Evaluation of the Positive Prevention HIV/STD Curriculum

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ABSTRACT

This study evaluated the effectiveness of Positive Prevention, a theory-based, HIV/STD prevention education curriculum for high school youth. Three hundred fifty-three students participated in a longitudinal experimental design to determine the impact of the curriculum on HIV/AIDS knowledge, self-efficacy to abstain from sex, self-efficacy of condom use, attitudes toward abstaining from sex, and sexual behaviors. Results indicate that the curriculum significantly increased positive attitudes toward abstaining from sexual intercourse, increased self-efficacy to abstain from sexual activity, and increased self-efficacy to use condoms. Among students who had not initiated sexual intercourse prior to the pretest, the curriculum significantly reduced the likelihood that they would have initiated sexual activity six months later. These findings are consistent with the literature surrounding effective school-based prevention programs that suggests that curricula emphasizing social skills while limiting bio-medical information are effective in reducing HIV/STD risk behaviors.

HIV/STD CURRICULUM FOR STUDENTS GRADES 9–12

It is estimated that about 27% of all new HIV infections are among young people under age 25.[1] Alarmingly, over 65% of all students in grades 9–12 have had sexual intercourse by the time they graduate.[2] Researchers cite poor use of condoms as a primary reason for high STD rates in the United States.[3, 4] The 2003 Youth Risk Behavior Survey indicates that only 62% of teens had used a condom the last time they had sexual intercourse.[2] The failure to use risk-reduction methods, such as condoms, can place adolescents at increased risk of exposure to unintended pregnancy, HIV, and other STDs.

HIV infection is preventable by avoiding risky sexual behaviors such as unprotected sexual intercourse, and school health education plays a key role in the prevention of the spread of the disease. Because young adults spend the majority of their developmental lives in schools, schools are an effective vehicle for delivering HIV/STD prevention programs to youth.[5] Nationwide, 87% of students had been taught in school about acquired immunodeficiency syndrome (AIDS) or HIV infection.[2] While many school-based HIV prevention curriculums have increased students' knowledge about how pregnancy and HIV transmission occur, few programs have demonstrated improvements in skills necessary to recognize, manage, or avoid HIV risk taking behaviors.[6]

The existing literature surrounding school-based HIV/STD prevention programs has consistently supported the superiority of programs that use experiential, interactive activities to emphasize abstinence and risk reduction techniques.[6–13] Programs effective in reducing unsafe sexual practices have several important characteristics. These include: (a) a focus on reducing sexual behaviors that lead to HIV/STD infection; (b) a clear message about abstaining from sexual activity; (c) providing accurate information about the risks of

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teen sexual activity and about methods of avoiding intercourse or using protection against pregnancy and STDs; (d) the inclusion of activities that address social pressures that influence sexual behavior; (e) lessons that provide modeling and practice of communication, negotiation, and refusal skills; (f) the use of a variety of teaching methods designed to involve the participants and have them personalize the information; (g) the use of behavioral goals and teaching methods that are appropriate to the age, sexual experience, and culture of the students; (h) curriculums with a sufficient length of time to complete important activities adequately (at least 15 instructional hours or lessons).[11]

Additionally, the use of established theoretical approaches has shown to be highly effective in encouraging adolescents to modify or change their attitudes, beliefs, and behaviors.[12] This includes the use of social learning theories and cognitive behavioral models. Social learning theory posits that the likelihood of taking preventive action is determined by an understanding of what must be done to avoid pregnancy, a belief that one is able to use this method, and the belief that this method will successfully decrease the chance of getting pregnant or contracting HIV or an STD.[6] Central to the application of social learning theory is the idea that new prevention skills can be learned through observation and practice. Students' likelihood of using the skill is increased through interactive role-plays, thus increasing self-efficacy to use these skills in everyday life.[11, 14]

Cognitive behavioral models are used to give young people specific cognitive and behavioral skills to resist peer pressure, make decisions, and successfully negotiate situations that place them at risk for HIV/STD infection.[8] This includes activities that increase a student's perceived risk, training in decision-making and assertive communication skills, and practice in applying these skills in various risk situations. Successful school-based curriculums use cognitive behavioral models to provide opportunities for students to implement these new skills rather than merely demonstrate the acquisition of new knowledge.[4]

