Relationship of Alcohol Use and Sexual Risk Taking Among Hazardously Drinking Incarcerated Women: An Event-Level Analysis*

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ABSTRACT. Objective: To understand the association of alcohol use with sex and unprotected sex among hazardously drinking incarcerated women, we examined the relationship of these behaviors on any given day. **Method:** Participants endorsed unprotected sex and hazardous alcohol consumption (four or more drinks at a time on at least 3 separate days in the previous 3 months or a score of 8 or above on the Alcohol Use Disorders Identification Test). Participants recalled behaviors in the 90 days before incarceration using the Timeline Followback method. Generalized estimating equation models estimated the effect of daily alcohol use and selected covariates on the odds of sexual-risk behavior. **Results:** The 245 participants averaged 34 years of age and were 71.4% white; 67.8% used cocaine. On most (84.7%) drinking days, women consumed four or more drinks. One hundred forty-one participants (57.6%) reported sex with only main partners, 10.6% with only casual partners, and 30.6% with both casual and main partners. The likelihood of having any sex (odds ratio = 1.78, $p < .01$) and unprotected sex (odds ratio = 1.95, $p < .01$) was higher on days when participants consumed alcohol compared with nondrinking days. However, when the analysis was restricted to days on which participants reported having sex, the odds of having unprotected sex was not significantly associated with drinking. **Conclusions:** Among incarcerated women who reported hazardous drinking, alcohol use was associated with an increased likelihood of sexual activity and a concomitant increase in unprotected sex. However, use of alcohol was not significantly associated with condom use on days when participants were sexually active. (*J. Stud. Alcohol Drugs* **70:** 508-515, 2009)

SINCE 1995, THE NUMBER OF AMERICAN women in prisons has increased 53%, far surpassing increases in the rate of incarceration of men (Harrison and Beck, 2005). Alcohol use plays a significant, negative role in the lives of women who become incarcerated and has been associated with violent crime, recidivism, health consequences, and risk-taking behaviors (Henderson, 1998).

Estimates of the prevalence of hazardous drinking depend on the type of correctional sample, recorded offense, and measure of alcohol use. A lifetime history of alcohol abuse has been reported in approximately one third of female offenders (Grella and Greenwell, 2007; Jordan et al., 1996; Teplin et al., 1996). This rate is approximately five times that identified in a national sample of community-dwelling women (Kessler et al., 2005). Estimates of women under the influence of alcohol at the time of arrest suggest even higher rates (El-Bassel et al., 1995; Greenfeld and Snell, 1999; Paasche-Orlow et al., 2005).

Incarcerated women live in the midst of epidemics of HIV and sexually transmitted infections (Willers et al., 2008). Earlier studies have documented that incarcerated women use condoms infrequently (Clarke et al., 2006; El-Bassel et al., 1995). When condoms were used, it was more often with casual or commercial partners than with regular partners. Alcohol can interfere with judgment and decision making and, in the context of sexual activity, may increase the likelihood of risky behaviors. Attention to modifiable factors, such as alcohol use, that may influence sexual risk taking is crucial.

The association of alcohol consumption and unsafe sexual behavior has been studied extensively. Research has yielded mixed results depending on methodology, population, consideration of contextual effects, and inclusion of potentially confounding variables. Unprotected sexual behaviors have been associated with alcohol use in global association studies of adolescents, gay men, and the mentally ill (Kalichman et al., 1994; Koopman 1994; Siegal et al., 1989). However, other studies have shown a null or protective role of alcohol use, particularly between steady sexual partners (Harvey and Beckman, 1986; Weatherburn et al., 1993).

