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Housing Instability and HIV Risk-Taking Behaviors among a cohort of Black Men who have sex with Men in Atlanta

By

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Master of Public Health

Epidemiology

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B.A.

The Johns Hopkins University

2014

Thesis Committee Chair: Jeb Jones, PhD, MPH, MS

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Abstract

Housing Instability and HIV Risk-Taking Behaviors among a cohort of Black Men who have sex with Men in Atlanta

By Angelique Harris

Young Black men who have sex with men (YBMSM) are disproportionally affected by HIV incidence in the United States when compared to White MSM despite not engaging in higher rates of HIV sexual risk-taking behaviors. BMSM are also disproportionally affected by homelessness, a structural factor associated with higher HIV prevalence and HIV risk behaviors. However, little is known about how housing insecurity is associated with HIV risk behaviors among YBMSM. Data from the Ele[men]t study, a cohort study among 469 sexually active HIV+ and HIV- YBMSM aged 18 to 30 from Atlanta, was used for this analysis. Housing insecurity was defined as experiencing homelessness in the past 6 months, moving more than once in the past 6 months, and/or reporting feeling very worried about future housing situations. Bivariate analyses were performed to assesses the association between housing insecurity and socio-economic factors, sexual behaviors, and substance use behaviors. Unadjusted and adjusted multivariable logistic regression with predicted margins was used to estimate prevalence ratios for housing insecurity and condomless anal sex, use of water or oil-based lubricant during anal sex, HIV testing within the past 6 months, and current adherence to ART medication. 103 of the YBMSM in our sample experienced housing insecurity in the past 6 months. The prevalence of education level, income level, and having health insurance significantly differed based on housing insecurity status. The multivariable analysis of the association between housing insecurity and condomless anal sex was non-significant with an adjusted prevalence ratio (PR) of 0.99, 95% (CI: 0.88-1.11). Similar non-significant results were observed for use of silicon or water-based lubricant, PR of 0.95, 95% (CI: 0.51-1.76). Among HIV- participants, the association between housing insecurity and HIV testing at least every 6 months was not significant with a PR of 1.11, 95% CI: (0.89-1.40). Lastly, among HIV positive participants, there was not a significant difference for currently taking HIV medication based on housing instability with a PR of 1.03 (95% CI: (0.84-1.25)). These findings suggest that despite the challenges of housing insecurity, it is not associated with HIV sexual risk-taking, prevention, or treatment behaviors among YBMSM in Atlanta.

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Introduction

In the United States, men who have sex with men (MSM) accounted for 70% of new HIV cases in 2016 despite comprising only 2% of the population.[1] In addition, new HIV diagnoses are hyperendemic in Southern states.[2] HIV incidence and prevalence is characterized by a pronounced Black/White racial disparity, and Black MSM (BMSM) account for a disproportionate number of new HIV diagnoses. In 2017, BMSM represented 26% of new HIV diagnoses and 37% of new diagnoses among all MSM in the United States despite African Americans only accounting for 13% of the total US population.[3, 5 13] Even among BMSM, further disparities are seen. Although HIV incidence in this population has been stable, new HIV infections are largely clustered among young BMSM (YBMSM) aged 13-24. YBMSM in this age group have experienced a 38% increase in infection from 2010 to 2016.[3] In addition, nearly two-thirds of all BMSM diagnosed with HIV live in a Southern US state.[1] This trend is apparent in Georgia with the both the state and the metropolitan city Atlanta having a high HIV prevalence and incidence.[2]

Despite these marked disparities, it has been previously established that BMSM do not participate in a higher amount of individual sexual risk-taking behaviors known to increase the risk of HIV seroconversion. A meta-analysis completed by Millett et al found that BMSM reported less unprotected anal sex with main male partners, fewer male sex partners, and more condom usage during anal sex than other MSM.[4] In addition, BMSM were less likely to combine substance use and sexual intercourse and were more likely to report HIV testing in the past year.[4] Findings such as these have led to exploring structural barriers as possible contributors to the disparities affecting BMSM. The same meta-analysis found prominent disparities between BMSM and other MSM in different structural barriers that are associated with either HIV

infection or access to care. Despite finding that access to health insurance was similar between races, BMSM were more likely to not have graduated high school, to have been incarcerated, or to be currently unemployed.[4] Given the paradoxical nature of these findings, it is important to determine if structural disparities, such as lack of stable housing and economic instability, lead to HIV risk-taking behaviors among BMSM who experience these disparities.