The Curriculum

The Positive Prevention HIV/STD Curriculum for Students Grades 9–2[15] was developed after a review of the literature of effective sexuality education prevention programs and uses social learning and cognitive behavior theories to increase a student's ability to use refusal skills, condoms, and resist peer pressure. The curriculum consists of six lessons, 45 minutes in length, delivered in the classroom. Lesson 1 focuses on myths and stereotypes regarding persons infected with HIV. Students participate in an interactive activity regarding the emotional impact of being infected with HIV. Lesson 2 teaches students about the effects of HIV on the human body including the body fluids and body openings that can transmit HIV. This lesson includes interactive activities designed to increase students' perceived susceptibility to HIV infection by identifying the symptoms of HIV and the HIV disease process from initial infection to death. Lesson 3 focuses on transmission facts including risk behaviors related to HIV infection, symptoms of HIV infection, and resources for HIV antibody testing and counseling. Students identify HIV risk behaviors and ways to reduce/prevent HIV infection. Lesson 4 focuses on the risks of early sexual involvement and helps students explore the reasons that teenagers have sex and the reasons why they might choose to abstain from sexual activity. Activities include an exploration of social norms surrounding sexual intercourse and drug use and the steps in correct and consistent condom use. Lesson 5 helps students understand and resist the social pressures that can lead to sexual involvement. Activities include the modeling and practice of communication and refusal skills using role-plays. Lesson 6 identifies community resources for HIV testing and counseling. Students develop personal contracts for avoiding HIV/STDs and participate in a classroom body fluid exchange activity demonstrating the benefits of abstaining from sex and other risk reduction techniques (i.e., condom use). The curriculum emphasizes that students should avoid unprotected sexual intercourse by abstaining from sex altogether; information and practice of skills concerning correct and consistent condom use is provided. Teachers implementing the curriculum participated in a two-day training session including extensive practice of classroom activities with feedback and guidance from the training facilitators.

While the Positive Prevention curriculum is based upon the characteristics of effective sexuality education programs, it differs in several important respects from similar school-based curricula. First, while Kirby[9] has found that effective HIV/STD curriculums were at least 15 hours in duration, it is unlikely in today's educational climate that a school or school district would dedicate three weeks solely to HIV/AIDS instruction because of increased pressures to increase academic test scores. Therefore, this six-lesson curriculum attempts to use intensive, small group activities with a clear focus on a limited range of skills necessary to avoid behaviors associated with HIV infection. Second, the curriculum's main focus is on having students learn and practice ways to identify, avoid, and/or manage risky sexual behaviors rather than increasing student knowledge about the bio-medical aspects of HIV and other STDs. Numerous studies have found that knowledge-based programs may increase students' knowledge but do not show reductions in risk-taking behavior.[8-11]

METHODS

Sampling and Research Design

A longitudinal experimental design was used to measure the impact of the curriculum (Figure 1). Fifteen ninth grade classrooms from four Southern California high schools of students enrolled in a mandatory physical science class participated in the study during the 2003–04 academic year. Classes of students (approximately 30 students per class) from the four school sites were randomly assigned to intervention and comparison groups. Surveys were admin-

Figure 1. Study Design

Group	Pretest		1 Month Posttest	6 month Follow-up
Intervention	X	*Curriculum implementation*	X	X
Comparison	X		X	X

istered by researcher and research assistants to each group one week prior to the implementation of the curriculum, approximately one month after the curriculum and six months later. Students from the both the intervention group and comparison group completed the survey on the same days and times. Student identifiers were used to match surveys from all three data collection episodes.

Permission and parental consent to participate in the study were obtained via a take-home letter to each student's parent/guardian. Students completed the survey themselves during normal class time; it took about 15 minutes to complete. Students were briefed as to the nature and purpose of the study and were asked to give their verbal assent to participate in the study. No incentives were provided to the students for participating in this study. The Institutional Review Board at California State University, San Bernardino approved this study.

