Examining the Sexual Health Consequences of Alcohol Consumption Among Black Gay and Bisexual Men

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Background: Black men who have sex with men (MSM) are disproportionately affected by HIV infection. Efforts are needed to understand correlates of HIV risk among this group. Alcohol consumption may have a role in HIV transmission given its association with condomless sex. This study aimed to examine the association between alcohol consumption (i.e., drinking before/during sex and levels of alcohol use problems) and condom use during lifetime, past 6 months, and the event (i.e., a specific sexual episode) level.

Methods: Black MSM ($N = 102$) reported sexual behavior and condom use for lifetime, past 6 months, and the most recent condom and condomless sex events. The Alcohol Use Disorders Identification Test (AUDIT) determined alcohol use problems.

Results: Ordinal and binary regression analyses analyzed associations between AUDIT scores and condomless sex (receptive and insertive). AUDIT scores were associated with a greater likelihood of condomless sex (lifetime receptive sex: OR = 1.06, $p < 0.05$; past 6 months insertive sex: odds ratio [OR] = 1.09, $p < 0.01$). At the event level, there was no greater likelihood of drinking during last condomless sex as compared to last condom sex, $\chi^2(1) = 0.18$, $p = 0.39$.

Conclusions: There was evidence that an increase in alcohol use problems was associated with a greater likelihood of risky sexual behavior. Drinking before/during sex was not related to condom use. These findings contribute to understanding the nuanced relationship between alcohol use and sexual risk.

Key Words: Black Men Who Have Sex with Men, HIV, Sexual Risk, Condom Use.

GAY AND BISEXUAL men experience disproportionate rates of HIV/AIDS morbidity and mortality, accounting for 70% of new HIV infections in the United States (Centers for Disease Control and Prevention, 2017). Among men who have sex with men (MSM), black MSM are disparately affected accounting for 36% of new infections, followed by Hispanic/Latino (17%) and white (15%) MSM (Centers for Disease Control and Prevention, 2017). Despite the overall stability of HIV incidence among MSM, high HIV prevalence among black MSM persists. If current trends continue, it is projected that 1 in 2 black MSM will be diagnosed with HIV in their lifetime (Buchbinder and Liu, 2016; Centers for Disease Control and Prevention, 2017).

Alcohol use may have a role in HIV incidence given that it impairs judgment (Steele and Josephs, 1990), potentially reducing the likelihood of condom use during sex. The impaired judgment characteristic of alcohol use is not unique to MSM, nor is there consistent evidence suggesting greater alcohol use among MSM as compared to heterosexual men (Bux, 1996; Centers for Disease Control and Prevention, 2013; Cochran et al., 2000; Drabble et al., 2005; National Institute on Alcohol Abuse and Alcoholism, 2004, Trocki et al., 2005). However, given black MSM are more than twice as likely as white MSM to encounter a partner living with HIV (Rosenberg et al., 2012), alcohol-induced lapses in judgment regarding condom use have particular implications for the sexual health of such men. These findings highlight the need to examine the pathways by which alcohol exacerbates and facilitates HIV risk behavior among men who carry a disproportionate burden of risk, black MSM.

Although there is support for the role of alcohol in decreasing the likelihood of condom use during sex, studies of this relationship yield inconsistent results. Leigh (2002) conducted a meta-analysis of non-MSM-specific studies examining the relationship between alcohol use and condom use, and found that drinking was unrelated to condom use at the event level. Event-level assessments strengthen casual inferences by asking about drinking and condom use that occur on the same occasion (Leigh, 2002). Vosburgh and colleagues (2012) reviewed the literature on the association between substance use and sexual behavior among MSM. Binge drinking was consistently associated with sexual risk behavior, and of the 10 studies that assessed nonbinge alcohol use, 6 found no association with sexual risk behavior and 3 studies found only a bivariate association. Only 1 study demonstrated a significant multivariate association in which

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alcohol use before sex was actually protective when controlling for drug use before sex.