In the United States, Black individuals are more likely to experience homelessness than White individuals. The 2018 Annual Homeless Assessment Report to Congress found that African Americans are overrepresented among the homeless population in the United States. Black individuals account for 40% of all people that experience homelessness in the United States.[5] The prevalence of homelessness for gender and sexual minorities in the United States has not been estimated; however, these individuals are at an increased risk of becoming homeless.[6] Different cohort studies have found that the prevalence of homelessness is higher for BMSM then it is for White MSM. In a cohort of 803 HIV+ and HIV- MSM in Atlanta, a significant difference was found in homeless status between Black (14.9%) and White (6.9%) MSM.[12] In addition, in the same cohort among the 562 HIV- participants, 13.5% of the Black participants indicated homelessness compared to 4.7% of the White participants.[11]

Homeless individuals in general experience an HIV prevalence that is three to nine times higher than non-homeless individuals[6], and young homeless sexual minorities are more likely to engage in HIV sexual risk behaviors.[7 8] It is important to determine if housing instability specifically among BMSM is associated with higher HIV risk-taking behaviors and subsequent HIV diagnosis so that targeted interventions can be developed to prevent HIV seroconversion in this population.

A study by Reback et al among a group of homeless substance using MSM found that 65% of the population participated in sexual activities while under the effects of alcohol and/or drugs, 25% engaged in unprotected receptive anal intercourse, and 53% exchanged sex for money and/or drugs.[9] Substance use is more common among homeless individuals than in the general population with 38% and 26% estimated by the Substance Abuse and Mental Health Services Administration to be dependent on alcohol and other drugs, respectively. In addition, substance use can be both the cause and a result of homelessness.[14] The findings by the Substance Abuse and Mental Health Services Administration supports the results found by Reback et al and provides additional evidence that substance use, both drug and alcohol, is an important factor in the relationship between homelessness and HIV sexual risk-taking behaviors among MSM.

In contrast to the hypothesis that homeless BMSM are more likely to participate in HIV sexual risk-taking behaviors, a study by Creasy et al found that in a cohort of BMSM from six U.S. cities, participants who self-reported being homeless were more likely to report HIV testing in the past six months when controlling for sociodemographic and sampling differences.[10] In addition, homeless HIV positive BMSM were as likely as stably housed BMSM to engage in lifetime or current HIV care. However, homeless BMSM were more likely to miss an ART dose and have difficulty adhering to medications.[10] This study assessed only HIV test-taking behaviors and the continuation of care for HIV positive homeless BMSM and does not provide insight into how homelessness may affect sexual risk-taking behaviors such as unprotected anal sexual intercourse.

Previous research has indicated that homelessness is an important structural factor for HIV risk behaviors and subsequent HIV infection among White MSM. However, less is known

about how housing insecurity is associated with HIV sexual risk-taking behaviors among BMSM specifically. Unlike homelessness, housing insecurity is an umbrella term comprised of multidimensional issues related to housing. The Department of Health and Human Services has identified five housing conditions that contribute to housing insecurity: high housing cost, poor housing quality, unstable neighborhoods, overcrowding, and homelessness. [15] A study by Frederick et al, include other housing and structural factors such as recent housing history, current housing tenure, financial status, education and employment, and housing type. [16] A meta-analysis summarized the evidence on the association between housing insecurity, defined by the location, quality, and/or affordability of the housing, and health outcomes in people living with HIV. Across studies, those who had increased housing stability had better medication adherence, utilized health and social services more frequently, and were less likely to participate in HIV risk behaviors. [17] [18]

To address the gap in research on the effects of housing insecurity, we examined the association between housing insecurity and the HIV risk-taking behavior of condomless anal sexual intercourse and sex with proper lubrication in a cohort of HIV-negative and HIV-positive BMSM in Atlanta, GA. In addition, HIV medication adherence and HIV testing regularity was explored to assess if there was a difference in the prevalence of these behaviors based on housing stability status.