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More recently, event-level analyses that assess the use of alcohol and risky sex on the same day or occasion have made inferences about causal association possible. Again, there are conflicting data regarding whether consumption of alcohol before sex increases the likelihood that sex will be unprotected. Some authors have reported that drinking before sex increases the likelihood and frequency of unprotected sex (Irwin et al., 2006, Kiene et al., 2008). Other work attempting to demonstrate temporal causality has, in many cases, not found a correlation between alcohol and condom use in adolescents, college students, and clients of sexually transmitted disease clinics (Bailey et al., 2006; Leigh et al., 2008; Weinhardt and Carey, 2000). In a meta-analysis of the relationship between alcohol use and condoms, drinking was unrelated to the use of condoms in sexual encounters among adults (Leigh, 2002). However, most event-level studies focus on first or more recent sexual encounters and do not include samples of hazardously drinking adult women at very high risk for sexually transmitted infections (Barta et al., 2008).

Among incarcerated women, condom use may also be related to other contextual factors. For instance, relational attachment, often characterized as partner type (main or casual), may influence condom use. The frequency of sex has been reported in other populations to be associated with lower condom use within partner types and consistently across partner types (Williams et al., 2001). In addition, alcohol is often mixed with other drugs, including cocaine; these substances are the two most frequently abused by incarcerated women (National Institute of Justice, 2003). Cocaine use is thought to have desirable effects on sexual performance (Hayaki, 2005; Macdonald et al., 1988) and has been associated with sexual risk taking, including trading sex for drugs (Larrat et al., 1994; Marx et al., 1991; McBride et al., 1992; Siegel et al., 1992).

To better understand the temporal linkage of alcohol use with sex and unprotected sex, we examine the relationship of these behaviors on any given day among incarcerated women with hazardous drinking. We hypothesized that alcohol use and unprotected sex on the same day would be associated after controlling for other factors related to unprotected sex.

Method

Study site

In Rhode Island, all incarcerated persons are housed on a single campus that operates as a unified, centralized, and comprehensive state correctional system, the Rhode Island Department of Correction (RIDOC), encompassing jail, prison, rehabilitative services, and community corrections (probation/parole). The Women's Facility at the Adult Correctional Institute (ACI) has an average daily population of 219 inmates, and, as with jails throughout the nation, the majority of women detained at the Women's Facility return to the community within 30 days of commitment. Fewer than 25% of commitments result in sentences, and, for the women who are sentenced, 45% of sentences are less than 6 months in length.

Study design and procedure

All detained women over a 40-month period from February 2004 to June 2007 were eligible for screening. The goal of screening was to recruit detainees for a randomized clinical trial of a brief intervention to reduce alcohol use and HIV risk. The trial protocol was approved by the Miriam Hospital Institutional Review Board, the Office for Human Research Protection, and the RIDOC's Medical Research Advisory Group. In addition, a Certificate of Confidentiality was obtained from the federal government to protect further the information collected from study participants. The full details regarding the logistical planning for this trial have been published elsewhere (Hebert et al., 2008).

After detained women completed the RIDOC nursing intake process, which included a medical history, review of vital signs, and phlebotomy, research assistants approached all women regarding consent to be screened for a clinical trial. During the consent process, it was stressed that refusal to be screened would have no negative impact on the services they would normally receive, their disciplinary status, or scheduled medical visits. If verbal consent was given, screening was conducted confidentially, without compensation.

At the time of screening in a private room, no other individuals were present, and the room was not under surveillance. Participants were eligible for the clinical trial of interest if they spoke English, had reliable contact information (to track participants during the ensuing clinical trial), and endorsed having risky sexual behavior (unprotected sex on at least 3 days in the previous 3 months) and hazardous alcohol consumption (four or more drinks at a time on at least 3 separate days in the previous 3 months or a score of 8 or above on the Alcohol Use Disorders Identification Test [AUDIT], which was framed to the past year) (Paasche-Orlow et al., 2005). During the enrollment period, 1,616 women were approached for screening, and 201 refused. Of the 1,415 women screened, 1,133 were ineligible; 33 eligible women refused participation, leaving a final sample of 245 women.

If an inmate qualified for the trial, the same private room was used for enrollment. Informed consent was obtained, and contact information was gathered. After completion of the consent process, the research assistant read aloud and recorded answers for a 45-minute baseline survey. The survey covered sexual risk, alcohol and drug use, mental health symptoms and diagnoses, and other topics. For their time, participants were compensated $20 in the form of a money order mailed to them on release from the ACI. All

participants also received the names and phone numbers of local drug and alcohol treatment facilities, as well as their next interview date and condoms. The current analysis uses data collected at the baseline assessment.

