

Factors Mediating Changes in Sexual HIV Risk Behaviors among Gay and Bisexual Male Adolescents

ABSTRACT

Objectives. Factors mediating changes in sexual behaviors that increase the risk of human immunodeficiency virus (HIV) infection were monitored in a group of gay and bisexual male adolescents.

Methods. One hundred thirty-six males aged 14 to 19 years (Hispanic, 51%; African-American, 31%) were recruited from one gay-identified agency, were assessed at four points over a 1-year period, and participated in HIV preventive intervention sessions.

Results. Significant reductions occurred in the number of unprotected same-sex anal and oral acts. Those with less risk in their previous sexual history, those who did not engage in commercial sex, and those who attended more HIV intervention sessions were more likely to reduce their sexual risk. The impact of sessions varied significantly by race/ethnicity: African-American youths reduced their risk acts most dramatically. Abstinence was consistently and significantly more likely among younger youths and those who had been abstinent before enrollment. The youths significantly reduced the number of sexual partners following the intervention; this reduction in partners was maintained through the 12-month follow-up and was greatest among youths with no involvement in commercial sexual activity (prostitution).

Conclusions. The efficacy of HIV prevention programs must be empirically evaluated. (*Am J Public Health*. 1994;84:1938-1946)

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Introduction

The goal of this study was to describe changes in sexual risk behaviors over 1 year and mediators of change among gay and bisexual male adolescents who are predominantly African-American and Hispanic. This study was initiated because gay and bisexual male adolescents are at high risk for infection with the human immunodeficiency virus (HIV).¹⁻⁴ Sexual activity between males is the primary risk factor for HIV infection for one third of adolescent males with acquired immunodeficiency syndrome (AIDS)⁵ and accounts for two thirds of 20- to 24-year-old men with AIDS, suggesting that these young men were infected with HIV during adolescence.⁶ Furthermore, estimates of HIV infection rates among adults indicate that young gay males are at greater risk than older gay men.⁷ Injection drug use, a primary route for HIV infection,³ is very rare among gay and bisexual youths in New York City; therefore, we monitored only the sexual risk behaviors of this group.⁸

Gay males have multiple male sexual partners⁸⁻¹⁰; condom use is infrequent⁸; 17% to 23% exchange sex for money or drugs^{8,10}; and younger gay men engage in more sexual risk acts than older gay men.⁸⁻¹¹ Many gay male adolescents have sexual relations with adult gay men,⁹ the group with the highest prevalence of AIDS.⁵ The prevalence and frequency of noninjection drug use is high in this group^{8,10}; such use has been linked to risky sexual behaviors among heterosexual adolescents^{12,13} and gay and bisexual male adolescents⁸ and to HIV seroconversion among gay men.¹⁴

Four factors were hypothesized to mediate HIV-related sexual risk acts: (1) age, (2) ethnicity, (3) involvement in commercial sexual activity (prostitution) and (4) attendance at an HIV interven-

tion. First, we anticipated that HIV-related sexual risk acts would increase with age. Among youths, more older than younger adolescents are HIV seropositive,⁶ and sexual activity and drug use increase with age among adolescents,¹⁵ thus our hypothesis that HIV risk acts would also increase with age.

Second, ethnic differences in sexual risk patterns were expected. African-American and Hispanic adolescents, like African-American and Hispanic adults, are overrepresented in the AIDS case-load: African Americans constitute 37% and Hispanics 19% of adolescents with AIDS⁵—more than double their representation in the general adolescent population.¹⁵ There are also ethnic differences in the means of contracting HIV.¹⁵ For example, infection attributed to same-sex contact is much higher for African Americans (63%) than for Hispanics (35%) or Whites (26%).¹⁶ Furthermore, differential seroprevalence rates parallel ethnic differences in sexual and substance use behavior patterns. For example, African Americans engage in oral sex more frequently than Whites,¹⁷ and more African-American and Hispanic gay males engage in anal intercourse.^{17,18} Ethnic differences in sexual and substance use behaviors are also found in epidemiological surveys of adolescents. More African-American than Hispanic or White adoles-

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cents report engaging in sexual intercourse,¹⁹⁻²¹ and they report having more sexual partners.^{3,22,23} In addition, African Americans and Hispanics are less likely than Whites to use condoms.^{21,22} Finally, substance use varies by ethnicity: for example, more Hispanic than African-American or White adolescents report injecting drugs.²³ Each of these factors indicates that African-American and Hispanic youth are at greater risk for HIV infection than White youth. Furthermore, the base rates of unprotected sexual behavior were higher for African Americans than for any other ethnic group in our sample, leading us to hypothesize that changes in sexual behavior over 1 year would be greatest among African-American youth.

Third, commercial sexual activity was hypothesized to increase sexual risk acts. With few outlets for initiating romantic relationships,²⁴ gay youths sometimes engage in commercial sex.^{8,25,26} In such relationships, youths are younger and need the money offered for sex for their subsistence. Youths who engage in commercial sex are less likely to be able to insist on condom use and, therefore, we hypothesize, less likely to reduce their sexual risk acts over 1 year.

Finally, among the factors mediating changes in sexual risk acts among gay and bisexual youths is participation in HIV prevention activities. Ethical concerns and unavailability of recruitment sites prohibited a controlled evaluation of an HIV intervention program. However, a consecutive series of youths were recruited from the only gay-identified agency in New York City in 1988, and it was possible to monitor changes associated with attending such interventions. Therefore, an intervention was mounted at the recruitment site for this study. We hypothesized that youths attending the intervention sessions would reduce their sexual risk acts.

