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Neighborhood Context and Black Heterosexual Men's Sexual HIV Risk Behaviors

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Abstract

The effects of neighborhood context on sexual risk behavior are understudied, particularly for Black heterosexual men who do not inject drugs or report heavy drug use. Evidence of a generalized HIV epidemic (>1%) among Black heterosexuals in low-income urban U.S. communities underscores the importance of examining the effects of neighborhood context on Black heterosexual men's sexual risk, however. We used structural equation modeling to test the pathways between neighborhood context (neighborhood disorder, personal violence, neighborhood threats), depression, substance use, and sexual risk behavior. Participants were 526 self-identified Black heterosexual men, ages 18 to 45, recruited via randomized venue-based probability sampling in Philadelphia, PA. Analyses of model fit statistics from Mplus indicated statistically significant direct pathways between neighborhood context, depression, substance use, and sexual risk behavior. The total indirect effect of neighborhood context on sexual risk behavior through substance use was also significant. The study's results highlight a need for more research on neighborhood context and sexual HIV risk, and for multilevel interventions to address the effects of negative neighborhood context on Black heterosexual men's sexual HIV risk.

Keywords

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INTRODUCTION

Individuals, rather than social-structural factors, have been the primary focus of most HIV prevention research [1-3]. Consequently, considerable gaps in knowledge exist about how social-structural factors such as neighborhoods facilitate or hinder sexual risk [4]. There is, however, abundant empirical evidence that neighborhood context is associated with physical and mental health [5-7]. Theory and research on neighborhood context encompasses sociodemographic, structural and spatial dynamics (e.g., neighborhood poverty, racial segregation), neighborhood disorder (e.g., violence, drug dealing), and social processes (e.g., collective efficacy) [5]. Numerous studies document the relationship between neighborhood disorder and urban violence [8], substance use [9-11], mental health [6], depression [12-14], and domestic violence [15]. Research on neighborhood context and sexual HIV risk, by comparison, is relatively sparse.

A small empirical literature documents that neighborhood context is associated with increased sexual HIV risk among predominantly Black samples of injection drug users [9,16], adolescents [17-20] (sexual orientation/identity unspecified), as well as predominantly White samples of men who have sex with men (MSM) [21,22]. These U.S.-based studies demonstrate relationships between sexual risk behaviors and neighborhood structural dimensions such as neighborhood social disorder (e.g., violence, selling drugs) [9,16]; neighborhood environment (e.g., vacant or boarded up buildings) [18]; neighborhood economic disadvantage (e.g., proportion of poverty) [17]; or social disorganization (e.g., proportions of married couples living with children under age 18) [19]. There is also some evidence, at least for predominantly White educated, employed, middle-class gay men who live in racially diverse neighborhoods, that neighborhood characteristics such as a high proportion of same-sex households may increase sexual risk [22], although other studies suggest that these neighborhood characteristics protect against sexual risk [21] or cocaine use and substance dependence [22]. Considerable empirical gaps exist in the literature on neighborhood context and sexual HIV risk for Black men who do not inject drugs or have sex with men, however. This study addresses those gaps.

The need to understand and intervene on neighborhood characteristics that facilitate HIV risk in Black communities is dire. Blacks represent 13% of the U.S. population, but are disproportionately clustered in impoverished and racially segregated neighborhoods. The proportion of Blacks living in poverty areas (47%) exceeded that of all other racial/ethnic groups between 2006 and 2010 [23]. There is evidence of a generalized HIV/AIDS epidemic (i.e., >1%) among heterosexuals in U.S. urban communities that are predominantly Black and disproportionately poor [24]. Yet Black heterosexual men are rarely the focus of HIV prevention research and interventions [25]. Epidemiological data attest to why an HIV prevention focus on Black heterosexual men is essential. Black men accounted for the vast majority (3,117 of 4,588 cases, or 68%) HIV cases due to heterosexual exposure among U.S. men in 2011 [26]. Moreover, the virus is more efficiently transmitted heterosexually from men to women. Black women accounted for 5,875 (67%) of the 8,814 HIV cases due to heterosexual exposure among U.S. women in 2011. Thus reducing Black heterosexual men's sexual HIV risk is also inextricably linked to reducing that of Black women's.