Measures

Participants were asked to recall 90 days before their incarceration at baseline using the Timeline Followback (TLFB) method (Sobell and Sobell, 1996). Using a calendar, the research assistant prompted the participant to remember any important dates, such as birthdays or anniversaries, to help remember specific days. National holidays were marked on the calendar. Respondents were asked to recall days they consumed alcohol and how many drinks on each day. They were then asked about vaginal or anal sex on each of these 90 days with both main and casual (partner other than main) male partners and whether they used a condom for each encounter.

Primary outcome variables were assessed as dichotomous variables indicating the presence or absence of events on each day. The specific outcomes included (1) any vaginal or anal sex, (2) any vaginal or anal sex with a main partner, (3) any vaginal or anal sex with a casual partner, (4) any unprotected vaginal or anal sex with a main partner, and (5) any unprotected vaginal or anal sex with a casual partner. We restricted our analyses to days when the participant was not incarcerated.

Alcohol use was a time-varying covariate also assessed using TLFB methodology. Alcohol use was coded 1 if any alcohol was used on the assessed day and 0 otherwise. Other covariates were time invariant and based on self-reported data collected at baseline. These included age in years, race (1 if white), living with a partner with an alcohol problem (1 if yes), number of days on which cocaine was used in the 90 days before baseline, and sex work (1 if the participant reported exchanging sex for money in the 90 days before baseline).

Statistical analysis

We report a range of descriptive statistics (rates, means, medians, standard deviations) to summarize the sexual risk behaviors and patterns of alcohol use during the 90 days assessed by the TLFB. We also report the number of days on which specific events occurred. Generalized estimating equation models were used to estimate the effect of daily alcohol use and selected covariates on the odds of sexually risky behavior. All models were specified using the logit link function, binomial error distribution, and autoregressive order 1 working correlation structure. Tests of significance were based on robust standard error estimators. The initial models estimated the effects of selected predictor variables on the odds of any vaginal or anal sex, and the odds of any vaginal or anal sex with main or casual partners separately. We then estimated the effect of selected predictor variables on the likelihood of unprotected sex with main and casual partners; in these analyses we restricted the samples to days on which participants reported having sex with main and casual partners, respectively. We repeated these analyses using heavy alcohol use (defined as four or more drinks on the assessed days) rather than any alcohol use.

Results

The 245 participants averaged (SD) 34.1 (8.9) years of age, and 71.4% were white (Table 1). Sixty six (26.9%) participants reported exchanging sex for money in the 3 months before baseline, and 67.8% had used cocaine at least once in that period. On average, participants used cocaine on 36.6 (8.9) of the 90 days before baseline. The mean AUDIT score was 20.6 (10.1), and all participants had AUDIT scores of 8 or more when screened. Most (89.8%) participants met criteria for a lifetime diagnosis of alcohol dependence. One hundred forty one participants (57.6%) reported sex with only main partners, 26 (10.6%) reported sex with only casual partners, and 75 (30.6%) said they had been sexually active with both casual and main partners. Despite meeting eligibility criteria at screening, three (1.2%) participants were not sexually active during the 90-day period assessed by the TLFB.

Table 2 gives the number of person-days on which either drinking or sexual activity was reported. The average number of days assessed was 87.6 (7.2). On average, participants were sexually active on 43.8% (31.5) of at-risk days. They were sexually active with a main partner on 36.6% (31.5) and with a casual partner on 10.6% (24.1) of days. Most sex with main partners was unprotected; participants did not use condoms on 7,499 (96.8%) of the 7,731 days on which they reported having sex with main partners. Participants were more likely to use condoms when having sex with casual partners. But even with casual partners, participants reported using condoms on only 1,334 (60.1%) of the 2,218 days they had sex with casual partners.