Methods

Study Procedure

Data for this study are from the baseline study visit of the Ele[men]t cohort study. Ele[men]t is designed to study the association between substance use and HIV/STI risk among

young black MSM in Atlanta, GA. At baseline, participants completed a questionnaire that collected demographic details as well as information about prior HIV testing, condom use knowledge and skills, substance use, and past sexual partners. Participants were also screened for HIV and Hepatitis C. Participants were recruited from a variety of venues in Atlanta. The recruitment effort was supplemented through targeted advertisements on Facebook and peer referrals. Participants were eligible for the study if they were male at birth and currently identified as male, were between the ages of 18 and 30, reported having anal sex with a man in their lifetime, had any sex with a man in the past 3 months, self-reported race as Black/African American, lived in the Atlanta area with plans to remain for 2 years, was able to complete the survey instruments in English, were willing to provide at least 2 means of contact, were willing to be re-contacted for the return of HIV/STI testing results, and were not currently enrolled in an HIV prevention trial.

Outcome Variables

Condomless Anal Sex

Condomless anal sex was assessed using self-reported data. Participants were initially asked to select the gender/sex of the persons that they had sex with over the last 6 months. Those who indicated that they had male sex partners were then asked to indicate how many of those partners that they had anal or oral sex with. From this number, the participants were then asked to indicate the number of those anal sexual encounters that were not fully protected by a condom. This was clarified to mean that either the participant or the partner did not use a condom at any point during sex or the condom broke or came off. In this analysis, condomless sex was dichotomized as any condomless anal sex with a male partner or no condomless anal sex with a male sex partner.

Sex with Lubrication

Sex with lubrication was assessed using self-reported data. Participants were initially asked how often they used lubrication when they had anal sex in the past 6 months. Lubrication was clarified to include either commercial products, saliva, or any other liquid/gel. Those who answered always or sometimes were then asked what type(s) of lubrication was used during anal sex over the last 6 months. For this analysis, sex with lubrication was dichotomized as those indicating that they used silicon and/or water-based lubrication categorized as using appropriate lubrication and those who used other forms of lubrication or not using it at all as not using lubrication.

Past 6-month HIV Testing

HIV testing regularity was assessed using a combination of self-reported data and biological testing. Participants who reported ever testing for HIV were asked to indicate how frequently they test: every month, every 3 months, every 6 months, once a year or once every 2 years. For the analysis, this variable was dichotomized as participants who indicated testing at least every 6 months categorized as testing regularly for HIV and those who tested less frequently categorized as not testing regularly.

Current HIV Medication Adherence

Current adherence to HIV medication was assessed using self-reported data. Participants who reported a previous HIV diagnosis were asked to report current HIV medication use. The current HIV medication adherence variable was dichotomized for this analysis as those currently taking HIV medications categorized as currently adherent and those who answered no being categorized as non-adherent.

Independent Variable

Housing Insecurity

Housing Insecurity was defined in the analysis as a multidimensional indicator that assessed threats to housing security and stability. The first dimension was homeless status. This variable was assessed using self-reported data. Homelessness was defined as reporting currently living on the street, in a shelter, a single room occupancy hotel (SRO), temporarily staying with friends or relatives, or living in a car. The second dimension was moving frequency in the past 6 months. This variable was assessed using self-reported data. Frequent moving was defined as moving more than 1 time in past 6 months. The third dimension was worrying about housing. The variable was assessed using self-reported data. Worrying about housing was defined as participants that indicated that they worried a lot about their current or future housing situation. An indicator variable for housing insecurity was then developed based on these three different dimensions. If a participant was either homeless over the last 6 months, moved more than once in the last 6 months, or worried a lot about their current or future housing situation they were categorized as being housing insecure.

Covariates

Sociodemographic & Healthcare Factors

Factors that might confound the association between housing insecurity and HIV risk taking behaviors were identified using a directed acyclic graph and literature review. Based on the DAG, we controlled for age (continuous), income (<$20,000/year v $20,000/year or more), education (<high school v greater than high school), previous incarceration (having been incarcerated in the past 6 months vs not having been incarcerated in the past 6 months), chronic

depression (ever diagnosed as depressed vs not ever been diagnosed as depressed), substance use (use of crack, ecstasy, meth, heroin, opioids, poppers, or hallucinogens in the past 6 months vs not using any of these substances in the past 6 months), and alcohol dependency (a score of less than 14 vs 15 or greater on the alcohol dependency score).