The design of the intervention was based on programs that had been successful in changing sexual risk behaviors in runaways²⁷ and adult gay men^{14,28} and in changing other adolescent health risk behaviors (e.g., cigarette smoking²⁹). Early HIV prevention programs for adolescents changed knowledge and attitudes toward HIV, rather than behaviors.³⁰⁻³² This program was intensive and included components with demonstrated effectiveness: social skills training, behavioral self-management, and group and social support from peers, as well as addressing youths' needs for comprehensive health care.

Methods

Participants

From June 1988 through February 1991, a consecutive series of 138 male youths aged 14 to 19 years were recruited from 141 potential subjects seeking services at the Hetrick-Martin Institute, a community-based agency providing recreational and social services to gay youths in New York City. Immediately following their intake interview at the institute, the youths were recruited with informed consent and completed the first individual interview (the baseline interview). Sexual risk data were complete for 136 subjects. Reassessments were conducted 3, 6, and 12 months after the baseline interview. Each youth was paid \$2 for participating in the initial assessment and \$20 to \$25 for each follow-up interview. At the time of this analysis, 88% of the youths had received a follow-up interview at 3, 6, or 12 months after the baseline assessment: 52% had completed all four assessments, 79% had completed at least three assessments, and 9% had completed only two assessments. The completion rate at the 3-month follow-up was 78%; at 6 months, 82%; and at 12 months, 71%.

Assessment Procedures

Three highly trained,³³ master's-level, White male homosexual research assistants conducted all interviews; the quality and consistency of the interviewing was monitored biweekly through audiotapes and individual and group supervision. A master's-level research psychologist supervised interviewing, tracking, and productivity of the interviewers. A semistructured interview protocol³⁴ was used to assess sexual activities during the previous 3 months. A sexual partner was defined as a male with whom the youth engaged in oral sex, anal sex, or anilingus; opposite-sex contact was too infrequent for inclusion. A sexual act was defined as a single session of receptive or insertive (active) oral or anal intercourse or anilingus. Youths reported specific sexual acts with each partner, the total number of partners and sexual acts, and the use of condoms during each act (except anilingus).

Thus, five indices were calculated for each assessment period: (1) the sum of the number of unprotected active and receptive anal acts; (2) the sum of the number of unprotected active and receptive oral acts; (3) abstinence from anal sex (no sexual partners and no acts); (4)

abstinence from oral sex (no sexual partners and no acts); (5) the total number of sexual partners.

HIV Intervention Sessions

An intensive HIV intervention program was initiated at the Hetrick-Martin Institute simultaneous with the beginning of participant recruitment. All interventions were co-led by a staff member from the institute and a member of the research team. Leaders were trained by clinical psychologists and social workers in 25 to 40 hours of analog group sessions in which they received training in cognitive-behavioral strategies, procedures to cope with clinical crises, and sensitivity to issues of cultural and sexual orientation. A 20-session intervention rotated in a 3-week sequence, with youths joining the sequence at various points. Small group sessions of about 10 youths each were conducted at the institute typically 2 or 3 days a week, with the content of the sessions varying by day of the week. These sessions lasted 90 to 120 minutes. No schedule indicating the content of sessions was posted; therefore, youths could not self-select to attend sessions covering topics of their choice. The manual used in the intervention³⁵ is available from the authors.

The HIV intervention activities addressed five components:

1. Facts about HIV were communicated in two types of activities. First, youths participated in video and art workshops to develop soap opera dramatizations, public service announcements, commercials, and raps about HIV prevention. Second, youths reviewed commercial HIV prevention videos.

2. Coping skills training addressed youths' unrealistic expectations regarding their emotional and behavioral responses in high-risk situations (i.e., their ability to cope with risky situations). They were taught to identify the personal cues or triggers placing them at potential risk for HIV transmission and to identify and practice behavioral and cognitive coping responses to such situations.

3. Access to health care and other resources was addressed by visits to a community-based agency providing vocational and educational counseling, recreational opportunities, and referrals to ongoing comprehensive health and mental health care and legal aid. All youths attended a minimum of one visit at a health care agency.

TABLE 1—Differences in Background Factors and Sexual Behaviors among Youths (n = 136) at Baseline, by Attendance at HIV Intervention Sessions

	No. of Sessions Attended			Overall Sample
	0–5 (n = 45)	6–14 (n = 46)	15–30 (n = 45)	
Ethnicity, %				
African American	24.4	32.6	34.9	30.6
Hispanic	57.8	47.8	46.5	50.7
White	13.3	15.2	7.0	11.9
Other	4.4	4.3	11.6	6.7
Mean age, y	16.7	16.9	16.8	16.8
Abstinence, %				
Anal sex	42.2	50.0	48.8	47.0
Oral sex	33.3	41.3	34.9	36.6
Unprotected acts, mean no.				
Anal (n = 68)	5.2	2.6	2.8	3.5
Oral (n = 79)	11.1	8.0	8.2	9.2
Protected acts, mean %				
Anal (n = 71)	49.9	74.4	54.8	59.4
Oral (n = 85)	22.4	34.5	28.7	28.3
Consistent condom use, %				
Anal (n = 71)	38.5	56.5	40.9	45.1
Oral (n = 85)	20.0	18.5	14.3	17.7
Same-sex partners, mean no. ^a	2.4	2.4	2.4	2.4

^aExcludes one youth with 631 partners. Range is from 0 to 20 partners in the previous 3 months.

