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An evaluation of factors associated with sexual risk taking among Black men who have sex with men: A comparison of younger and older populations

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Abstract

Background—In the United States, rates of human immunodeficiency virus (HIV) infection are highest among Black men who have sex with men (BMSM). Prior research indicates that younger BMSM in particular (*i.e.*, BMSM 29 years of age and younger) are most at risk for HIV infection and that HIV incidence in this subpopulation has risen in recent years. It remains unclear, however, why younger BMSM, relative to BMSM 30 years of age and older, are at increased risk for HIV infection.

Methods—For the current study, we surveyed 450 BMSM located in the Atlanta, GA metropolitan and surrounding areas. We assessed BMSM's depressive symptoms, substance use during sex, psychosocial risk factors (*i.e.*, HIV risk perceptions, condom use self-efficacy, internalized homophobia, and perceived HIV stigmatization), and sexual risk taking (*i.e.*, condomless anal intercourse [CAI]).

Results—We found that younger BMSM (YBMSM) and older BMSM (OBMSM) differed with respect to factors associated with CAI. In multivariable models, alcohol use before or during sex, lower educational attainment, and sexual orientation (*i.e.*, bisexual sexual orientation) were significantly associated with increased CAI for YBMSM, while HIV risk perceptions and internalized homophobia were significantly, negatively associated with CAI among OBMSM.

Discussion—Rates of engaging in CAI were similar across the two age cohorts; however, factors related to CAI varied by these two groups. Findings emphasize the need to consider targeted interventions for different generational cohorts of BMSM.

Keywords

HIV; age; prevention; Black men who have sex with men

Introduction

There is well-documented evidence of both race- and age-based disparities in the prevalence and disease progression of human immunodeficiency virus (HIV) infection among men who have sex with men (MSM) in the United States. In particular, MSM who identify as Black or African-American (BMSM) historically have been, and continue to be, the group most heavily impacted by the HIV epidemic (Prejean *et al.*, 2011; Millett, Peterson, Wolitski, & Stall, 2006). BMSM who are 29 years of age and younger account for 45% of all new HIV infections among BMSM in the United States (CDC, 2014). Along similar lines, nearly half of all new HIV infections among BMSM in the state of Georgia, the location of the present study, were among BMSM 20 to 29 years of age (GDPH, 2015). In the state of Georgia and in the U.S. on the whole, HIV incidence in younger BMSM is the highest of all risk groups and the rate of new HIV diagnoses in this population has continued to steadily increase in recent years (CDC, 2010; GDPH, 2015). Further, young BMSM are least likely of all MSM to be aware of their HIV statuses and to receive necessary HIV care and treatment (CDC, 2015). It is therefore imperative that BMSM – younger BMSM in particular – receive targeted HIV prevention and treatment efforts.

To date, it remains unclear why the rates of HIV transmission are elevated among younger BMSM (*i.e.*, BMSM aged 29 years and younger) relative to older BMSM (*i.e.*, BMSM 30 years of age and older). Prior research in this area has proposed that the high prevalence of HIV infection among younger BMSM may be driven by (a) higher rates of unrecognized HIV infection (MacKellar *et al.*, 2005), (b) higher rates of unrecognized and untreated STIs (Bocour, Renaud, Wong, Udeagu, & Shephard, 2011), (c) differential partner selection patterns between younger and older BMSM, with younger BMSM tending to have sexual partners five or more years older (Millett *et al.*, 2012), or (d) fewer skills, knowledge, or efficacy in negotiating safer sex practices or in carrying out other risk reduction strategies relative to older BMSM (Scott *et al.*, 2014). Previous research, however, has largely overlooked other potentially key risk factors that may differ by age among BMSM, including substance use, depressive symptoms, and other psycho-social risk variables (*e.g.*, internalized homophobia, perceived HIV stigmatization, condom use self-efficacy, and HIV risk perceptions). These potentially key risk factors may be of unrealized importance to a complete understanding of the issue and should be evaluated with respect to their relationships to sexual risk behavior among younger and older BMSM.

