Socioeconomic Disconnection as a Risk Factor for Increased HIV Infection in Young Men Who Have Sex with Men

Travis A. Gayles, MD, PhD,¹ Lisa M. Kuhns, PhD,¹ Soyang Kwon, PhD,¹
Brian Mustanski, PhD,² and Robert Garofalo, MD, MPH¹

Abstract

Purpose: HIV disproportionately affects young men who have sex with men (YMSM), particularly black YMSM. Increasingly, researchers are turning to social, economic, and structural factors to explain these disproportionate rates. In this study, we explore the relationship between socioeconomic disconnection and HIV status and factors related to HIV infection, including drug use, condomless anal sex, and binge drinking. We operationalize socioeconomic disconnection in this young population as lack of engagement in educational and employment opportunities.

Methods: Baseline data were analyzed from a longitudinal cohort study of YMSM aged 16–20 years recruited from the Chicago area ($N=450$). Bivariate analyses of the association of socioeconomic disconnection and HIV-positive status, drug and alcohol use, and condomless anal sex were assessed using chi-square tests. The relationship of socioeconomic disconnection and HIV-positive status was then examined in multivariate logistic regression models, controlling for age and race/ethnicity and significant behavioral factors.

Results: Among study participants, 112 (25%) were not in school, 310 (69%) were not currently working, and 81 (18%) were neither in school nor working. Black MSM were more likely to be socioeconomically disconnected (neither in school nor working; $n=56$, 23.3%). The results revealed that disconnected YMSM were more likely to binge drink (AOR = 2.34; 95% CI = 1.16, 4.74) and be HIV positive (AOR = 2.24; 95% CI = 1.04, 4.83). Subpopulation analysis for black participants revealed similar associations (AOR of binge drinking = 2.92; 95% CI = 1.07, 8.01; AOR of HIV positive = 2.38; 95% CI = 1.03, 5.51). Controlling for substance use, the association between disconnection and HIV-positive status remained significant (AOR = 2.37; 95% CI = 1.08, 5.20).

Conclusion: Socioeconomic disconnection is significantly and positively associated with HIV status among YMSM, suggesting that the two factors are related. Socioeconomic factors present an important area for future research focusing on HIV infection in this high-risk group.

Key words: educational achievement, HIV, MSM, unemployment.

Introduction

THE HIV EPIDEMIC in the United States continues to be a major public health crisis, particularly among black men who have sex with men (MSM). Among men, the majority of new HIV infections are attributed to male-to-male sexual contact (78%).¹ In particular, black MSM are disproportionately affected by HIV infection, with a sharp increase of new HIV infections in black MSM aged 13–24 years in recent years.¹ Notably, HIV incidence continued to increase among black MSM between 2008 and 2011, whereas that of other racial and ethnic groups remained the same or decreased.² Consistent with national trends, black MSM in Chicago accounted

for 47% of new HIV cases in 2013 among MSM, almost two times that of white MSM (26%) and Latino MSM (22%).^{1,3}

These racial and ethnic disparities have existed and worsened over the years despite public health campaigns targeting largely individual-level behaviors among adult MSM. For example, in Chicago, many public health programs have emphasized increased condom usage and testing among black MSM. Following these efforts, data suggest more condom usage in black MSM, a higher percentage of black MSM having had at least one HIV test per year, and having been involved in an individual HIV prevention intervention.³ Unfortunately, in spite of these efforts, black MSM, particularly black MSM younger than age 29 years, remain the

¹Division of Adolescent Medicine, Ann and Robert H. Lurie Children's Hospital of Chicago, Feinberg School of Medicine, Northwestern University, Chicago, Illinois.

²IMPACT Program, Department of Medical Social Sciences, Feinberg School of Medicine, Northwestern University, Chicago, Illinois.

only demographic group with significant rate increases with regard to the acquisition of HIV.²

Efforts to explain differences in HIV infection rates by race/ethnicity have found that commonly explored risk factors for HIV acquisition, such as having multiple partners, increased frequency of condomless anal intercourse, and sex under the influence of alcohol and/or drug use could not explain racial differences in HIV infection.^{4–7} In fact, studies have shown that black MSM have the lowest reported risk profile in comparison to their peers.⁶ Recent efforts to explain these disparities have increasingly included community- and macrolevel factors, such as racism, discrimination, and economic insecurity, as well as the influence of social networks on sexual behavior, all factors that may create a social and economic environment conducive to HIV infection.^{7,8}

