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Race/Ethnic Differences in HIV Prevalence and Risks Among Adolescent and Young Adult Men who have Sex with Men

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ABSTRACT *The prevalence of HIV infection is disproportionately higher in both racial/ethnic minority men who have sex with men (MSM) and in men under the age of 25, where the leading exposure category is homosexual contact. Less is known, however, about patterns of HIV prevalence in young racial/ethnic minority MSM. We analyzed data from the Young Men's Survey (YMS), an anonymous, cross-sectional survey of 351 MSM in Baltimore and 529 MSM in New York City, aged 15–22, to determine whether race/ethnicity differences exist in the prevalence of HIV infection and associated risk factors. Potential participants were selected systematically at MSM-identified public venues. Venues and associated time periods for subject selection were selected randomly on a monthly basis. Eligible and willing subjects provided informed consent and underwent an interview, HIV pretest counseling, and a blood draw for HIV antibody testing. In multivariate analysis, adjusted for city of recruitment and age, HIV seroprevalence was highest for African Americans [adjusted odds ratio (AOR) = 12.5], intermediate for those of "other/mixed" race/ethnicity (AOR = 8.6), and moderately elevated for Hispanics (AOR = 4.6) as compared to whites. Stratified analysis showed different risk factors for HIV prevalence in each ethnic group: for African Americans, these were history of sexually transmitted diseases (STDs) and not being in school; for Hispanics, risk factors were being aged 20–22, greater number of male partners and use of recreational drugs; and for those of "other/mixed" race/ethnicity, risk factors included injection drug use and (marginally) STDs. These findings suggest the need for HIV prevention and testing programs which target young racial/ethnic minority MSM and highlight identified risk factors and behaviors.*

KEYWORDS *Adolescents, Drug use, HIV prevalence, Men who have sex with men, Race ethnicity, Sexual behavior.*

INTRODUCTION

Although the proportion of AIDS cases reported to the CDC attributable to men who have sex with men (MSM) has declined over the past decade,[1] the absolute number remains high.[2] MSM account for more than half of all men currently diagnosed with AIDS.[2] An increase in the number of sexually transmitted diseases

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(STDs) diagnosed among MSM in the late 1990s[3–5] suggested that MSM continued to engage in unprotected sex. Twenty-nine states with HIV reporting observed a 17% rise in new HIV diagnoses among MSM between 1999 and 2002,[6] reinforcing concerns about ongoing sexual risk taking behavior.

Young MSM are of special public health importance for HIV prevention. Considerable levels of HIV infection have been observed in samples of young MSM,[7–9] and young MSM consistently report participation in high risk sexual behaviors.[10] They are more likely to engage in these behaviors than older MSM[11] and are at significantly greater risk of seroconversion than older MSM.[11]

At the same time, race and ethnicity are correlated with risk of HIV infection in MSM. From 1996 to 1998, the 25 states that conducted confidential HIV case surveillance reported that 48% of all HIV infection cases and AIDS diagnoses were in racial/ethnic minority MSM.[12] Non-Hispanic blacks represented most (83%) of these cases while Hispanics accounted for an additional 13%.[12] African American MSM attending STD clinics generally experience higher rates of HIV infection than whites,[1] and in a four city survey of MSM, African American MSM were significantly more likely to be HIV infected than white MSM.[13] Data collected by the 25 HIV reporting states also revealed that a larger proportion of racial/ethnic minority MSM were younger (13–24 years) when they were first diagnosed with HIV than was the case among young white MSM,[12] suggesting that young racial/ethnic minority MSM are at particular risk.

It has been noted that African American MSM and Hispanic MSM report a higher frequency of unprotected anal intercourse than their white peers[10] and that this may account for the disproportionate rates of HIV infection seen in these populations. There is also evidence to suggest, however, that racial/ethnic risk may be related to being a member of a community with high HIV seroprevalence and one in which there is a greater prevalence of sexually transmitted infections.[14] It is not clear what relevance these findings have to young racial/ethnic minority MSM.