Conversely, several MSM-specific studies demonstrate a significant association between alcohol consumption and condom use. In an online survey of 2,916 mixed HIV serostatus gay and bisexual men, alcohol consumption was associated with noncondom use during anal sex (Hirschfield et al., 2004). Colfax and colleagues (2004) examined 4,295 HIV-negative MSM and found that heavy drinking (i.e., defined as 6 or more alcoholic drinks in a day) over the past 6 months predicted noncondom use during serodiscordant anal sex. Among HIV-negative MSM with diagnosed alcohol dependence, drinking has been associated with decreased condom use, particularly during receptive anal sex (Irwin and Morgenster, 2005). Additionally, drinking before sex has been associated with HIV-positive MSM engaging in anal sex without condoms and with unknown serostatus partners (Purcell et al., 2005). Among black men specifically, Wilton (2008) found that alcohol use before or during sex was predictive of several HIV risk behaviors in a sample of 481 mixed HIV serostatus black gay and bisexual men. In a study of alcohol problems, Reisner and colleagues (2010) found that black MSM who reported condomless sex with a serodiscordant casual male partner during their last sexual encounter were 3 times more likely to have a drinking problem than those who did not report engaging in condomless sex with a serodiscordant casual male partner.

This inconsistency in outcomes of the relationship between alcohol use and sexual behavior may result from varied assessment methodologies. Additional methodologies to event-level assessments (Leigh, 2002; Vosburgh et al., 2012) include global assessments that measure general patterns of behavior, as well as time-limited assessments that measure specific patterns of behavior within a given period of time (e.g., past 6 months). Examining behavioral patterns globally (i.e., overall), within a specific time period (e.g., past 6 months) and at the event level (i.e., a specific event) within the same sample, may allow for a more nuanced understanding of the relationship between alcohol consumption and condom use as decision making may vary across time (Bryan et al., 2007).

Summary

Black MSM are disproportionately affected by HIV infection, and understanding HIV prevalence in this population requires exploration of factors that may be contributing to this epidemic (Buchbinder and Liu, 2016; Centers for Disease Control and Prevention, 2017). Alcohol use in the context of sexual behavior is associated with HIV risk as alcohol use impairs judgment during sexual intercourse, potentially reducing the likelihood of condom use (Allen et al., 2015). While it does not appear that black MSM experience a disparity in alcohol use in comparison with other MSM or black men broadly, they may be disparately affected by the deleterious results of such use (Substance Abuse and Mental Health Services Administration, 2011, 2013). The potential for HIV risk behavior resulting from alcohol use during sex may be conceptualized as one such consequence.

The role of alcohol in the lives of MSM is complex and presents multiple pathways by which alcohol may affect HIV transmission, morbidity, and mortality. However, the role of alcohol use in increasing the likelihood of noncondom use during sex is inconsistent, illuminating the need for more thorough exploration of this relationship among black MSM. Therefore, the purpose of this study was to advance our understanding of the relationship between alcohol consumption and condom use in black MSM. This involved investigating the association between drinking before/during sex and condom use globally (i.e., general patterns of behavior), during the past 6 months and during the most recent sex events, as well as examining the relationship between alcohol use problems and condom use. The information learned from this research can inform the development of needed HIV/AIDS interventions for black MSM to reduce HIV incidence in this population.

MATERIALS AND METHODS

Participants

A community resident sample of 116 black men was recruited using fliers, print advertisements, snowball sampling, and in-person recruitment at community-based organizations targeting the black gay community in a major West Coast city. To be eligible, respondents had to: (i) be at least 18 years old; (ii) identify as black/African American; (iii) identify as a man/male; (iv) report at least 1 episode of condomless sex with a man in the 6 months prior to enrollment; and (v) report regular alcohol consumption (more than once per month) in the 6 months prior to enrollment. Exclusionary criteria included the following: (i) reporting regular use of illicit drugs (more than once per month) in the past 6 months, other than marijuana; (ii) breath alcohol content (BrAC) >0 during laboratory visit; and (iii) urine toxicology screening positive for illicit drugs during laboratory visit, not including marijuana. Consistent with other alcohol studies, marijuana was allowed for generalizability purposes (Ray et al., 2015).

