

## Differences in Substance Use, Psychosocial Characteristics and HIV-Related Sexual Risk Behavior Between Black Men Who Have Sex with Men Only (BMSMO) and Black Men Who Have Sex with Men and Women (BMSMW) in Six US Cities

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**ABSTRACT** *We assessed associations in substance use, psychosocial characteristics, and HIV-related sexual risk behaviors, comparing characteristics of Black men who only have sex with other men only (BMSMO; n=839) to Black men who have sex with men and women (BMSMW; n=590). The study analyzed baseline data from the HIV Prevention Trials Network Brothers Study (HPTN 061), a feasibility study of a multi-component intervention for Black MSM in six US cities. Bivariate analyses compared BMSMO to BMSMW along demographics, substance use, psychosocial characteristics, and HIV-related sexual risk behaviors. Logistic regression models then assessed multivariable associations between being BMSMW and the odds of engaging in HIV-related sexual risk behaviors. Adjusted analyses revealed that BMSMW remained more likely to have unprotected anal intercourse while under the influence of alcohol (AOR: 1.45; 95 % CI:1.11–1.90) and were more likely to receive money/drugs for sex (AOR: 2.11; 95 % CI:1.48–3.03), compared to BMSMO. Substance use is an important factor to be considered when developing risk-reduction interventions for BMSMW. Structural interventions that address factors that may contribute to exchange sex among these men are also warranted.*

**KEYWORDS** *HIV, Black MSM, Substance use, Mental health, Homophobia, Sexual risk, Sexual minorities*

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### INTRODUCTION

Within the context of HIV-prevention programs, Black men who have sex with men (Black MSM) still account for one quarter of new HIV infections in the United States (US) annually.<sup>1,2</sup> Black MSM have disproportionate HIV-infection rates and disease burden with more than twice as many cases of HIV/AIDS compared to White or Latino MSM.<sup>2–4</sup> Yet, Black MSM are no more likely to engage in HIV-risk behaviors than non-Black MSM.<sup>5,6</sup> Thus, HIV-risk behaviors alone do not account for the

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disproportionate number of HIV infections in this group. Efforts to focus HIV prevention solely on the reduction of risk behaviors will not likely stem the high rate of new infections in this population.<sup>7,8</sup> Extant literature suggests that structural factors exist, which contribute to the ongoing high HIV-infection rates among Black MSM.<sup>6,9,10</sup>

Black MSM (including the subgroup of Black MSM who also has sex with women (MSMW)) have double minority status based on their race and sexuality.<sup>11</sup> Minority stress may be a potent structural factor (i.e., a large social factor contributing to under/unemployment, psychological, and socio-legal problems.<sup>9,12,13</sup>) for Black MSM that also contributes to ongoing increases in HIV infections. Based on the work of Meyer et al.,<sup>14</sup> the theory of minority stress holds that stigma, prejudice, and discrimination based partially within frames of racism and heterosexism, create a hostile and stressful social environment that contributes to psychological (e.g., depression, anxiety) vulnerability, and increases sexual risk among ethnic minorities who are also sexual minorities.<sup>15,16</sup> Correspondingly, several studies report higher levels of stress, depressive symptoms, and sexual/drug-related risk behaviors among Black MSM who experience relatively high levels of homophobia<sup>12,17</sup> and that indicators of “syndemics” (multiple psychological vulnerabilities) are common among Black MSM.<sup>9</sup>

There is also evidence that suggests substance use is a significant factor that increases risk for engaging in unprotected anal intercourse (UAI) among MSM.<sup>17-21</sup> A growing number of studies specifically focus on correlates of substance use (including alcohol) and HIV-risk behavior among Black MSM.<sup>8,22,23</sup> Few studies have examined substance use correlates of HIV-related sexual risk behaviors that distinguish Black MSM and Black MSMW,<sup>24,25</sup> though in HIV-infected Black MSM and Black MSMW, the drug most likely to be used is crack cocaine.<sup>17,26,27</sup>