These factors may be particularly salient within the larger socioeconomic context, in which many urban black MSM exist, as black MSM are more likely than other MSM of different racial/ethnic categories to be of lower income, to be unemployed, and to have a history of school dropout and incarceration.³ Specifically, HIV infection in black MSM has been linked in some preliminary or exploratory studies to a number of indicators of economic insecurity, including unemployment.^{9–12} Furthermore, differences in patterns of social and sexual networks, such as increased racial segregation among black MSM, may concentrate exposure and contribute to transmission of HIV and other sexually transmitted infections (STIs).^{7,13}

While these findings offer new insights that may partially explain the disparity in infection rates, measuring economic insecurity as a risk factor for acquiring HIV has not been fully examined or even explored in young MSM (YMSM), a subpopulation of MSM at particularly high risk of HIV infection, as noted earlier in the introduction. The relationship between economic insecurity and HIV infection suggests that socioeconomic factors may play an important role in driving high rates of HIV infection among urban racial/ethnic minority MSM. Educational achievement and early employment represent developmentally appropriate socioeconomic milestones for adolescents and young adults.

It is estimated that 8% of teens aged 16–19 years (i.e., 1.4 million youth) are not working and not in school, with no education and few job-related skills.¹⁴ In a recent report of the Institute of Medicine (IOM) on the well-being of young adults, youth who are neither working nor in school, described as “disconnected” or “idle,” often have poor basic skills. This lack of skill may result in future low employment rates or low wages, reducing socioeconomic stability.¹⁵

Achievement of educational and employment milestones, therefore, is an important indicator of future success for emerging adults and is related to important health outcomes.^{15–17} School participation, for example, has been found to protect against engagement in substance use and early sexual initiation,¹⁸ both of which have been tied to high-risk sexual behaviors, such as having multiple sexual partners and reduced condom usage, that may lead to HIV seroconversion.^{19,20} Similarly, youth unemployment and living in poverty have been tied to similar high-risk behaviors and increased vulnerability to HIV.^{21,22} One of the few studies to explore this line of inquiry among YMSM (aged 15–22 years) found that being in school or working (in contrast to not in school and unemployed) was protective against HIV infection (newly diagnosed cases).²¹

However, despite the publication of this finding more than 10 years ago, there has been little continued focus on this area.

Thus, the purpose of this study was to examine the association between socioeconomic disconnection and HIV status among urban YMSM (aged 16–20 years). Socioeconomic disconnection was defined as the combination of being unemployed and out of school given the developmental age of the target population. We hypothesized that lack of participation in either work or school, as an early indicator of socioeconomic disconnection, would be positively and significantly related to HIV infection, controlling for demographic and behavioral factors.

Methods

Data collection

Baseline data were analyzed from a longitudinal cohort study of YMSM (aged 16–20 years) recruited from the Chicago area from late 2009 to early 2013 ($N=450$). This research initiative was developed to study the prevalence, course, and predictors of a syndemic of psychosocial health issues linked to HIV among YMSM.²² To be eligible for the study, participants had to be between the ages of 16 and 20 years, born male, and English speaking, to report prior sex with a male or identify as gay/bisexual, and to be available for follow-up for 2 years. The method of recruitment used was a modified form of respondent-driven sampling that allowed for a higher proportion of the sample to be initial recruits (i.e., “seeds”).²³ Face-to-face, community- and school-based outreach, and geosocial network applications (e.g., Grindr and Jack’d) were the methods used for recruiting seeds as well as posting flyers in community settings frequented by the target population.

Participants completed the self-administered interview using computer-assisted self-interviewing (CASI) software and testing for HIV and STIs at the study sites. Written informed assent or consent was obtained from participants with a waiver of parental permission for minors (aged 16–17 years). The study was approved by the Institutional Review Boards of the participating institutions: the Ann and Robert H. Lurie Children’s Hospital of Chicago and the Northwestern University.

Measures

Student status and employment status were collected using standard items. Participants were asked, “Are you currently a student?” (yes or no), and “Are you currently working?” (yes/full time, yes/part time, or no). An indicator of socioeconomic disconnection was created by coding these responses into a single dichotomous variable reflecting not currently a student and not employed versus either or neither (1 or 0).

