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Alcohol use as a marker for risky sexual behaviors and biologically-confirmed sexually transmitted infections among young adult African American women

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Abstract

Introduction—Previous research has primarily focused on the relationship between illicit drug use and HIV/STI-risk behavior among African American women. Very few studies have solely reviewed the role of alcohol use on risky sexual behavior. The present study examined the relationship between alcohol use at non-abuse levels and risky sexual behaviors and sexually transmitted infections (STIs) among young adult African American women.

Methods—Eight hundred forty-eight African American women, 18–29, participated at baseline, with 669 and 673 women at 6- and 12-months follow-up, respectively. Participants completed an Audio Computer Assisted Survey Interview assessing sociodemographics, alcohol use, and risky sexual behaviors. Subsequently, participants provided two vaginal swab specimens for STIs.

Results—Multivariate logistic regression analyses were conducted for cross-sectional analyses, with illicit drug use as a covariate. Women who consumed alcohol were more likely to have multiple partners and risky partners. Binary generalized estimating equation models assessed the impact of alcohol use at baseline on risky sexual behavior and STIs over a 12-month period. Illicit

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drug use, intervention group, and baseline outcome measures were entered as covariates. Alcohol consumption predicted positive results for Chlamydia, positive results for any STI, and never using a condom with a casual partner over a 12-month follow-up period.

Discussion—Frequency of alcohol use at non-abuse levels was correlated with and predicted risky sexual behaviors and STIs. Prevention programs for African American women should incorporate education regarding the link between alcohol and HIV/STI-risk behaviors and the potential negative health consequences.

Introduction

According to the Centers for Disease Control and Prevention (CDC), HIV/AIDS is a major health crisis among African Americans. Despite only accounting for 13% of the U.S. population, 49% of new HIV/AIDS diagnoses in 2005 were given to African Americans. HIV is the leading cause of death among African American women between the ages of 25 and 34 years (Anderson & Smith, 2003; CDC, 2007). Relative to Caucasian women, African American women were 23 times more likely to be diagnosed with AIDS, indicating a major health disparity (CDC, 2007). Young African American adults have been found to be at high-risk for sexually transmitted infections (STIs), even when engaging in normative behavior (Hallfors, Iritani, Miller, & Bauer, 2007). Given the increasing rates of HIV and AIDS among African American women, specifically resulting from heterosexual contact, it is pertinent to examine factors contributing to increased HIV-risk behavior.

Previous research has primarily focused on the relationship between illicit drug use and HIV/STI-risk behavior among African American women (Brown & Van Hook, 2006; Ross, Kohler, Grimley, & Bellis, 2003; Sterk, Theall, Elifson, & Kidder, 2003; Weissman et al., 1995). When examining risky sexual behavior, alcohol use is an important contextual factor that should be considered. Alcohol use can interfere with cognitive processing of information, which may often influence sexual decision-making and increase the likelihood of risky sexual behavior due to lowered perceptions of risk (Fromme, D'Amico, & Katz, 1999; Norris, Masters, & Zawacki, 2004). Although the prevalence of alcohol abuse or disorders is lower among African American women than among Caucasian women (O'Leary, Broadwell, Yao, & Hasin, 2006), epidemiological studies have indicated that the consequences of alcohol abuse are more severe among African American women (Caetano, 1984).

Previous research has indicated that heavy drinkers are reported as having more sexual partners than non-heavy drinkers (Graves & Leigh, 1995). Among a sample of women who were attending an urban STD clinic, female binge drinkers were more likely to engage in anal sex, have multiple sexual partners, and test positive for gonorrhea when compared to women who abstained from alcohol (Hutton, McCaul, Santora, & Erbeling, 2008). Additionally, it has been found that alcohol use is related to less condom use among women, specifically when alcohol use preceded sexual activity with someone other than a main/primary partner (Scott-Sheldon et al., 2009). Among a sample of predominantly African American women living with HIV, women with alcohol problems were more likely to test positive for *Trichomonas vaginalis*, have sex with their spouse or steady partner when only

they had been drinking, and have sex with their spouse or steady partner when they both had been drinking (Seth, Wingood, & DiClemente, 2008).