Depression is an empirically documented psychological pathway to sexual risk behavior in Black women [27-29] and [30] IDUs, and predominantly White samples of MSM [31], young adults (sexual orientation unspecified) [32], and IDUs [33]. Depression may indirectly link to sexual risk because people who are more depressed are more likely than less depressed people to use substances such as alcohol and drugs that impair condom use [34]. An abundant empirical literature documents the comorbidity between depression and substance use [35-38], and suggests that people who are depressed often self-medicate with alcohol and/or drugs[39]. Qualitative research with urban Black men traumatized by violence documents frequent marijuana use as a form of self-medication [40]. Research on the link between depression and Black heterosexual men's sexual risk behaviors is virtually nonexistent, however.

Research also documents the link between neighborhood context, depression and increased substance use for Black men [41-43] and multi-ethnic populations [11]. Research investigating the psychological pathways that link neighborhood context and sexual risk is rare, however [4]. A study conducted by Latkin and colleagues[16] is the only study to date that shows associations between neighborhood disorder and sexual risk (and drug use), directly and indirectly through depression. Specifically, that study documented that neighborhood disorder leads to depressive symptoms, then to substance use, and in turn to sexual risk behaviors, among predominantly Black urban people with histories of heroin or cocaine use. There are, however, gaps in empirical knowledge about whether neighborhood disorder and psychological distress are related to sexual risk behavior among Black heterosexual men for whom heavy drug use is relatively low. Because HIV is more densely concentrated in Black communities, young Black adults are at increased sexual risk even when they have lower rates of risky sexual and drug use behaviors, compared with Whites with higher rates of risky sexual and drug use practices [44]. These findings affirm the need for research on how factors beyond the level of the individual, such as neighborhood context, may increase sexual HIV risk.

Informed by Latkin et al.'s [16] research on neighborhood disorder and sexual risk, we tested a model of neighborhood context, depression, substance use and sexual risk behavior for Black heterosexual men. Specifically, we hypothesized that more negative neighborhood context would be related to greater depression, which would in turn be related to substance use, and in turn be linked to sexual risk behavior. Our study's focus on Black heterosexual men who reported low frequencies of heavy drug use (e.g., heroin, cocaine) is noteworthy because it examines the impact of neighborhood context on sexual HIV risk for a group who, despite being at increased sexual risk for HIV, is understudied in the neighborhood context and HIV risk literature. While it is likely that many of the male injection drug users in previous neighborhood and HIV risk studies were heterosexually identified, Black male IDUs and Black heterosexual men are treated as distinct populations in HIV incidence reporting. Of the nine subpopulations most affected by HIV in 2010, for example, the CDC[45] estimates that Black male IDUs accounted for 1,100 new HIV cases. By comparison, estimates for Black heterosexual men were 5,300 cases, almost five times that of the number of Black male IDUs. These HIV incidence estimates underscore the importance of understanding how neighborhood context shapes sexual risk for men who are the focus of this study: Black heterosexual men for whom heavy drug use is relatively low.

METHODS

This research was part of a cross-sectional, mixed methods study on the effects of social-structural factors, masculinity ideologies, sexual scripts and sexual HIV risk behaviors among Black heterosexual men. We used venue-based probability sampling [46] to recruit Black heterosexual men from randomly selected venues such as corner grocery stores, restaurants, and barbershops in Philadelphia, PA. Sixty U.S. Census blocks with a Black population of at least 50% were eligible for selection. A team of trained Black women and men recruiters first canvassed block groups to identify viable venues for recruitment (i.e., those in which they observed at least 2 Black men during a 30 minute canvassing session). After obtaining the permission of venue owners to recruit at their sites, we developed a sampling frame of potential two-hour recruitment venue timeframes. Recruiters approached and screened prospective participants on-site to determine whether or not they met the study's eligibility criteria of: identifying as Black/African American, identifying as heterosexual, being 18-44 years old, and reporting vaginal sex during the last two months. Men who did not identify as heterosexual or reported having sex with men exclusively were excluded from study participation. Substance use history was not an eligibility criterion. Eligible men provided their name and contact information.

Participants

A total of 578 study-eligible men completed the Audio Computer Assisted Self Interview (ACASI) at the project's office. We eliminated data from 42 men who reported no vaginal or anal sex in the last 2 months, 8 men who reported a sexual orientation other than heterosexual, and 2 men who reported only anal sex, to obtain a final sample size of 526. Participants provided informed consent prior to participation and received a $50 cash incentive. The Institutional Review Board at Drexel University, the primary author's former institution, approved all study procedures.