Procedure

Individuals interested in the study completed an initial screening online, over the telephone, or both during which their eligibility was determined. After this initial brief assessment, eligible individuals were invited to the study location and provided written informed consent to participate in the study. To ensure sobriety during the testing session, participants' BrAC was measured using a Breathalyzer (Dräger, Telford, PA) and they completed a Medimpex United, Inc. (Bensalem, PA) dip stick multidrug urine toxicology screening. Participants then completed a battery of self-report measures, described below. The battery took approximately 90 minutes to complete, with the total visit taking approximately 2 hours. Participants were compensated for their time. All methods and procedures were approved by an Institutional Review Board.

Measures

Demographic variables assessed included age, race, income, education, employment status, relationship status, sexual orientation, and self-reported HIV status.

Alcohol Use. Measuring alcohol use involved 2 methods: (i) assessing alcohol use in the context of sex; and (ii) assessing alcohol use problems. To assess alcohol use in the context of sex, participants were asked about their frequency of alcohol use 2 hours prior to or during sex globally (i.e., general pattern of behavior) and during the past 6 months, and responded using the following options: *all the time, most of the time, occasionally, rarely,* and *never*. Participants also responded *yes* or *no* to drinking 2 hours prior to or during their most recent condom and most recent condomless sexual events (Table 1).

The Alcohol Use Disorders Identification Test (AUDIT) examined participant's level of alcohol use problems (Babor et al., 2001). The 10-item AUDIT assessed alcohol consumption, drinking behaviors, and alcohol-related problems. Each item (e.g., *How often you have failed to do what was normally expected of you because of drinking?*) ranged in score from 0 (e.g., *never*) to 4 (e.g., *daily*). Total scores reflected level of risk related to alcohol, while scores of 8 or greater indicated hazardous or problem drinking. Total AUDIT scores were used to assess relationships between levels of alcohol use problems and condomless sex for global and past 6 months.

Measuring alcohol use in these 2 different ways allowed for examination of the relationship between alcohol use in the context of sex and sexual behavior outcomes, as well as the ways in which alcohol use problems were associated with sexual behavior outcomes. While the AUDIT does provide a cutoff to screen for problem drinking, the intention of this methodology was not to determine sexual risk behavior among those with problem drinking versus nonproblem drinkers. Rather, the intention was to explore whether there was a linear relationship between endorsing alcohol use problems and the likelihood of sexual risk behaviors (i.e., condomless sex). Such examination demonstrated the potential sexual risk conferred by alcohol use, even among those below the threshold for "problem drinking" yet who endorsed alcohol use problems.

Sexual Behavior. Participants were asked about their sexual behavior globally, during the past 6 months and during the most recent condom and condomless sex events. For global assessment, participants were asked about their sexual behavior without respect to a given time period (e.g., *How often do you use condoms?*). Similar items assessed sexual behavior in the past 6 months (e.g., *During the past 6 months, how often did you use condoms?*). Event-level items examined sexual behavior during their most recent sexual episodes with condoms (e.g., *The last time you used a condom during sex, were you drinking alcohol?*) and without condoms (e.g., *The last time you did not use a condom during sex, were you drinking alcohol?*). Such an assessment of sexual behavior along these 3 levels has been used previously in the measurement of high-risk sexual behavior and allows for greater understanding of the nuance of sexual patterns across time (Bryan et al., 2007). Participants were asked about the frequency of condom use, alcohol use, and drug use 2 hours prior to or during sex across the 3 levels. Response options for each item included the following: *all the time, most of the time, occasionally, rarely*, and *never*. Although exclusion criteria included regular (i.e., more than once a month) use of illicit drugs other than marijuana in the past 6 months, the assessment of drug use in the context of sex allowed for a thorough assessment of participants' global behavior and included assessing the use of marijuana before/during sex. Given the differential risk associated with sexual position during sex with men (Patel et al., 2014), items assessed participants' sexual behavior as both the insertive and receptive partner. These assessment methodologies were adapted from large-scale epidemiological studies of MSM and black MSM (HIV Prevention Trials Network, 2014). Given the relatively low HIV risk associated with oral sex (Patel et al., 2014), such behavior was not assessed. Additional descriptions of measures by level of analysis are presented in Table 1.

