

Sexual Behavior Change Among Human Immunodeficiency Virus-Infected Adolescents With Hemophilia

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ABSTRACT. *Purpose.* To determine the factors associated with the adoption or maintenance of consistent safer sexual behaviors among human immunodeficiency virus-positive adolescents and young adults with hemophilia.

Methods. One hundred eleven adolescents at 10 hemophilia care sites participated in an intervention program designed to increase safer sexual behaviors (abstinence, condom use, or nonpenetrative behavior). The theory-based intervention spanned 1 year. Adolescents attended individual sessions, small group activities, and an intensive group retreat.

Results. Patients who maintained or improved safer sexual behaviors were compared with those who relapsed or did not improve. Logistic regression analyses found that improvement and maintenance of safer sexual behavior were significantly associated with perceived peer support for outercourse (odds ratio [OR]: 5.47; confidence interval [CI]: 1.4–20.8), perceived peer support for abstinence (OR: 5.08; CI: 1.2–20.1), and decreased general emotional distress (OR: 4.65; CI: 1.04–20.6). Perceived health status and previous sexual behavior were unrelated to change in safer sexual behavior.

Conclusions. These longitudinal data indicate that improvement and maintenance of safer sexual behavior among adolescents during an intervention is strongly associated with perceptions of peer support for safer sex and lesser degrees of emotional distress. Programs for human immunodeficiency virus-infected adolescents may require developmentally appropriate social and psychological approaches to impact peer norms and emotional well-being. *Pediatrics* 2000;106(2). URL: <http://www.pediatrics.org/cgi/content/full/106/2/e22>; *human immunodeficiency virus, sexual behavior, stages of change, peer norms, emotional distress, transtheoretical model.*

ABBREVIATIONS. HIV, human immunodeficiency virus; AIDS, acquired immunodeficiency syndrome; HBIEP, Hemophilia Behavioral Intervention Evaluation Project; TM, transtheoretical model; OR, odds ratio; CI, confidence interval.

Few behavioral interventions have specifically targeted human immunodeficiency virus (HIV)-seropositive youth. In the early 1990s, the largest group of young people with acquired immunodeficiency syndrome (AIDS) were youth with hemophilia.¹ The Centers for Disease Control and Prevention (CDC) funded the adolescent Hemophilia Behavioral Intervention Evaluation Project (HBIEP) to develop, implement, and evaluate behavioral interventions to reduce the transmission of HIV to sexual partners of this population. The HBIEP was a national, multisite study that offered interventions through 10 hemophilia care sites serving adolescents in 22 states. Interventions that are effective in reducing the risk of HIV transmission with this particular cohort may offer guidance for both primary and secondary prevention with other adolescent populations.

The HBIEP implemented a theory-based intervention, based on the theory of reasoned action (TRA) and the transtheoretical model (TM).^{2,3} The TM holds that behavior change is marked by progression through a series of stages. Individuals do not change health-related behaviors in a single act, but rather go through a series of 5 predictable stages of behavior change that can result in the long-term maintenance of the behavior. In the first 3 stages, individuals are not considering the behavior or are not engaging in it. In the final 2 stages (action and maintenance), individuals are consistently engaging in the behavior and intend to continue it. Individuals often relapse to earlier stages and move back through the stages a number of times. The TM has been applied to a variety of populations and to numerous health-related behaviors, including smoking cessation, diet, exercise, and safer sexual behavior.³

Several variables are likely to influence the movement across the stages of change. One determinant is self-efficacy, which has been defined as the conviction that one can actually perform a specific behavior.⁴ Several studies, including those that have assessed risk reduction behavior in adolescents, have demonstrated a direct relationship between self-efficacy and the actual performance of health-promoting

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behaviors.⁵⁻⁸ Perceived advantages of safer sexual behavior are another set of influences. It has been found that as the skills necessary to perform a health-related behavior are acquired, the perceived advantages of the behavior increase.^{9,10} Adolescents are especially susceptible to the influence of subjective peer norms, particularly with regard to sexual behavior.¹¹⁻¹⁶ A recent prevention project that used group discussions to reinforce peer norms for HIV risk reduction behaviors among college students resulted in significant increases in safer sex.¹⁷ Finally, emotional distress concerning HIV infection may influence risk reduction among HIV-seropositive youth. Some studies have shown a relationship between unsafe sexual behavior and feelings of frustration, apathy, or anger among HIV-positive gay men.^{18,19} In the developmental phase of the HBIEP and in another project with seropositive youth, emotional distress was found to be associated with risk behavior, withdrawal, and problem avoidance.^{20,21}