There is some evidence that depressive symptomology and substance use may directly impact sexual risk behavior among younger MSM (Perdue, Hagan, Thiede, & Valleroy, 2003) and that younger MSM are more likely to report depressive symptoms and heavy alcohol or drug use than their older counterparts (Salomon *et al.*, 2009). However, to date, no study has compared younger and older BMSM with respect to depressive symptomology and substance use as risk factors for sexual risk taking.

Today, younger MSM have greater access to HIV education and services than what was at one point available for older MSM. It is possible that improved access to services may predispose younger MSM to have HIV risk perceptions lower than that of older MSM (MacKellar *et al.*, 2005). Indeed, there is some evidence that increased HIV risk perceptions

among younger MSM may facilitate sexual risk taking relative their older counterparts (Mansergh & Gary, 1998). Further, due in part to more preventive services available, condom use self-efficacy may be higher, and perceived HIV stigmatization and internalized homophobia may be lower, among younger, relative to older, MSM (Preston, D'Augelli, Kassab, & Starks, 2007). Further, it has been shown that HIV risk perceptions, condom use self-efficacy, and internalized homophobia are all related to sexual risk taking among MSM (Ross, Simon Rosser, & Neumaier, 2008; Vanable, Ostrow, McKirnan, Taywaditep, & Hope, 2000); however, previous research has yet to explore whether younger and older BMSM mirror the findings of the MSM community as a whole, and whether these two groups differ with respect to which factors are associated with their sexual risk taking.

Unfortunately, there has been a dearth of research regarding risk factors specific to the BMSM community, and even less regarding whether there are risk factors unique to specific BMSM age cohorts that can inform the development of targeted interventions for these populations. The results of previous studies do point to comparable rates of sexual risk taking, specifically condomless anal intercourse (CAI) among younger and older BMSM populations (Klein, 2012); however, little is known regarding whether the factors that contribute to HIV risk for the entire BMSM community accurately represent the HIV risks of younger BMSM in particular (Millett *et al.*, 2012).

One conceptual framework that may be used to inform our understanding of the disproportionate rates of HIV among the younger BMSM population that takes into account the multiple correlates of risk is syndemics theory (Singer, 1994). Broadly, the term *syndemic* refers to the clustering of different physiological (*e.g.*, chronic and infectious diseases) and psycho-sociological (*e.g.*, racism, institutionalized poverty, psychological ill-health) epidemics by person, place, or time (Singer *et al.*, 2006). Many BMSM contend with co-occurring physical and mental health concerns that can be described as a syndemic. In the context of BMSM's health, syndemics theory represents a useful framework through which the increased HIV rate among younger BMSM can potentially be explained. Specifically, understanding the unique contextual factors that may lead to greater risk for younger versus older BMSM is an important step towards the development, implementation, evaluation, and translation of well-informed HIV prevention interventions that target these populations (Klein, 2012).

Study Objectives and Hypotheses

The current study had three primary objectives and associated hypotheses. First, depressive symptoms, substance use, and relevant psychosocial risk variables were examined among YBMSM and OBMSM. It was hypothesized that depressive symptomology and substance use would be higher, and HIV-related stigmatization and HIV risk perceptions would be lower, for YBMSM; that internalized homophobia would be higher, and condom use self-efficacy would be lower, for OBMSM. Second, CAI between YBMSM and OBMSM was compared. Rates of CAI were hypothesized to be similar across the two groups. Third, using regression analyses, we analyzed the relationships between the aforementioned variables and CAI among YBMSM and OBMSM. It was hypothesized that depressive symptoms and substance use would be positively associated with, and HIV risk perceptions would be

negatively associated with, CAI among YBMSM; internalized homophobia would be positively associated with, and condom use self-efficacy would be negatively associated with, CAI among OBMSM.