Statistical Analysis Plan

Descriptive and frequency statistics provided an understanding of the demographic characteristics of the sample, and Spearman's correlations examined associations between predictors and outcomes. Chi-square and *t*-tests examined differences in the endorsement of several outcomes by sexual position (i.e., receptive and insertive sex). Ordinal logistic regression tested the odds of engaging in condomless sex given participants' alcohol consumption and alcohol use problems (i.e., AUDIT total score) for global and past 6 months. Additionally, to test event-level associations binary logistic regression analyzed the odds of drinking during last condomless sex compared to last condom sex. Due to the low frequency of participants endorsing using condoms *never*, the *rarely* and *never* categories of condom use variables were combined into 1 category (i.e., *rarely/never*).

Age and years of education demonstrated significant bivariate associations with condom use and therefore were analyzed as covariates in the main analyses. Additionally, illicit drug use before/during sex for global, past 6 months and the most recent event was analyzed as a covariate for corresponding global, past 6 months and event condom use variables. Age and years of education were not significant in any of the models. Illicit drug use significantly predicted past 6 months condomless receptive sex in all analyses. Unadjusted odds ratios (UOR), that did not include any covariates, were also examined. For all significant UOR, adjusted odds ratios (AOR) are also presented. For nonsignificant findings, only UOR are presented.

Table 1. Methodology for Assessing Alcohol Use and Condomless Sex Across Levels

	Assessment		
Variable	Global	Past 6 months	Event
Condomless sex	Frequency of condom use, assessed for both insertive and receptive sex (*all the time—rarely/never*)	Frequency of condom use in past 6 months, assessed for both insertive and receptive sex (*all the time—rarely/never*)	Assessment of last condom sex and last condomless sex
Drinking 2 hours before and/or during sex	Frequency of drinking before/during sex, assessed for both insertive and receptive sex (*all the time—rarely/never*)	Frequency of drinking before/during sex in the past 6 months, assessed for insertive and receptive (*all the time—rarely/never*)	Drinking during last condom and last condomless sex (*Yes/no*)
Levels of alcohol use problems	Alcohol Use Disorders Identification Test (AUDIT) total score	AUDIT total score	NA

RESULTS

Sample

A community resident sample of 116 black MSM was recruited for this study. Of the 116 participants, 14 were removed from final data analyses: 5 due to concerns over data validity and 9 who tested positive from drugs other than marijuana during the study visit. This resulted in a final sample of 102 participants.

Demographics

Participants ranged in age from 20 to 63, with an average age of 35.2. The majority of participants were single (61.8%), employed at least part-time (61.4%), and had an annual income <$40,000 (75.5%), with a high school diploma, its equivalent or less (52.9%). Nearly one-third (27.7%) of participants reported being HIV-positive (full demographic characteristics found in Table 2). The mean AUDIT score was 9.3 (SD = 7.3), with half (52%) of the men scoring 8 or higher on the AUDIT, indicating hazardous or problem drinking. In addition to alcohol, the substance most endorsed by the sample was marijuana (67.6%) with very few participants endorsing other illicit drug use in the past month (7.8%).

The majority (66.6%) of participants reported drinking alcohol 2 hours prior to or during sex *occasionally* (i.e., 50% of the time) or less. Additionally, slightly more than half of the participants reported using condoms *most of the time* or *all the time* during receptive (53.3%) and insertive (53.5%) sex. For global sexual behavior, the majority of men (86.3%) endorsed both receptive and insertive sex, while few men reported exclusively receptive sex (2%) or insertive sex (10.8%). Similarly, almost half (46.1%) reported both receptive and insertive sex during the past 6 months, while fewer men reported receptive (12.7%) or insertive (31.4%) sex only. There were no significant differences in drinking behaviors or condom use for those reporting receptive and/or insertive sex globally or during the past 6 months. Similarly, no differences were found when comparing global to past 6 months sexual behavior, although during the past 6 months, men reported significantly more sexual partners as the insertive partner (3.81) than as the receptive partner (1.68), $t(101) = -4.02$, $p < 0.01$ (Table 3).

