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A Multilevel Analysis of Neighborhood Socioeconomic Disadvantage and Transactional Sex with Casual Partners among Young Men Who Have Sex with Men Living in Metro Detroit

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Abstract

The role of structural factors when evaluating the vulnerability of HIV/STI risks among young gay, bisexual, and other men who have sex with men is an important area of focus for HIV prevention. Using cross-sectional data from young men living in Metro Detroit. (N=319; ages 18–29; 50% Black, 25% White, 15% Latino, 9% Other Race/Ethnicity; 9% HIV-positive), we examined whether transactional sex with casual partners was associated with neighborhood-level socioeconomic disadvantage and individual-level factors (race/ethnicity and sexual identity, socioeconomic status, HIV/STI diagnoses, and substance use). Youth living in greater socioeconomic disadvantage reported more transactional sex (b=.11; SE=.04; p≤.01). This relationship was mitigated once individual-level correlates were entered into the model. Multi-level efforts to counteract socioeconomic deficits through community and individual level strategies may alleviate youth's exposure to transactional sex and reduce their vulnerability to HIV/STI risks.

Keywords

HIV; sexual minority; young adulthood; sex work

INTRODUCTION

Until the 1950s, the Detroit Metro area (DMA) was one of the richest and most populous metropolitan regions in the US. However, since this time it has become one of the most economically strained and racially segregated areas in the US due to a collapse of the American manufacturing industry during the second half of the twentieth century[1]. The

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population of Detroit, specifically, has declined from 1.8 million in the 1950s to 688,000 as of 2015[2]. The city's large youth population (ages 15–29) account for a quarter of the total population – indicating the potential for a large, active workforce, yet the unemployment rate remains among the highest of U.S urban centers (13.1% compared to a national average of 5.5%)[2]. Forty percent of Detroit residents live in poverty despite 78% of those over age 25 possessing a high school degree or equivalent. Alongside this economic decline, social tensions have led to racial segregation[1]. African American/Black individuals constitute 14.2% of Michigan's population, however, they account for 82.7% of all citizens living in the city of Detroit, followed by non-Hispanic Whites (7.8% in the city versus 76.6% in the state) and Latinos (6.8% in the city versus 4.4% in the state)[2]. A declining economy paralleled by increased racial segregation has acted to limit economic, educational, and social opportunities for minority populations living in Detroit, resulting in the creation of a large, dense socioeconomically disadvantaged population and the disproportionate increase in risk behaviors and poor health outcomes.[3,4].

Although the incidence of HIV has stabilized in the U.S among older age groups, adolescents and young adults continue to carry the largest proportion of new HIV/STI infections[5]. Similar to national trends, incident cases of HIV/STIs in the DMA continue to increase among racial/ethnic minority young gay, bisexual men and other men who have sex with men (YGBMSM) between the ages of 13 and 29[6]. The unequal distribution of new infections is further complicated by the social contexts where YGBMSM live. Within the DMA, areas with higher HIV prevalence are more likely to be inhabited by racial/ethnic minorities and characterized by socioeconomic disadvantage (*e.g.,* housing vacancy, poverty, unemployment). Consistent with Social Disorganization Theory[7], these epidemiologic patterns reinforce the need to consider how contextual characteristics may increase the HIV vulnerability of YGBMSM living in these spaces. For example, prior HIV research has noted that youth who experience socioeconomic challenges are more likely to engage in negative coping behaviors (*e.g.*, substance use), experience greater barriers to adopt and sustain health-promoting behaviors (*e.g.*, HIV testing), and to engage in behaviors (*e.g.,* transactional sex) that increase their vulnerability to HIV acquisition[8–12].