What is less understood among these men are the psychosocial characteristics and factors by which HIV, substance use, and sexual risks may differ for Black MSM who have sex only with other men (BMSMO) and Black MSM who have sex with women also (BMSMW). These characteristics may describe important vulnerabilities by which BMSMW may face unique challenges that contribute to engaging in sexual risks that place both their male and female partners at greater risk for HIV.<sup>9</sup> While BMSMW have lower HIV prevalence compared to BMSMO, they often report elevated levels of compound, interconnected factors (e.g., internalized homophobia, cocaine use) that correspond with increased risk and frequency of potential exposure to HIV, which places their male and female partners at increased risk, as well.<sup>17,28,29</sup> To best understand how to reduce disproportionate infection among BMSMW and to prevent transmission from these men to their male and female partners, research is needed to compare BMSMO and BMSMW on substance use, psychosocial factors, and behaviors that correspond with HIV risk. Therefore, there is a need to utilize existing data to develop an understanding of risk in order to tailor interventions for BMSMW.

This study addresses this gap by describing differences in substance use, psychosocial characteristics, and self-reported HIV-related sexual risk behaviors between BMSMO and BMSMW enrolled in a study from six US cities to determine the feasibility of a multi-component intervention to prevent HIV infection. Based on prior work,<sup>30</sup> we hypothesized that self-reported crack/cocaine and alcohol use, as well as high internalized homophobia would be more prevalent among BMSMW compared to BMSMO, while reported methamphetamine use would be more prevalent among BMSMO than BMSMW. Data from a large survey in Los Angeles showed MSMW to have higher ratings of depression symptoms and lower levels of social support, leading

us to further predict that more BMSMW would report clinical depression symptoms and low levels of social support, compared to BMSMO.<sup>31</sup> Based on research suggesting that BMSMW engage in sero-adaptive behaviors,<sup>31</sup> we hypothesized that more BMSMW would report engaging in insertive sexual behaviors than BMSMO. Considering that these characteristics can potentially interact with one another, we hypothesized that after controlling for sociodemographic and structural factors, BMSMW compared to BMSMO would report more engagement in sex while under the influence of drugs and/or alcohol.

## **METHODS**

### **Study Design**

Baseline data used in this secondary analysis were collected from the HIV Prevention Trials Network (HPTN) 061 Study, also known as the BROTHERS (Broadening the Reach of Testing, Health Education, Resources and Services) Project. HPTN 061 was a 2-year study (July 2009–December 2011) to determine the feasibility and acceptability of a multi-component intervention to reduce HIV infection among Black MSM in the US. The study was conducted in six cities including Atlanta, Boston, Los Angeles, New York City, San Francisco, and Washington, DC. The institutional review boards at the participating institutions approved the study. Black MSM were recruited directly from the community or as sexual network partners referred by index participants. Index participants were defined as community-recruited men who were newly identified with HIV infection, previously diagnosed HIV infection, not receiving HIV care, or HIV-negative. Community recruitment methods were developed at each site and included community outreach, engagement of key informants, and local community-based groups, advertising, and use of online strategies including the placement of banner ads, text ads, chat room outreach, and social networking sites.

Men were eligible to participate in the study if they self-identified as a man or male at birth; identified as Black, African-American, Caribbean Black, or multiethnic Black; were at least 18 years old; reported at least one instance of UAI with a man in the 6 months prior to assessment; resided in the metropolitan area and did not plan to move away during the time of study participation; and provided informed consent for the study. Men were ineligible if they were enrolled in any other HIV-interventional research study or an HIV-vaccine trial or were a community-recruited participant in a category that had already reached its enrollment cap. Pre-screening was performed either in person or over the telephone to determine eligibility.