4. Individual barriers to safer sex were reviewed in private counseling targeting dysfunctional attitudes. Discussion of individual barriers also allowed HIV and AIDS knowledge to be personalized for each youth.

5. Prejudice against gays and positive feelings and attitudes toward coming out (declaring one's homosexuality) were addressed as potential mediators of safer sex attitudes.

The number of intervention sessions attended indicated the dosage of the intervention received. Sessions were scheduled after school; therefore, all youths had the same opportunity to attend.

Data Analysis

Descriptive statistics were used to summarize participants' characteristics and sexual risk acts, to compare those successfully reassessed with those not reassessed, and to make comparisons among those attending varying numbers of intervention sessions. Changes in sexual behavior over time were analyzed by regressing each index of sexual risk (number of unprotected anal acts, number of unprotected oral acts, and number of partners) during the previous 3 months on predictor variables entered hierarchically

in the following order: (1) ethnicity; (2) age; (3) abstinence for current and previous time periods and sexual risk acts for previous time periods; commercial sexual activity (i.e., receiving money or drugs in exchange for sex) for (4) previous and (5) current time frames; (6) the number of HIV intervention sessions received; and (7) ethnicity \times sessions interaction. Both the summary change statistics of the hierarchical regressions at each stage of the analysis and the final results of the regression analyses with the unstandardized coefficients are presented. The number of unprotected acts and number of partners were not normally distributed. Therefore, to reduce skewness and obtain the most symmetric distribution possible, outliers were trimmed from the top 95% of the distributions (about three youths per assessment point) and the natural log of unprotected acts was analyzed in the regression analysis.³⁶ Hierarchical logistic regression was used to analyze abstinence; improvements in chi-square statistics at each step of the analysis are presented. Rank order of entry into the study was calculated from the baseline interview date. This variable was nonsignificant when entered into the regression models, indicating no cohort effect on the

outcome variables; therefore, it was dropped from the analysis.

Results

Sample

At the baseline assessment, the 136 males ranged in age from 14 to 19 years (mean = 16.8, SD = 1.39). The ethnic makeup was 51% Hispanic (71% of these 61 youths were Puerto Rican), 31% African-American, 12% White, and 6% other (Asian and Native American). The youths primarily labeled themselves as gay (66%) or bisexual (25%); a few labeled themselves as straight (3%) and some (6%) refused to identify with any of these labels.

An analysis of differences in sexual risk behaviors between those not reassessed and those reassessed one, two, or three times indicated that the number of follow-up assessments did not differ significantly with age, ethnicity, or sexual risk acts. Only one significant difference in sexual behavior was found among youths assessed for different numbers of follow-up interviews: youths assessed at only one follow-up were more likely to have abstained from anal sex in the 3 months prior to the baseline assessment. Those with more follow-up assessments also attended more intervention sessions ($r = .52, P = .001$). However, 79% of the sample completed three or four assessments; therefore, this difference was found among only a few youths.

Youths received a minimum of 1 intervention session or as many as 30 (mean = 11.3, SD = 8.9; median = 8). About equal numbers received from 1 to 5 sessions (n = 45), from 6 to 14 sessions (n = 46), and more than 14 sessions (n = 45). There were no significant associations between number of intervention sessions attended and age, ethnicity, baseline sexual risk behaviors, or number of sexual partners (Table 1).

Sexual Risk Behaviors at Baseline

Youths' reports of oral and anal sex indicated quite different behavior patterns. While 89% of the sample had been sexually active over their lifetimes, 70% (n = 92) had been sexually active in the 3 months prior to recruitment. During the previous 3 months 53% (n = 72) had engaged in anal sex, with a mean of 3.5 acts (SD = 5.5; median = 1.0). When youths who abstained from anal sex were included, the mean was 1.8 (SD = 4.3; median = 0.0). Among those engaging in anal sex, 60% of the acts were protected

with a condom; 46% of the youths had consistently used condoms during all anal sex acts. Youths who engaged in oral sex ($n = 79$; 61%) reported a mean of 9.2 acts ($SD = 9.0$; median = 6.0). When youths who were abstinent from oral sex were included, the mean was 5.6 acts ($SD = 8.3$; median = 0). Use of condoms was less common during oral sex than during anal sex: 28% of the oral sex acts were protected with a condom, and 18% of the youths who engaged in oral sex used condoms consistently. Sexually active youths reported a median of 2.0 partners (mean = 3.5, $SD = 3.8$); when abstinent youths ($n = 135$) were included, the median was 1.0 partners (mean = 2.4, $SD = 3.5$). During the previous 3 months, 7% of the youths ($n = 9$) had engaged in commercial sex. Sexual risk behaviors (number of unprotected anal and oral acts, number of sexual partners, and abstinence) were similar for African-American and Hispanic youths and did not vary by age at the baseline interview.

Monitoring Changes in Sexual Risk Behaviors

Figures 1 and 2 illustrate the group means for unprotected anal and oral acts, respectively, over 1 year, by ethnicity, before statistical controls were applied in the regression analysis. Figures 3 and 4 illustrate the group means for unprotected anal and oral acts by involvement in commercial sexual activity. These figures provide a visual indicator of change over the 1-year period, using the actual mean values at each time point rather than the logs used in the regression analysis. Table 2 contains the final results of regressing the log of the number of sexual risk acts and partners hierarchically on background factors (age and ethnicity), history of sexual risk acts and abstinence, previous or current commercial sexual activity, number of HIV intervention sessions attended, and the interaction of sessions \times ethnicity on the log of the number of sexual risk behaviors. Table 2 presents unstandardized coefficients from the final regression equations. (Tables summarizing each step in the hierarchical regression analyses are available from the authors upon request.)