Method

Sampling, Recruitment, and Enrollment

The current study aimed to examine the HIV risk correlates of two generational cohorts of BMSM located in the Atlanta, GA metropolitan and surrounding areas. Consistent with prior research (*e.g.*, Bauermeister, Eaton, Meanley, & Pingel, 2015; MacKellar *et al.*, 2005; Millett *et al.*, 2006; Prejean *et al.*, 2011; Scott *et al.*, 2014; Vial, Starks, & Parsons, 2014) and with age-related HIV prevention priorities set by the CDC (2010), age groups were established for data-analyses. This approach was selected due to the fact that it garners information for tailored intervention development that is specific to BMSM generational cohorts.

Participants were recruited from gay-identified bars, clubs, bathhouses, parks, and street locations; from online classifieds; and on social media (*e.g.*, Facebook, Black Gay Chat, Jack'd) in the Atlanta, GA metropolitan and surrounding areas. Participants were screened in-person using electronic handheld devices and over the phone using telephone screening software. For in-person screening procedures, recruiters approached men as they entered the abovementioned target venues. Men were eligible to participate if they reported CAI in the past year with a man, an HIV negative status, and were at least 18 years of age. Participants were provided with written consent for the study procedures. The study procedures required participants to attend an in-person appointment at the study research site. The appointment included participating in an Audio Computer Assisted Interviewing (ACASI) survey assessment and taking an HIV test (OraQuick ADVANCE Rapid HIV-1/2 Antibody Test). Participants were compensated \$30 for their participation in this study.

A total of six hundred and twenty participants were recruited and surveyed between January of 2012 and March of 2014. Fourteen percent of recruited participants tested HIV positive. These participants were linked to care and were not included in further analyses. Of the remaining 544 participants, we focused only on the 450 MSM who identified as Black or African American. Participants who did not report being Black/African American were removed from all further data analyses. All study procedures were approved by *<blinded for peer review>* Institutional Review Board.

Measures

Socio-demographic characteristics—Participants were asked to report on their age, years of education, employment status, income level, race/ethnicity, and sexual orientation (*i.e.*, whether they identified as same gender loving/gay, bisexual, or heterosexual).

Depressive symptoms—Participants completed the Center for Epidemiological Studies Short Depression Scale (CES-D 10; Irwin, Artin, & Oxman, 1999). The CES-D 10 is a 10-item screening questionnaire that is used to measure depressive symptoms and has been used previously with both HIV-positive and HIV-negative MSM (*e.g.*, Zhang *et al.*,

2012; Li, Li, Wang, & Lau, 2015). Items included: “In the past week, I was bothered by things that usually don’t bother me,” and “In the past week, I felt that everything I did was an effort.” Each of the Likert-type items ranged from 0 = *less than one day* to 3 = *five to seven days*. The CES-D 10 items were reversed coded, if necessary, and summed to form a total CES-D 10 score. The CES-D 10 is not a diagnostic screening tool; rather it is valid measure of assessing depressive symptomology (Björgvinsson *et al.*, 2013). Participants who score above the threshold on the CES-D 10 require further mental health assessment. Internal consistency for the present sample was acceptable, Cronbach’s $\alpha = 0.70$.

Substance use with sexual activity—Two variables were used to assess substance use in the context of sexual activity. Participants reported the number of times they used drugs (for item 1) or alcohol (for item 2) prior to or during sexual activity in the past three months.

HIV stigmatization—HIV stigmatization was measured by six Likert items adapted from the Internalized AIDS-Related Stigma Scale (Kalichman *et al.*, 2009), including: “People living with HIV/AIDS face rejection from their friends” and “I would feel ashamed if I was HIV positive.” Each of the items ranged from 1 = *strongly disagree* to 6 = *strongly agree*. The six items were averaged to comprise one HIV stigmatization variable for data analysis, and higher scores represented greater internalized stigma. Internal consistency for the present sample was acceptable, Cronbach’s $\alpha = 0.75$.