At the enrollment visit, eligibility was confirmed and written informed consent obtained. Participants provided locator information as well as demographic information to an interviewer and then completed a behavioral assessment using audio computer-assisted self-interview (ACASI) technology. Following completion of the ACASI assessment, a social and sexual network questionnaire was completed with an interviewer. A rapid HIV antibody test was conducted and reactive rapid test results were confirmed by Western blot testing. Additional testing was performed retrospectively at the HPTN Network Laboratory, which included testing for acute HIV infection at study enrollment. Participants who were confirmed to be HIV infected were referred to medical and social services. All participants received HIV/STI prevention risk-reduction counseling.

## Measures

*BMSMO/BMSMW.* BMSMO were defined as reporting no biological female partners and at least one biological male partner in the 6 months prior to enrollment, whereas BMSMW were defined as reporting at least one biological female partner and at least one male partner in the 6 months prior to enrollment.

*Substance Use.* A screening question asked participants whether they had used marijuana, crack cocaine, powder cocaine, or methamphetamine in the past 6 months. Individual items then asked participants to report the frequency of use (e.g., daily use) of specific drugs used. Those who answered “No” to the screener, who denied drug use in the past 6 months were coded “0 = None” on the frequency variable for each type of drug. Participants who answered “Yes” to the screener were then asked, “How many days did you use ‘x’ ‘drug’ in the past 6 months?” Response categories were, “1 = Daily,” “2 = Several times a week,” “3 = Weekly,” “4 = Several times a month,” “5 = Monthly,” “6 = A few times,” and “7 = Once.” These categories then were collapsed to create a 3-level variable reflecting frequency of substance use. The categories were “0 = None,” 1 = Rarely or Occasionally (several times a month, monthly, a few times, or once) and 2 = Frequently (daily, several times a week, or weekly).

Participants were also asked “In the last 6 months, how many drinks containing alcohol did you have on a typical day when you were drinking?” Response categories were, “1=1 or 2,” “2=3 or 4,” “3=4 or 5,” “4=5 or 6,” “5=7, 8 or 9,” “6=10 or more.” These categories were then collapsed to create a dichotomous variable reflecting participants who drank five or more drinks vs. those who drank less than five drinks.<sup>32</sup>

## PSYCHOSOCIAL CHARACTERISTICS

*Internalized Homophobia.* A 7-item, 5-point Likert-type scale from 1 (Strongly Disagree) to 5 (Strongly Agree), adapted from Herek et al. (1998) was used to measure internalized homophobia.<sup>33</sup> Sample items included: “I have tried to stop being attracted to men,” “If someone offered me the chance to be completely heterosexual, I would accept the chance,” “I wish I weren’t attracted to men,” “I feel that being attracted to men is a personal shortcoming for me,” “I feel bad about being attracted to men because my community looks down on men who are attracted to other men,” and “I would like to get professional help to change my sexual orientation.” The mean was calculated for participants who answered at least five of the six items in the scale. In the present study, the alpha coefficient showed high internal consistency ( $\alpha=0.91$ ).

*Depression Symptoms.* We used the Center for Epidemiologic Studies Depression Scale (CES-D)<sup>34</sup> to measure symptoms of depression. The sum of all the scores was computed for participants who answered all 20 questions on the CES-D according to author instructions. A score of 16 or higher was considered to denote moderate depression symptoms. The Cronbach’s alpha coefficient indicated high internal consistency ( $\alpha=0.94$ ).

*Social Support.* We measured emotional/affectionate social support, utilizing a scale adapted from the Medical Outcomes Study Social Support Scale.<sup>35</sup> This was a 6-item Likert-type scale ranging from 0 (None of the time) to 5 (Most or all of the time). Sample items in the scale include the following questions: “How often is there someone

available to whom you can count on to listen to when you need to talk?”, “How often is there someone available to you to give you good advice about a problem?”, and “How often is there someone available to you who show you love and affection?” Scores were summed for participants who answered all six questions. A participant is categorized as having low social support (sum score  $\leq 13$ ), moderate support ( $13 < \text{sum score} \leq 21$ ), or high support (sum score  $> 21$ ). The Cronbach’s alpha coefficient indicated high internal consistency ( $\alpha = 0.88$ ).