Among a sample of African American men and women, a higher frequency of alcohol use was associated with history of STIs, higher risk perception of contracting HIV, lower condom use self-efficacy, larger number of sexual partners, lower HIV prevention knowledge, negative condom attitudes, and low intention to use condoms in the future (Morrison, DiClemente, Wingood, & Collins, 1998). Additionally, African American women who consumed alcohol between 20 and 30 days in a month were less likely to use condoms (Wingood & DiClemente, 1998). In a sample of high-risk African women, those who consumed alcohol were at increased risk to be HIV-positive than abstainers, but this was not the case with infrequent drinkers (Fisher, Cook, Sam, & Kapiga, 2008). Also, high quantity of alcohol use predicted positive results for *Trichomonas vaginalis*, inconsistent condom use, high sexual sensation seeking, multiple sexual partners, sex while high on alcohol or drugs, and having anal sex over a 12-month follow-up period among African American female adolescents (Seth et al., in press). A limited number of studies have examined the relationship between alcohol consumption, as opposed to problem drinking, and STIs among African American women (Cook & Clark, 2005). Among the studies that have found a significant relationship, many were conducted on men or adolescents (Cook & Clark, 2005; Crosby et al., 2002; Poulin et al., 2001; Seth, et al., in press).

Although previous literature has found that alcohol use is correlated with risky sexual behaviors and STIs, less literature has reviewed the role of alcohol use at non-abuse levels on sexual behavior solely among African American women. Even minimal drinking may result in deleterious effects for African American women, given the social network in which they reside. The existing literature that has examined the role of alcohol on sexual behavior primarily has been with college students, primarily Caucasian females, and other populations that may be at lower risk for HIV (Abbey, Parkhill, Buck, & Saenz, 2007; Cooper, 2002; So, Wong, & DeLeon, 2005). Therefore, the present study examined alcohol use as a correlate and predictor of biologically-confirmed STIs and risky sexual behaviors among African American women. This is one of a few studies, to our knowledge, that specifically examines the role of alcohol use at non-abuse levels on HIV/STI-risk behavior and STIs cross-sectionally and longitudinally over a 12-month period among young adult African American women.

Methods

Participants

Participants were part of a larger HIV intervention trial tailored for African American women. From October 2002 through March 2006, 9393 members from three Kaiser Permanente Centers having the greatest number of African Americans in Atlanta, GA, were randomly selected using the Kaiser subscriber database. Of these members, 4905 (52.5%) did not meet the study inclusion criteria of being an African American woman between the ages of 18 – 29 years. The recruitment team contacted, via telephone, and screened the remaining 4488 women meeting these inclusion criteria and sent letters inviting them to participate in the study. Among the 4488 women invited to participate in the study, 2510

(55.9%) did not meet additional eligibility criteria, 591 (13.2%) were not available to participate, and 408 (9.1%) were not interested in participating in the study. Thus, 979 (21.8%) met all eligibility criteria, including being a member of one of the three Kaiser Permanente Centers, unmarried, sexually active in the prior 6 months, and provided informed consent. All 979 eligible women were invited to participate in the study and 848 (86.6%) completed baseline assessments, 669 (78.9%), and 673 (79.4%) completed 6 and 12-months follow-up, respectively. Participants were compensated \$50 for travel and child care to attend each intervention session and complete behavioral and biological assessments. [Blinded by WHI editors] Institutional Review Board (IRB) approved the study protocol prior to implementation.

Data Collection

Data collection occurred at baseline and at 6- and 12-months follow-up. At each assessment, data were obtained from two sources. First, participants completed a 40-minute Audio Computer Assisted Survey Interview (ACASI) assessing sociodemographics, psychosocial factors associated with HIV/STI risk behaviors, and sexual risk behaviors. Subsequently, participants provided two vaginal swab specimens to be tested for STIs.