Internalized homophobia—Internalized homophobia was measured using four items adapted from the Internalized Homophobia scale (IHP; Herek, Cogan, Gillis, & Glunt, 1998). The four items included statements such as: “I try not to be attracted to men in general” and “I wish I did not want to have sex with men.” Each of the items ranged from 1 = *strongly disagree* to 6 = *strongly agree*. Items were averaged to comprise one internalized homophobia variable, and higher scores indicated greater internalized homophobia. Internal consistency for the present sample was acceptable, Cronbach’s $\alpha = 0.79$.

Condom use self-efficacy—We used seven items adapted from the Condom Use Self-Efficacy Scale (CUSES) by Brafford and Beck (1991) to assess participants’ condom use self-efficacy during sexual negotiations with a partner (*e.g.*, “I feel confident in my ability to discuss condom usage with any partner I might have” and “I feel confident in my ability to put a condom on myself or my partner”). These seven items were averaged to create a composite condom use self-efficacy variable, and higher scores represented greater condom use self-efficacy. Responses ranged from 1 = *strongly disagree* to 6 = *strongly agree*. Internal consistency for the present sample was acceptable, Cronbach’s $\alpha = .89$.

HIV risk perceptions—Participants were asked five questions (Eaton *et al.* 2007), regarding how much HIV risk they perceived under varying scenarios. Questions included “How risky is anal sex without a condom as the bottom partner with a man you just met who tells you his HIV status is negative?” and “How risky is anal sex without a condom as the bottom partner with a man you just met who tells you his HIV status is negative and that he just recently tested negative?” These five items were averaged to create a HIV risk perceptions variable, and higher scores indicated greater perceived HIV risk associated with

unprotected anal sex acts. Responses ranged from 0 = *no or low risk* to 10 = *very high risk*. Internal consistency was acceptable, Cronbach's $\alpha = 0.76$.

Sex behaviors—Participants were asked to report the total number of times they engaged in CAI with another man in the past three months. For this item, we used an open response set format.

Data Analysis

For the current study, we sought to examine how factors associated with sexual risk taking may vary across age groups. Means and standard deviations or frequencies and percentages were provided for each variable. Odds ratios (ORs) were calculated for identifying age group differences between YBMSM and OBMSM with respect to the abovementioned sociodemographic variables as well as the other independent variables of interest (see Tables 1 and 2). Generalized linear modeling was used to conduct univariate regression analyses to assess the relationships between CAI as the dependent variable and (1) substance use, (2) depressive symptoms, and (3) relevant psychosocial risk variables, including perceived HIV-related stigmatization, HIV risk perceptions, condom use self-efficacy, and internalized homophobia as the independent variables (Table 3). For these analyses risk ratios (RR) were provided. Independent variables with $p < .10$ in bivariate analyses were included in multivariable analyses for YBMSM and OBMSM with CAI as the dependent variable. Multivariable analyses were conducted to establish which variables were uniquely associated with CAI for both YBMSM and OBMSM (Table 3). Analyses controlled for sexual orientation and employment status. Data analyses were completed between December 2014 and April 2015. Less than 5% of data were missing for any given variable. For all analyses, $p < .05$ was used to define statistical significance. PASW Statistics version 22.0 (SPSS Inc., IBM, Somers, NY) was used for all analyses.

Results

Demographics

A total of 450 BMSM living in the Atlanta, GA metropolitan and surrounding areas were included in the present analysis. YBMSM comprised 51.1% of all BMSM in the sample. One hundred and ninety-seven (43.8%) men identified as gay, homosexual, or same gender loving, 173 (38.4) men were bisexual, and the remaining 71 (15.8%) identified as straight or heterosexual. On average, YBMSM were more likely than OBMSM to identify as gay, homosexual, or same gender loving (OR = 0.24, CI: 0.14, 0.43, $p < .001$). YBMSM were also significantly more likely to identify as bisexual than OBMSM (OR = 0.43, CI: 0.24, 0.76, $p < .01$).