## OUTCOME MEASURES

*HIV-related Sexual Risk Behavior Variables.* We assessed HIV-related sexual risk behavioral items including any drug use 2 h before or during last UAI. The “any drug use” score proximal to UAI was derived if any of the substances included in the substance use measures were used within 2 h of last UAI. Participants also indicated alcohol use 2 h before or during last UAI. Finally, participants were asked about their involvement with exchange sex. Two items asked participants whether they received or gave money, drugs, other goods, or a place to stay the last time they had UAI. Each question was coded as a dichotomous (Yes/No) outcome, indicating whether participants engaged in this sexual risk behavior. Sociodemographic variables included age, education, income, employment status, housing stability, incarceration history, and study site.

## STATISTICAL ANALYSES

Frequency distributions of participant characteristics, substance use, internalized homophobia, depression, social support, and HIV-related sexual risk behavior were tabulated for BSMO and BSMW, respectively. For categorical variables, chi-square tests were used to compare differences in characteristics between BSMO and BSMW, whereas for continuous variables, Wilcoxon rank sum tests were used to compare differences. Univariate and multivariate logistic regression models then were used to assess associations between being BSMO/BSMW with increased risk for each of the following HIV-related sexual risk behaviors: (1) using drugs within 2 h of last UAI, (2) using alcohol within 2 h of last UAI, (3) receiving drugs or money for sex, and (4) giving drugs or money for sex. Multivariate analysis controlled for demographics, past incarceration, depression symptoms, social support, and study site. All analyses were conducted using SAS 9.2.<sup>36</sup>

## RESULTS

A total of 1,553 men were enrolled in HPTN 061 and data from 1,429 participants were utilized in the current analysis. The current analysis excluded 84 men (5.4 %) who self-identified as female, transgender, transsexual, and tranny and 40 men (2.6 %) who reported that their partners were transgender. Characteristics of the 1,429 participants are summarized in Table 1.

Mean age of the sample was 39 years with a range of 26 to 47 years of age (Table 1). Compared to BSMO, BSMW were significantly older, less educated, had lower incomes, were more likely to be unemployed, less stably housed, and more likely to have been incarcerated prior to enrollment.

**TABLE 1** Baseline participant characteristics among BMSMO and BMSMW

Variables	BMSMO (N=839)	BMSMW (N=590)	<i>p</i> Value
Age	35.0 (24.0, 45.0)	44.0 (34.0, 49.0)	0.0000
Education			
High school or less	360/839 (42.9 %)	372/589 (63.2 %)	<0.0001
College or higher	479/839 (57.1 %)	217/589 (36.8 %)	
Income			
Less than 20,000	443/828 (53.5 %)	393/589 (66.7 %)	<0.0001
20,000–39,999	194/828 (23.4 %)	137/589 (23.3 %)	
40,000–59,999	97/828 (11.7 %)	41/589 (7.0 %)	
Over 60,000	94/828 (11.4 %)	18/589 (3.1 %)	
Employment status			
Working currently	314/838 (37.5 %)	140/590 (23.7 %)	<0.0001
Not working currently	524/838 (62.5 %)	450/590 (76.3 %)	
House stability			
Stable	758/839 (90.3 %)	469/590 (79.5 %)	<0.0001
Unstable	81/839 (9.7 %)	121/590 (20.5 %)	
Past incarceration (lifetime)			
No	428/828 (51.7 %)	156/578 (27.0 %)	<0.0001
Yes	400/828 (48.3 %)	422/578 (73.0 %)	
City			
New York	163/839 (19.4 %)	128/590 (21.7 %)	<0.0001
Washington, DC	171/839 (20.4 %)	35/590 (5.9 %)	
Boston	95/839 (11.3 %)	124/590 (21.0 %)	
Los Angeles	172/839 (20.5 %)	89/590 (15.1 %)	
San Francisco	90/839 (10.7 %)	92/590 (15.6 %)	
Georgia	148/839 (17.6 %)	122/590 (20.7 %)	