Anal sex. Dramatic changes in anal sex acts over 1 year were associated with sexual history and the number of intervention sessions attended (an influence that varied by ethnic group). At 3 months, 34% of the variance in the log of unprotected anal acts ($F[df = 12, 119] = 3.6$, $P < .001$) was explained. Previous history of anal sex

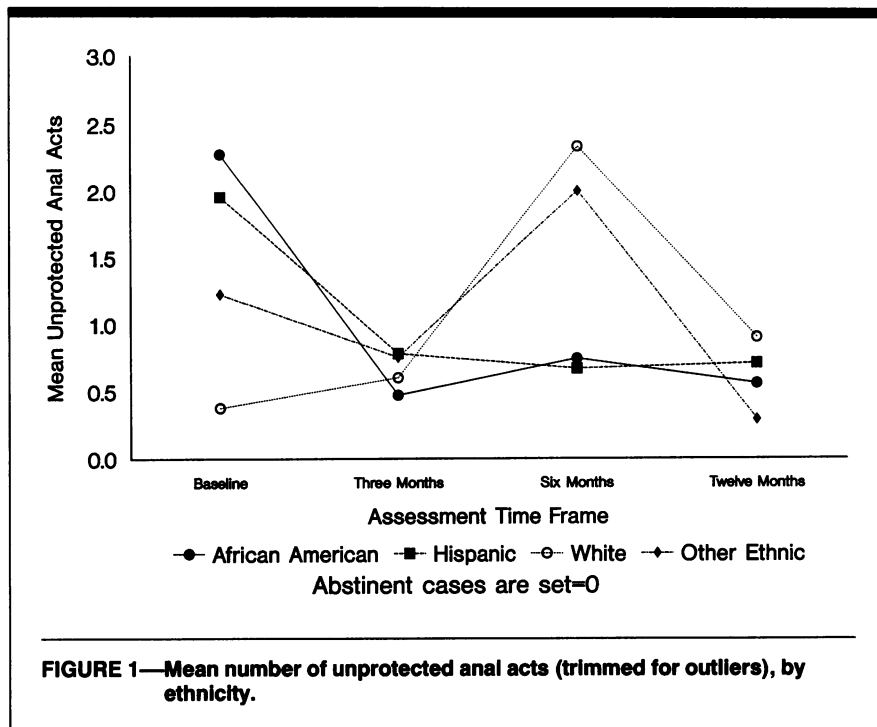


FIGURE 1—Mean number of unprotected anal acts (trimmed for outliers), by ethnicity.

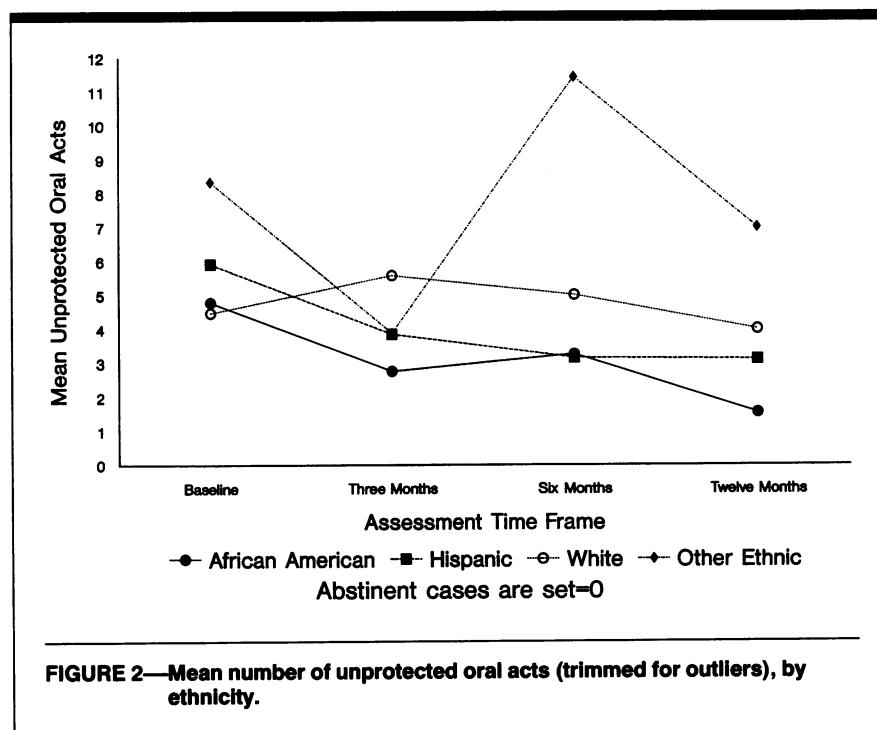


FIGURE 2—Mean number of unprotected oral acts (trimmed for outliers), by ethnicity.

acts and baseline and current abstinence contributed the largest amount of unique variance (20%, $P < .001$), once ethnicity and age were controlled. The unique R^2 contributed by the number of intervention sessions attended was 3% ($P < .06$), while the sessions \times ethnicity interaction explained 10% ($P < .01$) of the variance. The differential impact of the number of intervention sessions on risk acts by ethnic

group was estimated by separate regression slopes for each ethnic group, calculated from the final equation.³⁷ The unstandardized coefficient for Hispanics indicates a positive slope ($b_H = .030$), while the slopes for African Americans, Whites, and youths of other ethnic groups are all negative ($b_A = -.013$; $b_W = -.002$; $b_O = -.023$). Attending the intervention was associated with decreases in unpro-