Measures

Neighborhood Context—We adapted the 18-item City Stress Inventory (CSI), which consists of two subscales: neighborhood disorder and exposure to violence[47,48]. We adapted the original CSI in four ways. First, we used a 4-point scale (*Never* to *Very Often*). Second, we deleted two items from the original CSI's neighborhood disorder subscale (number of neighbors with food stamps, number of vacant houses or buildings) because of the likelihood for inaccurate responses. Next, whereas the original CSI asked about family and friends' exposure to violence, we changed the stem to be "someone you know." We combined four of the CSI's original items that asked separate questions about family and friend's experiences with being stabbed or shot, and being robbed or mugged, into 2 questions (i.e., "How often has someone you know been stabbed or shot?" and "How often has someone you know been robbed or mugged?"). Finally, we added 6 questions regarding respondents' personal exposure to violence (e.g., "How often have you been stabbed or shot?";). The adapted measure consisted of 20 items. We used exploratory factor analysis to explore the underlying dimensions of the adapted 20-item measure. Factor analysis yielded three factors that accounted for 55% of the variance. We set ±.45 as the factor loading criterion and deleted two items ("How often has someone you know been attacked or

beaten?" and "How often has someone threatened to hurt someone you know?") with factor loadings below the ±.45 cutoff. The resultant final adapted CSI consisted of 18 items and three subscales: Neighborhood Disorder (e.g., "How often are drug dealers near your home"?; 8 items; α = .88); Neighborhood Threats (e.g., "How often has someone you know been stopped and questioned by the police?", 5 items; α =.86); and Personal Violence (e.g., "How often have you been stabbed or shot?", 5 items; α =.69).

Substance Use—Substance use was self-reported. Because reports of cocaine use (6%) and injection drug use (0.8%) during the past 30 days were low, the substance use measure focused on alcohol and marijuana use. Substance use was measured with three questions from the 2009 State and Local Youth Risk Behavior Survey (YRBS) [49]. Two items assessed alcohol use in the past 30 days (frequency and binge drinking). Response options for 30-day alcohol use ranged from 0 (=1) to all 30 days 0 (=7). We used the YRBS's operationalization of binge drinking as "having 5 or more drinks of alcohol in a row within a couple of hours." Response options for binge drinking ranged from 0 (=1) to 20 or more days (=7). The third item assessed the frequency of marijuana use in the past 30 days. Response options for marijuana use ranged from 0 (=1) to 40 or more times (=6).

Depression—The *Patient Health Questionnaire* (PHQ-9; α = .87) was used to measure depression [50]. It consists of 9 items assessing the frequency of depressive symptoms in the past two weeks. Response options ranged from Not at All (= 1) to Nearly Every Day (= 4).

Sociodemographic characteristics—Sociodemographic characteristics included: (1) *Age* in years; (2) *Education*, which ranged from 1 (some high school) to 5 (graduate degree); (3) *Income*, ranging from 1 (< $10,000) to 4 ($40,000-$59,000); (4) *Employment Status* which consisted of 2 levels: 0 = unemployed and 1 = employed; and (4) *Relationship Status*, which consisted of 2 levels: single (0 = single, widowed, or divorced) and committed (1 = married or domestic partnership).

Sexual Risk Behavior—Sexual risk behavior items were adapted from the National Sexual Health Survey (NSHS)[51]. Consistent with previous research [52], respondents were asked to indicate on a partner-by-partner basis (up to 10 primary and casual partners) how many times they had vaginal sex in the past 2 months, and how many times they used condoms during the same period. From this information, a condom use ratio was created, reflecting consistent use (100%), inconsistent use, and no condom use in the last 2 months. Next, a 3-level ordinal index of self-reported sexual risk was created, modeled on the National Longitudinal Youth Survey [53]. The index included both information on the number of partners and the condom use ratio. Low risk (=1) men reported that they were monogamous and used condoms 100% of the time (*n* = 81; 15%). Moderate risk (=2) men reported that they were monogamous and used condoms inconsistently or never, or that they were not monogamous and used condoms consistently (n = 309; 59%). High risk (=3) men reported that they were not monogamous and used condoms inconsistently or never (*n* = 136; 26%).

Data Analysis

Descriptive analyses of sample characteristics were conducted using SAS 9.3. We performed bivariate screening of the associations of the previously listed covariates with sexual risk. We then used structural equation modeling (SEM) via M*plus* 7.11 to examine the expected relationships between neighborhood context, depression, substance use, and sexual risk behavior implied by the SEM shown in Figure 1. Structural equation modeling allows for the testing of both direct and indirect effects with latent and observed variables. The latent variable neighborhood context was modeled as a higher-order factor measured by three lower-order factors: neighborhood disorder, neighborhood threats, and personal violence. The latent variable depression consisted of the nine observed items that comprise the PHQ-9. The latent variable substance use consisted of three observed variables: frequency of alcohol use, binge alcohol use, and marijuana use. Sexual risk behavior was the observed outcome variable. Weighted least squares estimation with mean and variance-adjusted test statistics was used due to the presence of categorical and ordinal variables (M*plus* estimator WLSMV).