Table 2. Demographic Characteristics ($N = 102$)

Variable	*M* (SD)/*n* (%)
Age	35.2 (10.1)
Sexual orientation	
Gay/homosexual/same-gender-loving	77 (75.5%)
Bisexual	23 (22.5%)
Other	2 (2%)
In a committed relationship	
No	63 (61.8%)
Yes	39 (38.2%)
Education	
≤High school diploma/equivalent	54 (52.9%)
>High school diploma/equivalent	47 (46.1%)
Employment status	
Employed	62 (61.4%)
Unemployed	39 (38.6%)
Income	
≤$39,999	75 (75.7%)
≥ $40,000	24 (24.2%)
HIV status (self-report)	
Unknown	5 (5%)
Negative	68 (67.3%)
Positive	28 (27.7%)
Illicit drug use (past month)	
No	94 (92.2%)
Yes	8 (7.8%)

Bivariate Associations

Spearman's correlations were conducted to examine associations with condom use. AUDIT scores were positively correlated with global condomless receptive ($r_s = 0.24$, $p < 0.05$) and past 6 months condomless insertive sex, $r_s = 0.25$, $p < 0.05$. Demographic variables associated with condom use included age, relationship status, and years of education.

Association Between Alcohol Consumption and Condom Use Across Levels

Ordinal logistic regressions were conducted to predict the odds of engaging in condomless sex. Specifically, odds ratios demonstrated the likelihood of moving from using condoms *all the time* to using condoms *rarely*/*never* (i.e., the likelihood of being in a higher risk category). This was done for both receptive and insertive sex for global and the past 6 months (Table 4). All analyses met the test of proportional odds assumption.

Global. Initial models examined whether the frequency of drinking 2 hours before or during sex was associated with a greater likelihood of condomless sex. There was not a significant association between drinking before/during sex and condomless receptive, $\chi^2(1) = 1.66$, $p = 0.20$, or insertive sex, $\chi^2(1) = 0.00$, $p = 0.98$. Next, models assessed the relationship between levels of alcohol use problems, as defined by the AUDIT total scores, and condomless sex. There was a significant association such that a 1-unit increase in AUDIT scores was associated with a 6% greater odds of global condomless receptive sex, UOR = 1.06, 95% confidence interval [CI], 1.01 to 1.12, $p < 0.05$; AOR = 1.07, 95% CI, 1 to 1.13, $p < 0.05$. Additionally, there was a trend toward significance for global insertive sex such that a 1-unit increase in AUDIT scores was associated with 5% greater odds of engaging in condomless insertive sex, UOR = 1.05, 95% CI, 1.05 to 1.10, $p = 0.07$; AOR = 1.03, 95% CI 0.98 to 1.09, $p = 0.26$. An examination of predicted probabilities revealed that as AUDIT scores moved from 1 standard deviation below to 1 standard deviation above the mean ($M = 9.3$, SD = 7.3), the

Table 3. Condom and Substance Use, Global, and Past 6 Months ($N = 102$)