### Substance Use

Table 2 illustrates the substance use, psychosocial characteristics, and HIV-related sexual risk behaviors comparing BMSMO and BMSMW. As predicted, significantly more BMSMW reported the frequent use of marijuana (38.3 vs. 26.6,  $p < 0.0001$ ), and occasional use of crack cocaine (21.1 vs. 12.1 %,  $p < 0.0001$ ) and powder cocaine (17.4 vs. 11.1 %,  $p = 0.0009$ ) than BMSMO. By contrast, approximately 10 % of both BMSMO and BMSMW reported use of methamphetamine. More BMSMW reported having more than five drinks on one occasion (22.7 vs. 16.1 %,  $p = 0.016$ ) than BMSMO.

### Psychosocial Characteristics

As hypothesized, BMSMW had higher average internalized homophobia scores compared to BMSMO. Significantly higher percentages of BMSMW reported lower social support (30 vs. 17 %,  $p < 0.0001$ ), and higher depression symptoms (48 vs. 40 %,  $p = 0.002$ ) than BMSMO.

### HIV-related Sexual Risk Behavior

Comparing the two groups of men, BMSMW were significantly less likely to report having a primary male partner than were BMSMO (37.9 vs. 54.2 %,  $p < 0.001$ ) and

**TABLE 2 Comparisons of substance use, psychosocial characteristics, and HIV-related sexual risk between BMSMO and BMSMW**

Characteristics	BMSMO (N=839)	BMSMW (N=590)	<i>p</i> Value <sup>a</sup>
Substance use (in the past 6 months) <sup>b</sup>			
How often did you use marijuana			
None	399/822 (48.5 %)	215/572 (37.6 %)	<0.0001
Rarely or occasionally	204/822 (24.8 %)	138/572 (24.1 %)	
Frequently	219/822 (26.6 %)	219/572 (38.3 %)	
How often did you use crack cocaine			
None	657/799 (82.2 %)	341/555 (61.4 %)	<0.0001
Rarely or occasionally	97/799 (12.1 %)	117/555 (21.1 %)	
Frequently	45/799 (5.6 %)	97/555 (17.5 %)	
How often did you use powder cocaine (coke)			
None	670/790 (84.8 %)	423/551 (76.8 %)	0.0009
Rarely or occasionally	88/790 (11.1 %)	96/551 (17.4 %)	
Frequently	32/790 (4.1 %)	32/551 (5.8 %)	
How often did you use methamphetamine			
None	712/795 (89.6 %)	489/536 (91.2 %)	0.5644
Rarely or occasionally	63/795 (7.9 %)	37/536 (6.9 %)	
Frequently	20/795 (2.5 %)	10/536 (1.9 %)	
Number of alcohol drinks per drinking day			
<5	695/828 (83.9 %)	449/581 (77.3 %)	0.0016
5+	133/828 (16.1 %)	132/581 (22.7 %)	
Psychosocial characteristics			
Internalized homophobia mean score (scale) <sup>2</sup>	1.8 (1.0, 2.7)	2.7 (2.0, 3.2)	<0.0001
CES-D (dichotomized)			
0 ≤ Scale ≤15	479/798 (60.0 %)	273/530 (51.5 %)	0.0022
16 ≥ Scale	319/798 (40.0 %)	257/530 (48.5 %)	
Social support scale (categorized) <sup>c</sup>			
Low	135/813 (16.6 %)	168/552 (30.4 %)	<0.0001
Moderate	259/813 (31.9 %)	192/552 (34.8 %)	
High	419/813 (51.5 %)	192/552 (34.8 %)	
HIV-related Sexual risk behaviors (past 6 months)			
Number of male partners <sup>d</sup>	3.0 (2.0, 6.0)	3.0 (2.0, 5.0)	0.0045
Having a primary male partner			
No	382/834 (45.8 %)	362/583 (62.1 %)	<0.0001
Yes	452/834 (54.2 %)	221/583 (37.9 %)	
Having IAI with any male partner			
No	153/835 (18.3 %)	43/587 (7.3 %)	<0.0001
Yes	682/835 (81.7 %)	544/587 (92.7 %)	
Having UIAI with any male partner			
No	230/833 (27.6 %)	108/586 (18.4 %)	<0.0001
Yes	603/833 (72.4 %)	478/586 (81.6 %)	
Having RAI with any male partner			
No	219/834 (26.3 %)	356/584 (61.0 %)	<0.0001
Yes	615/834 (73.7 %)	228/584 (39.0 %)	
Having URAI with any male partner			
No	298/834 (35.7 %)	396/582 (68.0 %)	<0.0001
Yes	536/834 (64.3 %)	186/582 (32.0 %)	