One hundred and ninety-five individuals (43.3% of the total sample) were unemployed. The estimated odds of unemployment were 2.19 (CI: 1.52, 3.16, $p < .001$) times as large in OBMSM than in YBMSM ($p < .001$). Furthermore, 414 BMSM (85.5% of the total sample) reported incomes equal to or less than \$10,000; however, there was no significant difference between YBMSM and OBMSM with respect to income level (OR = 1.05, CI: 0.92, 1.19, $p > .05$).

Depressive Symptoms

Of the total sample, 233 (48.1%) men scored 10 or higher on the CES-D. Forty-five percent of YBMSM and 50.8 % OBMSM scored 10 or higher on the CES-D. The two cohorts did not differ significantly with respect to their CES-D scores.

Substance Use

On average, YBMSM drank alcohol before or during sex 5.06 times ($SD = 11.50$) in a three-month period, and OBMSM drank alcohol before or during sex 7.26 times ($SD = 15.31$) during a three-month period. On average, YBMSM used drugs before or during sex 6.71 times ($SD = 23.86$) in a three-month period, and OBMSM used drugs before or during sex 5.89 times ($SD = 14.68$) in a three-month period. OBMSM were trending toward drinking more frequently before or during sex than YBMSM ($OR = 1.02$, $CI: 1.00, 1.03$, $p < .10$) but there were no statistically significant differences between the two groups with respect to drug use.

Psycho-social Variables

Internalized homophobia—The mean score on the IHP scale for the total sample was 3.08 ($SD = 1.53$, range 1 to 6, where 6 reflects greater internalized homophobia) for the total sample (2.78 for YBMSM and 3.37 for OBMSM). OBMSM, on average, reported significantly greater internalized homophobia than did YBMSM ($OR = 1.29$, $CI: 1.15, 1.46$, $p < .001$).

HIV stigmatization—Overall, the mean score on the perceived HIV stigmatization scale was 3.98 ($SD = 1.12$, range 1 to 6, where 6 reflects greater HIV stigmatization). There were no significant differences between OBMSM and YBMSM with respect to perceived HIV stigmatization.

Condom use self-efficacy—The mean score on the CUSES for the total sample was 5.11 ($SD = 1.14$). YBMSM, on average, reported significantly greater condom use self-efficacy than did OBMSM ($OR = 0.70$, $CI: 0.58, 0.83$, $p < .001$).

HIV risk perceptions—The average HIV risk perceptions score for the total sample was 7.40 ($SD = 1.74$). There were no significant differences between the two groups with respect to HIV risk perceptions.

Sexual Risk Taking

Condomless anal intercourse—The mean number of CAI acts in the past three months for the total sample was 5.33 ($SD = 9.44$). There were no significant differences between YBMSM and OBMSM with respect to number of CAI acts in the past three months.

Bivariate and Multivariable Regression Models with CAI as Dependent Variable

The results of the following bivariate and multivariable regressions are organized by age group (*i.e.*, YBMSM and OBMSM) and then by model type (*i.e.*, bivariate and multivariable models; Table 3).

YBMSM bivariate models—In the bivariate regression models, each of the following variables – education, income, sexual orientation, employment status, alcohol use before sex, drug use before sex, CES-D, HIV risk perceptions, condom use self-efficacy, HIV stigmatization, and internalized homophobia – was assessed as an independent variable with CAI as the dependent variable. Education, sexual orientation, alcohol use before or during sex, drug use before or during sex, and HIV stigmatization were significant or trending toward significance and were entered into the multivariable regression model for YBMSM. Income, employment status, CES-D, HIV risk perceptions, condom use self-efficacy, and internalized homophobia were not significant and were thus left out of YBMSM's multivariable model.