Concerns about reports of high levels of HIV infection in young MSM led to the Young Men's Survey (YMS) a collaborative, community-based, cross-sectional study of young MSM aged 15–22, which was conducted in seven major cities in the United States.[15] Analyzes of data from the first phase of this study identified significantly higher levels of HIV among young, minority MSM[15] and revealed no real differences in behavioral risk factors between white and minority young MSM.[16] This study addresses the potential associations between risk behaviors and HIV prevalence in young racial/ethnic minority populations by providing an in-depth, within minority group evaluation of data from two cities that were part of the YMS.[15] Baltimore and New York City were selected because they reported the highest overall HIV prevalence (Baltimore, 8.5%, and New York, 12.1%) among the seven participating sites[17] and had high race/ethnicity specific HIV prevalence for African American participants (17.5% in Baltimore[17] and 18.4% in New York).[18] We examine associations between behavioral risk factors and prevalence of HIV in various race/ethnicity groups in these two cities.

METHODS

Survey Methodology

The Baltimore and New York YMSs were venue-based random sample surveys, conducted between 1994 and 1998. The methods for the YMS, which were standardized

across sites, individual site recruitment data, and a description of the analytic sample have been published previously.[16,19] In both cities, potential venues and time periods of high attendance were identified through interviews with community leaders and informants, focus groups of young MSM, and systematic observation. Venues consisted of bars, dance clubs, businesses, social organizations, sex establishments, and neighborhood locations and did not include clinical settings providing HIV services, locations attended by sex workers, or needle-exchange sites. Venues were selected for inclusion in the sampling frame if the minimum number of young MSM attending and likely to be eligible for enrollment exceeded seven in any 4-hour period. Over the course of the study, the sampling frame of venues and time periods were reviewed on a monthly basis and venues were added or deleted from the sampling frame depending on criteria such as attendance. Each month, in both cities, 12–16 venues and their associated periods of attendance were randomly selected for the survey and scheduled for sampling in the upcoming month.

During each sampling event, staff counted all men who appeared to meet the study age criteria (15–22 years) entering a geographically designated area at a venue (e.g., a corner, the sidewalk in front of a bar). Young men were systematically approached and screened for eligibility. Those who met the age (15–22 years) and residency (Baltimore and New York metropolitan areas, respectively) eligibility criteria, had not previously participated in the study, and agreed to be interviewed were then escorted to a mobile van located nearby. After obtaining informed consent, an interviewer/counselor administered a standardized questionnaire, conducted HIV pretest counseling, obtained a blood specimen for HIV antibody testing, and provided referrals to medical and social services, as needed. Participants who could not complete the study at the time of recruitment were given an appointment to conduct all study procedures at a convenient clinic soon thereafter. Participants were compensated $50 for participation and given an appointment to receive HIV test results and posttest counseling approximately two weeks later. The survey and blood tests were anonymous, linked only by a study identification number. Duplicate enrollment to the survey was prevented by asking whether participants had already participated in the study and by examination of antibody profiles of suspected duplicates. Blood specimens of enrollees with identical birthdays and race/ethnicity information were tested with the Miragen assay[20] to match identical antibody profiles. In such cases, data provided during the first enrollment of the individual were used for analysis. The YMS protocol was approved by institutional review boards of the Centers for Disease Control and Prevention, the Johns Hopkins University, the City of Baltimore Health Department, the Maryland Department of Health and Mental Hygiene, the New York Blood Center, and the New York City Department of Health.

Risk Factor Assessment

The interviewer-administered survey included questions on demographics (e.g., race/ethnicity, age), HIV-related risk behaviors (e.g., sexual behaviors, condom use, history of drug use), and history of STDs. Participants were asked for their race/ethnicity and were categorized as either African American; Asian, Asian American, or Pacific Islander; Hispanic; American Indian; white; or from multiple racial backgrounds (mixed). To simplify interpretation of the data, any participant who reported being of mixed race and in part African American was categorized as African American. Of the 135 participants who reported being of mixed race/ethnicity, 82 (60.7%) were classified as African American. Because there were so

few participants who were categorized as Asian, Asian American, Pacific Islander or American Indian (n = 20), these groups were included with the "mixed" ethnic group (n = 53) and hereafter are referred to as "other/mixed race/ethnicity".