To assess exact model-data fit, the chi-square test statistic was computed. Although the chi-square test provides a popular fit statistic, it is sensitive to sample size [54], so approximate model-data fit was also assessed. Approximate model fit was determined by Bentler's [55] comparative fit index (CFI), the root mean square error of approximation (RMSEA), the weighted root mean square residual (WRMR), as well as the chi-square statistic. If two of the following three conditions are met, the model fits the data on an approximate basis: CFI greater than or equal to 0.95, RMSEA values less than 0.06, and WRMR values less than 1.00 [56,57]. Exact model-data fit suggests that the model can be replicated in a new sample drawn from the same population; approximate model-data fit suggests that the model provides a parsimonious approximation to the observed data, and is likely to replicate across heterogeneous populations.

The SEM was conducted pursuant to Anderson and Gerbing's [58] two-stage process recommendation. The first stage involves fitting the measurement model to ensure adequate measurement of the constructs. This was accomplished by focusing on the relationship between each observed variable, its corresponding latent factor, the correlations among the latent factors, as well as by assessing model fit. The second stage involves testing the full structural model with a focus on paths between constructs as well as model fit. The measurement scale of each latent factor in both the measurement and full structural equation models was determined by fixing the first indicator's factor loading to 1.00. As part of the full structural equation model fitting process, any covariates bivariately associated with sexual risk were included in an initial SEM model and evaluated for significance within the context of the SEM using chi-square difference tests. Non-significant covariates were then dropped from the SEM to maximize statistical efficiency for the remaining hypothesis tests and to maximize interpretability of results. Single degree-of-freedom nested model chi-square tests were then performed to test the significance of direct effects in the structural part of the model. Indirect effects from the neighborhood context latent factor to sexual risk through depression and substance use were also hypothesized and estimated. To address the complex sampling design, a case weight variable for probability of selection and non-

response was included in the analysis and venue ID was used as a clustering variable for computation of robust standard errors and test statistics (M*plus* COMPLEX analysis type). Unstandardized regression coefficients (B) and standardized regression coefficients (β) are both reported for each effect.

RESULTS

Demographic characteristics of the sample and descriptive statistics for neighborhood context, depression, substance use and sexual risk behavior are presented in Table 1.

Measurement model

The measurement model fit the data well: $\chi^2(399) = 709.48$, $p <.0001$; CFI = .957, RMSEA = .036 (90% CI = .031, .040); WRMR = 1.268. All factor loadings between the latent variables and the observed variables were significant at $p <.001$. All factor intercorrelations were significant at $p <.001$, with substance use being positively correlated with depression and neighborhood context being positively correlated with depression and substance use. Sexual risk was positively correlated with neighborhood context, depression, and substance use (see Table 2 for the matrix of factor intercorrelations from the measurement model).

Structural model

Age was the only covariate associated with sexual risk behavior in the bivariate screening ($r = -.11$, $p =.03$). The initial SEM including age as a covariate did not fit the data on an absolute basis ($\chi^2(453) = 758.83$, $p<.0001$), but it fit the data well on an approximate basis: CFI = .956, RMSEA = .036 (90% CI = .031, .040); WRMR = 1.287. The chi-square difference test for the effect of age in the model was not significant ($\chi^2(4) = 7.50$, $p=.11$), so age was dropped and the model was refitted. Figure 1 illustrates the resulting structural model with the estimated standardized path coefficients. Though the model did not fit the data on an absolute basis ($\chi^2(426) = 709.48$, $p<.0001$), it fit the data well on an approximate basis: CFI = .957, RMSEA = .036 (90% CI = .031, .040); WRMR = 1.268. Table 3 shows the estimates and standard errors for each measurement and structural path. With the exception of the hypothesized pathway between depression and substance use, all hypothesized direct pathways were significant. Of note, significant positive direct effects were observed from neighborhood context, depression, and substance use to sexual risk (Table 3; Figure 1). Neither the indirect effect of neighborhood context on substance use via depression (B = .04, p = .30, β = .03) nor the indirect effect of depression on sexual risk via substance use was significant (B = .02, p = .33, β = .01). The total indirect effect of neighborhood context on sexual risk was significant (B = .36, p = .001, β = .13), however. Examination of the three constituent indirect components of the total indirect effect revealed that the indirect effect from neighborhood context to sexual risk via substance use was significant (B = .11, p = .005, β = .07) whereas the indirect effects through depression (B = .08; p = .09, β = .05) and depression followed by substance use (B = .01, p = .34, β = .01) were not significant. Taken collectively, these results suggest that variability in sexual risk is explained by direct influences of neighborhood context, depression, and substance use, with substance use also serving as a conduit through which additional neighborhood context effects exert influence on sexual risk.