Understanding how structural factors shape the risk of transactional sex has the potential to add significantly to our understanding of the relationship between community context and individual behavior, and to inform the development of structural level interventions to improve sexual health among YGBMSM in socioeconomically disadvantaged contexts. For example, researchers have noted that engagement in transactional sex is more prevalent in socioeconomically strained contexts, influences individuals' sexual agency, and increases rates of HIV/STI transmission[13]. At present, however, less is known about the role of transactional sex as a survival strategy in the lives of YGBMSM. Transactional sex refers to the commodification of the body in exchange for shelter, food, and other goods and needs[14]. Within the public health literature, transactional sex among MSM has been associated to numerous risk factors including increased risk of HIV/STI infection, psychological distress, and substance use[13]. Most of the existing literature, however, has focused on individual-level correlates of transactional sex (e.g., low socioeconomic status indicators). The sole reliance on individual-level indicators of disadvantage, however, may mask how contextual factors (e.g., concentrated socioeconomic disadvantage) are associated with transactional sex

experiences among YGBMSM; limiting our ability to propose multi-level strategies to address both contextual and individual risk in YGBMSM's lives.

Given our interest in understanding how structural disadvantage may influence the vulnerability to HIV/STI among YGBMSM living in the DMA, we examined the role of neighborhood socioeconomic disadvantage on YGBMSM's lifetime experiences of transactional sex with casual partners. We focus on casual partners given long-standing evidence that HIV/STI exposure may be heightened during transactional sex encounters (e.g., commercial sex work, survival sex)[11, 13, 15]. Our study had three objectives. First, we examined whether neighborhood socioeconomic disadvantage, as measured by Census-level indicators, was associated with transactional sex. Second, we assessed whether transactional sex was associated with YGBMSM's demographic characteristics (*e.g.,* age, race/ethnicity, employment, education, HIV/STI status) and HIV/STI risk behaviors (*e.g.,* alcohol and marijuana use). Consistent with prior research, we hypothesized that transactional sex would be greater among individuals who reported being racial/ethnic minorities, had a lower socioeconomic status, and who engaged in greater substance use. Finally, we tested whether the association between neighborhood-level disadvantage and transactional sex persisted after accounting for individual-level demographic characteristics and risk behaviors.

METHODS

Data for this paper come from a cross-sectional observational study examining the structural and psychosocial vulnerabilities experienced by sexual minority young men in the DMA[16]. To be eligible for participation, recruits had to be between the ages of 18 and 29; identify as cis-male (assigned male at birth and currently identify as male); report currently residing in the DMA (as verified by zip code and IP address), and report ever having had sex with men.

Study recruitment and procedures are described in greater detail elsewhere[16]. Briefly, participants were recruited through online and in-person outreach efforts. On the Internet, advertisements were posted on Black Gay Chat Live (BGC Live) and Facebook. In-person recruitment occurred across gay bars, clubs, and community events frequented by the target population, as well as by staff from community partner agencies, clinics, and other agencies in the DMA working with YGBMSM (*i.e.*, LGBT organizations, AIDS Service Organizations, and community and university health clinics). Advertisements displayed brief information about the study, including a mention of a $30 VISA e-gift card, a website to verify eligibility, and a toll-free number to reach the research team.

Procedures

Upon completing an eligibility screener, eligible youth underwent an electronic consent process. Consented participants then answered a 45–60 minute questionnaire that covered assessments regarding their socio-demographic characteristics, HIV status, individual-level characteristics (*i.e.* sexual and substance use behaviors), perceptions and experiences with community (*e.g.* social networks, neighborhood, stigma, participation in minority communities), general mood over the last few months, and their hopes and dreams. Participants were compensated via e-mail upon completion of the questionnaire. The University of Michigan's Institutional Review Board approved all study procedures.

Measures

Transactional Sex with Casual Partner—Participants were asked to report their lifetime engagement in transactional sex with casual partners across four different indicators of socioeconomic need[15]: "I have had sex with someone who was NOT a regular partner because I needed help…: (1) "paying for things that I couldn't afford by myself", (2) "having a place to live", (3) "paying for groceries, utilities, or other bills", and (4) "providing for someone else who depends on me for financial support". Each statement could be answered on a 4-point scale (0=False, 1=Somewhat False, 2=Somewhat True, 3=True). We created a mean composite score of these four items, where higher scores indicated greater endorsement of transactional sex with a casual partner (α=.92).