Instrumentation

The measures used in this study have been used in previous studies examining the effectiveness of other school-based HIV and teen pregnancy prevention programs. Students completed a 47 item, self-administered, paper-and-pencil in-class survey, which measured variables related to: 1) HIV/AIDS knowledge, 2) attitudes toward abstaining from sexual intercourse, 3) self-efficacy to abstain from sexual activity, 4) self-efficacy to use condoms, 5) frequency of sexual behaviors, condom use, and lifetime sexual history, and 6) demographics. Student knowledge regarding other STDs was not measured. Pilot testing of the survey instrument revealed that readability level was equivalent to 4th grade (Flesch-Kincaid Index[16]).

The Knowledge Regarding HIV/AIDS Infection Questionnaire[17] was used as a measure of student knowledge regarding HIV disease and AIDS. The scale contains 11 true/false questions regarding AIDS transmission, general medical aspects of AIDS, and knowledge of preventive behaviors. Examples of items included "Only people who look sick can spread the AIDS virus," and "A person can get the AIDS virus even if he or she has sexual intercourse just one time without a condom." Correct answers were coded as "1" and incorrect answers were coded as"0", the sum totaled to give a composite knowledge score. This scale demonstrated adequate reliability (Cronbach's alpha=.79).

The Attitudes Towards Abstinence Among Adolescents Scale was used as a measure of attitudes toward abstinence.[18] The 12-item scale contains self-referential statements regarding abstinence from sexual intercourse (e.g., It is important for me not to have sexual intercourse before I get married). Scores range from 1= Strongly Disagree to 5= Strongly Agree. A higher score indicates more positive attitudes towards abstaining from sexual intercourse. This scale demonstrated adequate reliability (Cronbach's alpha=.85).

Self-efficacy to Abstain from Sexual Activity Scale[17] was used to measure self-efficacy to abstain from sex (e.g., Could you stop someone from touching your body parts?). The 7-item scale employs a summative-rating type scale ranging from 5= Definitely Could to 1= Definitely Could Not. This scale demonstrated adequate reliability (Cronbach's alpha=.89).

The Condom Self-efficacy Scale[17] was used to measure self-efficacy to use condoms. The 2-item scale (If you needed a condom, could you get one? and If you decided to have sex, could you tell the other person you wanted to use a condom?) employs a summative-rating type scale ranging from 4= Definitely Would to 1= Definitely Would Not. This scale demonstrated satisfactory test-retest reliability (alpha=.78). Additionally, participants were asked 3 items regarding their sexual behaviors and condom use.[17] Participants were asked, "Have you ever had sexual intercourse? (By sexual intercourse, we mean putting a penis in a vagina) (YES/ NO)," "In the past 2 months, how many times did you have sexual intercourse?" and "If you've had sexual intercourse in the last 2 months, how many times did you or your partner use a condom (rubber)?" A brief demographics section (10 items) and a section that asked students to rate the extent to which they understood each question and answered each question honestly were included (2 items).

RESULTS

Sample Characteristics

At pretest, 216 students in the intervention group and 137 students in the comparison group completed the survey (n=353). The comparison group was somewhat smaller because teachers in the comparison group found it more difficult to have students return parental consent forms because they were not participating in the curriculum. At six-month follow-up, 174 students in the intervention group and 113 students in the comparison group completed the survey (n= 287). This resulted in an attrition rate of 20% for the intervention group and 18% for the comparison group. The study attrition rate is consistent with district-wide attrition rates. A one-way ANOVA and non-parametric statistics were used to test the hypothesis that those participants who were lost to attrition are no different from those participants who remained in the study. Those students who did not complete the six-month follow-up

Table 1. Sample Demographics

	Intervention		Comparison	
	n	%	n	%
Gender				
Male	74	42.5	54	47.8
Female	100	57.8	59	52.2
Ethnicity				
African American	29	16.7	16	14.2
Latino	102	58.6	71	62.8
Anglo	18	10.2	10	8.8
Asian	7	4.0	1	0.9
Native American	2	1.1	4	3.5
Other	16	9.4	11	9.8

survey were not significantly different than their counterparts at baseline on key outcome variables including their gender X^2 (2, N = 297) = 5.11, p = .08, knowledge regarding HIV/AIDS (F (2, 344) = .174, p =.84), frequency of sexual intercourse (F (2, 345) = 1.72, p =.18).