For this study, safer sexual behavior was defined as abstinence, condom use, or nonpenetrative sexual behaviors (outcourse). Participants were classified according to their report of any of these safer sexual behaviors along the stages of change as defined by the TM. Although these behaviors required different skills and could be based on different motivations, each of the behaviors alone, or in combination, effectively promoted the project goal of decreasing the sexual transmission of HIV. To date, no other study has applied the TM to abstinence behavior among adolescents, but other longitudinal research has found important associations with continued abstinence. For example, a 2-year study of 10th and 11th grade students found that continued abstinence, contrasted with the initiation of sexual intercourse, was associated with fewer mental health problems and fewer behavioral risks.²² The TM has been shown to apply to behaviors that require long-term attention and avoidance, making it an appropriate model for abstinence behavior in addition to condom use.⁴ A recent project, for example, found that the TM was a suitable model for describing the avoidance of smoking initiation among adolescents.²³ The current study sought to determine the associations among sexual attitudes, intention for future safer sexual behaviors, and the longitudinal progression of safer sexual behaviors. It was hypothesized that participants who remained in maintenance or progressed toward the action and maintenance stages of safer sexual behavior would differ from their peers based on changes in self-efficacy for safer sex behavior, perceived advantages and disadvantages of safer sex, perceived peer and family norms regarding sexual behavior, and emotional distress.

METHODS

Study Design and Population

This single-arm, observational study was conducted to determine the effectiveness of a behavioral intervention program in promoting safer sexual behaviors among adolescent young/adult males with hemophilia and HIV infection. Study eligibility included known diagnoses of both hemophilia and HIV infection and age between 12 and 24 years. One hundred sixty-seven par-

ticipants were recruited from a population of 364 eligible youth. Hemophilia care sites provided demographic information on participants ($n = 167$) and nonparticipants ($n = 197$). Comparisons revealed that the 2 groups were similar in ethnicity, residency, and sexual experience. They differed only by age (19.6 years old for nonparticipants vs 18.8 years old for participants; $t = 2.30$; $P < .05$). In 122 cases (62%), staff noted reasons for refusal to participate, including the following: 22% were too busy, 15% were too ill, 9% failed to obtain parental permission, 8% did not want to discuss HIV, and 8% were not generally involved with hemophilia care site activities. The project was approved by each local institutional review board and written informed consent was obtained from each participant and from parents of participants younger than 18 years of age. Pretest and posttest measurements were completed by 111 patients who form the final sample for these analyses. There were no differences in demographics or perceived severity of HIV illness at baseline between subjects who completed the posttest ($n = 111$) and those who did not ($n = 56$). Staff noted reasons for noncompletion, such as loss of interest in the project (43%), death (27%), serious illness (9%), or inability to be located (14%).

The protocol was designed as a series of 4 interventions over a 1-year period and emphasized communication skills, assertiveness, and decision-making, as well as problem solving related to obstacles impeding safer sex that would be specific to HIV-infected youth. The protocol used both individual and group formats. Activities for each intervention were selected using the appropriate process of change for the participants' stage of change, measured before each intervention.

The first intervention was an individual session that introduced the general approach and developed individual goals for safer sexual behavior. The second intervention combined a group session with a social activity to establish a supportive peer group in which issues related to HIV could be raised. The intervention also included exercises to enhance self-efficacy for safer sexual behaviors. The third intervention was a weekend retreat that incorporated activities that focused on self-efficacy, communication, decision-making, skills building, and problem solving concerning the barriers to practicing safer sex. The final intervention was an individual session designed to prevent relapse by developing a plan for future behavior change. A detailed description of the intervention may be found in the *Adolescent Behavior Change Manual*, available through the National Hemophilia Foundation.²⁴