HIV/STI Testing & Status—Items[17] related to testing assessed whether participants had ever tested for HIV, when they had their last HIV test, and whether they had ever tested positive for HIV. We used these two questions to categorize our sample of YGBMSM into HIV-positive, HIV-negative, and HIV-unknown status. We also asked participants to report if they had ever been diagnosed by a medical provider as having a STI (*e.g.,* syphilis, gonorrhea, herpes, and chlamydia).

Substance Use—To ascertain participants' substance use[18], two items measured how often alcohol and marijuana were used in the past 30 days. Both items included a 7-point response set (1 = 0 Times; 2 = 1–2 Times; 3 = 3–5 Times; 4 = 6–9 Times; 5 = 10–19 Times; 6 = 20–39 Times; 7 = 40+ Times). The prevalence of hard drugs in our sample was limited; thus, it was not included in this analysis.

Demographic Characteristics—Participants were asked to report age (in years), sexual identity, and race/ethnicity. We asked participants to indicate which of the following terms corresponded with their primary sexual identity: gay or homosexual, bisexual, straight/heterosexual, same gender loving, MSM, or other. For the purposes of these analyses, we collapsed participants' answers into 3 categories: gay/homosexual, bisexual, or another sexual identity. Participants also indicated their race (Black/African American, White, American Indian/Alaskan Native, Asian, Native Hawaiian/Pacific Islander, and Other) and Spanish/Hispanic/Latino ethnicity. Most Latinos identified as White/European American and/or as Other, making it difficult to have sufficient cases to represent other Latino racial subgroups (e.g., Black Latino, Asian Latino, and/or Native American Latino) in our multivariate analyses. Due to small variances, race/ethnicity was collapsed to four levels (0 = Black/African-American; 1 = White/Caucasian; 2 = Latino; 3 = Other Race). Participants noted their highest educational attainment (1=Less than High School; 2=High School or GED; 3=Technical/Associate Degree; 4=Some College; 5=College or graduate work). We dichotomized participants' income into above or below the federal poverty line.

Neighborhood Economic Disadvantage—We defined neighborhood as Census tracts. We linked study data with 2010 Census information based on address information reported by respondents. Participants were sampled from 231 tracts. Although originally we sought to examine racial/ethnic segregation and economic disadvantage jointly at the tract-level, we did not include these two predictors concurrently due to multi-collinearity concerns (r.=70).

We created a standardized neighborhood concentrated economic disadvantage score[10,19] through a Principal Axis Factor analysis with Varimax rotation using Census data. This composite score (α = .75) had a one-factor solution that explained 59.96% of the variance (Eigenvalue=3.40), and included five indicators: percent of households in poverty (*M*=24.98, *SD*=17.89; factor loading = .80), percent of households receiving public aid (*M*=5.61, *SD*=5.15; factor loading = .81), percent of single-headed households with children under the age of 18 (*M*=47.82, *SD*=29.59; factor loading = .72), unemployment percentage (*M*=10.26, *SD*=5.56; factor loading = .76), and percentage of residents over the age of 25 without a high school diploma (*M*=16.22, *SD*=11.81; factor loading = .77). We then created a z-score measure based on these 5 indicators.

Data Analytic Strategy

We used HLM 7[20] to design a multilevel regression model where we could model the association between transactional sex and the individual (Level One; *i.e.,* demographic characteristics, socioeconomic indicators, HIV/STI status, and substance use) and neighborhood (Level Two; *i.e.,* socioeconomic disadvantage) indicators. This modeling strategy allowed the total variance to be partitioned into within-individual error I, between-individual error I, and between-neighborhood error (u) variation. We first created a fully-unconditional model to compute the intra-class correlation. Consistent with our first objective, we entered our neighborhood disadvantage score into the model, allowing us to see how neighborhood-level disadvantage was associated with YGBMSM's transactional sex score. To test our second objective, we then entered YGBMSM's individual-level data to our regression model. By entering individual-level data as our last step, we were able to test our third objective and examine whether these characteristics mediated the relationship between neighborhood disadvantage and transactional sex. We report our findings as fixed-effect models with robust standard errors using $p \leq .05$ as criterion for statistical significance. For brevity, only statistically significant findings are discussed in the Results sections.