**TABLE 2 (continued)**

Characteristics	BMSMO (N=839)	BMSMW (N=590)	<i>p</i> Value <sup>a</sup>
Used marijuana within 2 h of UAI			
No	571/820 (69.6 %)	343/573 (59.9 %)	0.0002
Yes	249/820 (30.4 %)	230/573 (40.1 %)	
Used crack cocaine within 2 h of UAI			
No	705/800 (88.1 %)	396/554 (71.5 %)	<0.0001
Yes	95/800 (11.9 %)	158/554 (28.5 %)	
Used powder cocaine (coke) within 2 h of UAI			
No	727/790 (92.0 %)	473/550 (86.0 %)	0.0004
Yes	63/790 (8.0 %)	77/550 (14.0 %)	
Used methamphetamine within 2 h of UAI			
No	738/795 (92.8 %)	506/536 (94.4 %)	0.2549
Yes	57/795 (7.2 %)	30/536 (5.6 %)	
Used any substance (marijuana, cocaine, coke and meth) within 2 h of UAI			
No	495/815 (60.7 %)	248/566 (43.8 %)	<0.0001
Yes	320/815 (39.3 %)	318/566 (56.2 %)	
Used alcohol within 2 h of UAI			
No	452/829 (54.5 %)	276/586 (47.1 %)	<0.0001
Yes	377/829 (45.5 %)	310/586 (52.9 %)	
HIV status			
Unknown	33/839 (3.9 %)	10/590 (1.7 %)	<0.0001
HIV–	585/839 (69.7 %)	496/590 (84.1 %)	
HIV+	218/839 (26.0 %)	84/590 (14.2 %)	
HIV+, Acute	3/839 (0.4 %)	0/590 (0.0 %)	

<sup>a</sup>Chi-square test *p* values are reported, unless noted otherwise

<sup>b</sup>Substance use frequency categories were "0 = None," 1 = rarely or occasionally (several times a month, monthly, a few times, or once) and 2 = frequently (daily, several times a week, or weekly)

<sup>c</sup>Social support categories were defined as follows: low social support: Sum score ≤13, moderate support: 13 < Sum score ≤21, high support: Sum score >21

<sup>d</sup>Median (Q1, Q3) and Wilcoxon Rank Sum test *p* value reported

were also significantly less likely to report engaging in unprotected receptive anal intercourse (URAI) with any male partner compared to BMSMO (32 vs. 64.3,  $p < 0.001$ ). Supporting our hypothesis, significantly more BMSMW reported insertive anal intercourse with any male partner (92.7 vs. 81.7,  $p < 0.001$ ) and for that sex to be unprotected (81.6 vs. 72.4,  $p < 0.001$ ) than BMSMO. Significantly more BMSMW reported using marijuana (40.1 vs. 30.4 %,  $p = 0.0002$ ), crack cocaine (28.5 vs. 11.9 %,  $p < 0.0001$ ) and powder cocaine (14.0 vs. 8.0 %,  $p = 0.0004$ ) within 2 h of UAI, compared to BMSMO. More BMSMW also reported drinking alcohol within 2 h of unprotected anal intercourse (UAI; (52.9 vs. 45.5 %,  $p = 0.0059$ )) and to have used any drugs within 2 h of unprotected intercourse (UAI; (56.2 vs. 39.3 %,  $p < 0.0001$ )) compared to BMSMO.