Participants reported using alcohol on an average of 51.8% (32.6) of days. Heavy alcohol use (four or more drinks) was reported on 43.8% (33.7) of days. Thus, most

Table 1. Background characteristics

Variable	Mean (SD)	*n* (%)
Age, in years	34.1 (8.9)	
Ethnicity, white		175 (71.4%)
Any sex work, last 90 days, yes		66 (26.9%)
Partner alcohol problem, yes		73 (29.8%)
AUDIT	20.6 (10.1)	
Lifetime alcohol dependence, yes		220 (89.8%)
Any cocaine use last 90 days, yes		166 (67.8%)
No. cocaine use days, last 90 days	36.6 (39.1)	

Note: AUDIT = Alcohol Use Disorders Identification Test.

Table 2. Summary of Timeline Followback data

Variable	*n*	% (SD)
Total days at risk (not incarcerated)	21,449[a]	–
Days sexually active		
With main partner	9,334	43.8% (31.5)
Days sexually active	7,731[b]	36.6% (31.5)
Days unprotected sex	7,499	35.2% (31.3)
Days protected sex	232	1.4% (5.8)
With casual partner		
Days sexually active	2,218[b]	10.6% (24.1)
Days unprotected sex	1,334	6.4% (17.5)
Days protected sex	884	4.3% (14.8)
Drinking days	11,093	51.8% (32.6)
Heavy drinking (≥4 drinks) days	9,401	43.8% (33.7)

[a]Includes the day on which participants were first incarcerated but excludes the second and all subsequent days of contiguous periods of incarceration; [b]participants reported being sexually active with both main and casual partners on 615 days; thus, the sum of days sexually active with main and casual partners does not equal the number of days participants were sexually active.

(84.7%) of the 11,093 days on which alcohol was used were heavy drinking days. The mean number of drinks per day was 6.6 (7.6) (median = 3.5), and the mean number of drinks per drinking day was 11.3 (8.8) (median = 8.9).

The likelihood of having any sex was estimated to be approximately 1.78 ($p < .01$) on days when participants consumed one or more drinks containing alcohol compared with nondrinking days (Table 3). The likelihood of sex with main partners was estimated to be 1.52 ($p < .01$) times higher on drinking days than on nondrinking days, and the likelihood of sex with casual partners was estimated to be 2.31 ($p < .01$) times higher on days when alcohol was consumed. Participants who reported any sex work in the 3 months before baseline were significantly less likely (odds ratio [OR] = 0.54, $p < .05$) to report sex with main partners but more likely to report sex with casual partners (OR = 16.40, $p < .01$) than those who reported no sex work. Living with a partner with an alcohol problem was associated with a significant increase in the likelihood of having sex with main partners (OR = 1.46, $p < .05$). Frequency of cocaine use was positively associated with the likelihood of sex with casual partners (OR = 1.01, $p < .01$). Age was inversely associated with the likelihood of having any sex (OR = 0.98, $p < .05$) and sex with casual partners (OR = 0.95, $p < .05$).

The analyses summarized in Table 4 parallel those reported in Table 3 but give the estimated effect of alcohol use and selected covariates on the likelihood of having any unprotected sex, unprotected sex with main partners, and unprotected sex with casual partners on any day. The odds of having any unprotected sex were approximately 1.95 times higher on drinking days than nondrinking days. In addition, the likelihood of having unprotected sex with main partners (OR = 1.71, $p < .01$) or unprotected sex with casual partners (OR = 2.61, $p < .01$) was significantly higher on days when participants consumed one or more drinks. Sex workers were significantly less likely than non-sex workers to report unprotected sex with a main partner (OR = 0.42, $p < .05$) but were more likely to report having unprotected sex with a casual partner (OR = 18.27, $p < .01$). The likelihood of having unprotected sex with casual partners also increased significantly as the frequency of cocaine use increased (Table 4).