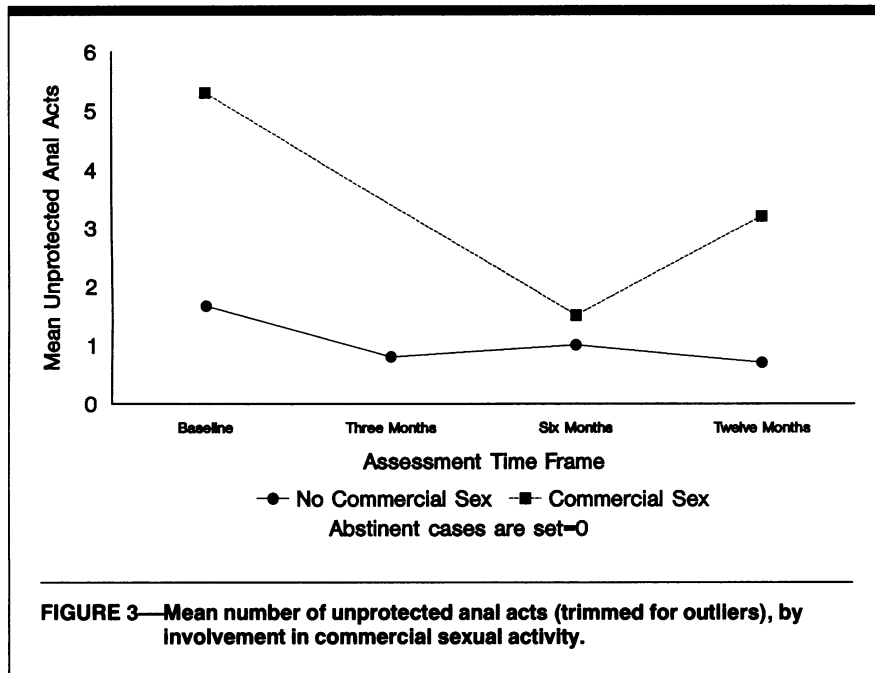


FIGURE 3—Mean number of unprotected anal acts (trimmed for outliers), by involvement in commercial sexual activity.

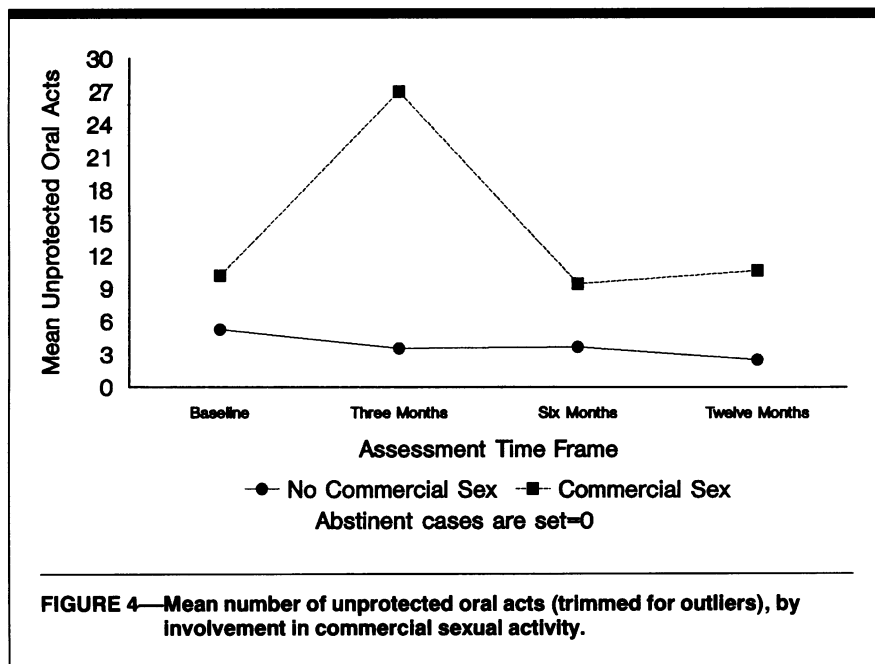


FIGURE 4—Mean number of unprotected oral acts (trimmed for outliers), by involvement in commercial sexual activity.

ected anal acts at 3 months for all but Hispanic youths.

At 6 months, controlling for risk acts at 3 months, ethnicity alone explained more than 7% of the variance. Whites and youths of other ethnicity had a higher mean number of unprotected acts than Hispanics; African Americans, on average, had a lower number than Hispanics. An additional 30% of the variance was explained by previous anal sex acts and abstinence, and 5% of the variance was accounted for by the ethnicity \times sessions interaction. As the number of HIV inter-

vention sessions increased, risk acts decreased significantly among Whites ($b_W = -.043$) but increased among African Americans and those of other ethnicity ($b_A = .017$; $b_O = .007$). At 6 months, with baseline risk behavior controlled, youths with a history of commercial sexual activity were more likely to engage in unprotected anal acts (unique $R^2 = 9\%$).

At 12 months, controlling for behavior either at 6 months or at baseline, a significant proportion of the variance in unprotected anal acts was explained by youths' previous behavior. Previous anal

sex acts and abstinence accounted for at least 18% of the variance. In addition, commercial sexual activity at 12 months explained 9% to 10% of the variance, and the unstandardized coefficients ($b_{12b} = .865$; $b_{12c} = 1.003$) indicate that youths currently engaging in commercial sex were more likely to engage in unprotected anal acts (when age, ethnicity, and previous risk acts were controlled). There were no significant changes associated with attending the intervention at 12 months.