We ascertained participation in oral and anal sex with male partners, vaginal and anal sex with female partners, and lifetime number of male partners. We asked about condom use in the past six months with male partners for oral and anal intercourse, as lifetime use may not represent "usual" patterns of condom use. Participants were asked to provide information on lifetime history of STD diagnoses and lifetime drug use. Lifetime drug use was used as only prevalent HIV was identified in this study with no information to estimate the date of infection. Participants were asked specifically about use of recreational drugs [amphetamines, methylenedioxymethamphetamine (ecstasy), lysergic acid diethylaminde (LSD), nitrites ("poppers") and cocaine not used by injection], "hard drugs" (crack cocaine and opiates not used by injection), and "injection drugs" (cocaine, heroin, and amphetamines).

HIV Antibody Testing

Blood specimens were tested for HIV-1 antibodies with a Food and Drug Administration-approved enzyme immunoassay (Sanofi Diagnostics Pasteur, Chaska, Minnesota). Repeatedly reactive specimens were confirmed by western blot (Bio-Rad, Hercules, California, or Epitope Inc., Organon-Teknika Corp., Durham, North Carolina).

Statistical Methods

Statistical analysis was conducted on data from the 880 participants who reported ever having sex with a man. We first ascertained associations between HIV seropositivity and demographic and behavior variables among the entire sample of participants. Univariate associations were determined by chi-square tests. Stepwise logistic regression analysis was used to identify multivariate predictors of HIV seropositivity, and the results were compared with regression results in which all significant univariate factors were simultaneously entered; no major differences were found, so we present only the stepwise results here. The multivariate model included all variables significant at $P < .05$ in univariate analysis. The above analysis was repeated by stratifying by race/ethnicity, which allowed examination of univariate and multivariate associations of HIV seropositivity and demographic and behavioral variables for each race/ethnicity separately. All statistics were computed using the Statistical Analysis Software, version 8.0 (SAS Institute, Inc., Cary, North Carolina).

RESULTS

Approximately 40% of the sample (n = 351) was recruited in Baltimore and the remainder (n = 529) in New York City. Thirty-nine percent of study participants were African American, 26% were Hispanic, 26% were white, and eight percent were other or mixed race. Half of the subjects were aged between 15 and 19 and the other half were aged 20–22. In Baltimore, 41% of men approached declined to participate, whereas 36% of men approached in New York City declined participation. Table 1 summarizes the distribution of demographic covariates and self-reported risk behaviors and their associations with HIV prevalence. Although the prevalence of HIV infection in the New York City sample was somewhat higher than in Baltimore (12.1% and 8.5%, respectively), the difference was not statistically significant.

Marked disparities were observed in HIV infection rates by race/ethnicity (Table 1). HIV prevalence among African Americans was 17.7%, 10 times higher

TABLE 1. Associations of sociodemographic factors and risk behaviors with HIV prevalent infection among Young Men's Survey (YMS) participants, Baltimore and New York City, 1996–1998