Statistical Analysis

First, a bivariate analysis was conducted to assess the differences between socio demographics, health insurance status, and HIV status between YBMSM who were determined to be housing insecure in the past 6 months and those who were not. Data were analyzed using the Chi-square test of association (or Fisher's Exact Test for those with expected values lower than 5) for categorical variables, and t-tests for normally-distributed continuous variables. Logistic regression with predicted margins was used to estimate prevalence ratios for the outcomes of condomless anal sex, lubrication use, and HIV medication adherence. [19] For all participants, a multivariable logistic regression was performed to assess the differences in condomless anal sex with a male in the last 6 months and the use of either silicon or water-based lubricant during anal sex in the last 6 months among YBMSM who were housing insecure compared to those who were not, adjusting for education, income, incarceration status, substance use, and alcohol dependency. In addition, a multivariable logistic regression analysis was performed to assess differences in HIV medication adherence adjusting for education, income, incarceration status, substance use and alcohol dependency among HIV positive YBMSM. Lastly, a multivariable logistic regression analysis was performed to assess difference in HIV testing in the past 6 months among HIV negative YBMSM. Significance for all analysis was set at $\alpha = 0.05$ and analyses were conducted using SAS version 9.4 and SAS-callable SUDAAN.

Results

A total of 469 participants completed a baseline visit. 123 (27.6%) participants self-reported as HIV positive. 334 participants had a higher than high school education (72.1%) and 232 participants had an income greater than $19,999 per year (54.8%). 262 participants had health insurance (59.01%). In addition, 151 participants (32.5%) reported using illegal substances in the past 6 months and 56 participants (10.5%) of the participants who fully completed the self-reported alcohol use disorder identification test had a reported to having dependency on alcohol. 350 of the participants (82.0%) reported engaging in condomless anal sex with a male at least once over the past 6 months. In addition, 86.3% reported using either silicon or water-based lubrication during anal sex. Among the HIV negative participants, 60.6% reported getting tested HIV at least every 6 months. Among the HIV positive participants, 87.0% were currently adhering to their antiretroviral medications.

103 participants were ultimately categorized as housing insecure.57 (57.0%) self-reported being homeless in the past 6 months, 74 (71.8%) indicated worrying about their current or future housing situation, and 30 (58.8%) moved 2 or more times in the past 6 months (Table 1). The prevalence of the demographic factors of education level, income level, and having health insurance differed based on housing insecurity status. In addition, there was a significant difference in HIV status based on housing stability ($p = 0.005$). Moreover, the prevalence of chronic depression ($p < 0.0001$), and substance use, ($p = 0.0065$), was different based on housing instability. There were no differences based on marital status (p-value = 0.6), incarceration status in the past 6 months ($p = 0.85$), or in alcohol dependency ($p = 0.38$). A test of collinearity test showed collinearity between exposure variables and confounders.

In crude models, there was no association between housing insecurity and condomless anal sex [prevalence ratio (PR) = 1.00, 95% CI: 0.90-1.12]. The adjusted model produced similar results

with a [PR = 0.99, 95% CI: 0.88-1.11]. Similar non-significant results were observed for use of silicon or water-based lubricant with a crude [PR = 0.99, 95% CI: 0.56-1.76]. The adjusted model was also non-significant with a [PR = 0.95, 95% CI: 0.51-1.76]. Among HIV negative participants, the crude association between housing insecurity and HIV testing at least every 6 months was not significant with a [PR = 1.08, 95% CI: 0.87-1.34]. The adjusted model remained non-significant with a [PR = 1.11, 95% CI: 0.89-1.40]. Among HIV positive participants, there was not a significant difference for currently taking HIV medication based on housing instability with a crude [PR = 0.99, 95% CI: 0.79-1.24]. The association remained non-significant in the adjusted model with a [PR =1.03, 95% CI: 0.84-1.25].