RESULTS

Sample Characteristics

The average age of participants (N=319) was 23 years old (see Table 1), with most of the sample identifying as gay (N = 295, 84.6%). Black/African American men comprised the largest group in our sample (N = 159, 49.8%), followed by Non-Hispanic Whites (N = 82; 25.7%), Latinos (N = 49; 15.4%), and participants categorized in the Other Race/Ethnicity group (N = 27; 8.5%). The majority of the sample had completed high school or obtained a GED (N = 295; 92.5%), and was employed full-time (41.4%) or part-time (29.5%). Over half of our participants reported an annual income above the federal poverty line (N = 199, 55.8%). A majority of our participants reported being HIV negative (N = 245, 76.8%), with smaller proportions reporting being HIV positive (N = 30, 9.4%) or unaware of their HIV status (N = 44, 13.8%). Among HIV-negative participants, 57.6% (N = 141) reported having had their test that year and 22.4% (n=55) reported having their last test in the prior year. The remainder of the HIV-negative sample indicated that their last HIV test had occurred two or

more years ago (N = 49; 20%). Twenty percent of our sample had been diagnosed by a medical provider with having a prior STI.

Twenty-six percent of the sample (N = 85) endorsed at least one of the four statements regarding engaging in transactional sex with a casual partner. The most endorsed motivation for engaging in transactional sex with a casual partner was being worried about not being able to afford things, followed by worries about paying for groceries, utilities and other bills, being worried about a place to live, and supporting someone else's financial well-being (see Table 1).

Multilevel Correlates of Transactional Sex

We found significant variation between neighborhoods for our transactional sex outcome (χ^2=305.66, df=230, $p \leq .001$), with an estimated intra-class correlation of 19.3%. We then entered the neighborhood socioeconomic disadvantage indicator into the model. On average, YGBMSM's transactional sex scores were positively associated with greater neighborhood socioeconomic disadvantage (b=.11; SE=.04; $p \leq .01$). Once we entered the individual-level indicators into our model, however, the association between neighborhood socioeconomic disadvantage and transactional sex became statistically non-significant, suggesting mediation through the individual-level indicators (see Table 2).

YGBMSM who lived above the poverty line (b=−.20; SE=.09; p=.04) had lower mean transactional sex scores than YGBMSM who lived below the poverty line. Similarly, YGBMSM who had part-time (b=−.24; SE=.12; p=.04) or full-time (b=−.52; SE=.12; $p \leq .001$) employment reported lower mean scores on transactional sex than their unemployed counterparts. Compared to non-Latino Whites, transactional sex scores were higher among YGBMSM who identified as Black (b=.26; SE=.10; p=.01), Latino (b=.59; SE=.15; $p \leq .001$) or as another race/ethnicity (b=.40; SE=.15; p=.01). Transactional sex scores were higher among YGBMSM who reported greater alcohol (b=.07; SE=.03; p=.02) and marijuana use (b=.08; SE=.02; p=.01) in the prior 30 days. We observed no association between transactional sex and having completed high school, living alone, sexual identity, age, or HIV/STI status.

DISCUSSION

The inclusion of neighborhood socioeconomic disadvantage as a structural factor in our analysis acknowledges that HIV/STI risk is not the sole result of individual-level characteristics but, rather, a reflection of how structural vulnerability may place individuals in contexts where their opportunities for advancement are significantly constrained[21,22].

YGBMSM who live in areas with greater socioeconomic disadvantage were more likely to report engaging in transactional sex with casual partners, a known indicator of HIV/STI transmission risk among MSM. These findings emphasize the importance of considering how social and economic structural factors may foster circumstances that propel young men to engage in transactional sex as a method of gaining access to basic needs, and draw attention to the importance of examining structural factors as critical risk correlates[23,24] when assessing the health and well-being of YGBMSM. Programs focused on identifying

facilitators of and alternative options to transactional sex are warranted given the well-documented link between transactional sex and vulnerability to HIV/STI[13]. Structural initiatives that include strategies to advance communities' economic wellbeing (*e.g.,* job creation, small business loans, education advancement trainings) may improve the socioeconomic resources available to YGBMSM (and others) who live in those areas and, thereby, lower risk taking associated with HIV/STI transmission.