Variable	Number of participants (N = 880)	HIV prevalence (%)	OR (95% CI)	AOR (95% CI)
YMS site				
Baltimore	351 (39.9)	8.5	0.7 (0.4–1.1)	–
New York	529 (60.1)	12.1	1.0	–
Race/ethnicity				
African American	345 (39.2)	17.7	12.2 (4.4–34.2)*	12.5 (4.4–35.6)*
Hispanic	230 (26.1)	8.7	5.4 (1.8–16.2)†	4.6 (1.5–14.0)†
White	232 (26.4)	1.7	1.0	1.0
Other/mixed	73 (8.3)	12.3	8.0 (2.4–26.9)*	8.6 (2.5–29.5)*
Age group				
15–19 years	436 (49.6)	9.4	1.0	–
20–22 years	444 (50.4)	11.9	1.3 (0.8–2.0)	–
Education				
Currently in school	448 (51.0)	7.8	0.5 (0.3–0.8)*	0.6 (0.4–0.9)†
Currently out of school	431 (49.0)	13.5	1.0	1.0
Sexual behavior—lifetime				
Ever sex with male only	302 (34.3)	9.6	0.8 (0.5–1.3)	–
Ever sex with male and female	578 (65.7)	11.3	1.0	–
Ever anal sex with male				
Yes	794 (90.2)	11.7	11.3 (1.6–81.9)†	–
No	86 (9.8)	1.2	1.0	–
Ever vaginal/anal sex with female				
Yes	533 (60.6)	11.6	1.3 (0.8–2.0)	–
No	347 (39.4)	9.2	1.0	–
Number of male partners				
19+	211 (24.2)	18.0	4.1 (2.2–7.5)*	4.2 (2.0–8.6)*
5–18	356 (40.8)	11.2	2.4 (1.3–4.3)†	2.3 (1.1–4.5)†
1–4	306 (35.0)	4.9	1.0	1.0
Condom use—last 6 months				
Unprotected oral sex				
Yes	680 (86.7)	10.0	0.5 (0.3–0.9)†	0.5 (0.3–0.9)†
No	104 (13.3)	17.3	1.0	1.0
Unprotected anal sex				
Yes	357 (51.5)	12.9	1.0 (0.7–1.6)	–
No	336 (48.5)	12.5	1.0	–
Drug use—lifetime				
Recreational drugs‡				
Yes	336 (38.2)	11.0	1.1 (0.7–1.6)	–
No	544 (61.8)	10.5	1.0	–
Hard drugs§				
Yes	96 (10.9)	9.4	0.9 (0.4–1.8)	–
No	784 (89.1)	10.8	1.0	–
Injection drug use				
Yes	44 (5.0)	13.6	1.3 (0.6–3.3)	–
No	835 (95.0)	10.5	1.0	–

TABLE 1. ***Continued***

Variable	Number of participants (N = 880)	HIV prevalence (%)	OR (95% CI)	AOR (95% CI)
STD diagnosis—lifetime				
Yes	136 (15.4)	22.1	3.0 (1.9–4.9)*	2.1 (1.2–3.6)†
No	744 (84.6)	8.6	1.0	1.0

AOR, adjusted odds ratio; CI, confidence interval; OR, odds ratio; STD, sexually transmitted disease.
*$P < .01$.
†$P < .05$.
‡Recreational drugs include amphetamines, ecstasy, lysergic acid diethylaminde, poppers, and cocaine.
§Hard drugs include crack cocaine and heroin.

than among whites (1.7%). The prevalence of HIV in Hispanic participants was 8.7%, five times higher than among whites. Participants in the "other/mixed race/ethnicity" category had an HIV prevalence of 12.3%, which was seven times higher than among whites and midway between the prevalence of HIV in African American participants and the prevalence of HIV in Hispanic participants. The prevalence of HIV infection in each of the minority race/ethnicity categories was statistically significantly ($P < .05$) higher than the prevalence of HIV in white participants. Adjusting for city of recruitment and age group did not change the associations between minority race/ethnicity and HIV infection.

Multivariate analysis highlighted other significant relationships (Table 1). Being in school had an independent protective effect in terms of HIV infection [adjusted odds ratio (AOR) = 0.6, 95% confidence interval (CI) = 0.4–0.9]. Increasing number of male partners [5–18 partners (AOR = 3.0, 95% CI = 1.1–4.5, over 19 partners (AOR = 4.2, 95% CI = 2.0–8.6)] and history of STD diagnosis (AOR = 2.1, 95% CI = 1.2–3.6) were also independently associated with HIV infection.

Analysis Stratified by Race/Ethnicity

African American Participants Among African American MSM (Table 2), participants who were still in school were less likely to be HIV infected. Having had anal sex with men and having had more male sex partners were associated with higher HIV prevalence. Having used condoms for oral or anal intercourse was not significantly associated with HIV prevalence. There was a strong association, however, between lifetime STD diagnoses and HIV prevalence in this population. Finally, lifetime drug use variables were not associated with HIV prevalence, although drug use was relatively infrequent among this sample of young African American MSM.

In multivariate analysis (Table 2), after adjusting for all other covariates, only two factors remained statistically significant among African American participants. Compared to young men of the same age (i.e., 15–18 or 19–22) who had completed their education or had dropped out of school, those who were still in school were half as likely to be HIV infected (AOR = 0.5, 95% CI = 0.3–0.9). Report of a diagnosed lifetime STD (AOR = 2.0, 95% CI = 1.0–4.0) was also significantly associated with higher HIV prevalence among African American participants. No sexual risk behavior variables were found to be associated with HIV infection in this multivariable analysis.