Intervention Methods

The HIV/STI intervention consisted of two 4-hour group sessions, with an average of 10 participants per session, and was facilitated by two trained African-American female health educators. The general health promotion condition consisted of one 4-hour group session that emphasized nutrition and exercise. The HIV/STI intervention applied Social Cognitive Theory (Bandura, 1994) and the Theory of Gender and Power (Wingood & DiClemente, 2000) to enhance HIV/STI knowledge, condom use, negotiation skills, and norms supportive of healthy relationships. The intervention sought to reduce STI acquisition by emphasizing the importance of enhancing condom use, abstaining from sex until completion of STI therapy, reducing number of sexual partners, and encouraging STI treatment for male partners (Aral & Holmes, 1999; Aral & Peterman, 2002).

Measures

Alcohol Use—The primary exposure, alcohol use, was assessed by asking participants the frequency with which they consumed alcohol in the past 30 days at baseline. Previous studies also have assessed frequency of alcohol in this manner (Blobaum & Anderson, 2006; Morrison, et al., 1998). Alcohol use was categorized as women who consumed alcohol vs. women who abstained from alcohol.

Self-reported sexual behaviors—Sexual behaviors were assessed using measures that had been previously used with young African American women (DiClemente & Wingood, 1995). Participants reported if they engaged in consistent condom use over the past 30 days (yes/no), used condoms with a main and casual sexual partner (never/sometimes), in general. Consistent condom use was defined as the use of a condom during every episode of vaginal intercourse during the past 30 days. Main sexual partner was defined as a current partner with whom you have a sexual relationship or someone with whom you have a special or committed relationship. Casual sexual partner was defined as someone other than a current

boyfriend, someone with whom you occasionally have sex and are NOT in a committed relationship. The survey also assessed having multiple sexual partners during the past 6 and 12 months and having a risky sexual partner during the past 6 months (i.e., recently released from jail, had an STI, used injection drugs, or had a concurrent sexual partner). All self-reported sexual behaviors were assessed at baseline, 6- and 12-months assessments.

Sexually transmitted infections—Acquiring an incident STI was defined as a positive laboratory test result for a new Chlamydia, Gonorrhea, or Trichomonas infection at the baseline, 6-months, or 12-months assessments. Participants provided 2 vaginal swabs at each of the 3 assessments (DiClemente & Wingood, 1995). One swab was evaluated for *Neisseria gonorrhoeae* (GC) and *Chlamydia trachomatis* (CT) using the Becton Dickinson ProbeTec ET *Chlamydia trachomatis* and *Neisseria gonorrhoeae* Amplified DNA Assay (Sparks, MD). A second vaginal swab was tested for *Trichomonas vaginalis* (TV) using Taq-Man PCR. The Caliendo Laboratory developed and validated this test which employs a homogenous kinetic polymerase chain reaction to amplify and detect a conserved part of a repeated DNA fragment of *T. vaginalis*. All assays were conducted at the Emory University, Department of Pathology, Caliendo Research Laboratory. Women testing positive were provided directly observable single-dose treatment, received risk-reduction counseling per CDC recommendations, and were encouraged to refer sex partners for treatment. The county health department was notified of reportable STIs.

Data Analyses

Descriptive statistics were first conducted to assess the prevalence of sociodemographics, alcohol use, sexual behavior, and STIs. Alcohol use was dichotomized into women who reported consuming alcohol versus those who abstained over the past 30 days at baseline. The cross-sectional data were analyzed by multivariate logistic regression analyses and the independent contribution of alcohol use on risky sexual behavior and STIs was examined. Previous literature has indicated that illicit drug use is associated with risky sexual behaviors (Brown & Van Hook, 2006; Ross, et al., 2003; Sterk, et al., 2003; Weissman, et al., 1995). Therefore, in order to elucidate the relationship between alcohol use and the outcome variables, illicit drug use (i.e., marijuana, amphetamines, heroin, cocaine, crack, ecstasy) was included as a covariate.