Oral sex. There were substantial changes in oral sex acts over 1 year. The strongest predictors of oral sex at each assessment point parallel those for anal sex: previous unprotected oral acts and baseline and current abstinence. Oral acts were significantly associated with an ethnicity \times intervention interaction that explained 5% of the variance at 3 months and 8% at 12 months. The slopes at 3 months estimated with the sessions \times ethnicity interaction are positive for Hispanics ($b_H = .018$) but negative for African Americans, Whites, and youths of other ethnic groups ($b_A = -.018$; $b_W = -.070$; $b_O = -.033$). The pattern at 12 months, controlling for behavior at 6 months, is similar: Whites and youths of other ethnic groups decreased their risk activity as the number of intervention sessions increased (when previous risk activity and commercial sexual activity were controlled). African-American youths did not reduce their risk acts relative to youths of other ethnic groups ($b_H = -.003$; $b_A = .034$; $b_W = -.013$; $b_O = -.130$); however, African-American youths had significantly reduced their risk acts at the previous assessment. When baseline oral risk acts were controlled, youths currently engaging in commercial sex exhibited an increase in oral risk acts at 12 months (increment increase in $R^2 = 4\%$, $P < .05$). Age accounted for 5% of the variance in oral sex acts at 3 months and 4% at 12 months; older youths were more likely to engage in unprotected oral sex acts.

Number of sexual partners. Two factors consistently predicted the number of sexual partners: number of partners in the earlier time period and involvement in commercial sex. For youths with 10 or more same-sex partners, the number of partners was set equal to 10 to reduce the skewness of the distribution. No significant changes in the number of partners for anal or oral sex acts at any 3-month time frame were associated with attending the intervention. However, there was a significant drop in the mean number of

TABLE 2—Unstandardized Regression Coefficients (Standard Errors) for the Final Equation of Hierarchical Regression Models Examining Predictors of the Log of Unprotected Anal Acts and Oral Acts across Different Assessment Periods

	3 mo vs Baseline	6 mo vs Baseline	6 mo vs 3 mo	12 mo vs Baseline	12 mo vs 6 mo
Anal sex					
Ethnicity^a					
White	.519** (.261)	.747** (.314)	.828*** (.314)	-.199 (.323)	-.475 (.351)
African American	.560** (.236)	-.117 (.257)	-.118 (.255)	-.250 (.274)	-.231 (.295)
Other	.775* (.432)	.623 (.482)	.402 (.461)	-.193 (.531)	-.262 (.527)
Age	.018 (.042)	-.011 (.044)	-.023 (.047)	.051 (.045)	.038 (.050)
Abstinence					
Previous	.329** (.130)	.248* (.137)	.197 (.130)	.252* (.144)	.232* (.132)
Current	-.545*** (.120)	-.459*** (.123)	-.526*** (.130)	-.407*** (.130)	-.417*** (.131)
Previous unprotected acts	.128 (.083)	.243*** (.086)	.520*** (.123)	.146 (.089)	.118 (.116)
Commercial sex					
Previous	-.070 (.259)	.732*** (.257)		-.110 (.268)	-.208 (.384)
Current		.085 (.284)	.340 (.349)	.865*** (.281)	1.003*** (.313)
No. of intervention sessions	.030*** (.008)	.000 (.008)	-.003 (.010)	-.007 (.008)	-.006 (.008)
No. of sessions × ethnicity^a					
White	-.028 (.021)	-.040* (.024)	-.040* (.023)	.024 (.022)	.031 (.024)
African American	-.043*** (.014)	.010 (.016)	.020 (.015)	.003 (.016)	.000 (.017)
Other	-.053** (.025)	-.006 (.029)	.010 (.027)	-.013 (.029)	-.009 (.029)
Constant	-.450 (.747)	.323 (.774)	.543 (.847)	-.466 (.782)	-.198 (.866)
Regressions, statistics for the equation					
R ²	.343	.380	.440	.337	.346
Adjusted R ²	.249	.290	.350	.216	.215
F	3.648	4.202	4.851	2.779	2.646
df	(12, 84)	(13, 89)	(13, 89)	(13, 71)	(13, 65)
Oral sex					
Ethnicity^a					
White	1.170*** (.441)	.173 (.570)	.630 (.588)	1.104** (.480)	.157 (.541)
African American	.614* (.344)	.753** (.359)	.748* (.407)	-.478 (.381)	-.959** (.426)
Other	.793 (.671)	.481 (.803)	.776 (.806)	2.377*** (.765)	2.037** (.829)
Age	.202*** (.066)	.008 (.067)	-.073 (.078)	.108* (.061)	.110 (.070)
Abstinence					
Previous	.158 (.259)	.253 (.257)	.109 (.259)	.090 (.229)	.400* (.218)
Current	-1.386*** (.181)	-1.133*** (.191)	-1.253*** (.199)	-.546*** (.188)	-.756*** (.194)
Previous unprotected acts	.186* (.109)	.247*** (.098)	.405*** (.123)	.248*** (.094)	.394*** (.100)
Commercial sex					
Previous	.065 (.401)	.873** (.394)	.368 (.896)	-.580* (.351)	.402 (.536)
Current	1.357* (.831)	-.031 (.431)	-.077 (.570)	1.253*** (.366)	.866** (.420)
No. of intervention sessions	.018 (.013)	.005 (.012)	.021 (.014)	.002 (.011)	-.003 (.012)
Number of sessions × ethnicity^a					
White	-.088*** (.033)	-.009 (.039)	-.029 (.041)	.041 (.031)	-.010 (.035)
African American	-.036* (.021)	-.043* (.023)	-.039 (.024)	.020 (.021)	.037 (.024)
Other	-.051 (.039)	.033 (.045)	.020 (.045)	-.120*** (.040)	-.126*** (.043)
Constant	-2.600 (1.165)	.448 (1.180)	1.651 (1.367)	-1.364 (1.035)	-1.271 (1.214)
Regressions, statistics for the equation					
R ²	.572	.475	.544	.596	.585
Adjusted R ²	.503	.394	.460	.514	.496
F	8.331	5.910	6.508	7.261	6.606
df	(13, 81)	(13, 85)	(13, 71)	(13, 64)	(13, 61)