**Multivariate Analysis** The results for the crude and adjusted analyses for the HIV-related sexual risk behavior outcomes are presented in Table 3. Being a BMSMW was associated with all four potential risk behaviors in the crude analysis. After controlling for demographics, housing status, incarceration history, internalized homophobia, depression symptoms, social support and city, the associations were attenuated but remained for two of the four outcomes. Specifically, being a BMSMW was significantly



associated with increased risk of engaging in recent UAI while under the influence of alcohol (AOR: 1.45, 95 % CI: 1.11–1.90), and receiving money or goods during recent UAI (AOR: 2.11, 95 % CI: 1.48–3.03). No differences between the two groups of men were found in the odds of either giving money or goods for sex during recent UAI or using drugs within 2 h of UAI in the adjusted analysis.

## DISCUSSION

Consistent with our prediction, BMSMW reported significantly higher rates of substance use (except methamphetamine use) than BSMO, which may suggest substance use is an attempt at coping in an effort to blunt emotional distress related to engaging in sex with other men. More BMSMW reported more depression symptoms and lower social support levels, which when taken in context of higher scores of internalized homophobia, suggests these men face differentially greater psychosocial burden compared to BSMO. After adjusting for covariates, we found that BMSMW remained more likely than BSMO to engage in unprotected anal intercourse while under the influence of alcohol and that BMSMW were more likely to receive money or drugs for sex.

Our results support findings from recent studies that suggest a high burden of substance use within the BMSM community at risk for HIV transmission.<sup>13,37–39</sup> These results further suggest that HIV-prevention interventions should attend to meaningful behavioral differences within the BMSM community, paying special attention to BMSMW who may be substantially more likely to engage in high-risk sex with both male and female partners, particularly concomitant with alcohol use. Demonstrating differential vulnerabilities for BMSMW, findings showed that these men were more likely to report exchange sex and depressive symptoms, poverty, unemployment, unstable housing and incarceration, compared to BSMO—all of which describe contexts that are conducive to increased HIV-risk behaviors and potentially, HIV transmission.

Consistent with other research, our study found that fewer BMSMW were HIV infected compared to BSMO.<sup>17,28,29</sup> This could reflect the comparatively lowered risks for HIV transmission per sexual event as BMSMW have sex with some high-risk men and low-risk heterosexual women, while BSMO engage in sex with other men, exclusively.<sup>40</sup> Specifically, female partners for BMSMW have lower HIV prevalence than that of male partners, which may explain the comparatively lower HIV prevalence for this group.<sup>40</sup> Additionally, it may be that BMSMW employ a range of activities short of disclosing their behaviors to their female partners, to reduce risks for potential HIV transmission, including sero-adaptive sexual behaviors on the parts of these men. Specifically, our findings that BMSMW reporting significantly more unprotected insertive anal intercourse (UIAI) compared to BSMO could be conceptualized as a behavioral attempt at reducing risks for HIV acquisition during anal sex with men short of using condoms 100 % of the time. This type of behavior, while controversial due to its focus on harm minimization, has been documented in other samples of MSM.<sup>31,41</sup> Another explanation for differences in HIV prevalence between BSMO and BMSMW is the higher transmissibility of HIV from URAI. In our sample, BMSMW reported more insertive intercourse compared to BSMO, which has lower per-contact risk and may ultimately explain this difference. While less likely to be HIV infected than BSMO, BMSMW experience more factors associated with HIV that include, substance use proximal to risky sexual behaviors, internalized homophobia, depression, and poor social supports, which further indicates the role of background prevalence in sexual partners.