TABLE 2. Associations of sociodemographic factors and risk behaviors with HIV prevalent infection among African American Young Men's Survey (YMS) participants, Baltimore and New York City, 1996–1998

Variable	Number of participants (N = 345)	HIV prevalence (%)	OR (95% CI)	AOR (95% CI)
YMS site				
Baltimore	148 (42.9)	16.2	0.8 (0.5–1.5)	–
New York	197 (57.1)	18.8	1.0	–
Age group				
15–19 years	205 (59.4)	14.2	1.0	–
20–22 years	140 (40.6)	22.9	1.8 (1.0–3.1)*	–
Education				
Currently in school	186 (53.9)	12.9	0.5 (0.3–0.9)*	0.5 (0.3–0.9)*
Currently out of school	159 (46.1)	23.3	1.0	1.0
Sexual behavior—lifetime				
Ever sex with male only	110 (31.9)	15.5	0.8 (0.4–1.5)	–
Ever sex with male and female	235 (68.1)	18.7	1.0	–
Ever anal sex with male				
Yes	322 (93.3)	18.6	5.0 (0.7–38.1)	–
No	23 (6.7)	4.3	1.0	–
Ever vaginal/anal sex with female				
Yes	220 (63.8)	18.6	1.2 (0.7–2.1)	–
No	125 (36.2)	16.0	1.0	–
Number of male partners				
19+	66 (19.2)	22.7	2.3 (1.1–5.1)*	–
5–18	145 (42.3)	21.4	2.2 (1.1–4.2)*	–
1–4	132 (38.5)	10.6	1.0	–
Condom use—last 6 months				
Unprotected oral sex				
Yes	245 (82.2)	16.7	0.6 (0.3–1.3)	–
No	53 (17.8)	24.5	1.0	–
Unprotected anal sex				
Yes	136 (47.7)	22.8	1.4 (0.8–2.5)	–
No	149 (52.3)	17.5	1.0	–
Drug use—lifetime				
Recreational drugs†				
Yes	63 (18.3)	20.6	1.3 (0.6–2.5)	–
No	282 (81.7)	17.0	1.0	–
Hard drugs‡				
Yes	11 (3.2)	27.3	1.8 (0.5–6.9)	–
No	334 (96.8)	17.4	1.0	–
Injection drug use				
Yes	9 (2.6)	33.3	2.4 (0.6–9.8)	–
No	335 (97.4)	17.3	1.0	–
STD diagnosis—lifetime				
Yes	56 (16.2)	28.6	2.2 (1.1–4.2)*	2.0 (1.0–4.0)*
No	289 (83.8)	15.6	1.0	1.0

AOR, adjusted odds ratio; CI, confidence interval; OR, odds ratio; STD, sexually transmitted disease.
*$P < .05$.
†Recreational drugs include amphetamines, ecstasy, lysergic acid diethylaminde, poppers, and cocaine.
‡Hard drugs include crack cocaine and heroin.
§$P < .01$.

Hispanic Participants There were 230 young Hispanic MSM in our sample, almost all from New York City. In univariate analysis (Table 3), older age, greater number of male partners, report of lifetime use of recreational drugs, and report of a lifetime diagnosed STD were each associated with HIV prevalence. In multivariable analysis (Table 3), compared to men under 20 years, older men were nearly four times as likely to be infected with HIV (AOR = 3.8, 95% CI = 1.1–12.8). HIV prevalence was also higher among young MSM with more lifetime male sex partners. No other sexual behaviors were associated with HIV prevalence in young Hispanic MSM in univariate or multivariate analysis. Almost half (43.9%) of Hispanic participants reported lifetime use of recreational drugs and these men had significantly higher HIV prevalence (AOR = 3.4, 95% CI = 1.0–11.3). The use of hard drugs or injected drugs was rare among this sample of Hispanics and was not associated with HIV prevalence.