DISCUSSION

Despite burgeoning advocacy for research informed by social-structural approaches to HIV prevention [1-3,59-62], research on neighborhood context and sexual HIV risk is virtually nonexistent for Black heterosexual men. Thus, this study is the first to empirically document the relationship between neighborhood context and sexual risk among urban Black heterosexual men for whom heavy drug use is relatively low . Consistent with the results of Latkin et al.'s[16] research with women and men with histories of heavy drug use, our study found significant direct pathways between men's reports of more negative neighborhood contexts, depression, substance use, and sexual risk, as well as significant indirect pathways between men's reports of more negative neighborhood contexts and sexual risk via substance use. However, in contrast to the Latkin et al. study and counter to our hypotheses, our study found no significant indirect pathways between neighborhood context and sexual risk behavior via depression.

The study's finding of a significant direct relationship between neighborhood context and sexual risk behavior underscores the need for more multilevel effects research to better understand how social-structural factors such as negative neighborhood contexts become "embodied" [63] in Black heterosexual men to increase sexual HIV risk. The question, in short, is how does negative neighborhood context get into the body as HIV infection? Latkin and colleagues have aptly summed up the challenge of neighborhood factors and HIV risk this way: "Abandoned buildings, per se, do not "cause" HIV acquisition"[4]. In a similar vein, our study highlights the critical need for more research on the mechanisms that link neighborhood context and sexual risk behaviors for Black heterosexual men.

As increasing numbers of HIV prevention scholars have asserted[1-3,59-62], social-structural factors such as negative neighborhood context may offer additional understanding of sexual HIV risk in Black communities beyond exclusively individual level factors such as depression. Understanding the mechanisms by which neighborhoods influence sexual risk is challenging, at best however. Low prioritization of sexual risk within the context of more pressing concerns such as negative neighborhood contexts and the impact of Black men's disproportionate incarceration, may be two likely mechanisms that bridge neighborhood context and sexual risk. For example, challenges presented by living in neighborhoods characterized by poverty violence, crime, and drug dealing may trump HIV prevention concerns. Negative neighborhood characteristics are visible, tangible, often severe, and in some cases, immediately life threatening; this is not the case with HIV. Thus, for men who live in negative neighborhood contexts, HIV avoidance may be a lower priority than it is for those who live in more positive neighborhood environments. This is conceptually similar to "bandwidth scarcity"[64,65] economics research with impoverished people that documents that the mental strain of poverty consumes valuable mental resources. Following this logic, risky sexual behaviors do not reflect the inability to have less risky sex, but rather that the social-structural stressors involved with navigating and staying safe in negative neighborhoods may diminish the resources needed to practice safer sex consistently. Further compounding the issue is that the same behaviors – sexual activity and substance use -- that may help people who live in negative neighborhood contexts cope with living in such stressful environments, are the ones associated with increased sexual HIV risk.

As for the role of incarceration, Black men's disproportionate incarceration rates compared with Latino and White men are staggering. In 2008, 1 in 15 Black men ages 18 or older was incarcerated compared with 1 in 36 Latino men, and 1 in 106 White men [66]. AIDS cases among people in state and federal prisons in 2007, the most recent year for which such data exist, were approximately 2.4 times greater than the general U.S. population [67]. Research has documented the "revolving door" that characterizes many Black men's incarceration, return to their neighborhoods and sexual networks, and incarceration[68-70] [71]. This revolving door provides a pathway to increased sexual risk for the sexual partners of incarcerated men, as well as those in the sexual partners' sexual networks [72]. Moreover, because a history of incarceration poses substantial barriers to employment [73], incarceration functions to relegate Black men to the same negative neighborhood and sexually risky contexts that they left before incarceration. Thus the mechanisms that link negative neighborhood contexts and sexual risk likely reflect a complex interplay of social structural, psychosocial, and cognitive factors. These conceptual challenges notwithstanding, the HIV prevalence of 2.1% among Black heterosexuals who live in predominantly Black urban communities characterized by poverty, neighborhood disorder and violence [24] attests that more neighborhood context-informed research and interventions are an HIV prevention imperative for Black communities.