YBMSM multivariable model—In the multivariable model predicting number of CAI acts, education and alcohol use before sex each remained statistically significant. For YBMSM, alcohol use before or during sex was significantly, positively related to CAI (OR = 1.03, 95% CI: 1.01, 1.05). Further, education was significantly, negatively associated with CAI (OR = 0.81, CI: 0.69, 0.95, $p < .05$).

OBMSM bivariate models—In the bivariate regression models for OBMSM, each of the independent variables was individually entered into a regression model as an independent variable with CAI as the dependent variable. Sexual orientation, alcohol use before or during sex, HIV risk perceptions, HIV stigmatization, condom use self-efficacy, and internalized homophobia were significant or trending toward significance and were therefore added to the multivariable regression model for OBMSM. Income, employment status, drug use before or during sex, and the CES-D were not significant and thus left out of the multivariable model for OBMSM.

OBMSM multivariable model—In the multivariable regression model with number of CAI acts in the past three months as the outcome variable, HIV risk perceptions and internalized homophobia each remained statistically significant. Results from the multivariable model indicate that, for OBMSM, HIV risk perceptions were significantly, negatively associated with CAI (OR = 0.85, CI: 0.78, 0.93, $p < .001$) as was internalized homophobia (OR = 0.75, CI: 0.68, 0.83, $p < .001$).

Discussion

YBMSM and OBMSM were no different with respect to the average number of times each group had engaged in CAI in the previous three months. In this way, our data is in line with previous research in this area (*e.g.*, Klein, 2012) that suggests that differential rates of sexual risk taking are not responsible for increased HIV prevalence among YBMSM. However, YBMSM and OBMSM each had unique factors associated with their sexual risk taking behavior. For YBMSM, CAI was significantly, positively associated with alcohol use before

or during sex and bisexual identity, and significantly, negatively associated with education. Alternatively, HIV risk perceptions and internalized homophobia were both significantly, negatively associated with CAI for OBMSM. These results highlight the fact that there are differential factors associated with the sexual risk behavior of these two age cohorts of BMSM and that these differences should inform the development of sexual risk reduction interventions for BMSM.

Our findings related to alcohol use before or during sexual activity among YBMSM are in line with and expand on prior research. Work by Newcomb, Clerkin, and Mustanski (2011) suggests that the significant positive associations between alcohol use before or during sex and CAI among younger MSM in particular may be due to the higher levels of sensation seeking behaviors associated with their younger age; however, this work has not specifically focused on Black MSM. It is possible that sensation seeking is what drives YBMSM's alcohol use before sex as well as their engagement in sexual risk taking, *e.g.*, CAI. Interventions targeting YBMSM should specifically address sexual decision making in the context of substance use.

OBMSM who perceived less HIV-related risk were more likely to engage in CAI, but the same was not true for YBMSM. Previous research suggests that the association between CAI and HIV risk appraisals is moderated by individuals' knowledge of HIV transmission and prevention (Newcomb & Mustanski, 2014). It is possible that OBMSM have greater HIV knowledge, or that their knowledge of HIV and the effects of HIV are characteristically different than the HIV knowledge of YBMSM. It is also possible that YBMSM grew up after the advent of new technologies and treatments for HIV (*e.g.*, highly active antiretroviral therapy, or HAART) and thus are more optimistic about treatment options for HIV because they have not experienced a time where the disease progression of HIV was much faster and more serious. Along similar lines, a longitudinal study by Pickett (2003) found that individuals who engaged in CAI were likely to justify their behavior by citing new treatment options as reason for why they did not use condoms.