Table 3. Generalized estimating equation models[a] predicting daily sex, sex with main partners, and sex with casual partners ($n = 245$ participants assessed for a total of 21,449 person-days)

Predictor	Any sex OR (95% CI)	W/ main OR (95% CI)	W/ casual OR (95% CI)
Years age	0.98* (0.96-0.99)	0.99 (0.97-1.01)	0.95* (0.91-0.99)
Ethnicity, white = 1	1.11 (0.77-1.58)	0.99 (0.68-1.45)	1.60 (0.79-3.25)
Frequency of cocaine use, last 90 days	1.00 (0.99-1.01)	1.00 (0.99-1.01)	1.01† (1.00-1.02)
Partner alcohol problem, yes = 1	1.26 (0.89-1.79)	1.46* (1.01-2.11)	0.62 (0.27-1.38)
Sex work, yes = 1	1.36 (0.91-2.05)	0.54* (0.33-0.87)	16.40† (7.66-35.08)
Any alcohol use, yes = 1	1.78† (1.51-2.10)	1.52† (1.30-1.78)	2.31† (1.57-3.39)

Notes: OR = odds ratio; CI = confidence interval. [a]The specified working correlation structure was autoregressive lag 1; coefficients give the population-averaged estimated effects on the odds of having sex on the observed day; any alcohol use is a time-varying covariate assessed using Timeline Followback methodology; all other predictors are time-invariant covariates assessed at baseline; confidence interval estimates and tests of significance are based on the sandwich (robust) standard errors.
*$p < .05$; †$p < .01$.

Table 4. Generalized estimating equation models[a] predicting any unprotected sex, unprotected sex with main partners, and unprotected sex with casual partners ($n = 245$ participants assessed for a total of 21,449 person-days)

Predictor	Any unprt. sex OR (95% CI)	Unprt. w/ main OR (95% CI)	Unprt. w/ casual OR (95% CI)
Years age	0.99 (0.97-1.01)	0.98 (0.95-1.00)	1.03 (0.96-1.11)
Ethnicity, white = 1	1.14 (0.76-1.70)	1.15 (0.71-1.85)	1.28 (0.43-3.79)
Frequency of cocaine use, last 90 days	1.00 (1.00-1.01)	1.00 (0.99-1.01)	1.02* (1.01-1.03)
Partner alcohol problem, yes = 1	1.18 (0.81-1.71)	1.64 (1.02-2.64)	0.55 (0.15-1.99)
Sex work, yes = 1	1.14 (0.72-1.80)	0.42* (0.21-0.85)	18.27† (3.23-103.32)
Any alcohol use, yes = 1	1.95† (1.61-2.36)	1.71† (1.41-2.06)	2.61† (1.51-4.52)

Notes: Unprt. = unprotected; OR = odds ratio; CI = confidence interval. [a]The specified working correlation structure was autoregressive lag 1; coefficients give the population averaged estimated effects on the odds of having sex on the observed day; any alcohol use is a time-varying covariate assessed using Timeline Followback methodology; all other predictors are time-invariant covariates assessed at baseline; confidence interval estimates and tests of significance are based on the sandwich (robust) standard errors.
*$p < .05$; †$p < .01$.

TABLE 5. Generalized estimating equation models[a] predicting any unprotected sex, unprotected sex with main partners, and unprotected sex with casual partners on days when sexually active

Predictor	Any unprt. sex[b] OR (95% CI)	Unprt. w/ main[c] OR (95% CI)	Unprt. w/ casual[d] OR (95% CI)
Years age	1.05† (1.02-1.08)	1.05 (0.99-1.10)	1.09† (1.04-1.14)
Ethnicity, white = 1	0.83 (0.39-1.80)	1.72 (0.43-6.90)	0.89 (0.40-1.99)
Frequency of cocaine use, last 90 days	1.00 (0.99-1.01)	1.01 (0.99-1.03)	1.00 (0.99-1.02)
Partner alcohol problem, yes = 1	1.65 (0.68-4.03)	2.14 (0.26-18.00)	0.62 (0.24-1.58)
Sex work, yes = 1	0.23† (0.12-0.43)	1.18 (0.27-5.11)	0.37* (0.15-0.94)
Any alcohol use, yes = 1	0.86 (0.51-1.44)	0.82 (0.32-2.08)	1.19 (0.79-1.79)