Another important contribution of this study is what it highlights about the effects of negative neighborhood contexts for Black men who for whom heavy drug use is relatively low Substance users such as crack cocaine and injection drug users [9,16] and non-injection use populations such as adolescents [17-19], women [74], and MSM [21,22] have been the focus of the scant empirical literature on neighborhoods and sexual risk. In contrast, this study is the first to highlight the relationship between negative neighborhood context and sexual risk among Black urban heterosexual men for whom heavy drug use is relatively low. Indeed, reported use of harder drugs such as cocaine and injectable drugs was so infrequent in the sample that we focused our analyses only on the substance use that participants did report: alcohol and marijuana. In spite of this, we found that negative neighborhood contexts were linked to sexual risk behavior via substance use. This finding accords with previous research that shows that Blacks are at increased HIV risk even when their drug and sexual risk behaviors are normative [44,75].

Our study also yielded interesting results about the link between depression, substance use and sexual risk. Although numerous studies[35-39], including Latkin et al. 's[16] have documented a direct link between depression and substance use, the direct pathway between these variables was non-significant in our study. Moreover, neither the indirect effect of neighborhood context on substance use via depression, nor the indirect effect of depression on sexual risk via substance use was significant. A possible explanation for this result is that in populations with low rates of substance use, as was the case with the Black heterosexual men in this study, depression is not linked to substance use. Another explanation may lie in the relative importance of psychological and structural factors as predictors of risky behaviors in non-clinical populations. Until now, psychological theory has had considerable influence on behavioral HIV prevention research. Psychologically-informed studies have emphasized individual-level psychological factors, such as depression, as pathways to risky behaviors such as substance use and sexual behaviors. Our findings suggest that for many

low-income Black heterosexual men who are not heavy substance users, social-structural factors such as negative neighborhood context may have a more important effect on risky behaviors than individual-level psychological factors. Overall, our results point to the potential value of more social-structurally informed approaches to HIV prevention research.

There are several limitations to the research. First, because this was a cross-sectional study, causal relationships between variables cannot be determined. Second, bias may have been introduced if participants provided socially desirable responses regarding their sexual behavior or their substance use. Third, our measure of sexual risk was based on condom use with a maximum of 10 sexual partners. Moreover, the sexual risk measure is ordinal (i.e., low, moderate, high), which may reduce its sensitivity compared to continuous measures. These limitations notwithstanding, a strength of our measure is that it reflects the complexity of sexual risk, incorporating both number of partners and frequency of condom use. A fourth limitation is that the neighborhood context measure relied only on individuals' reports of their neighborhoods rather than on multilevel or aggregated data on neighborhood characteristics (e.g., neighborhood poverty) [5]. There is also an implicit bias in self-reported neighborhood context, in that there may be large differences in how people who inhabit the same neighborhood perceive and experience their neighborhoods[4]. At the same time, substantial research indicates that subjective evaluations of structural factors such as socioeconomic status are important predictors of health outcomes [76,77]. Finally, although the results may be generalizable to other low-income Black heterosexual men in urban settings, the generalizability of the findings to middle class or upper middle class men, those who live in rural areas, or other populations of Black men such as Black MSM, remains unknown.

These limitations notwithstanding, the study signals a dire need for innovative, culturally tailored, multilevel interventions for Black heterosexual men. At the individual level, trauma-informed interventions for urban Black men who are victims and perpetrators of urban violence[40,78] and support groups for Black men coping with the adverse effects of racism and other forms of oppression[79], may help inform HIV interventions for Black heterosexual men. At the macro level, structural interventions to address the negative context of the neighborhoods that many Black urban men inhabit are desperately needed. Yet, despite increased advocacy for structural approaches to HIV prevention [1-3,59] structural HIV-related interventions have lagged considerably compared with individual level interventions. Structural interventions such as needle exchange have effectively reduced HIV risk within neighborhoods, but substantial gaps in knowledge exist about how effective other structural interventions focused on structural dynamics (e.g., poverty) or social processes (e.g. collective efficacy) might be in reducing HIV risk at the neighborhood level. This notwithstanding, proponents of structurally informed approaches to HIV prevention have suggested several structural interventions to reduce the impact of negative neighborhood contexts on sexual HIV risk and other syndemics that disproportionately affect Black men[80]. These include: the decriminalization of drug use and possession, the expansion of publicly-funded substance use treatment programs, changes in zoning ordinances to reduce the number of alcohol stores in low-income neighborhoods [3]; poverty-reduction programs[2]; programs to reduce the disproportionate mass incarceration of Black men[2,72]; and programs designed to increase quality education for Black boys and men[81]. To this list, we would also add the need for structural interventions such as those that: end