Binary generalized estimating equations (GEE) models were conducted to control for repeated within-subject measurements and allow for a number of observations on participants longitudinally. GEE models examined the independent contribution of alcohol use at baseline, with illicit drug use, intervention group, and outcomes measures at baseline as covariates, on risky sexual behaviors and STIs over a 12-month follow-up period. Intervention group was included as a covariate to control for any effects the prevention program may have had on participants' behaviors.

Results

Participant Characteristics

Participant characteristics on the outcome variables are displayed in Table 1. At baseline, 340 (40.1%) of women reported abstaining from alcohol over the past 30 days, whereas 508 (59.9%) reported consuming alcohol at least 1 or more days. Among women who reported alcohol consumption, the average number of days was 4.34 ($SD= 4.70$) during the past 30 days. Among women who consumed alcohol, the average number of drinks in a typical setting was 1.66 ($SD= .95$) drinks. The frequency of alcohol use also did not significantly differ across baseline (59.9%), 6-months follow-up (61.6%), and 12-months follow-up (57.6%).

Participants' average age was 22.04 ($SD= 3.61$) years. The majority of women reported completing 1–4 years of college (59.3%), with 25.6% graduating from high school, 11.2 % completing some high school (9th-11th grade), and 3.9% having graduate school training. In terms of their living situation, the majority of participants reported living with parent(s) (53.5%), with 20.2% living alone, 12.4% living with a roommate, 5.2% living with their boyfriend, 5.4% living with another relative, and 3.3% living with their children. Finally, the majority of women obtained their spending money from their job (65.4%), with 28.5% not reporting their source of income and 6.1% receiving an allowance from parent(s) or boyfriend, public assistance, or school financial aid.

Multivariate Logistic Regression Analyses

In cross-sectional analysis, multivariate logistic regression analyses, with illicit drug use as a covariate, revealed that women who consumed alcohol in the past 30 days, relative to those who abstained, were more likely to have multiple sexual partners over the past 6 and 12 months and a risky sexual partner (Table 2). There were no significant associations for the condom use variables and STIs.

Binary Generalized Estimating Equations (GEE)

After controlling for illicit drug use, intervention group, and baseline outcomes measures, GEE models revealed that women who consumed alcohol in the past 30 days at baseline, relative to those who abstained, were more likely to test positive for Chlamydia, for any STI (i.e., Chlamydia, Gonorrhea, and/or *Trichomonas vaginalis*), and were more likely to never use a condom with a casual sexual partner over the 12-month follow-up period (Table 3). There were no significant associations for multiple or risky partners, consistent condom use, and condom use with a main partner.

Discussion

This is one of a few studies to specifically examine alcohol use as at non-abuse levels as a correlate and predictor of HIV/STI-risk behavior and biologically-confirmed STIs among young adult African American women. Previous research has primarily examined the role of both illicit drug and alcohol use in predicting risky sexual behavior among African American women (Brown & Van Hook, 2006; Ross, et al., 2003; Sterk, et al., 2003;

Weissman, et al., 1995). Results indicated that among women who consumed alcohol, the frequency of alcohol use was relatively low and at normative rates ($M= 4.34$, $SD= 4.70$ days in the past 30 days), as opposed to another study that examined African American women who consumed alcohol between 20–30 days in a month (Wingood & DiClemente, 1998). However, others have reported that African American women are most likely to abstain from alcohol or consume alcohol at infrequent rates (Collins & McNair, 2002; Grant & Dawson, 1999). Although the study assessed overall frequency of alcohol use as opposed to quantity of alcohol use and situation-specific alcohol consumption, the findings highlight the significant relationship of alcohol use at non-abuse levels on biologically-confirmed STIs and risky sexual behaviors.