Notes: Unprt. = unprotected; OR = odds ratio; CI = confidence interval. [a]The specified working correlation structure was autoregressive lag 1; coefficients give the population averaged estimated effects on the odds of having sex on the observed day; any alcohol use is a time-varying covariate assessed using Timeline Followback methodology; all other predictors are time-invariant covariates assessed at baseline; confidence interval estimates and tests of significance are based on the sandwich (robust) standard errors; [b]n = 242 participants sexually active on 9,334 person-days; [c]n = 216 participants sexually active with a main partner on 7,731 person-days; [d]n = 101 participants sexually active with a casual partner on 2,218 person-days.
*$p < .05$; †$p < .01$.

In Table 5, we restricted our analysis to only those days on which participants reported having any sex, sex with a main partner, or sex with a casual partner. We present estimates of the association of alcohol use and selected covariates with unprotected sex. The odds of having unprotected sex with main partners are slightly, although not significantly (OR = 0.82, $p > .05$), lower on drinking days than on nondrinking days. Unprotected sex with main partners was not associated significantly with any of the other covariates included in the model. The likelihood of unprotected sex with casual partners was not significantly higher (OR = 1.19, $p > .05$) on days when alcohol was consumed. The odds of unprotected sex with casual partners increased by a factor of 1.09 for each 1-year increase in participants' age ($p < .01$). In addition, participants who reported exchanging sex for money were significantly less likely to report unprotected sex with casual partners (OR = 0.37, $p < .05$) than those who were not engaged in sex work.

We replicated the analyses reported in Tables 3 through 5 using heavy drinking days. The results were substantively and statistically consistent with those reported.

We conducted auxiliary analyses to test for a potential Alcohol Use × Sex Work interaction effect on unprotected sex. The first-order Alcohol Use × Sex Work interaction effect on the odds of unprotected sex with main partners was substantively quite strong (OR = 2.96) but not statistically significant ($p = .08$). In this sample, the observed odds of unprotected sex with main partners was .67 times lower on alcohol-use days among those who reported no sex work. Among the 43 participants who reported both sex work and sex with a main partner, the odds of unprotected sex with a main partner increased by a factor of 1.98 on drinking days ($p = .003$). The first-order Alcohol Use × Sex Work interaction effect on unprotected sex with casual partners was not statistically significant (OR = 1.39, $p > .05$).

Discussion

In this sample of incarcerated women who reported hazardous drinking before incarceration, we found that alcohol use was associated with an increased likelihood of sexual activity and a concomitant increase in unprotected sex (sex without condom use). However, use of alcohol was not significantly associated with unprotected sex on days when participants were sexually active. Women who did not use condoms when sober also did not use them when drinking. These results suggest that alcohol increases sexual activity, which in turn provides more opportunity for unprotected sex, exposing women to substantial infection risk.

Previous work has noted that increased alcohol use is related to greater sexual activity in general (Crowe and George, 1989). Our data suggest that women were more likely to drink on days they had sex. Alcohol can be energizing, as well as socially disinhibiting. In addition, alcohol expectancies—the belief that alcohol can decrease anxiety or sexual inhibitions or enhance the sexual experience—may lead to women being more likely to drink before or during sexual encounters. Our data demonstrate that alcohol and sex were associated at the event level. This supports the possibility that alcohol use may be cognitively consonant with the plan to engage in sexual behavior (Leigh, 1990).

It is often assumed that alcohol use in conjunction with sexual activity increases the probability of unsafe behavior. Our findings challenge the view that alcohol use, heavy or otherwise, increases sexual risk taking because of alcohol myopia (Steele and Josephs, 1990). But in keeping with our findings, most studies that have used methodologically rigorous within-subject analysis of multiple events assessing whether alcohol and condoms were used at those events also have demonstrated no compelling association between alcohol and nonuse of condoms (Bailey et al., 2006; De Visser et al., 2001; Fortenbery et al., 1997; Gillmore et al., 2002; Leigh, 1993; Weinhardt et al., 2001). Rather, our data suggest that an increase in sexual activity generally mediated any association between alcohol use and unprotected sex. Therefore, we believe it is crucial that sexual frequency be measured and controlled for in future studies of risk taking.