residential segregation for poor and working-class families; increase affordable housing programs; revitalize neighborhoods characterized by vacant and abandoned properties [82]; implement community-oriented policing best practices[83]; end police "stop-and-frisk" policies; increase full-time employment and job training; and eliminate barriers to employment for men with criminal records. The February 2014 launch of President Obama's *My Brother's Keeper* Initiative[84] designed to provide boys and young men of color with opportunities for success attests to the recognition of a critical need for interventions to improve the lives of boys and young men of color.

CONCLUSIONS

This study focused on the interplay between negative neighborhood context, depression, substance use and Black men's sexual risk behaviors. The results highlight the notion that sexual HIV risk is more complex and multilevel than implied by much previous research, which has generally utilized individual-level social cognitive and psychosocial models to examine sexual HIV risk in Black communities [44,59,85]. The solution to reducing sexual HIV risk in Black communities in general, and Black heterosexual men in particular will likely reside in the design and implementation of innovative and multidisciplinary theory, research and interventions that match the individual and social-structural level complexities of sexual HIV risk.

Acknowledgments

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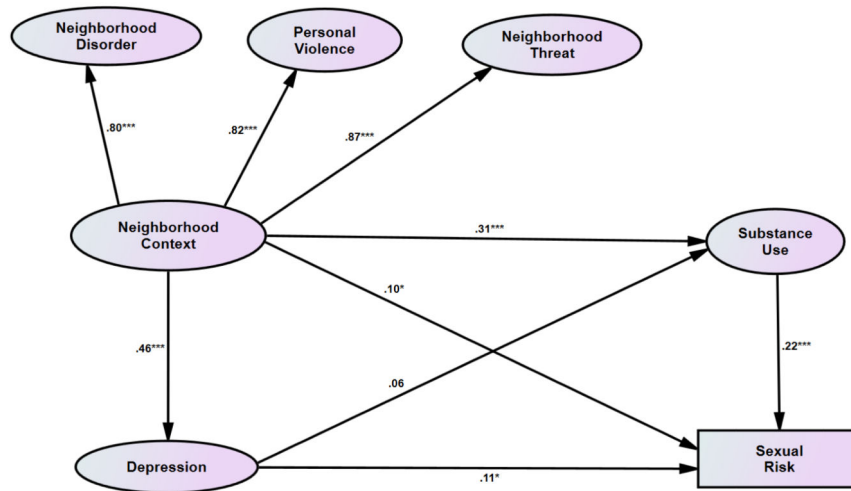
Note. *p < .05, ***p < .001 for structural coefficients (p < .001 for all measurement coefficients)

Figure 1.
Structural Equation Model for Black Heterosexual Men, Depicting Paths and Standardized Estimates among Neighborhood Context, Depression, Substance Use, and Sexual Risk Behavior (N = 526; Measurement Model Component Not Shown)

Table 1

Descriptive Characteristics of Black Heterosexual Men Participants (N = 526)

Demographic Characteristics	N	%
Age (*M* = 28.80, *SD* = 7.57)		
Education		
Some high school	90	17
High school graduate or GED	241	46
Some college	165	31
Bachelors degree	22	18
Graduate degree	8	2
Income		
<$10,000	251	48
$10,000-$19,999	67	13
$20,000-$39,999	101	19
$40,000-$59,999	107	20
Employment status		
Employed	191	36
Unemployed	335	64
Relationship status		
Single (Separated, divorced, widowed)	385	73
Married or domestic partner	141	27

Study Measures	M	SD
Neighborhood Context	2.32	0.56
Neighborhod Disorder	2.50	0.75
Exposure to Violence Toward Others	2.86	0.74
Personal Exposure to Violence	1.59	0.46
Substance Use		
# of days had at least one drink last 30 days	2.96	1.70
# of days, had >5 drinks in a row last 30 days	2.30	1.81
# of times used marijuana last 30 days	2.80	2.00
Depression	1.72	0.63
Sexual Risk Behavior	1.15	0.65

Note: Results presented above were generated using SAS version 9.3.

