Computerized HIV Preventive Intervention for Adolescents: Indications of Efficacy

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We tested the hypothesis that a computerized intervention would be as efficacious as an in-person, small-group intervention in reducing sexual risk behaviors. The sexual behavior of high-risk adolescents in 3 intervention conditions was examined: (1) computer based, (2) small groups, and (3) control. Adolescents in the computerized intervention were significantly less likely to engage in sexual activity and reported significantly fewer partners. For some youths, computers are a viable way to deliver prevention information and promote skill development. (*Am J Public Health.* 2007;97:1027–1030. doi:10.2105/AJPH.2005.072652)

Delinquent youths (defined as youths involved with the juvenile justice system) are at substantial risk for contracting HIV because they engage in unprotected sexual behavior, and their sexual activity is often associated with substance use. Although delinquent youths are similar to their peers in knowledge and attitudes about AIDS,[1,2] they are more likely to be sexually active, initiate sexual activity at younger ages, and have more sexual partners.[1–3] Therefore, delinquent youths are a subgroup in which successful interventions are needed.

An intervention with established efficacy is Project LIGHT (Living in Good Health Together).[4] This intervention targeted both adults and adolescents who recently engaged in high-risk behaviors and produced increases in condom use of 160% and increases in consistent condom use of 45%. Given the intervention's success with this target population and with adolescents,[5] we hypothesized that it would be an efficacious program for delinquent youths.

However, interventions need to be designed a priori for implementation with fidelity and in natural adolescent settings, such as schools. Computers are becoming more accessible to disadvantaged populations,[6–8] youths enjoy and are easily engaged by computer-based interventions,[9,10] and the delivery of educational material via computer can be far more effective than traditional methods of instruction.[10–12] Computerized interventions offer a vehicle to reach youths easily, free the intervention from reliance on the teacher, and maintain fidelity. As a result of these successes, computer-based interventions have been widely advocated in the fields of health education and prevention.[13–17] We tested the hypothesis that a computerized version of Project LIGHT would be as efficacious as the interpersonal, small-group delivery of the intervention in reducing the sexual risk behaviors of delinquent youths.

METHODS

Participants

Students aged 14 to 18 years attending 3 alternative education schools were recruited and assessed at baseline and 3 months. These students had been unsuccessful in a mainstream school setting and were at risk for becoming involved with or were currently involved with the juvenile justice system. Participants were paid $25 for completing the 1.5-hour baseline and 3-month follow-up assessments. This compensation level is standard for this type of research with adolescents.[5,9,13] A total of 219 students were approached. Of those approached, 18 (8%) declined participation, and 68 (31%) did not complete parental consent. Consequently, 133 students (61%) were enrolled in the study.

Measures

The primary outcome was sexual behavior[4]: that is, whether the student had sexual intercourse (0=no; 1=yes) in the previous 3 months and the type of sexual activity the student had in the past 3 months (number and sex of sexual partners, occasions, types of acts, and frequency of condom use).

Students self-reported demographic variables (Table 1), including age, gender, race/ethnicity, living situation, criminal behavior, and substance use.[4]

Statistical Methods

To examine the intervention effect on sexual behavior from baseline to 3 months, logistic, linear, and Poisson random-effects regression models were fit to binomial, continuous, and count outcomes, respectively. Regression models included covariates for time (measured in months), assigned intervention condition, and a 2-way time-by-intervention interaction. Models also included person-level random effects to account for correlation between repeated measurements at baseline and 3 months. All models were fit in the SAS Proc Mixed procedure (SAS Institute Inc, Cary, NC) for continuous data and SAS GLIMMIX macro for discrete outcomes.

RESULTS

After we adjusted for baseline differences, we found varying rates of behavior change across intervention conditions from baseline to 3 months on sexual activity rates ($F_{2,104}=3.11$; $P=.05$) and the number of sexual partners ($F_{2,104}=3.90$; $P=.02$). Adolescents in the

TABLE 1—Sexual Behavior of High-Risk Adolescents in 3 Intervention Conditions: Demographic Variables at Baseline

	Control Group (n = 38), %	Computer Group (n = 38), %	Small Group (n = 31), %	Overall (N = 107), %	*P*
Mean age (SD)	15.6 (1.3)	16.4 (1.0)	16.2 (1.5)	16.0 (1.3)	.03
Gender					.36
Female	53	45	36	45	
Male	47	55	65	55	
Race/Ethnicity					.07
Black	61	34	52	49	
Latino	32	63	45	47	
Other	8	3	3	5	
Financial situation					.01
Very poor or poor	0	11	10	7	
Have necessities	5	5	26	11	
Comfortable	95	84	65	82	
Living situation					.24
With parents	71	84	84	79	
With other relatives	13	13	13	13	
In a group home	11	0	0	4	
Other	15	3	3	4	
Lifetime criminal behavior					
Arrested	39	42	84	52	< .01
Time in jail	16	26	23	22	.53
Time in juvenile hall	29	26	77	42	< .01
Currently on probation	26	29	74	41	< .01
Substance use					
Alcohol	61	71	74	68	.83
Marijuana	50	47	55	51	.88
Hard drugs	21	29	19	23	.63

computer-based condition were less likely to engage in sexual activity (t_{104}=2.43; P=.02) compared with those in the small-group condition over time (Figure 1). Adolescents in the computer-based (t_{104}=2.67; P<.01) and small-group (t_{104}=2.15; P=.03) conditions had fewer sexual partners than did those in the control condition over time. Although the results were not significant, the computer-based condition reported reductions in the percentage of unprotected sexual intercourse, whereas the control and small-group conditions reported increases in unprotected sexual intercourse.