^aHispanics are used as the reference group for all ethnic contrasts.

* $P \leq .10$; ** $P \leq .05$; *** $P \leq .01$.

partners from the baseline interview to the follow-up interviews. In the 3 months prior to the baseline interview, the youths

had an average of 2.2 partners (SD = 2.8). In the three subsequent time frames, the average number of partners in the previ-

ous 3 months decreased to about 1.5 (at 3 months, mean = 1.3, SD = 1.6, $P < .01$; at 6 months, mean = 1.6, SD = 1.9,

TABLE 3—Logistic Regression Analysis of Abstinence from Anal and Oral Sex

Spanner	Initial Estimate -2 Log Likelihood χ^2 (df)	Entry of Predictors					Final Estimate -2 Log Likelihood χ^2 (df)	Goodness of Fit χ^2 (df)
		(1) Ethnicity: Improvement in χ^2	(2) Age: Improvement in χ^2	(3) Controls for Previous Abstinence: Improvement in χ^2	(4) Sessions: Improvement in χ^2	(5) Ethnicity × Sessions: Improvement in χ^2		
Anal sex								
3 mo vs baseline (n = 102)	140.8 (101)	3.9	1.0	15.8***	0.5	1.1	118.5 (92)	102.1 (92)
6 mo vs baseline (n = 108)	147.3 (107)	1.4	0.0	10.6***	0.9	2.4	132.0 (98)	108.0 (98)
6 mo vs 3 mo (n = 92)	126.0 (91)	2.1	0.0	0.2	0.2	1.7	121.8 (82)	92.1 (82)
12 mo vs baseline (n = 86)	115.4 (85)	5.1	4.7**	6.7***	0.9	8.5**	89.7 (76)	77.1 (76)
12 mo vs 6 mo (n = 82)	108.8 (81)	5.0	4.8**	4.1**	0.0	5.2	89.6 (72)	77.8 (72)
Oral sex								
3 mo vs baseline (n = 102)	180.0 (101)	3.9	0.1	7.3***	0.2	2.3	124.4 (92)	101.0 (92)
6 mo vs baseline (n = 108)	138.2 (107)	0.1	0.7	10.7**	0.2	0.8	125.0 (98)	107.4 (98)
6 mo vs 3 mo (n = 92)	137.5 (91)	0.1	0.2	2.2	0.0	1.2	112.0 (82)	92.3 (82)
12 mo vs baseline (n = 86)	111.2 (85)	6.0	3.3*	18.2***	1.1	0.0	82.6 (76)	73.2 (76)
12 mo vs 6 mo (n = 82)	105.3 (81)	5.8	3.6*	8.2***	0.3	0.2	87.2 (72)	80.0 (72)

*P = .10; **P = .05; ***P = .01.

P < .05; at 12 months, mean = 1.6, SD = 1.6, P < .01, a significant reduction at each assessment.

Abstinence from anal sex. Table 3 summarizes each step in the hierarchical logistic regression analysis. (A table of odds ratios and confidence intervals is available from the authors.) Abstinence from anal sex was consistently predicted by age and prior abstinence. The odds of abstaining from anal sex at 3 months were five times higher (adjusted odds ratio [aOR]_{3,b} = 5.6, 95% confidence interval [CI] = 2.3, 13.6) for youths who had abstained from anal sex at baseline; their odds for abstinence at 6 and 12 months were almost four times as high (aOR_{6,b} = 3.7, 95% CI = 1.7, 8.4; aOR_{12,b} = 3.5, 95% CI = 1.3, 9.5). In addition, abstinence from anal sex at 12 months was three times higher for youths who had abstained during the

previous assessment than for those who had not (aOR_{12,6} = 2.8, 95% CI = 1.0, 7.5). Age had a significant inverse relationship with abstinence at 12 months (aOR_{12,b} = 0.7, 95% CI = 0.49, 0.98 compared with baseline; aOR_{12,6} = 0.7, 95% CI = 0.45, 0.92 compared with 6 months); older adolescents were less likely than younger adolescents to abstain from anal sex. After controlling for ethnicity, each year of age meant a 30% decline in the odds of abstaining from anal sex. The findings for abstinence from oral sex were similar. Attending the HIV intervention was not associated with significant increases in abstinence.