Data Collection and Analysis

Participants completed a study-specific 162-item instrument developed for this study at least 2 weeks before the first intervention session and 2 months after the last intervention session. The instrument included questions regarding disclosure of hemophilia and HIV, sexual practices, health status, and basic demographic information. Items also assessed intentions, facilitators, and barriers around sexual practices. Sexual behavior was assessed using items reflecting sexual abstinence, intimate touch, vaginal intercourse, and condom use. Remafredi²⁵ found that items among high school students have high test-retest reliability with >90% consistent responses. As suggested by Prochaska et al,³ stages of change for sexual behavior were assessed using 4 items to define the consistent occurrence of the behavior (eg, always use condoms); the duration of the behavior (eg, using intimate touch for <6 months); and future intentions (eg, intend to not have sex in the next 6 months). A global measure of stage of change for all safer sexual behaviors was constructed, with safer behaviors defined as abstinence, condom use, or outcourse. Thus, a participant reporting the use of abstinence or condom use or outcourse in the past 6 months without unprotected intercourse was classified in the action stage for safer sexual behaviors. Much of the survey was developed based on findings from earlier HBIEP formative research with the same population.²⁷⁻³⁰ To confirm the scales, principal components factor analyses with a Varimax rotation were performed, and factors with Eigen values >1.0 were retained. Separate analyses were conducted for the following sets of items yielding the following scales: knowledge (yielded prevention behaviors and risk behavior knowledge scales); social norms (yielded peer norms for each sexual behavior); abstinence (yielded 3 scales for pros, cons, and self-efficacy); outcourse (yielded pros, cons, and self-efficacy); and condom use (yielded pros, cons, and self-efficacy). Factor analyses of adjustment items

yielded a general distress scale, but 2 potential scales—health status and coping—were not confirmed and thus dropped from subsequent analyses. Cronbach's α s for the final scales are indicated in Table 1. Eleven of the 15 derived scales exhibited α s $>.66$. Smaller but acceptable α s were found with scales with the fewest items (eg, a 2-item scale for peer norms for condom use). The measures were administered to 81.6% of the sample by a trained telephone interviewer. The remainder completed a written survey.

Responses to the questionnaire were confidential, with all data coded by a participant number. For purposes of verification, data were entered twice using an SPSS personal computer data entry package (SPSS, Chicago, IL). Group comparisons were made using χ^2 and Student's *t* test statistics. Change patterns were compared using residual change scale scores to adjust for any potential pretest differences between groups and ceiling effects.³¹ Multiple logistic regression analyses were conducted with variables significant in univariate analyses to test for adjusted influences.

RESULTS

At entry into the study, the mean age of the 111 participants was 18.5 years old, with a range of 13 to 24 years old. Participants were predominantly white (74%), suburban (51%), and unmarried (98%) males. Overall, 59% of the sample reported previous sexual intercourse and 45% had been sexually active in the previous 6 months. Sixty-three percent had used condoms at last intercourse, and 64% had experienced outercourse ever in their lives. Thirty percent of the patients reported having AIDS. Participants were cross-classified according to the global measure of stages of change for current safer sexual behavior (abstinence, outercourse, or condom use). Eighty-eight participants remained in maintenance or progressed toward the action and maintenance stages over the course of the study. This group was considered to have achieved a successful outcome. In contrast, 23 participants did not progress to the action stage or relapsed from maintenance of safer sex. This group was considered to have experienced an unsuccessful outcome.

Subsequent univariate analyses examined behavioral and demographic characteristics of the 2 outcome groups at baseline and differential change in scale scores associated with safer sex stage of change outcome. Before intervention, there were no differences between the groups based on demographic characteristics or previous sexual behaviors or perceived health status (by χ^2). Among the sexually active teens at posttest, 97% of the successful group indicated condom use at last intercourse, compared with only 63% of the unsuccessful group ($P < .05$).

Examination of the residual change scores by Student's *t* test did not reveal differences in HIV prevention knowledge or the perceived advantages and disadvantages of safer sexual behaviors. There were significant differences between outcome groups for changes in self-efficacy (for condom use and outercourse), perceived peer norms (for outercourse and abstinence), and emotional distress. The successful group was more likely than the unsuccessful group to report increased self-efficacy, more peer support, and less emotional distress over the intervention period. For ease of interpretation, Table 1 illustrates the relevant scale scores, rather than the residual change scores, at pretest and posttest for each outcome group.

Most participants (94%) attended at least 1 of the 4 intervention sessions. The majority (68%) attended the 2 individual interventions and at least 1 of the 2 peer activities. The successful outcome group was more likely than the unsuccessful group to have attended the peer discussion session/social activity (60.2% vs 36.4%; $P < .05$), although attendance did not otherwise differ between groups.