CONCLUSIONS

Some youths may require the traditional in-person, therapist-led format to reduce sexual risk behaviors successfully. However, this study suggested that for youths who are outside mainstream schools and who may respond poorly to didactic instruction, computers are a viable way to deliver prevention information and promote skill development.[15] Computer-assisted instruction has been used to treat phobias, depression, obesity, eating disorders, and diabetes[18–23] yet is rarely used in HIV prevention. Our results support the use of computers as a tool for HIV prevention. Youths receiving the computerized intervention were successful in reducing their sexual risk behaviors.

A limitation of the current study was the use of self-report data. To ensure veracity of reports, assessments used audio computer-assisted interviewing. Previous research indicates that risky behaviors are more likely to be reported by adolescents when this technique is used.[24–29] This research was limited by the small sample size and short follow-up period. Randomized controlled trials with larger sample sizes that follow students longitudinally for a longer time are needed to explore fully the potential of using technology for engaging youths in prevention activities.

Several interventions have successfully reduced the HIV transmission risk behaviors of adolescents.[30] However, these interventions face challenges in implementation in real-world settings. The design of future interventions must acknowledge the need for accessible and sustainable programs. Computerized interventions, which are relatively easy to implement and sustain, appear to be a potentially effective means of promoting reductions in HIV-related sexual risk behaviors. This program was implemented in schools, increasing the likelihood of access for youths who are often difficult to reach, particularly minorities. Furthermore, interactive computer programs may help youths learn skills to prevent HIV infection and instill in these youths the self-efficacy to apply these new skills. This is particularly important given the probable cost-effectiveness and ease in dissemination and use of computerized programs. ■

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Contributors

M. Lightfoot supervised all aspects of the intervention study and served as lead writer. W. Scott Comulada performed the statistical analyses for the study. G. Stover was project director for the intervention study and assisted with writing.

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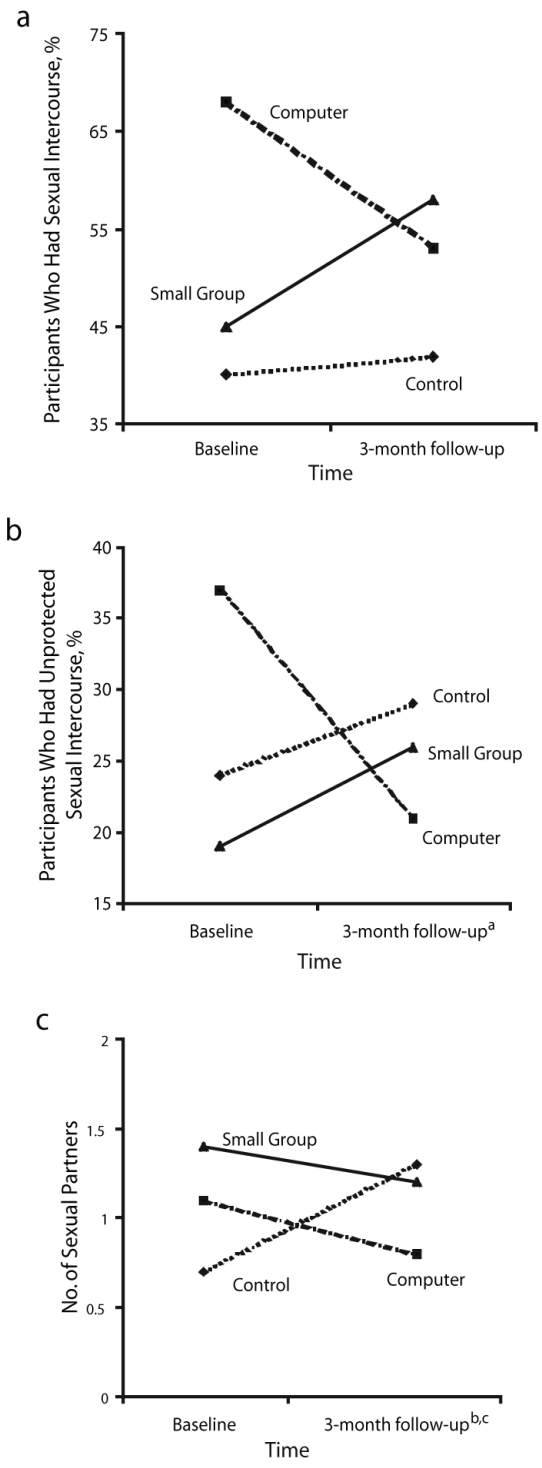

[a]Small group vs computer group difference.
[b]Computer group vs control group difference.
[c]Small group vs control group difference.

FIGURE 1—Sexual behavior outcomes: baseline and follow-up comparisons of (a) percentage of students who had sexual intercourse, (b) percentage of the students who had unprotected sexual intercourse, and (c) number of sexual partners.

Human Participant Protection

This study was approved by University of California's institutional review board.

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