Table 1 shows the demographic distribution of the sample. All 353 students were in the ninth grade. The demographics of the sample are consistent with the population demographics and there were no statistically significant differences between the intervention group and comparison group on any of the demographic variables reported in this study. Additionally, it must be noted that those students who reported that they did not answer each question honestly at each data collection point were excluded from the analysis of outcome variables (n=9). Table 2 shows the results of the post-hoc tests (Bonferroni) on outcome variables demonstrating statistical significance.

Knowledge Regarding HIV/AIDS Infection

A 2 x 3 repeated measures ANOVA was calculated to examine the effects of group (intervention vs. comparison) and time (pretest vs. one-month posttest vs. six-month follow-up) on knowledge regarding HIV infection and AIDS. The main effect of time (F (2, 276) = .112, p = .89), the main effect for group (F (1, 277) = .444, p =.50), and the time by group interaction (F (2, 277) = .799, p =.45), were all not significant.

Attitudes Towards Abstaining from Sexual Intercourse

A 2 x 3 repeated measures ANOVA was calculated to examine the effects of group (intervention vs. comparison) and time (pretest vs. one-month posttest vs. six-month follow-up) on positive attitudes toward abstaining from sexual intercourse. The main effect of time (F (2, 258) = 3.60, p = .02) was found to be significant. The main effect for group was not significant (F (1, 259) = 1.62, p =.20). The group by time interaction was not significant (F (2, 258) = 2.46, p = .08). Post hoc tests indicate that positive attitudes toward abstaining from sexual intercourse increased from pretest (m= 35.28, sd= 4.34) to one-month posttest (m= 36.30, sd= 4.03) for the intervention group (p = .05) and did not change significantly at six-month follow-up (m= 36.15, sd= 3.96). However, positive attitudes toward abstaining from sexual intercourse decreased significantly from the one-month posttest (m= 36.88, sd= 4.36) to the 6-month follow-up (m= 36.02, sd= 3.02) for the comparison group (p =.05).

Self-efficacy to Abstain from Sexual Activity

A 2 x 3 repeated measures ANOVA was calculated to examine the effects of group (intervention vs. comparison) and time (pretest vs. one-month posttest vs. six-month posttest) on self-efficacy to abstain from sexual activity. The main effect of time (F (2, 202) = .294, p = .74) was not found to be significant. The main effect for group was not significant (F (1, 203) = .016, p =.90). The group by time interaction was significant (F (2, 202)= 8.38, p =.01). Post-hoc tests indicate that self-efficacy to abstain from sexual intercourse increased from pretest (m= 26.53, sd= 4.74) to the six-month posttest (m= 27.47, sd= 4.99) for the intervention group (p = .05). However, self-efficacy to abstain from sexual intercourse significantly decreased from the pretest (m= 27.72, sd= 4.18) to the six-month follow-up (m= 26.63, sd= 4.71) for the comparison group (p = .05).

Self-efficacy of Condom Use

A 2 x 3 repeated measures ANOVA was calculated to examine the effects of group (intervention vs. comparison) and time (pretest vs. one-month posttest vs. six-month posttest) on self-efficacy to use condoms. The main effect of time was significant (F (2, 206) = 3.46, p = .03). The main effect for group was significant (F (1, 207) = 12.54, p =.001). The group by time interaction was significant (F (2, 207)= 11.27, p =.001). Post hoc tests revealed a significant linear trend for the intervention group indicating that self-efficacy to use condoms increased from pretest (m= 6.95, sd=1.28) to the one-month posttest (m=7.18, sd= 1.09) to the six-month follow-up ((m=7.41, sd=.90) (p =.05).

Frequency of Sexual Intercourse

A 2 x 3 repeated measures ANOVA was calculated to examine the effects of group (intervention vs. comparison) and time (pretest vs. one-month posttest vs. six-month posttest) on the frequency of sexual intercourse. Only those participants who reported that they were sexually active at all three data collection points were used in the analysis (n=60). The main effect of time was not significant (F (2, 58) = .838, p = .43). The main effect for group was not significant (F (1, 59) = .722, p=.39). The group by time interaction was not significant (F (2, 58)= 1.06, p=.34). No decrease in the frequency of sexual intercourse was found among those students who were sexually active.