**TABLE 3 Unadjusted and adjusted models of recent HIV-related sexual risk behaviors comparing BMSMO and BMSMW**

	Number (%)	UOR (95 % CI)	AOR (95 % CI) <sup>a</sup>
Drug use within 2 h of last unprotected anal intercourse			
BMSMO	168 (20 %)	Ref.	Ref.
BMSMW	204 (35 %)	2.15 (1.69–2.74)	1.31 (0.98–1.75)
Alcohol use at last unprotected anal intercourse			
BMSMO	212 (26 %)	Ref.	Ref.
BMSMW	245 (43 %)	2.15 (1.71–2.69)	1.45 (1.11–1.90)
Giving money or drugs at last unprotected anal intercourse			
BMSMO	51 (6 %)	Ref.	Ref.
BMSMW	57 (10 %)	1.68 (1.14–2.50)	1.10 (0.70–1.73)
Receiving money or drugs at last unprotected anal intercourse			
BMSMO	67 (8 %)	Ref.	Ref.
BMSMW	143 (25 %)	3.72 (2.72–5.09)	2.11 (1.48–3.03)

<sup>a</sup>Models adjusted for age, education, income, working status, housing stability, incarceration history, depression, and city

Given the disproportionate and increasing burden of HIV/AIDS shouldered by Black MSM in the US, BMSMO and BMSMW (and the female sexual partners of BMSMW) may represent distinct subgroups that need specific focus and attention from a prevention perspective. Our findings show that BMSMW report being the insertive partner when having sex with other men, a sexual risk practice that may mitigate some infection risk, even in the presence of alcohol and drug use proximal to sex with other men. Future studies should examine sero-adaptive behaviors among BMSMW with both their male and female partners to provide insight into these phenomena.

There are several limitations to the current study. One is that the study was limited to six US cities, which decreases our ability to generalize findings to the Black community in general and Black MSM more specifically. Because of eligibility criteria for the HPTN 061 study, the cohort was at higher risk than a more generalized sample that would include Black MSM who did not report unprotected sex at enrollment. Although ACASI may minimize social desirability bias, ACASI data are nonetheless based on self-report and social desirability bias may persist and potentially differ between BMSMO and BMSMW. Additionally, the possibility of spurious associations due to misclassification bias cannot be ruled out. For this analysis, the men were categorized as either BMSMO or BMSMW based on self-report of the genders of sexual partners during the 6 months prior to study enrollment. Therefore, it is possible that some men classified as BMSMO may actually have had female partners, and men classified as BMSMW may have had sex only with men outside of the 6 month period of recall. While the possibility of misclassification cannot be discounted, data outside the 6-month recall period is unavailable. As such, the study highlights the differences in substance use and psychosocial factors among men who were categorized according to their self-reported sexual behavior and partnership types during a recent specific time period. Longitudinal studies are warranted to document sexual behavior and partnership types over a longer period of time. Finally, this analysis uses cross-sectional baseline data; therefore, the findings highlight associations and do not establish causality.

Despite these limitations, the findings have strong implications for research on BMSMO and BMSMW. Of specific interest is to understanding the potential ways in which BMSMW may be bridges for HIV transmission to Black women, who make up 64 % of women living with HIV, nationally<sup>1</sup> but comprise only about 12 % of the US female population.<sup>42</sup> Of these women, 85 % of cases are reported to be from heterosexual contact with infected male partners.<sup>1</sup> Many Black women with HIV report being unaware of their personal transmission risks because they do not identify as being a member of a behavioral-risk group for HIV (i.e., they are heterosexual women, often with one partner), representing a hard to reach population for HIV prevention.<sup>28</sup>

Findings from this study highlight the need to address substance use and psychosocial issues that affect BMSMW and highlight factors that may be associated with HIV risk including internalized homophobia and substance use during sexual encounters. Interventions should therefore, address the multiple, overlapping stressors for BMSMW in efforts to reduce risk to their male and female partners. Assessing other aspects of risk, including sex under the influence, unprotected sex, and sex trade with women, may yield information that could help in tailoring interventions to reduce risk for men and both their male and female partners. Interventions that focus on structural and economic barriers faced by BMSMW, including unstable housing, poverty and unemployment, and incarceration, are likely needed to help reduce the burden of HIV in BMSMW and their sexual partners.

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