Discussion

We hypothesized that YBMSM who are housing insecure would be more likely to participate in HIV risk taking behaviors than those who are not housing insecure. The crude estimates of condomless anal sex were not significantly different between YBMSM who were housing insecure in the past 6 months compared to those who were not. After adjusting for sociodemographic and healthcare differences, this association remained the same. These results are inconsistent with the meta-analysis by Aidala et al [18] which found that among people living with HIV/AIDS were more likely to participate in risky sex. However, this meta-analysis was not specifically among MSM and was restricted to those with HIV/AIDS. In contrast to these results, a study by Tuker et al [20] assessed the correlation between social networks and sexual risk behavior among homeless YMSM. They found that homeless YMSM were less likely to engage in unprotected sex and had fewer sexual partners. This was only so among YMSM whose social network included peers who regularly attended school and were not heavy drinkers. This study also found that being older and sleeping outside were predictors of sexual risk behaviors.

The use of water-based and silicon-based lubrication during sex is associated with a lower risk of HIV infection because they prevent condoms from breaking or slipping and are safe to use with all condoms. [21] In addition, lubrication prevents the tearing of tissue in the anus. [22] In our unadjusted analysis on the association between housing insecurity and use of either water-based or silicon lubrication during anal sex we found the estimates of using water-based or silicon lubrication during anal sex were not significantly different between YBMSM who were categorized as being housing insecure compared to those who were not categorized as being housing insecure. After adjusting for sociodemographic and healthcare differences, this association remained the same.

Among HIV negative YBMSM only, we assessed whether housing insecurity was associated with testing for HIV at least every 6 months. In our unadjusted analysis on the association between housing insecurity and regular HIV testing we found the estimates of getting tested for HIV at least every 6 months were not significantly different between YBMSM who were categorized as being housing insecure compared to those who were not categorized as being housing insecure. After adjusting for sociodemographic and healthcare differences, this association remained the same. This is inconsistent with those found from an analysis performed by Creasy et al [10] which found that among BMSM, those who self-reported homelessness were more likely to get tested for HIV in the past 6 months after adjusting for demographical factors and sampling differences. An increased regularity in HIV testing was also observed in a study by Noska et al [23] who found that among veterans in care, those who were unstably housed were more likely to be tested for HIV compared to those who were stably housed.

Among HIV positive YBMSM only, we assessed whether housing insecurity was associated with current adherence to HIV medication. In our unadjusted analysis on the association between

housing insecurity and current adherence to HIV medication we found the estimates of current adherence to HIV medications was not significantly different between YBMSM who were categorized as being housing insecure compared to those who were not categorized as being housing insecure. After adjusting for sociodemographic and healthcare differences, this association remained the same. Creasey et al [10] found that HIV medication uptake was not significant difference in ART between BMSM who were unstably housed compared to those who were stably housed. However, the analysis performed by Creasey et al [10] found that those who reported homelessness, also reported difficulty taking ART and reported missing a dose. This is consistent with the meta-analysis by Aidala et al [18] which found that ART adherence was significantly lower among those who were homeless or unstably housed. Our results imply that like ART uptake, current ART adherence is not significantly different based on housing insecurity status.

Although our multivariate analysis implied no differences in HIV risk taking behaviors, our bivariate analysis indicated that those who were housing insecure were more likely to be HIV positive. In addition, being housing insecure was associated with indicators of lower socioeconomic status including being more likely to have a high school education or lower and earn less than $19,999 a year. Moreover, housing insecure YBMSM, were significantly more likely to have been diagnosed with chronic depression and to have use the one of the substances in the past 6 months. This indicates that although housing insecurity is not directly associated with HIV risk taking behaviors in this population, it is associated with structural, psychosocial, and addiction elements associated with HIV risk taking behaviors. [24]

Strengths

Our study has several strengths. We collected several measures that determine housing stability. Using the data, we were able to develop a housing insecurity variable that both assessed housing insecurity with the inclusion of homelessness and moving frequency as well as asking participants to indicate their level of worry about further housing. In addition, for all of the outcome variables the proportion of missing data was less than 10.0% except for current adherence to HIV medication which was at 12.2%.