Discussion

Limitations

This study describes sexual risk behaviors over time and examines the

association between risk acts, background factors, sexual history, and attendance at HIV intervention sessions. It would have been desirable to conduct a controlled trial examining the effectiveness of the HIV intervention by randomly assigning participants to intervention and control conditions. Unfortunately, a control group was not feasible for several reasons: (1) there was only one potential recruitment site; (2) gay youths were at such risk that assigning them to a control group would have been unethical; and (3) contamination effects could not be adequately controlled within the one available recruitment site, preventing use of a lagged design. Increases in the number of agencies serving gay-identified youths offer the possibility of comparing the effectiveness of an HIV intervention by evaluating youths at agencies randomly assigned to receive the intervention with those at

agencies that do not receive the intervention. An additional limitation of the study is that the dosage of specific components of the intervention was not measured and therefore identification of which aspects of the intervention hold the greatest promise for reducing risk was not included in the analysis. However, this study provides the first indication that gay male adolescents are changing their sexual risk behaviors and that such changes are associated with attending an HIV intervention.

The sample recruited is not representative; it consisted of youths seeking services at the single gay-identified agency in New York City in 1988 and 1989. More than 97% of the youths in a consecutive series were recruited, and 88% were retained for at least one of the three follow-up assessments over 1 year. Youths who were assessed at follow-up were similar in demographic profile and sexual risk behaviors to those lost to follow-up assessments. There were also no cohort effects reflective of changes in patterns of risk behaviors among gay youths over the recruitment period. Only one potential difference emerged: sexual abstainers at baseline ($n = 10$) were more likely to receive only one of three follow-up assessments.

Youths who chose to attend many HIV intervention sessions did not vary from those who attended fewer sessions in background factors, sexual risk behaviors at recruitment, or ability to be recontacted for follow-up assessments. Thus, there was no identifiable bias in who attended more intervention sessions, and most youths received substantial intervention at the agency. However, bias in this sample may arise from other sources. The adolescents in this study came out (told others of their sexual orientation) earlier than most homosexuals; they are not representative of homosexuals who come out for the first time as adults.³⁸ However, these youths are clearly at risk for HIV infection.^{39,40}

Implications of Findings

Like gay and bisexual men,^{28,41} the gay and bisexual male adolescents in our study reduced their sexual risk behaviors over time. The most potent predictor of current HIV risk acts and number of sexual partners is a youth's history of sexual behaviors and abstinence. For example, among youths abstinent from same-sex encounters at baseline, 58% were also abstinent 3 months later. The best predictor of future behaviors is past

behaviors, arguing forcefully for early (before the age of 13) intervention for HIV prevention.⁸

Changes in sexual risk behaviors were associated with attending HIV intervention sessions. As expected, the changes in the numbers of unprotected sex acts were mirrored in the proportion of protected acts. The mean proportion of protected acts, for those who were sexually active, rose from 60% at baseline to 78% at 12 months for anal sex and from 28% at baseline to 45% at 12 months for oral sex. The highest proportion of protected acts occurred immediately following the intervention; at the 3-month assessment, the mean proportion of protected anal acts was 80%. The upper range of about 78% protected anal sex acts at the 12-month assessment is similar to the proportion found for gay men.^{28,42-44} Although the number of sexual partners remained stable (median = 2 partners during each 3-month assessment period), these findings suggest that gay and bisexual youths can and do try to protect themselves from HIV infection.

African-American youths showed significant and substantial reductions in both anal and oral risk acts over 1 year (e.g., the proportion of protected anal acts was 36% at baseline, 80% at 3 months, 67% at 6 months, and 84% at 12 months). Initially, Hispanic youths had somewhat higher percentages of protected sex (anal, 67%; oral, 31%), and these proportions increased through 6 months (anal, 88%; oral, 60%). At 1 year, levels of protection were returning toward baseline level (anal, 72%; oral, 40%). Attending an HIV intervention was associated with Hispanic youths' reductions in sexual risk acts between the 3- and 6-month assessments for anal sex; a similar improvement was present between 6 and 12 months for oral sex. In designing HIV interventions for youths who are already practicing safer sex, innovative intervention strategies must be developed to ensure consistency.

Attending the intervention was also associated with significant shifts in HIV risk acts for White, Asian, and Native American youths. However, dramatic shifts in risk acts among a few individuals led to substantial variations in the number of risk acts at each assessment and may reflect marginalization within the peer group at the community-based agency or random error. The number of youths from these ethnic groups was small in our sample ($n = 24$); therefore, further research should be conducted with these groups.

Gay and bisexual youths who engaged in commercial sexual activity increased their anal and oral sex risk acts over time even though they received the intervention. Although few youths ($n = 9$ at baseline) practiced commercial sex, these increases in risk acts are discouraging, and they are inconsistent with findings from female commercial sex workers.³ These findings must also be considered as hypothesis-generating rather than conclusive; further research must confirm this effect. We hypothesize that youths who are paid for sex are likely to have less power to negotiate condom use. Without singling out or stigmatizing youths engaging in commercial sex, strategies for negotiating safer sex under conditions of unequal power should be emphasized in future HIV intervention efforts.

Like gay men,^{42,43} the youths in our sample were initially more likely to use condoms during anal sex, the riskiest sexual activity for HIV transmission,⁴⁴⁻⁴⁶ than during oral sex. Attending the HIV intervention was associated with dramatic changes in both anal and oral sex. For anal sex, 45% consistently used condoms after the intervention, and 32% improved by at least 15% throughout the year. For oral sex, 25% of the youths used condoms throughout the year, and 28% improved by at least 15% by the 12-month assessment (Rotheram-Borus, Rosario, and Reid, unpublished data). These data are encouraging and indicate the importance of mounting controlled intervention trials for gay and bisexual youths. When such trials are mounted, health care professionals must anticipate that responsiveness to the intervention will differ with ethnicity, because of attenuation of intervention effects at different time periods, and as a function of involvement in commercial sexual activity. □

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