences between this study and Kirby et al are due to length of the follow-up periods. Delay of sexual onset effect did not occur in Kirby et al study until the 18-month posttest. At the six-month follow-up, no differences existed. It is possible that with a longer follow-up period, one would see this effect from the YAPP intervention.

Implications

The intervention appears to have influenced changers who participated in the program to be more likely to adopt protective behaviors. Specifically, YAPP affected the extent of condom with foam use the past year and past month. Furthermore, of students who were sexually active the past 30 days, treatment students were more likely to have engaged in protective behaviors during the past month than control students, although due to the small sample sizes of those sexually active in the past month, some of these relatively large differences are not statistically significant.

While studies on whether the use of spermicides, such as the nonoxynol-9 contained in contraceptive film and foam, are associated with an
increased or decreased risk of acquiring HIV infection have produced conflicting results.[19,20] Potential harmful effects are considered to be dose- and frequency-dependent.[21] Further, generally it is still believed that the extra protection provided by these contraceptives against condom failure, improper technique, or no method at all, should be a consideration at the time of contraceptive selection for some especially vulnerable populations.[20,22,23]

The YAPP project decided to recommend use of condoms and a nonoxynol-9 product such as vaginal contraceptive foam or film, for several reasons. Initially, staff searched for an additional form of protection in response to focus group discussions with young males who reported having difficulty keeping condoms from slipping off during intercourse due to immature genitals. Japanese condoms, which are manufactured in smaller sizes, were not available in these communities. Therefore, as a multiple risk reduction program, staff recommended the use of an additional nonoxynol-9 contraceptive which has the extra advantage of providing protection against other STDs prevalent in the communities where the YAPP intervention took place. The project also included discussions on use of these products in the YAPP curriculum because they offer sexually active females the opportunity to participate more actively in protecting themselves against HIV/AIDS and other STDs. However, the YAPP intervention always stressed using latex condoms as the best method of protection against STDs for sexually active individuals. The use on nonoxynol-9 products was discussed only as a method of supplying extra protection, and not one that should ever be used alone.

Limitations

In terms of external validity, a limitation to interpretation of the study results involves differences found between students lost to the program between the seventh and eighth grades and students who remained in terms of licit drug use and sexual activity. This factor may create the impression that students in the matched changers sample were not high risk. Although students lost to the program were more likely to be sexually active and to have used licit drugs than the changers subsample, these differences may not be as problematic as they first appear. The changers matched sample must be considered at risk for HIV given that all of them, by definition, are sexually active by the eighth grade posttest. Further, data indicate this sample also is engaging in drug risk behavior (Table 4).

An external validity question also may be raised regarding whether these results generalize to other student populations given that the schools were recruited rather than randomly sampled. Again, this concern may not be as problematic as it first appears. On certain risk behaviors, this student sample resembles that of Illinois students. When comparing the changers sample at seventh grade baseline with data from a similar survey performed by Illinois, changers look similar to the state sample in terms of drug risk behaviors - 28.9% had smoked cigarettes, 43.1% had consumed alcohol, 5.3% had smoked marijuana, 6.5% had used inhalants and 1.8% had used cocaine[24] (Table 4).

CONCLUSION

One disappointment in this study involved lack of a measurable difference between parent interactive and parent noninteractive conditions, but some valuable insights were gained. Despite substantial effort and cost, it was not possible to get parents in large numbers to attend on-site school activities. Given the difficulty of balancing work and life stresses for today's parents in general and lower income parents specifically, asking parents to come to school to participate may not be feasible. Process evaluation notes indicate that, while parents who did attend the parent meetings were pleased and participatory, the primary way parents became involved with the program was through the interactive homework assignments. Therefore, interactive homework assignments may provide a practical way to involve parents in school-based prevention efforts. It is recommended that the planning of interactive homework assignments for students and their parents or significant adults to be included in curricula.

The primary goal of working with students in schools was successful, in that significant treatment effects occurred on knowledge, attitudinal, self-efficacy,[25,26] as well as behavioral variables. Lack of an effect in the control schools implies “standard” AIDS education in these schools was insufficient to produce knowledge, attitudinal, self-efficacy[25,26] and behavioral changes. These results indicate that success is possible when HIV education is comprehensive, integrated with other risk reduction issues such as drugs and sexuality, and provides skill-building and active learning opportunities for very young teens. Further, results suggest that given the relatively large number of students already sexually active by the seventh grade, a need exists for HIV/AIDS education to begin at an earlier age. The 15-lesson YAPP intervention did produce positive results over a two-year period. Given the large number of health education mandates currently required of schools, it appears that a program similar in length and comprehensive content to the YAPP intervention seems a reasonable and beneficial addition within the current limitations of school resources.

References

5. CDC. Selected behaviors that increase risk for HIV infection among high school students - United States - 1990. MMWR. 1990;41:231-240.


RELATED ARTICLE: Table 1

Youth AIDS Prevention Project (YAPP) Curriculum Highlights

1. Meets and surpasses the Illinois state guidelines under the expanded comprehensive health education act


3. Specific activities consist of lectures, class discussions, video presentations, small group exercises, role plays, brainstorming, educational competitions and discussions of anonymous questions from students.

4. Focuses on refusal, negotiation and decision-making skill-building techniques

5. Emphasizes abstinence

6. Enhances self-efficacy

7. Includes parent-child communication activities

8. Taught by trained master's level health educators

9. Provides follow-up training and support to enable schools to continue teaching the curriculum using their own staff.

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