Other/Mixed Race/Ethnicity Participants As there were only 73 participants included in the other/mixed race/ethnicity category (including 20 Asian/Asian American/Pacific Islanders, none of whom was infected with HIV), we had limited statistical power to detect significant associations with prevalent HIV infection. In both univariate and multivariate analysis, however, two covariates emerged as marginally important (data not shown), lifetime history of a diagnosed STD, which was associated with a 5.7-fold increase in HIV prevalence ($P = .04$), and injection drug use, which was associated ($P = .07$) with prevalent HIV infection. None of the sexual risk factors were statistically significant.

White Participants Although the study included 232 white participants (predominately recruited in Baltimore), only four participants were HIV infected, limiting the statistical power to detect associations with precision. None of the sociodemographic or sexual history variables was associated with HIV infection with the exception of a reported lifetime STD diagnosis. Although use of drugs, of all categories, was more common among young white MSM (i.e., 61% reported the use of recreational drugs, 23% gave a history of "hard" drug use, and 8% reported the use of injection drugs), drug use was not associated with HIV prevalence among white participants.

DISCUSSION

The disparities we found in HIV prevalence between young white participants and all three categories of young racial/ethnic minority participants were striking. Only Hispanic participants reported risk behaviors that could be associated with increased HIV prevalence. In the absence of strong associations between risk behaviors and elevated prevalence of HIV in this population of young racial/ethnic minority MSM, alternative explanations for observed differences must be considered.

African American participants had the highest overall prevalence of HIV. None of the risk behavior variables we considered, which included unprotected anal intercourse, number of male sex partners and lifetime drug use, were associated with HIV prevalence. Multivariate analysis did reveal a statistically significant association between history of STD and HIV prevalence in this group of participants. The connection between STDs and HIV infection has been well documented in MSM populations,[3] including African American MSM.[14] The association observed in this study suggests that sexual networks and background seroprevalence of STDs and HIV

TABLE 3. Associations of sociodemographic factors and risk behaviors with HIV prevalent infection among Hispanic Young Men's Survey (YMS) participants, Baltimore and New York City, 1996–1998

Variable	Number of participants (N = 230)	HIV prevalence (%)	OR (95% CI)	AOR (95% CI)
YMS site				
Baltimore	11 (4.8)	9.1	1.1 (0.1–8.7)	–
New York	219 (95.2)	8.7	1.0	–
Age group				
15–19 years	120 (52.2)	3.3	1.0	1.0
20–22 years	110 (47.8)	14.6	4.9 (1.6–15.3)*	3.8 (1.1–12.8)*
Education				
Currently in school	114 (49.8)	6.1	0.6 (0.2–1.5)	–
Currently out of school	115 (50.2)	10.4	1.0	–
Sexual behavior—lifetime				
Ever sex with male only	83 (36.1)	8.4	0.9 (0.4–2.5)	–
Ever sex with male and female	147 (63.9)	8.8	1.0	–
Ever anal sex with male				
Yes	208 (90.4)	9.6	–	–
No	22 (9.6)	0.0	1.0	–
Ever vaginal/anal sex with female				
Yes	138 (60.0)	9.4	1.3 (0.5–3.3)	–
No	92 (40.0)	7.6	1.0	–
Number of male partners				
19+	66 (29.1)	24.2	24.3 (3.1–189.2)†	10.7 (3.3–34.8)†
5–18	87 (38.3)	3.5	2.7 (0.3–26.7)	1.8 (0.2–18.3)
1–4	74 (32.6)	1.4	1.0	1.0
Condom use—last 6 months				
Unprotected oral sex				
Yes	186 (87.3)	8.6	0.8 (0.2–2.8)	–
No	27 (12.7)	11.1	1.0	–
Unprotected anal sex				
Yes	103 (55.1)	7.8	0.6 (0.2–1.7)	–
No	84 (44.9)	11.9	1.0	–
Drug use—lifetime				
Recreational drugs‡				
Yes	101 (43.9)	15.8	5.9 (1.9–18.2)*	3.4 (1.0–11.3)*
No	129 (56.1)	3.1	1.0	–
Hard drugs§				
Yes	24 (10.4)	12.5	1.6 (0.4–5.9)	–
No	206 (89.6)	8.3	1.0	–
Injection drug use				
Yes	11 (4.8)	9.1	1.1 (0.1–8.7)	–
No	219 (95.2)	8.7	1.0	–
STD diagnosis—lifetime				
Yes	38 (16.5)	23.7	5.1 (1.9–13.4)†	–
No	192 (83.5)	5.7	1.0	–