Table 2

Correlation Matrix of Measurement Model Latent Factors and Sexual Risk (N = 526)

Study Measure	I	II	III	IV
I. Neighborhod Context	1.00			
II. Depression	0 46***	1.00		
III. Substance Use	0.34***	0.20***	1.00	
IV. Sexual Risk	0 23***	0.21***	0.28***	1.00

Note. Correlations were generated in M*plus* 7.11 using a weighted least-squares estimator with a mean and variance adjustment (M*plus* estimator WLSMV).

***
p< .001.

Table 3

Unstandardized Estimates, Standard Errors, and Standardized Estimates for Structural Equation Model of Black Heterosexual Men's Neighborhood Context, Depression, Substance Use, and Sexual Risk Behavior (N = 526)

Outcome Variable	Explanatory Variable	*B*	*SE*	*β*
Measurement Coefficients D1. Little interest or pleasure in doing things	Depression	1.000	—	.747
D2. Bothered by feeling depressed, hopeless	Depression	1.157***	.063	.865
D3. Trouble with sleep	Depression	983***	.061	.734
D4. Feeling tired, having little energy	Depression	988***	.059	.738
D5. Poor appetite or overeating	Depression	900***	.070	.673
D6. Feeling like a failure	Depression	1.058***	.055	.790
D7. Trouble concentrating	Depression	.968***	.057	.723
D8. Moving more slowly or faster than usual	Depression	.954***	.068	.713
D9. Suicidal ideation	Depression	1.007***	.069	.752
ND1. Drugs dealt near home	Disorder	1.000	—	.802
ND2. Intoxicated strangers near home	Disorder	.952***	.034	.763
ND3. Adults argue loudly on street	Disorder	1.024***	.039	.821
ND4. Neighbors complain of crime	Disorder	974***	.043	.781
ND5. "Shooting gallery" near home	Disorder	919***	.055	.737
ND6. Complaints of police harassment	Disorder	.996***	.045	.798
ND7. Gang fights near home	Disorder	.861***	.051	.691
ND8. Cars speed on street	Disorder	873***	.049	.700
PV1. Attacked or beaten	Personal Violence	1.000	—	.719
PV2. Stabbed or shot	Personal Violence	694***	.078	.499
PV3. Arrested or gone to jail	Personal Violence	951***	.080	.684
PV4. Robbed or mugged	Personal Violence	931***	.070	.670
PV5. Been threatened	Personal Violence	1.036***	.097	.746
NT1. Someone you know been stabbed or shot	Neighborhood Threat	1.000	—	.788
NT2. Someone you know questioned by police	Neighborhood Threat	1 109***	.037	.874
NT3. You've been stopped or questioned by police	Neighborhood Threat	.933***	.033	.736
NT4. Someone you know arrested or jailed	Neighborhood Threat	1.109***	.036	.874
NT5. Someone you know robbed or mugged	Neighborhood Threat	1.025***	.041	.808
SU1. Number of days had 1 or more drinks	Substance Use	1.000	—	.875
SU2. Number of days 5 or more drinks	Substance Use	.965***	.084	.844
SU3. Number of times used marijuana	Substance Use	.863***	.075	.755
Neighborhood Disorder	Neighborhood Context	1.000	—	.804
Personal Violence	Neighborhood Context	.917***	.089	.822

Outcome Variable	Explanatory Varialle	*B*	*SE*	*β*
Neighborhood Threat	Neighborhood Context	1.062***	.072	.869
Structural Coefficients Depression[a]	Neighborhood Context	.527***	.060	.455
Substance Use[a]	Neighborhood Context	422***	.075	.311
Substance Use[a]	Depression	.069	.065	.059
Sexual Risk[a]	Neighborhood Context	.160*	.094	.103
Sexual Risk[a]	Depression	.153*	.089	.114
Sexual Risk[a]	Substance Use	.255***	.074	.223

Note. D = Depression; ND = Neighborhood Disorder; PV = Personal Violence; NT = Neighborhood Threat; SU = Substance Use. Estimates and associated statistics were generated in M*plus* 7.11 using a weighted least-squares estimator with a mean and variance adjustment (M*plus* estimator WLSMV). *B*= unstandardized regression coefficient; *SE* = standard error of *B*; *β* = standardized regression coefficient.

*
$p < .05$;

***
$p < .001$.

[a]p-value determined by nested model chi-square difference test. Item thresholds are not listed.