Overall, participants who consumed alcohol were more likely to have multiple male sexual partners, have a risky sexual partner, never use condoms with a casual male sexual partner, and to test positive for a biologically-confirmed STI. As stated previously, only a few studies have examined the relationship between alcohol use and STIs, and some did not observe a significant relationship (Cook & Clark, 2005). Given the relatively low frequency of alcohol consumption, it is noteworthy that even after controlling for intervention group, illicit drug use, and baseline outcome measures, alcohol use emerged as a significant predictor for STIs among this sample of young adult African American women.

Despite the longitudinal parts to this study, these findings do not imply a direct link between alcohol use and risky sexual behavior and STIs. Other factors, such as negative condom attitudes, lack of risk-avoidance strategies, psychological distress, partner/interpersonal factors, personality domains, alcohol expectancies, and racial disparities, to name a few, have been associated with high-risk sexual behavior (Brown, Tolou-Shams, Lescano, & Lourie, 2006; Crepaz & Marks, 2002; Grau & Ortet, 1999; Hallfors, et al., 2007; Kalichman & Cain, 2004; Norris, et al., 2004; Ruiz, Pincus, & Dickinson, 2003; Seth, Raiford, Robinson, & Wingood, 2010; Seth, Raiji, DiClemente, Wingood, & Rose, 2009) and may play a moderating/mediating role in the relationship between frequency of alcohol use and risky sexual behaviors and STIs.

Limitations

Despite several significant and interesting findings, there are limitations. The data on alcohol and sexual behaviors rely on retrospective self-report data. It is possible that participants had difficulty recalling important information, and/or they provided a socially desirable response to the sensitive questions (e.g., underreported alcohol consumption). However, it is noteworthy that STI results for the participants were biologically-confirmed and not based on self-report. Also, assessment of alcohol use was very general, as only overall frequency of alcohol consumption was examined in this study. For example, quantity and type of alcohol and event-specific associations relating to HIV/STI-risk behavior and STIs were not assessed (e.g., participants' alcohol use prior to sexual intercourse). Additionally, some of the analyses were cross-sectional; therefore, the causal and temporal associations between alcohol use and the outcome variables cannot be assessed. Finally, the sample was homogeneous, all African American women from the southeastern part of the United States. Thus, the results may have limited generalizability to other geographic

regions of the United States, and replication with diverse ethnic and geographic populations would be needed.

Implications

The findings from this study suggest that alcohol use at non-abuse levels is associated with and predictive of HIV/STI-risk behaviors, STIs, and adverse health outcomes among African American women. Despite being enrolled in an HIV/STI prevention program, frequency of alcohol use predicted biologically-confirmed Chlamydia at 6 months follow-up and any biologically-confirmed STI and risky sexual behaviors at 12 months follow-up. Although there are a number of other factors that may be playing a role, these findings highlight the need to incorporate education regarding the link between alcohol and HIV/STI-risk behavior in prevention programs for African American women. Specifically, effective interventions should assess the role of alcohol use on women's sexual behaviors. Risks and potential consequences of consuming alcohol in sexual situations should be highlighted to encourage women to be mindful of their attitudes and behaviors when consuming alcohol. For example, according to a motivational model of alcohol use (Cooper, Frone, Russell, & Mudar, 1995), women may consume alcohol to either cope with negative emotions or increase positive emotions. These emotions may serve as moderators/mediators between the relationship of alcohol use and risky sexual behaviors. Therefore, a deeper understanding of other factors contributing to this relationship is pertinent to develop effective prevention programs. Finally, programs should emphasize a sense of belonging to the community and incorporate culturally specific information relevant for African American women (Witherspoon & Richardson, 2006) to address potential racial disparities, with prevention efforts emphasizing the teaching of effective risk reduction skills that promote assertiveness but do not threaten women's sense of security and intimacy in their relationships.