In the present study, internalized homophobia was significantly, negatively associated with CAI among OBMSM. Interestingly, previous research has found the opposite to be true; specifically, that greater internalized homophobia is associated with *higher* rates of sexual risk taking (Meyer & Dean, 1995). However, a study by Preston, *et al.* (2007) found that the effects of internalized homophobia on sexual risk taking are mediated by mental health, such that respondents' low self-esteem and low internalized homophobia were associated with increased sexual risk taking. The findings of Preston *et al.*'s study are particularly relevant to the present study's results, given that a high percentage of our sample scored above the threshold on the CES-D – 48.1% for the overall sample and 50.8% for OBMSM – it is, therefore, possible that the potentially high prevalence of mental health concerns in this sample mediates the significant, negative association between internalized homophobia and sexual risk taking.

Limitations

The present paper offers important findings on the unique risk factors associated with CAI among YBMSM and OBMSM populations testing HIV negative. As such, the focus of the

current study was on identifying novel information for intervention development for HIV prevention; however, understanding factors associated with CAI among HIV positive BMSM is also a critical component in slowing the HIV epidemic. Understanding and evaluating the forms of HIV prevention strategies from the perspective of BMSM living with HIV is important and should be evaluated in future work.

Findings from the current study need to be interpreted in light of the following points. In our analysis, for intervention development and interpretation purposes, the dependent variable was dichotomized, thus removing variance related to this variable and potentially capitalizing on chance differences. Analytic techniques that treat age as a moderating variable could provide additional information on the effects of age on the relationship between known risk factors and sexual risk taking, and future research is warranted.

Additional limitations include the correlation nature of the study, and therefore, significant relationships are associative in nature and no causal relationships can be determined. In the future, longitudinal data analysis of the causal relationships between these variables is recommended. Further, all BMSM lived in the Atlanta, GA metropolitan and surrounding areas, limiting the generalizability of the results. Moreover, the dependent variable consisted of a single measure of sexual risk taking, *i.e.*, CAI. There are, however, other approaches to measuring risk, including the use of composite scores from multiple areas of sexual risk taking (*e.g.*, condomless vaginal sex, sexual positioning, and use of biomedical HIV prevention). It possible that our focus on a singular, although widely used, measure of sexual risk biased our results, and future studies should incorporate a broader perspective. Finally, it is not known to what extent social desirability may have affected the responses received from the participants.

Conclusion

The present study revealed that there are unique sets of HIV risks that YBMSM and OBMSM face with respect to sexual risk behavior. As a result, HIV risk reduction interventions that reach BMSM should include content tailored to the needs of the specific age cohorts of BMSM in order to be most effective. While HIV risk reduction interventions do exist that are targeted toward BMSM (*e.g.*, Harawa *et al.*, 2013) there are too few, and none exist for YBMSM in particular. Given the paucity of interventions available that target BMSM populations (Johnson *et al.*, 2009), this study is an important step towards filling an unmet need.

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Table 1
Demographic characteristics of 450 BMSM residing in Atlanta, GA with age group as the dependent variable.

Independent Variables	YBMSM		OBMSM		OR (95% CI)
	M	SD	M	SD	
<i>Age</i>	24.027	3.024	43.896	8.410	N/A
<i>Education</i>	1.954	0.961	1.857	1.198	0.87 (0.75, 1.05)
<i>Income</i>	1.913	1.294	2.035	1.518	1.05 (0.92, 1.19)
	N	%	N	%	
<i>Sexual Orientation</i>					
Gay/homosexual/same gender loving	118	54.1	79	35.4	0.24*** (0.14, 0.43)
Bisexual	80	36.7	93	41.7	
Straight/heterosexual	20	9.2	51	22.9	0.43*** (0.24, 0.76)
					Referent
<i>Employment Status</i>					
Unemployed	73	33.3	122	52.8	2.19*** (1.52, 3.16)
Working, on disability, student, or other	146	66.7	109	47.2	Referent

Note.

** $p < .01$,

*** $p < .001$.

Men who identified as straight/heterosexual were included in the analysis if they reported at least one instance of engaging in male-to-male sexual contact ($N=1$ participant was excluded for identifying as straight/heterosexual and reporting no male-to-male sexual contact.)