Sexual risk in the prior 6 months was evaluated using items from the HIV-Risk Assessment for Sexual Partnerships (H-RASP) for sexual behavior adapted for YMSM.²⁴ Sexual risk behavior was defined as having had condomless receptive and/or insertive anal intercourse (CAI) with primary and casual male sex partners. The binge drinking item was adopted from that recommended by the National Institute on Alcohol Abuse and Alcoholism (NIAAA; dichotomously coded as any episode in the prior 6 months of drinking five or more drinks in a 2-hour period).²⁵ Items reflecting use of

illicit drugs were taken from the 2009 Youth Risk Behavior Survey (YRBS) and included any prior 6-month use of (1) marijuana and (2) other drugs (i.e., cocaine, heroin, methamphetamines, and opiates; nonprescription depressants and stimulants; psychedelics, Ecstasy, GHB, ketamine, and inhalants; and dichotomized as any prior use of (1) marijuana versus none and (2) any other listed substance versus none). Positive HIV status was obtained by either self-report (i.e., for those with known HIV-positive status at baseline) or Ora-Quick/OraSure™ testing (i.e., for those with unknown status at baseline).

Statistical analyses

In terms of sociodemographics, age was dichotomized for analysis into two categories reflecting high-school age versus

older age, that is, 16–18 years and 19–20 years old; race/ethnicity was categorized into black, Latino, white, and others. All analyses were performed using SAS 9.3 (SAS Institute, Inc., Cary, NC). A significance level was set as 0.05 (two sided). Bivariate analyses between socioeconomic disconnection and HIV status as well as behavioral risk were conducted using chi-square tests. For behavioral risk factors that were significantly associated with socioeconomic disconnection in the bivariate analyses, we further examined the association, controlling for age and race/ethnicity in multivariate logistic regression models. A final multivariate logistic regression model was fit to predict the likelihood of HIV-positive status, including age, race/ethnicity, and significant behavioral risk factors. Subgroup analysis for black participants was conducted given disproportionate rates of HIV among these young men and prior studies suggesting

TABLE 1. CHI-SQUARE ANALYSIS OF PARTICIPANT DEMOGRAPHICS AND BEHAVIORAL RISK FACTORS BY SOCIOECONOMIC DISCONNECTION

	<i>Disconnected</i>		<i>Nondisconnected</i>		P
	n 81	% 18.0	n 369	% 82.0	
Age, years					
16–18	28	34.6	180	48.8	0.02
19–20	53	65.4	189	51.2	
Race/ethnicity					
Black	56	69.1	184	49.9	<0.01
Latino	12	14.8	78	21.1	
White	6	7.4	75	20.3	
Others	7	8.6	32	8.7	
Binge drinking					
Yes	14	17.3	35	9.5	0.04
No	67	82.7	334	90.5	
Regular marijuana use					
Yes	28	34.6	87	23.6	0.04
No	53	65.4	282	76.4	
Hard drug use					
Yes	15	18.5	52	14.1	0.31
No	66	81.5	317	85.9	
Condomless anal sex acts with a male partner ^a					
Yes	36	46.2	164	44.4	0.78
No	42	53.8	205	55.6	
Condomless insertive anal sex acts with a male partner ^a					
Yes	23	29.5	101	27.4	0.70
No	55	70.5	268	72.6	
Condomless receptive anal sex acts with a male partner ^a					
Yes	28	35.9	132	35.8	0.98
No	50	64.1	237	64.2	
Condomless anal sex acts with a casual male partner ^a					
Yes	29	37.2	100	27.1	0.07
No	49	62.8	269	72.9	
Condomless insertive anal sex with a casual male partner ^a					
Yes	15	19.2	57	15.4	0.41
No	63	80.8	312	84.6	
Condomless receptive anal sex with a casual male partner ^a					
Yes	23	29.5	79	21.4	0.12
No	55	70.5	290	78.6	
HIV ^b					
Positive	13	16.2	21	5.7	<0.01
Negative	67	83.8	348	94.3	

^aThree missing values ($n=447$).

^bOne missing value ($n=449$).