Prevention programs should not only target individuals but also should be created at the community level. These findings highlight that clinicians, specifically those who provide STI services, should be encouraged to screen African American women regarding their alcohol consumption and potential alcohol problems, especially with those engaging in high-risk sexual behavior. Hospitals and clinics should endeavor to provide integrated services for reducing alcohol consumption and STIs among high-risk African American women.

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Table 1

Prevalence of alcohol use, risky sexual behavior, and STIs.

	N(%)
Alcohol frequency over the past 30 days	
Consumed	508 (59.9%)
Abstained	340 (40.1%)
<u>Baseline</u>	
Multiple sexual partners over the past 12 months	
Yes	508 (59.9%)
No	340 (40.1%)
Multiple sexual partners over the past 6 months	
Yes	312 (36.8%)
No	536 (63.2%)
Risky sexual partner	
Yes	301 (35.6%)
No	545 (64.4%)
Any sexually transmitted disease	
Yes	144 (17%)
No	704 (83%)
Gonorrhea	
Yes	27 (3.2%)
No	821 (96.8%)
Chlamydia	
Yes	88 (10.4%)
No	760 (89.6%)
Trichomonas vaginalis	
Yes	55 (6.5%)
No	793 (93.5%)
<u>6-months Follow-up</u>	
Condom use with a casual sexual partner	
Never	41 (5.5%)
Sometimes	705 (94.5%)
Any sexually transmitted disease	
Yes	46 (7.2%)
No	594 (92.8%)
Gonorrhea	
Yes	4 (0.6%)
No	637 (99.4%)
Chlamydia	
Yes	33 (5.2%)
No	607 (94.8%)
Trichomonas vaginalis	

	N(%)
Yes	12 (1.9%)
No	631 (98.1%)
<u>12-months Follow-up</u>	
Condom use with a casual sexual partner	
Never	55 (7.6%)
Sometimes	672 (92.4%)
Any sexually transmitted disease	
Yes	64 (10.2%)
No	564 (89.8%)
Gonorrhea	
Yes	7 (1.1%)
No	629 (98.9%)
Chlamydia	
Yes	43 (6.8%)
No	594 (93.2%)
Trichomonas vaginalis	
Yes	20 (3.2%)
No	610 (96.8%)

Table 2
Multivariate logistic regression analyses examining cross-sectional associations between alcohol use and risky sexual behaviors.

	Alcohol Use				PR ^a	AOR ^b	95% CI ^c	p
	Used	Abstained						
Multiple sexual partners over the past 12 months	327 (64.4%)	181 (53.2%)		1.59	1.43	1.07–1.90	.02	
Multiple sexual partners over the past 6 months	212 (41.7%)	100 (29.4%)		1.72	1.46	1.08–1.98	.01	
Risky sexual partner	206 (40.6%)	95 (28%)		1.76	1.51	1.11–2.06	.01	

^a Prevalence ratio
^b Odds ratio adjusted by illicit drug use (i.e., marijuana, amphetamines, heroin, cocaine, crack, ecstasy)
^c 95% Confidence Interval

GEE analyses examining alcohol use as a predictor of biologically-confirmed sexually transmitted infections and condom use over a 12-month period.

Table 3

	Alcohol Use		PR ^a	AOR ^b	95% CI ^c	p
	Used	Abstained				
Biologically-confirmed Chlamydia	51 (6.5%)	25 (5.1%)	1.51	2.23	1.29–3.85	.004
Any biologically-confirmed STI (CT, GC, and/or TV)	73 (9.4%)	37 (7.6%)	1.32	1.69	1.09–2.62	.02
Never using a condom with a casual partner	66 (7.4%)	30 (5.1%)	1.48	1.94	1.11–3.39	.02

^a Prevalence ratio

^b Odds ratio adjusted by intervention group and illicit drug use (i.e., marijuana, amphetamines, heroin, cocaine, crack, ecstasy)

^c 95% Confidence Interval