Variable	Total, *M* (SD)/*n* (%)	Receptive sex, *M* (SD)/*n* (%)	Insertive sex, *M* (SD)/*n* (%)	χ^2(df)/*t*(df)	*p*
Alcohol Use Disorders Identification Test (AUDIT)					
AUDIT total score	9.3 (7.3)	9.61 (7.62)	9.41 (7.38)	−0.26 (98)	0.79
<8, no problem drinking	53 (52%)	46 (51.1%)	52 (52.5%)	0.04 (1)	0.85
≥8, problem drinking	49 (48%)	44 (48.9%)	47 (47.5%)		
Global					
Anal sex	102 (100%)	90 (88.2%)	99 (97.1%)	1.39 (1)	0.32
Condom use					
All the time		9 (10%)	12 (12.1%)	0.25 (3)	0.97
Most of the time		39 (43.3%)	41 (41.4%)		
Occasionally		15 (16.7%)	17 (17.2%)		
Rarely/never		27 (30%)	29 (29.3%)		
Alcohol before/during sex					
Half the time or less	68 (66.7%)	61 (67.8%)	66 (66.7%)	0.03 (1)	0.87
More than half the time	34 (33.3%)	29 (32.2%)	33 (33.3%)		
Past 6 months					
Anal sex	96 (94.1%)	60 (58.8%)	79 (77.5%)	0.07 (1)	0.49
Number of partners	5.35 (6.97)	1.68 (3.62)	3.81 (6.08)	−4.02 (101)	0.00**
Condom use					
All the time		9 (15%)	11 (13.9%)	0.37 (3)	0.95
Most of the time		24 (40%)	29 (36.7%)		
Occasionally		10 (16.7%)	16 (20.3%)		
Rarely/never		17 (28.3%)	23 (29.1%)		
Alcohol during sex					
Half the time or less		41 (68.3%)	42 (59.2%)	1.18 (1)	0.28
More than half the time		19 (31.7%)	29 (40.8%)		

**$p \leq 0.01$.

Table 4. Association Between Alcohol Use and Condom Use

		Global		Past 6 months		Event
	Variable	Receptive, $n = 90$	Insertive, $n = 99$	Receptive, $n = 60$	Insertive, $n = 79$	$N = 102$
Unadjusted odds ratios	1. Drinking before/during sex	NS	NS	NS	NS	NS
	2. Levels of alcohol use problems	1.06 (1.01 to 1.12)*	1.05 (1.00 to 1.10), $p = 0.07$	NS	1.09 (1.03 to 1.15)**	–
Adjusted odds ratios	1. Drinking before/during sex	NS	NS	NS	NS	NS
	2. Levels of alcohol use problems	1.07 (1 to 1.13)*	NS	NS	1.11 (1.04 to 1.18)**	

*$p < 0.05$ (95% CI), **$p < 0.01$ (95% CI).

likelihood of reporting using condoms *rarely/never* during global receptive sex increased from 20 to 38%. Conversely, the likelihood of using condoms *all the time* decreased from 14 to 6% (Fig. 1).

Past 6 Months. Consistent with the global associations, there was not a significant relationship between the frequency of drinking alcohol before/during sex in the past 6 months and condomless receptive, $\chi^2(1) = 0.05$, $p = 0.82$, or insertive sex, $\chi^2(1) = 0.17$, $p = 0.68$, in the past 6 months. However, there was a significant association with AUDIT scores, such that a 1-unit increase in AUDIT scores was associated with a 9% increase in the likelihood of condomless insertive sex in the past 6 months, UOR = 1.09, 95% CI, 1.03 to 1.15, $p < 0.01$; AOR = 1.11, 95% CI, 1.04 to 1.18, $p < 0.01$. As AUDIT scores increased from 1 standard deviation below to above the mean, the likelihood of reporting using condoms *rarely/never* during insertive sex in the past 6 months increased (17 to 41%), while using condoms *all the time* decreased, 22 to 7% (Fig. 1).

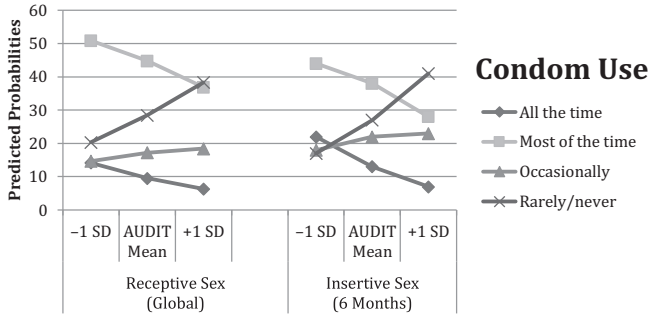

Fig. 1. Associations between Alcohol Use Disorders Identification Test (AUDIT) total scores and condom use.