AOR, adjusted odds ratio; CI, confidence interval; OR, odds ratio; STD, sexually transmitted disease.
*$P < .05$.
†$P < .01$.
‡Recreational drugs include amphetamines, ecstasy, lysergic acid diethylaminde, poppers, and cocaine.
§Hard drugs include crack cocaine and heroin.

may have an important impact on observed HIV seroprevalence. Bingham et al.[21] found at the Los Angeles site of the YMS that African American participants were significantly more likely to choose African American partners and were more likely to choose older partners than other participants. Young African American MSM are significantly more likely to be infected with HIV,[15] and choosing older partners has been associated with an increased likelihood of being exposed to HIV.[22] If partner selection among Baltimore and New York participants followed patterns similar to those of their Los Angeles peers, higher rates of HIV infection would not be surprising.

Multivariate analysis also showed that HIV prevalence in African American participants who were still in school was significantly lower than HIV prevalence among participants of the same age who had either dropped out of school or completed their education. Previous studies have found that participating in unprotected anal intercourse is associated with lower educational attainment[23] and lower socioeconomic status.[24] In our study, the protective effect of being in school was observed only among African American participants. The association between HIV prevalence and educational status may reflect not only educational differences but differences in socioeconomic status as well.

In Hispanic young men, we observed significant associations between risk behaviors and HIV infection. Increasing numbers of partners was significantly associated with HIV infection in multivariate analysis. Multivariate analysis also showed a significant association between use of recreational drugs and HIV infection in young Hispanic men. Although a number of studies[23,25,26] have shown an association between recreational drug use and unprotected sex, our white subjects, the most likely to report recreational drug use, did not experience an elevated risk of HIV infection. An explanation for this disparity may exist. If background seroprevalence of HIV is higher within the young Hispanic MSM population as it is among older Hispanic MSM[27] and if young Hispanic MSM are more likely to choose Hispanic partners as young Hispanic heterosexuals do,[28] young Hispanic MSM may be at increased risk of HIV simply because of the partners they choose. Circumstances such as these could also explain why increasing numbers of partners was associated with the increased risk of HIV that we observed.

Data from "other/mixed" race/ethnicity group participants highlighted other associations. HIV prevalence was concentrated exclusively in participants of "mixed" race and was associated with injection drug use. "Mixed" race participants with a history of STDs were also five times more likely to be HIV infected. Although the relatively small number of total subjects in this category may have limited our ability to observe these and other potential associations, our findings suggest that HIV prevalence is more common among "mixed" race than white race in young MSM. Given that almost 10% of our young MSM participants were of "other/mixed" race/ethnicity, gathering information on this segment of the MSM population remains essential.

A few limitations must be considered in drawing inferences from this study. In particular, despite being much larger than many other reports of young MSM, the sample was still relatively small. The results cannot be generalized to all young MSM, as this was a venue-based study conducted in two US cities and in which a sizable proportion of men approached refused to participate. At the same time, the cross-sectional design employed in the YMS limits our ability to infer causal relationships. Ideally, incidence of HIV as opposed to prevalence would be used as an outcome measure, as incidence provides a more exact measure of the state of an epidemic. Despite these limitations, however, this study design and sampling method provide valuable data on a population that has received scant attention in the HIV/AIDS literature.

These findings suggest that differences in prevalence between whites and racial/ethnic minorities are not simply due to differences in risk taking behavior. Moreover, the risk to young racial/ethnic minority MSM is real and the associations between sexual risk taking and HIV prevalence are complex. Prevention strategies to reach young, racial/ethnic minority MSM need to be innovative in their focus on the core of the affected community, particularly as the HIV epidemic among gay men continues to expand.[13] The integration of HIV prevention into other services (health, community development, expansion of general educational development, and other educational programs) may offer better opportunities to access and reach young racial/ethnic minority and high-risk MSM. Prevention programs should be developed to address factors associated with HIV infection for each racial/ethnic subgroup. To date, young racial/ethnic minority MSM may represent an especially difficult population to reach, but one that is essential to engage if their continuing high HIV burden is to be averted.[29]

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