As a product of economic and social disadvantage, transactional sex may be one important explanation for the higher rates of HIV experienced by the urban poor and YGBMSM in the U.S. YGBMSM who engaged in transactional sex with a casual partner were more likely to report living below the federal poverty line, be unemployed, and to self-identify as a racial/ethnic minority group member, highlighting the concentration of risk among the economically disadvantaged. YGBMSM who engaged in transactional sex with casual partners also reported higher odds of using alcohol and marijuana, mirroring prior findings with other populations[13,25,26]. Taken together, these findings point to a syndemic in which economic disadvnatage leads to maladaptive coping strategies (substance use and transactional sex) and highlight the importance of strengthening efforts to reduce existing disparities and offer culturally-sensitive prevention services to socioeconomically marginalized YGBMSM.

Our findings coincide with prior research suggesting that the negative socioeconomic shifts experienced in the DMA are associated with increases in an array of negative social risk factors (*e.g.,* unemployment, poverty, homelessness), increasing the propensity of marginalized communities to live in socioeconomically disadvantaged neighborhoods and working in high-risk, low-paying jobs and/or participating in informal (e.g., sex work) economies[4,11,27]. Our multilevel analyses support this argument and provide tentative evidence for mediational pathways; once individual-level indicators of socioeconomic disadvantage and risk behaviors were included in the model, we observed an attenuation of the direct association between neighborhood disadvantage and transactional sex through the individual-level characteristics of our participants. Taken together, these findings underscore the importance of developing HIV/STI prevention interventions at *both* the individual and community level. A multilevel approach may aide YGBMSM who are currently vulnerable, while also create long-term investments that may disrupt the cyclical processes that socioeconomic disadvantage causes on communities over time.

Several limitations of the current study should be noted. First, we were unable to model racial/ethnic density alongside socioeconomic disadvantage given the high correlation between these two Census indicators in our region. In addition, the Census and YGBMSM data were collected two years apart from one another. Although significant structural changes are unlikely to have occurred during this two year gap, it may have biased the precision of our estimates. Second, findings from the study are based on a community sample of YGBMSM from the Detroit and surrounding areas; the generalization of these findings is limited due to the employed recruitment and survey methods. The extent to which these findings apply to the larger population of YGBMSM in Detroit is unknown and probabilistic sampling is needed to confirm findings. The findings speak solely to the experiences of *cis*-identified YGBMSM. Though this focus is not necessarily a limitation,

the complexity and importance of understanding the experiences of transgender populations need to be acknowledged; prior evidence suggests that transgender populations may engage in transactional sex and survival sex more frequently than other populations. The measure of transactional sex focused on lifetime; given the high prevalence observed in this sample, future research examining recent experiences of transactional sex may be warranted. Items used to assess transactional sex did not include a specific focus on substance use. The lack of a specific item regarding exchanging substances is a limitation due to the elevated prevalence of exchanging substances versus other goods and should be included in future research in this area. The cross-sectional nature of our study limits our ability to make causal inference between transactional sex and the psychosocial factors examined in this manuscript. Given the cross-sectional design and the number of associations examined, future research should seek to replicate our findings in other samples of YGBMSM. In addition, it is possible that our HIV-positive prevalence is under-reported, particularly since YGBMSM self-reported their HIV status and many acknowledged that they had never had a HIV test or had not received a recent HIV test. Finally, our findings are constrained by the endogeneity of community choice[28]. In other words, individuals may not be able to self-select and live in their community of choice due to historical and sociopolitical experiences of marginalization[1]. Consequently, it is plausible that unmeasured structural processes (*e.g.*, housing discrimination, redlining) constrain participants' social contexts and their mobility and influence our observed associations.