Event. Binary logistic regression examined the likelihood of drinking during last condomless sex compared to last condom sex. There was not a greater likelihood of drinking during last condomless sex, UOR = 1.13, 95% CI, 0.64 to 2.01, $p = 0.67$.

In summary, neither the frequency of drinking before/during sex nor drinking during last sex lead to increased risk for condomless sex. There was some support for broader associations such that the endorsement of higher levels of alcohol use problems was associated with a greater likelihood of condomless sex, a finding demonstrated for receptive sex (global) and insertive sex (past 6 months).

DISCUSSION

The purpose of this study was to advance our understanding of the nuanced relationship between alcohol consumption and condom use among black MSM by evaluating this association across 3 levels: global, past 6 months, and event. Half of the men in this study reported problem drinking as defined by a score of 8 or greater in the AUDIT, with the average score being 9.3. This rate of problem drinking is relatively high compared to other studies of black MSM that reported levels of problem drinking ranging from 30 to 43% (Eaton et al., 2011; Koblin et al., 2013; Reisner et al., 2010; Tobin et al., 2014). The high rate of problem drinking in the present study may reflect methodological differences in the definition and assessment of problem and hazardous drinking across studies or may be an artifact of recruitment methods. Nevertheless, the frequency of problem drinking among this sample is noteworthy.

Frequency of drinking alcohol 2 hours prior to or during sex did not predict condomless sex. Similarly, event-level analyses revealed that participants were not more likely to report drinking during last condomless sex, compared to last condom sex. This reflects the inconsistent literature on the relationship between substance use and sex, some which suggests that substance use prior to sex is not associated with condom use nor is it the strongest predictor of sexual risk (Leigh, 2002; Newcomb et al., 2014; Vosburgh et al., 2012; Weinhardt and Carey, 2000), Furthermore, these findings may be indicative of the significance of the nature of alcohol use, rather than the use itself, in conferring additional risk. Engaging in binge drinking has been associated with increased sexual risk behaviors among MSM (Hess et al., 2015; Vosburgh et al., 2012). However, the nature of alcohol use and amount consumed was not assessed in the current study.

Men did not demonstrate additional risk by drinking in the context of sex, yet some associations were demonstrated such that the more problems men experienced as a result of alcohol use, the greater their likelihood of engaging in condomless sex. Similar associations between the prevalence of alcohol use problems and condom use have been found among black and other MSM (Deiss et al., 2013; Reisner et al., 2010). Examining risk behaviors by sexual position (i.e., receptive and insertive partner) is important given the increased risk of HIV/sexually transmitted infection (STI) transmission for receptive partners during anal sex (Patel et al., 2014). A strength of the current study is the ability to speak to such differences. An increase in alcohol use problems predicted an increased likelihood of condomless sex for global receptive and past 6 months insertive sex. There are several important considerations in contextualizing these findings. The majority (86.3%) of the men reported both receptive and insertive sex, and there were no significant differences in alcohol consumption or condom use between being the receptive and being the insertive partner. While sexual position is often an important factor in motivating condom use among MSM (Newcomb et al., 2014), men in the current study did not appear to make such distinctions. It should be noted that the current study operationalized sexual position as based on behavior (i.e., engaging in receptive anal sex, insertive anal sex, or both) and not identity as "bottom," "top," or "versatile." Sexual decision making and use of protective sexual behaviors may vary given sexual position, identity associated with sexual position, and whether there is discrepancy between the preferred position and stated identity (Dangerfield et al., 2017). Therefore, future investigations of identity as well as behavior may provide further characterization to the association between alcohol consumption and condom use.

MSM may intentionally use alcohol and/or other substances to enhance sexual pleasure, ease physical pain, or to cope with psychological distress related to being the receptive partner (Collier et al., 2014; Damon and Simon, 2005; Dangerfield et al., 2018; Simon et al., 1998). Although the frequency of alcohol use before/during sex failed to significantly predict condom use in the present study, it is interesting to consider the ways in which intentional alcohol use to facilitate sexual enjoyment may, over time, increase the overall frequency of alcohol use and contribute to the development of alcohol use problems and/or alcohol dependence.