TABLE 2. ADJUSTED ODDS RATIOS FOR BINGE DRINKING, REGULAR MARIJUANA USE, AND HIV STATUS BY SOCIOECONOMIC DISCONNECTION

Outcome	Binge drinking (n=450)		Regular marijuana use (n=450)		HIV (n=449)	
	AOR	95% CI	AOR	95% CI	AOR	95% CI
Age group, years						
16–18	Reference	—	Reference	—	Reference	—
19–20	1.11	0.60, 2.06	1.18	0.76, 1.83	2.78	1.25, 6.64
Race						
Black	Reference	—	Reference	—	Reference	—
Hispanic	2.59	1.20, 5.55	0.67	0.37, 1.23	0.32	0.09, 1.08
White	2.06	0.89, 4.79	1.01	0.57, 1.82	0.10	0.01, 0.76
Others	2.88	1.10, 7.55	1.22	0.58, 2.57	0.39	0.09, 1.74
Socioeconomic disconnection						
No	Reference	—	Reference	—	Reference	—
Yes	2.34	1.16, 4.74	1.64	0.97, 2.79	2.24	1.04, 4.83

AORs and 95% CIs were obtained from multivariable logistic regression models.

AOR, adjusted odds ratio; CI, confidence interval.

the important role of disconnection in HIV risk for black MSM. Finally, because HIV-positive status may influence disconnection directly (i.e., due to disruption in work or school as a result of stress associated with a recent diagnosis), we ran additional descriptive and sensitivity analyses, excluding prevalent cases from the multivariable model.

Results

Table 1 reflects the demographics of the entire sample of 450 participants. In terms of age, slightly less than half of the sample (46.2%) was aged 16–18 years. The study sample comprised 240 (53.3%) black MSM, 90 (20.0%) Latino MSM, 81 (18.0%) white MSM, and 39 (8.7%) others. Thirty-four participants were HIV positive (7.5%); 13 (38.2%) of these cases were incident “new” cases that were previously undiagnosed. Black MSM accounted for 11 (84.6%) of the newly diagnosed HIV cases, followed by 1 (8%) Latino MSM, 1 (8%) other ethnicity, and no new HIV infections among white MSM.

Of the study sample, 112 (25%) of the participants were not in school, while 310 (69%) participants were not currently working. Collectively, 81 (18%) of participants were neither in school nor employed. A higher proportion of older participants (19–20 years, 21.9%; $P=0.02$) and black participants (23%; $P<0.01$) were socioeconomically disconnected in comparison to other racial/ethnic groups (Table 1). In addition, disconnected YMSM were more likely to be HIV positive, to binge drink, and to be regular marijuana users ($P_s<0.05$). Of note, the same disproportionate percentage of young MSM (38%) was economically disconnected among prevalent and incident cases (data not shown). There were no significant differences in hard drug use and sexual risk behavior between the two groups.

As shown in Table 2, adjusted for age and race/ethnicity, disconnected YMSM were more likely to binge drink (AOR=2.34; 95% CI=1.16, 4.74) and to be HIV positive (AOR=2.24; 95% CI=1.04, 4.83); marijuana use (AOR=1.64; 95% CI=0.97, 2.79) was not significantly related to disconnected status. Subpopulation analysis for black participants revealed similar associations (AOR of binge drinking=2.92; 95% CI=1.07, 8.01; AOR of HIV positive=2.38; 95% CI=1.03, 5.51).

The association between disconnection and HIV-positive status remained significant (AOR=2.37; 95% CI=1.08, 5.2) in multivariable logistic regression models predicting the likelihood of HIV-positive status, controlling for substance use (Table 3). The association was also significant for black participants only (AOR=2.49; 95% CI=1.06, 5.87; data not shown). In sensitivity analyses for incident cases, a similar nonsignificant trend was observed (AOR=2.33, 95% CI=0.89, 6.11; data not shown).