Table 2. Post Hoc Analyses (ANOVA) of Main Effect by Group and Time on Study Variables

Item		Pretest M (SD)	1 Month Posttest M (SD)	6 month Follow-up M (SD)
Knowledge	*Intervention*	4.70 [1.14]	4.68 [1.15]	4.81 [1.25]
	Comparison	4.82 [1.06]	4.88 [1.17]	4.70 [0.94]
Attitudes Towards Abstaining from Sexual Intercourse	*Intervention*	35.28 [4.34]	36.30 [4.03]	36.15 [3.96]
	Comparison	36.29 [4.06]	36.88 [4.36]	36.02 [3.02]
Self-efficacy to Abstain from Sexual Intercourse	*Intervention*	26.53 [4.74]	27.05 [5.17]	27.47 [4.99]
	Comparison	27.72 [4.18]	26.89 [4.49]	26.63 [4.71]
Self-efficacy to Use Condoms	*Intervention*	6.95 [1.28]	7.18 [1.09]	7.41 [0.90]
	Comparison	6.82 [0.98]	6.66 [1.12]	6.74 [1.26]
Frequency of Sexual Intercourse	*Intervention*	1.85 [2.48]	1.55 [2.00]	1.40 [1.53]
	Comparison	1.78 [2.28]	2.65 [3.30]	1.88 [3.20]
Frequency of Condom Use	*Intervention*	.21 [0.60]	.79 [2.23]	.58 [1.17]
	Comparison	.21 [0.56]	.17 [0.25]	.28 [0.59]

Brackets indicate significant group differences (Bonferroni post hoc tests, $p < .05$)

Condom Use

A 2 x 3 repeated measures ANOVA was calculated to examine the effects of group (intervention vs. comparison) and time (pretest vs. one-month posttest vs. six-month posttest) on the frequency of condom use. Only those participants who reported that they were sexually active at all three data collection points were used in the analysis (n=60). The main effect of time was not significant (F (2, 58) = 1.12, p =.33). The main effect for group was not significant (F (1, 60) = 2.71, p =.10). The group by time interaction was not significant (F (2, 60)= 2.04, p =.13). No changes in the frequency of condom use were found among those students who were sexually active.

Initiating Sexual Intercourse

At pretest, 12 percent of all of the participants had ever had sexual intercourse. Among students who reported that they had never had sexual intercourse at pretest, 8.5 percent of the intervention group and 1.5 percent of the comparison group had initiated sexual intercourse after one month. However, after six months, only 9 percent of the intervention group had initiated sexual intercourse compared with 24 percent of the comparison group. Logistic regression analyses were computed using "having ever had sex" on intervention versus comparison group controlling for "having ever had sex" at pretest and one month posttest, gender, and ethnicity (minority vs. non-minority). The logistic regression analysis revealed a significant positive relationship of having had sex at the six-month follow-up with group. The odds ratio for group (Intervention vs. Comparison) indicates that when holding all other variables constant, those in the comparison group are five times more likely to have had sex after six months than those participants in the intervention group (LR chi square = 10.56, p = .01, 95% CI (expB) = [.068-.510]) (Table 3.).

DISCUSSION

These findings of this study are consistent with the literature surrounding effective school-based prevention programs that suggests that curriculums emphasizing social skills while limiting bio-medical information are effective in reducing HIV/STD risk behaviors. This study suggests that the Positive Prevention curriculum produced a number of positive attitudinal and behavioral effects. One of the goals of the curriculum was to increase positive attitudes toward abstinence from sexual

Table 3. Logistic Regression Predicting Having Ever Had Sex at 6-month Follow-up From Pretest, Posttest, Gender, and Ethnicity

Predictor	*B*	Waldχ^2	Odds Ratio
Pretest	1.27	3.17	3.59
1-month Posttest	3.02	18.89*	20.86
Gender	1.48	7.01	4.43
Ethnicity	.001	.221	1.00
Group	-1.67	10.46*	.19

* $p < .05$

intercourse. While the curriculum had an immediate effect on positive attitudes towards abstinence, these attitudes seemed to weaken over time. This is consistent with past research that indicates that social norms concerning sexual intercourse and negative attitudes toward abstinence among adolescents are strong and difficult to change through school-based interventions.[11,12] It may be that subsequent booster sessions of the curriculum or supplemental lessons addressing the benefits of sexual abstinence are needed to buffer the effects of the larger social norm over time. Further studies are needed to investigate the role of school-based prevention curriculums that attempt to modify the larger social norm regarding abstinence.