Multiple logistic regression analyses were performed with outcome group as the dependent vari-

TABLE 1. Scale Scores at Preintervention and Postintervention by Safer Sex Outcome Group for HIV-Positive Adolescents With Hemophilia ($n = 111$)

Scales	Number of Items	α	Range	Preintervention			Postintervention			<i>t</i>	<i>df</i>
				Successful	Nonsuccessful	Standard Deviation	Successful	Nonsuccessful	Standard Deviation		
Self-efficacy											
Condom use	11	.90	0–33	29.5	28.8	4.1	30.6	28.9	3.1	1.83†	101
Outercourse	6	.93	0–18	13.0	11.3	4.6	15.1	13.4	3.1	1.76†	101
Abstinence	5	.91	0–15	9.0	9.5	4.2	10.5	9.3	4.0	1.72	107
Peer norms											
Condom use	2	.45	0–4	2.4	2.2	1.1	1.6	2.3	1.4	.20	104
Outercourse	2	.67	0–4	1.9	1.3	1.8	1.6	2.3	1.4	2.62*	102
Abstinence	2	.78	0–4	1.8	1.9	1.8	1.4	2.2	1.7	2.00*	108
Distress knowledge											
Risk	6	.78	0–12	8.5	7.6	2.5	8.6	7.0	2.4	2.23†	108
Prevention	5	.56	0–15	11.1	10.4	2.3	11.4	10.4	2.5	1.14	101
Prevention	4	.69	0–12	9.1	9.5	2.2	9.6	10.2	2.2	.85	104
Decisional balance											
Condom use											
Pros	3	.66	0–6	4.5	5.0	1.5	4.4	4.2	1.7	1.69	108
Cons	5	.82	0–10	2.5	2.0	2.7	2.3	2.3	2.9	.87	106
Outercourse											
Pros	2	.68	0–4	2.2	2.7	1.2	2.6	2.5	1.2	.61	102
Cons	4	.73	0–8	2.8	2.7	2.1	2.9	2.8	2.0	.31	101
Abstinence											
Pros	3	.57	0–6	4.2	3.8	1.3	4.3	4.3	1.3	.16	106
Cons	3	.57	0–6	3.3	3.7	1.4	3.2	3.6	1.7	.83	106

* $P \leq .05$ by *t* test of residual change scores.

† $P < .01$ by *t* test of residual change scores.

TABLE 2. Multiple Logistic Regression for Successful Outcome in Safer Sex Stages of Change for HIV-Positive Adolescents With Hemophilia

Variable*	OR	P Value	CI
Peer norms—outercourse			
Large change	5.47	.01	1.44, 20.76
Small change	1.0		
Peer norms—abstinence			
Large change	5.08	.03	1.17, 20.10
Small change	1.0		
Distress			
Minimal or decreased	4.65	.04	1.04, 20.78
Maximal or increased	1.0		
Intervention—peer discussion			
Attended	4.7	.04	1.08, 20.59
Absent	1.0		
Self-efficacy—outercourse			
Large change	1.51	.56	.37, 6.27
Small change	1.0		
Self-efficacy—condom use			
Large change	2.16	.28	.53, 8.71
Small change	1.0		
Sexual intercourse			
Not sexually experienced	2.45	.25	.53, 11.27
Sexually experienced	1.0		

* Residual change scores split at median for ease of interpretation.

able (Table 2). All variables significant at the univariate analyses were entered. In addition, a history of sexual intercourse was included as a potentially important covariate of self-efficacy and peer norms. Changes in perceived peer norms (odds ratio [OR]: 5.47 and 5.08) and emotional distress (OR: 4.65) and attendance at the peer discussion session (OR: 4.7) remained significantly associated with group outcome, but changes in self-efficacy were not significant. Individual items comprising the peer norms scale were examined to judge the relevance of the change demonstrated by the residual scale scores. The groups were similar in their response to peer norm items on entry into the project, but after the intervention, the successful group, compared with the unsuccessful group, perceived most friends as supportive of their use of outercourse (67% vs 46%) and abstinence (46% vs 17%).

DISCUSSION

These findings suggest that the improvement or maintenance of safer sexual behaviors is associated with specific influences. There were no differences between successful and unsuccessful outcome groups at the baseline assessment. Through the intervention period, however, greater change in peer support for nonintercourse sexual behaviors was 5 times more likely to be associated with a successful outcome. These findings are consistent with other research, which has demonstrated the influence of peer norms on condom intentions and use.^{13,32,33} Significantly more of the successful outcome group attended the peer discussion session intervention, relative to the unsuccessful outcome group. For many participants in this study, the peer interventions provided their first opportunity to meet other adolescents and young men with both hemophilia and HIV. The intervention activities may have contributed to the formation of a new relevant peer

group or altered the perception of peer norms. The intervention was designed to encourage the older patients to serve as role models. Abstinence has been used previously as a target behavior in safer sex studies.³⁴ These results suggest the influence, even among older adolescents, that peer norms can have in promoting not only condom use, but also outercourse and abstinence. Maintaining abstinence, like the other target behaviors, can be intentional, marked by a series of decisions and behaviors that are influenced by group norms and personal values. National data indicate that among adolescents that have never had sexual intercourse, as many as 20% may engage in their first episode during the subsequent year.³⁵ This project was able to examine factors associated with the maintenance of abstinence throughout the year, despite the normative trend toward sexual debut. Thus, the TM seems to be a useful model for examining the continuation of abstinence behavior, as well as the progression to consistent condom use.