Limitations

Despite the strengths of our study, caution should be used when interpreting the results. The data were limited to YBMSM who lived in the urban area of Atlanta, GA which limits the generalizability of the results. In addition, although venue-based sampling and recruitment through online apps were used, the population may not be representative of all YBMSM in Atlanta. In addition, the overall study was not powered to specifically address our research question, and our study population was smaller than the previous studies with significant results. It is possible a difference in effect would be observed if there was more statistical power due to a larger sample size. However, the magnitude of the associations we observed suggests a small association. In addition, although we were able to use three dimensions to define our housing insecurity variable, homelessness, frequent moving, and worrying about future housing, these three variables were chosen due to the ability of data and a literature review. There is currently no standard definition of housing insecurity and without an agreed upon definition on the housing dimensions it is difficult to estimate the both the risk and outcomes of housing instability and to make comparisons across studies. [15]

Implications

Our findings suggest that housing insecure YBMSM are not more likely to participate in HIV risk taking behaviors. These results are consistent with previous research finding that BMSM are not more likely to participant in higher risk taking behaviors despite having higher rates of HIV. [1 2 3 5 13] In addition, homeless individuals are more likely to be HIV positive and is housing status has been found to be predictive nature of HIV sexual risk-taking behaviors among young MSM and of ART non-adherence among all HIV positive homeless individuals. [6 7 8] Moreover, since BMSM are more likely to be homeless, it was expected that this subgroup would participant in as compared to non-housing insecure BMSM. [4] Our results are as well as previous literature are inconsistent with this hypothesis. Although, in our population housing insecure YBMSM were more likely to be HIV positive, there was no difference in HIV risk-taking behaviors when comparing housing insecure YBMSM to stably housed YBMSM. In addition, among HIV negative BMSM and other vulnerable populations, it has been found that homeless is actually predictive of increased regular HIV testing. [10] Our non-significant results provide insight on the differences between homelessness and housing insecurity. Our housing insecurity variable included homeless individuals as well as those who moved frequently and indicated that they worried about their future housing status. This could indicate that these housing stability factors are not predictive of HIV risk taking behaviors and that other dimensions should be explored.

Conclusions

HIV disproportionately affects young, Black MSM more than any other group in the United States. [1 2 3 5 13] Racial disparities in HIV infection rates still persist despite an absence of increased sexual or drug related risk behaviors among this group. [6 7 8] Because of this, it is important to assess how structural factors that disproportionally affect BMSM are associated with participation in HIV risk taking and subsequent HIV infection. This analysis adds to

growing literature that assesses how homelessness and housing instability is associated with HIV risk-taking behaviors. [7] [8] Our results suggest that despite the challenges that result from housing instability, HIV public health interventions targeted towards BMSM may be experiencing success among the most vulnerable of this population to counteract the predicted negative effects. The next direction would be to explore other dimensions of housing insecurity such as neighborhood stability, overcrowding, and housing quality to assess how they, in combination the dimensions explored in this analysis, may be associated with the participation in HIV risk-taking behaviors. These studies would provide valuable information on how to best promote HIV prevention efforts to YBMSM.

Tables

Table 1: Bivariate Analysis of Sociodemographic factors HIV Status, Alcohol & Substance Use, and HIV Risk Taking Behaviors by Housing Insecurity Status among Young Black MSM in the Ele[men]t Study

	Total n (%) (n=469)	Housing Insecure[2] n (%) (n=103)	Not Housing Insecure[2] n (%) (n=360)	p-value[1]
Age m (SD)	24.9 (2.97)	24.74 (2.88)	24.93 (3.00)	0.57
HIV Status				
Positive	123 (27.58%)	39 (38.61%)	84 (24.42%)	0.005
Negative	323 (72.42%)	62 (61.39%)	260 (75.58%)	
Education				
≤ High School/GED	129 (27.86%)	42 (41.18%)	86 (23.89%)	0.0006
> High school	334 (72.14%)	60 (58.82%)	274 (76.11%)	
Income				
$0-19,999	199 (46.17%)	66 (70.97%)	133 (39.35%)	<0.0001
≥$20,000	232 (53.83%)	27 (29.03%)	205 (60.65%)	
Ever Married[7]				
Yes	22 (4.76%)	6 (5.88%)	16 (4.44%)	0.6
No	440 (95.24%)	96 (94.12%)	344 (95.56%)	
Health Insurance[2]				
Yes	262 (59.01%)	42 (42.86%)	220 (63.58%)	0.0002
No	182 (40.99%)	56 (57.14%)	126 (36.42%)	
Substance Use[2 3]				
Yes	151 (32.54)	45 (43.69%)	106 (29.44%)	0.0065
No	313 (67.46%)	58 (56.31%)	254 (70.56%)	
Alcohol Dependency Score[2]				
<15	408 (87.93%)	88 (85.44%)	319 (88.61%)	0.38
≥15	56 (12.07%)	15 (14.56%)	41 (11.39%)	
Incarcerated[2]				