Table 2

Descriptives and odds ratios of the independent variables with age group as the dependent variable.

Independent Variables (<i>Dependent variable = age</i>)	YBMSM		OBMSM		OR (95% CI)
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	
Mental Health					
Depressive symptoms	9.97	6.32	10.67	6.41	1.02 (0.99, 1.05)
Substance Use					
Alcohol use before or during sex	5.06	11.50	7.26	15.31	1.02 ^a (1.00, 1.03)
Drug use before or during sex	6.71	23.86	5.89	14.68	1.00 (0.99, 1.01)
Psycho-social Variables					
HIV risk perceptions	7.50	1.56	7.35	1.82	0.93 (0.84, 1.03)
Condom use self-efficacy	5.34	0.98	4.90	1.24	0.70 *** (0.58, 0.83)
HIV stigmatization	4.03	1.08	3.97	1.14	0.97 (0.83, 1.14)
Internalized homophobia	2.78	1.49	3.37	1.52	1.29 *** (1.15, 1.46)
Sexual Risk Taking					
Condomless anal intercourse, mean number of acts	5.88	12.21	5.44	13.73	1.00 (0.98, 1.02)

Note.

^a $p < .10$,

*** $p < .001$.

Table 3

Risk ratios from the univariate and multivariable negative binomial regression models for YBMSM and OBMSM with CAI as the dependent variable.

Independent Variables	Condomless Anal Sex YBMSM		Condomless Anal Sex OBMSM	
	<i>Univariate Model</i>	<i>Multivariable Model</i>	<i>Univariate Model</i>	<i>Multivariable Model</i>
	RR (95% CI)	RR (95% CI)	RR (95% CI)	RR (95% CI)
Sociodemographic Variables				
Education	0.69 *** (0.60, 0.80)	0.81 * (0.69, 0.95)	0.91 (0.81, 1.03)	N/A
Income	1.02 (0.92, 1.13)	N/A	0.97 (0.89, 1.07)	N/A
Sexual orientation				
- Gay/homosexual/same gender loving	1.73 * (1.02, 2.94)	1.56 (0.88, 2.79)	1.43 ^a (0.99, 2.06)	1.21 (0.80, 1.85)
- Bisexual	2.26 ** (1.31, 3.90)	2.02 * (1.15, 3.54)	1.21 (0.85, 1.72)	0.91 (0.62, 1.34)
- Straight/heterosexual	Referent	Referent	Referent	Referent
Employment status				
- Unemployed	0.92 (0.69, 1.24)	N/A	1.03 (0.79, 1.35)	N/A
- Working, on disability, student, or other	Referent	Referent	Referent	Referent
Mental Health				
Depressive symptoms	1.02 (0.99, 1.04)	N/A	1.01 (0.99, 1.03)	N/A
Substance Use				
Alcohol use before or during sex	1.04 *** (1.02, 1.06)	1.03 ** (1.01, 1.05)	1.02 * (1.00, 1.03)	1.00 (0.99, 1.02)
Drug use before or during sex	1.02 *** (1.01, 1.03)	1.01 (1.00, 1.01)	1.01 (0.99, 1.02)	N/A
Psycho-social Variables				
HIV risk perceptions	0.93 (0.85, 1.02)	N/A	0.76 *** (0.72, 0.83)	0.85 *** (0.78, 0.93)
Condom use self-efficacy	1.04 (0.89, 1.21)	N/A	0.75 *** (0.67, 0.84)	0.94 (0.83, 1.07)
HIV stigmatization	0.89 ^a (0.78, 1.02)	0.97 (0.84, 1.12)	1.18 ** (1.05, 1.34)	1.11 (0.96, 1.29)
Internalized homophobia	1.06 (0.96, 1.16)	N/A	0.76 *** (0.69, 0.84)	0.75 *** (0.68, 0.83)

Note.

^a $p < .10$,

* $p < .05$,

** $p < .01$,

*** $p < .001$.