Lower levels of reported distress were associated with a successful outcome. Some studies have found that unsafe sexual behavior is associated with emotional distress, such as feelings of frustration, apathy, or anger.^{18,19} In this study, although general distress scores stayed the same for the successful outcome group, the unsuccessful outcome group reported increased distress. For those with a successful outcome, the peer intervention may have been a protective factor through group support. Alternatively, factors unrelated to the project may have increased distress of those with unsuccessful outcome. The distress measure used in this study was global, not specifically related to HIV. Identification of origins of distress could lead to strategies to reduce distress and improve safer sexual behaviors.

The TM suggests that knowledge and shifts in the perceived advantages of a behavior are most important in the early stages.^{3,4} In keeping with the theory, knowledge about HIV and safer sex techniques did not differ between the outcome groups. Patients were well-educated, having been exposed to clinic-based HIV risk reduction for years before these interventions.³⁶ These findings also are similar to those previous studies that found that education was not sufficient to bring about behavior change.^{37,38} Perceived advantages and disadvantages of safer sex did not differ between groups consistent with patients being classified in the later stages of safer sex. Other processes are of greater influence during these later stages.⁴

Self-efficacy was also not associated with outcome, although there was a nonsignificant trend for improved self-efficacy to be related to successful outcome. This finding was in contrast to previous studies that found that self-efficacy is important for safer sex implementation.^{7-9,39,40} However, on entry into the project, patients were already confident that they could implement safer sexual behaviors and had been doing so at higher rates than participants in other studies. The small improvement in self-efficacy after the interventions did not distinguish the 2 outcome groups. Similarly, although the proportion of

participants with the diagnosis of AIDS increased significantly during the study, perceived health status was unrelated to behavior change outcome. This finding suggests that long-term HIV infection, even accompanied by symptoms and the development of AIDS, does not preclude sexual behavior and illness does not necessarily facilitate safer behavior.

Without a control group, there are constraints on the conclusions that can be drawn. However, because of the risk to sexual partners of these adolescents and young men, there was an urgency and ethical responsibility to offer this intervention to all eligible participants. Although participation in this study was by self-selection, there were no differences in demographics or sexual experience between those who chose to participate and those who declined.

Despite the limitations, this study offers unique contributions to the literature. First, the participants were all HIV-seropositive rather than simply at risk. Behavior change was not motivated by self-protection but rather by a desire to protect partners from the risk of transmission. Second, persons with hemophilia come from a variety of economic, ethnic, and geographic groups, and the study included patients from across the nation. With the increased prevalence of HIV among youth and improved treatments for HIV/AIDS, there will be a continuing need to address safer sex issues among long-term HIV-infected populations outside the hemophilia community. As demonstrated by this study, long-term HIV infection does not preclude sexual activity. Third, new cases of HIV will continue to be diagnosed among sexually active adolescents and young adults, further necessitating interventions that emphasize prevention of transmission and a variety of safer sexual practices, including abstinence. Finally, these are the first longitudinal data that suggest the power of peer-group norms and general emotional distress for infected adolescents.

CONCLUSION

In this study, both emotional distress and perceived peer norms were associated with the maintenance of safer sexual behaviors among HIV-positive adolescents and young men. The results of this study suggest that interventions for HIV-infected youth need to be broader than skill building and even attitude change. The emotional well being of participants can be addressed in the context of both adolescent development and social relationships. New developments in AIDS care, such as protease inhibitors, may lead to a larger proportion of HIV-seropositive individuals who feel healthy enough to engage in sexual relationships. Programs to reduce the risk of sexually transmitting HIV require both psychological and social approaches that are developmentally relevant to target perceptions of peer influence and emotional well being.

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Sexual Behavior Change Among Human Immunodeficiency Virus-Infected Adolescents With Hemophilia

Larry K. Brown, Janet R. Schultz, Jeffrey T. Parsons, Regina B. Butler, Ann D. Forsberg, Susan M. Kocik, Gary King, Marilyn Manco-Johnson, Louis Aledort and for the Adolescent Hemophilia Behavioral Intervention Evaluation Project Study Group

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