CONCLUSIONS

Our findings suggest that neighborhood socioeconomic disadvantage is associated with HIV/STI risk behaviors and may operate through individual-level indicators of socioeconomic vulnerability. Future research examining how these factors create individual-level vulnerability is warranted, as it may provide insights into the development of multilevel HIV/STI prevention programs that go beyond traditional, individual-level behavior change efforts. Given the bidirectional nature of engaging transactional sex and engaging in socioeconomic hardship, on-going intervention efforts should strive to reduce socioeconomic disadvantage and provide alternative options to transactional sex in order to improve YGBMSM's well-being.

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Table 1

Descriptive Statistics of YGBMSM in Detroit Metro Area (N=319)

	M	SD	*N*	%
Community-Level Indicator (N=231)				
Socioeconomic Disadvantage (z-score)	.46	1.05		
Demographic Characteristics				
Age	23.19	2.86		
Ages 18–20			64	20.1%
Ages 21–24			155	48.6%
Ages 25–29			100	31.3%
Race/Ethnicity				
White			82	25.7%
Black			159	49.8%
Latino			49	15.4%
Other			27	8.5%
Sexual Identity				
Gay			270	84.6%
Bisexual			28	8.8%
Other identity			21	6.6%
Completed High School			295	92.5%
Above Poverty			178	55.8%
Employment Status				
Full Time Work			132	41.4%
Part-Time Work			94	29.5%
Not Working			80	25.1%
Other/Disability			13	4.1%
Lives Alone			94	29.5%
HIV Status (self-report)				
HIV negative			245	76.8%
HIV positive			30	9.4%
HIV status unknown			44	13.8%
Prior STI Diagnosis			62	19.4%
Substance Use (past 30 days)				
Alcohol Use	3.39	1.59		
Marijuana Use	2.46	2.06		
Transactional Sex with Casual Partner [I have had sex with someone who was not a regular partner because I needed help…]	0.38	.80		
Paying for things that I couldn't afford by myself.	0.49	1.01		
Having a place to live.	0.31	.81		
Paying for groceries, utilities or other bills.	0.46	.97		
To provide for someone else who depends on me for financial support.	0.27	.76		

Table 2

Transactional Sex with Casual Partners among YGBMSM in Detroit Metro (N=319)

	Model 1: Neighborhood Model				Model 2: Multilevel Model			
	b	**SE**	***t***	***p***	**b**	**SE**	***t***	***p***
Mean Score, β_0	0.37	0.05	30.03	<0.001	0.77	0.23	7.75	<0.001
Neighborhood Disadvantage, γ_{01}	0.11	0.04	2.57	0.01	0.01	0.05	0.15	0.88
Individual Level Socioeconomic Indicators								
Completed High School, β_1					−0.09	0.19	−0.48	0.64
Lives Above Poverty Line, β_2					−0.20	0.09	−2.14	0.04
Employment Status								
Full Time Work, β_3					−0.52	0.12	−4.22	<0.001
Part-Time Work, β_4					−0.24	0.12	−2.06	0.04
Lives Alone, β_5					0.01	0.09	0.15	0.89
Demographic Characteristics								
Age Group								
Ages 18–20, β_6					−0.20	0.12	−1.67	0.10
Ages 21–24, β_7					−0.12	0.10	−1.25	0.21
Sexual Identity								
Gay Identified, β_8					−0.10	0.12	−0.81	0.42
Race/Ethnicity								
Black, β_9					0.26	0.10	2.62	0.01
Latino, β_{10}					0.59	0.15	4.04	<0.001
Other Race/Ethnicity, β_{11}					0.40	0.15	2.60	0.01
HIV Status								
HIV-positive, β_{12}					0.14	0.15	0.90	0.37
HIV status unknown, β_{13}					0.07	0.14	0.48	0.64
Prior STI Diagnosis, β_{14}					−0.17	0.10	−1.67	0.10
Substance Use (past 30 days)								
Alcohol Use, β_{15}					0.07	0.03	2.33	0.02

	Model 1: Neighborhood Model				Model 2: Multilevel Model			
	b	**SE**	***t***	***p***	**b**	**SE**	***t***	***p***
Marijuana Use, β_{16}					0.08	0.02	3.24	0.01