Although the curriculum failed to increase condom use among those participants who were already sexually active, the impact on delaying the onset of sexual intercourse among those students who were not sexually active is impressive. This is consistent with previous studies that suggest that it may be easier to delay the onset of sexual intercourse than it is to encourage condom use.[8,11] In any case, the curriculum may not be as effective with high-risk youth who are already sexually active. The authors of the curriculum are developing supplemental materials for high-risk youth including more explicit information on oral and anal sex as well as extensive practice of condom negotiation and condom use.

The results of this study suggest that the curriculum is effective but several methodological limitations should be noted. First, data were collected using self-report surveys. Although it is impossible to be completely confident of the validity of self-report responses, there is some evidence that supports the general validity of adolescents' reports of sexual behaviors.[19,20] Second, the level of assignment to intervention and comparison groups was at the classroom level and differences may exist in students' class schedules, teachers, or other factors that could have influenced the results. Multi-level statistics to control for higher order effects could not be conducted due to the low number of classrooms and schools sites. In addition, the use of classrooms as a basis of assignment to the intervention and comparison groups is a limitation due to possible bias from clustering within classrooms. The effect of clustering was not controlled since the analysis was computed at the individual level. Although it would have been methodologically ideal to randomly assign individuals to either the intervention group or comparison group, this is often logistically impossible in a school site or district and would have prevented conducting such work. Furthermore, some students in the intervention group may have interacted with students in the comparison group resulting in some contamination of the comparison group. As McBride and Gienapp[21] have noted, while this may have been an issue, it is possibly a better choice to use randomization and deal with potential contamination than apply a weaker and perhaps less adequate design. Third, the inability to find a significant effect for condom use might be due to the low number of students who were sexual active (n=60) at pretest thus resulting in a low sample size and decreasing statistical power. Lastly, it is not clear if the effects of the curriculum will endure into early adulthood and actually decrease rates of HIV/STD infection. Peer social norms are strong and the reasons why adolescents chose to have sexual intercourse or fail to use condoms are complex.[10–14] Future studies should examine the long-term impact of the curriculum at least 18 months post intervention.[8]

TRANSLATION FOR HEALTH EDUCATION PRACTICE

Since a significant number of school-aged youth engage in sexual risk behaviors, the need for effective school-based HIV prevention curriculums cannot be overstated. Although many sexuality education programs can increase student knowledge, only a few have demonstrated an impact on students' behaviors.[9] Findings from this study suggest that the Positive Prevention curriculum is effective and have implications for both health educators and researchers. First, unlike previous studies regarding effective pregnancy prevention and HIV curricula, this study suggests that a curriculum composed of six lessons that provides extensive practice of a small range of risk reduction skills can impact students' attitudes and behaviors. Second, the curriculum goes beyond the facts about HIV transmission and the benefits of abstaining from sexual intercourse. Students need to learn and practice skills that they can use in their everyday life. Consistent with social learning theory and cognitive behavior theory, the curriculum employs interactive strategies to personalize information about HIV/STD risk, training in decision-making and assertive communication skills, and practice in applying these skills once faced with a risk situation. Health educators can use the curriculum to enhance students' abilities to avoid risk-taking behaviors by using interactive lesson where students role-play risk situations and employ newly learned skills with feedback from a trained facilitator. Future research should examine the mechanisms by which the curriculum had

an affect on risk reduction skills and behaviors. In addition, it would be useful to examine the effectiveness of this curriculum compared to other HIV/STD prevention curriculums and the long-term impact of the Positive Prevention curriculum on sexual behaviors and HIV infection.

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