Yes	169 (36.82%)	38 (37.62%)	131 (36.59%)	0.85
No	290 (63.18%)	63 (62.38%)	227 (63.41%)	
Chronic Depression[5]				
Yes	75 (16.16%)	32 (31.07%)	43 (11.94%)	<0.0001
No	389 (83.84%)	71 (68.93%)	317 (88.06%)	
Worried about Housing[2]				
Not at all or A little	212 (45.79)	29 (28.16%)	360 (100.00%)	<0.0001
A lot	251 (54.21%)	74 (71.84%)	0 (0.00%)	
Frequent Moving[2]				
Yes	30 (19.61%)	30 (58.82%)	0 (0.00%)	<0.0001
No	123 (80.39%)	21 (41.18%)	102 (100.00%)	
Homeless[2]				
Yes	57 (12.50%)	57 (57.00%)	0 (0.00%)	<0.0001
No	399 (87.50%)	43 (43.00%)	356 (100.00%)	
Regular HIV Testing[2]				
Yes	192 (60.57%)	38 (64.41%)	154 (59.69%)	0.50
No	125 (39.43%)	21 (35.59%)	104 (40.31%)	
Currently on Medication[2]				
Yes	94 (87.04%)	27 (87.10%)	67 (87.01%)	1.0
No	14 (12.96%)	4 (12.90%)	10 (12.99%)	
Condomless Anal Sex[2 6]				
≥1	350 (81.97%)	78 (82.11%)	272 (81.93%)	0.97
0	77 (18.03%)	17 (17.89%)	60 (18.07%)	
Lubricant Use During Anal Sex[2 4]				
Yes	373 (86.34%)	83 (86.46%)	290 (86.31%)	0.97
No	59 (13.66%)	13 (13.54%)	46 (13.69%)	

1 – chi-square or ttest p-value; 2 – over the last 6 months; 3 – use of either cocaine, crack, ecstasy, meth, heroin, opioids, poppers, or hallucinogens; 4 – use of either silicon or water-based lubrication; 5- chronic depression diagnosed by a physician; 6 – with a male; 7 – yes categorized as legally married, registered domestic partnership or civil union, widowed, divorced, or separated and no categorized as never married

Table 2: Multivariate Analysis Logistic Regression Analysis of the association between Housing Insecurity and Condomless Anal Sex with a Male, Use of Lubricant During Anal Sex, HIV Testing in the past 6 Months, and Current Adherence of HIV Medications among YBMSM in the Ele[men]t Study[1]

Condomless Anal Sex with a Male Over Last 6 Months		
	cPR	aPR
Housing Insecure		
Yes	1.00 (0.90-1.12)	0.99 (0.88-1.11)
No	Reference	Reference

Use of silicon or water-based lubricant during Anal Sex		
	cPR	aPR
Housing Insecure		
Yes	1.00 (0.92-1.10)	1.01 (0.92-1.11)
No	Reference	Reference

HIV Testing Over the Last 6 Months		
	cPR	aPR
Housing Insecure		
Yes	1.08 (0.87-1.34)	1.11 (0.89-1.40)
No	Reference	Reference

Current HIV Medication Adherence		
	cPR	aPR
Housing Insecure		
Yes	0.99 (0.79-1.24)	1.03 (0.84-1.25)
No	Reference	Reference

1 – adjusted for substance use over the past 6 months, chronic depression, income and education level, alcohol dependency, and incarceration of the past 6 months

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