Discussion

In the study described herein, we investigate the impact of socioeconomic disconnection on HIV-positive status. We found that socioeconomic disconnection was significantly associated with HIV status, with similar trends in prevalent

TABLE 3. ADJUSTED ODDS RATIOS FOR HIV STATUS BY SOCIOECONOMIC DISCONNECTION, CONTROLLING FOR BINGE DRINKING AND REGULAR MARIJUANA USE

Outcome	HIV (n=449)	
	AOR	95% CI
Age group, years		
16–18	Reference	—
19–20	2.85	1.23, 6.62
Race		
Black	Reference	—
Hispanic	0.35	0.10, 1.22
White	0.10	0.01, 0.77
Others	0.44	0.10, 2.00
Binge drinking		
No	Reference	—
Yes	0.20	0.03, 1.58
Regular marijuana use		
No	Reference	—
Yes	1.68	0.77, 3.67
Socioeconomic disconnection		
No	Reference	—
Yes	2.37	1.08, 5.20

AORs and 95% CIs were obtained from multivariable logistic regression models.

and incident cases. The relationship between disconnection and HIV status remained significant for the subgroup of black YMSM, who are both disproportionately disconnected and well known to have higher rates of HIV than their peers and as found in our sample.

While our study did not specifically address reasons for socioeconomic disconnection, these data, coupled with our findings, suggest that socioeconomic disconnection, as we defined it, may represent a manifestation of structural factors that influence HIV status among YMSM. Socioeconomic disconnection presents a somewhat provocative target area for further research and a potential target for structural intervention. Future investigations of HIV-related risk in YMSM should assess socioeconomic disconnection to better understand its potential impact on both primary and secondary HIV prevention.

Further in-depth research exploring socioeconomic disconnection can elucidate which and in what manner specific factors (e.g., premature school failure, lack of transition to the workforce following graduation, or inability to maintain employment) may influence HIV status in YMSM. This is especially salient for youth in major urban areas, such as Chicago, who may experience higher rates of unemployment and lack of school involvement; for example, the percentage of Chicago YMSM in our sample who were not in school and not working (18%) was more than double the national estimate for adolescents (i.e., 8%).¹⁴ Chicago provides a compelling backdrop within which to study this construct given historically high rates of housing segregation²⁶ and largely unsuccessful attempts to address public school underperformance in predominantly minority neighborhoods, which are also home to some of the nation's highest unemployment rates.²⁷

Of additional note, we found no significant difference when analyzing measures of sexual risk behavior (e.g., CAI) and socioeconomic disconnection. This finding underscores the need for further analysis of socioeconomic disconnection within the context of other emerging factors linked to HIV infection in YMSM (e.g., social networks, partner status, and healthcare access).

Limitations

Our study is not without limitations. First, our sample of YMSM comes from one urban area, and therefore, our findings may not generalize to YMSM from other parts of the United States. Second, the cross-sectional design demonstrates associations but does not allow for any interpretations related to causality. In particular, known HIV-positive status (i.e., prevalent cases) may contribute to socioeconomic disconnection (i.e., due to disruption in work or school as a result of dealing with a recent diagnosis). Notably, however, the same disproportionate percentage of disconnection was found in both the incident and prevalent cases (38%, respectively), and sensitivity analyses demonstrated similar trends in the association of incident and prevalent cases with disconnection (in comparison to HIV-negative cases). Given these findings and the relatively small number of newly diagnosed cases, we included all HIV-positive cases in the final analysis.

Our measure of disconnection did not include duration of unemployment or length of time not in school, nor did we measure length of time since HIV diagnosis (among prevalent cases), making it difficult to establish a temporal associ-

ation between socioeconomic disconnection and HIV infection. In addition, as noted earlier in the article, the operationalization of socioeconomic disconnection used in this analysis was limited to a fairly straightforward dichotomous variable without the potential nuances that may affect this relationship. For example, the effect of disconnection may be moderated by premature school departure or inability to obtain employment (in comparison to job loss).

Finally, there are unmeasured variables beyond the scope of this study, including family-, community-, or neighborhood-level poverty and unemployment, which may be more powerful predictors of HIV status than those included herein. More research regarding both educational and employment trajectories in YMSM may provide additional insight into both temporality and causality characteristics of the relationship between disconnection and HIV status.

Conclusion

Further exploration of socioeconomic disconnection as a correlate of HIV status, particularly among black YMSM, is warranted given the study findings described herein, particularly studies that can disentangle the potential influence of individual versus community and neighborhood factors and identify potential intervention targets.

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Disclaimers

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Author Disclosure Statement

No competing financial interests exist.

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Address correspondence to:

Robert Garofalo, MD, MPH

Division of Adolescent Medicine

Ann and Robert H. Lurie Children's Hospital of Chicago

225 E. Chicago Avenue, #161

Chicago, IL 60611

E-mail: rgarofalo@luriechildrens.org