Limitations

There are several limitations worth noting. The examination of risk behaviors by sexual position and across levels of analyses allowed for assessing differential risk pathways. However, a sample size of 102 may not have provided the power needed to detect medium or smaller effects. This was demonstrated by many of the odds ratios being of similar magnitude, although some were significant and others were not depending on the sample size available for a particular analysis. While the cross-sectional nature of this study allowed for demonstrating significant associations, it limited the ability to draw causal inferences. Also, measuring the frequency of drinking before/during sex without assessing the amount of alcohol consumed limits the ability to examine how drinking before/during sex and condom use may differ by the amount of alcohol consumed.

In addition to methodological considerations, the nature of the sample should be considered. Use of a convenience sample limits the generalizability of the current findings, as it may not reflect the experiences of MSM who are harder to reach and potentially at higher risk. The sample reported relatively low rates of risk behaviors, including little recent illicit drug use other than marijuana and high rates of condom use. As a result, these findings may not generalize to black MSM illicit substance users for whom associations between alcohol use problems and risky sexual behavior are likely to be exacerbated by other substance use (Mimiaga et al., 2010; Reisner et al., 2010).

An eligibility criterion of the study was having had 1 incident of condomless anal sex in the past 6 months, yet 13.9 and 15% of participants reported using condoms *all the time* during insertive and receptive anal sex, respectively (Table 3). This discrepancy may reflect the time lag between screening and completion of the study visit and presents an additional limitation to the current findings. Furthermore, the high rates of condom use may not generalize to black MSM who engage in predominately condomless sex (i.e., "barebacking"). Social desirability may have also discouraged participants from disclosing sensitive information regarding their engagement in risk behaviors. If this was the case, then the current findings are potentially underreporting, rather than overestimating, risk taking among these men. Additionally, nearly 1 in 4 MSM living with HIV are unaware of their status (Centers for Disease Control and Prevention, 2016), suggesting that self-reported HIV status is unreliable and likely to result in an underestimate of HIV prevalence for the sample.

CONCLUSIONS AND FUTURE DIRECTIONS

The goal of this study was to contribute to the literature on the relationships between alcohol consumption and condom use in black MSM. These findings demonstrated the ways in which black MSM may have a greater likelihood of sexual risk behavior given their level of alcohol use problems. There was some evidence that general alcohol use problems predicted sexual risk, rather than drinking in the context of sex. There continues to be a need for effective, comprehensive, and culturally relevant HIV and substance use interventions for black MSM (Maulsby et al., 2013; Reisner et al., 2010; Tobin et al., 2014). The findings from this study highlight an important theme for consideration (i.e., alcohol use) in the development and testing of HIV interventions. Reflecting important findings of the current study, interventions for black MSM may benefit by providing information on general associations between levels of alcohol use problems and condom use, rather than emphasizing event-level associations. Additionally, teaching skills for addressing problems associated with alcohol use to reduce associated sexual risk behaviors may be an important addition to such interventions.

Several areas of the current study should be explored further in future studies. As HIV prevention efforts evolve to include more biomedical interventions (e.g., preexposure prophylaxis [PrEP]), there will be a need to understand the role of biomedical interventions in the relationship between substance use and sexual risk behavior. Nine men in this study reported use of PrEP and the majority (87.5%) of HIV-positive men reported currently receiving antiretroviral treatment. While biomedical treatments significantly lower the risk of HIV/STI transmission and infection, substance use can weaken the immune system and result in noncompliance that compromises the effectiveness of such treatment (Baum et al., 2010; Grodensky et al., 2012). As novel prevention methods are made available, it will be important to reconsider the associations between substance use, treatment adherence, and sexual risk. Additionally, black MSM are not monolithic, nor are their intentions for consuming alcohol. Numerous factors can explain the role of alcohol in the lives of black MSM as well as the reasons for which they engage in alcohol use during sexual activity. Understanding these dynamics can help to better characterize black MSM's motivation for alcohol use as well as the role of moderating variables in the relationship between alcohol use problems and sexual behavior.

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