Other researchers have noted that personality factors such as sensation seeking or impulsivity might lead to both alcohol use and unprotected sex (Kalichman et al., 1996). If so, any link between sex and drinking might represent these factors rather than a causal effect of alcohol (Fortenberry

et al., 1997; Weinhardt and Carey, 2000). However, within-subject analyses, as performed here, essentially remove these factors as potential third variables.

Condom use rates were low in our cohort, particularly during sexual activity with main partners. At first we speculated that women used other forms of contraception concurrently, but this turned out not to be the case. Only 15% of fecund women used a contraceptive other than condoms. A second reason for infrequent condom use may have been that women who had only one sexual partner perceived the risk of sexually transmitted infection as low. Fear of retribution, physical harm, and loss of economic support may contribute to women having difficulty negotiating condom use with male partners. Incarcerated women have high rates of anxiety and depression, with the attendant feeling of hopelessness, which have been associated with unsafe sexual behaviors (Grant et al., 2004). Condom use in general may be less prevalent among heavier drinkers (Leigh, 1993). Finally, condom use might imply infidelity or lack of intimacy in primary relationships but may be viewed as acceptable form of contraception within casual relationships (Ford and Norris, 1995).

As our findings demonstrate, the type of sexual partner may moderate the event-level association between alcohol use during sexual activity and condom use. Work by Seage et al. (1998) showed that partner type (steady vs nonsteady) is a strong modifier in the relationship between alcohol and sex in gay men. Reasons for using condoms with main and nonmain partners may be very different. For instance, pregnancy concerns may motivate condom use with main partners, whereas with nonmain partners concerns about contracting sexually transmitted infections may be paramount (Rosengard et al., 2006). As reported in other studies, alcohol use was more common in sexual encounters between casual partners than in encounters involving main partners in our cohort (76.6% vs 58.7% of days) (Senf and Price, 1994; Temple and Leigh, 1992). Others have reported that women are more likely to have had sex with a new or casual partner when drinking than when sober (Testa and Collins, 1997). This may be an example of using alcohol to reduce nervousness over relations with less well-known partners, or it may be that casual partners meet in locations where drinking takes place, such as bars. Other researchers have reported that drinking was related to unprotected sex for casual partners but not primary partners (Fortenberrry et al., 1997; Seage et al., 1998); there was no significant association in our study between alcohol use and unprotected sex after controlling for other variables. Although the term *casual partner* was not defined here, it may have different meanings to different participants. It may mean new partners or any partner outside a primary intimate relationship. Casual partners may also be those encountered during commercial sex work. Whereas drinking before sex may result in unprotected sex with some partners, alcohol use may lead to more frequent condom use with other partners (Graves and Hines, 1997).

Of interest is the finding that older age was associated with more unprotected sex with casual partners but not main partners. In other populations, older age is associated with lower sexually transmitted infection risk; therefore, less condom use may not be as risky among older men and women (Fortenberry et al., 1997). Younger persons may use condoms more often because condoms are more available than other forms of contraception. In addition, younger persons grew up during the era of HIV education and may have been more influenced by condom-use messages.

Not surprisingly, participants who reported engaging in sex work were more likely than others to report having sex with casual partners. They were also much more likely to report having unprotected sex with casual partners than non-sex workers. But these associations were observed when considering all TLFB days. A very different pattern was observed when analysis was restricted to days on which participants had sex with casual partners. On those days, participants who engaged in sex work were less than half as likely to have unprotected sex as non-sex workers. In other studies, commercial sex workers have demonstrated high rates of condom use (Rosengard et al., 2006). These findings again underscore the importance of adjusting for overall propensity to engage in sex when seeking to understand specific within-event behaviors that may affect sex risk.

Our study had several limitations. The data were based on self-report measures. TLFB is retrospective and may be subject to recall error. Ninety-day recall is commonly used in the literature, but shorter recall periods may be more accurate. However, we used techniques to aid recall and minimize bias (Schroder et al., 2003). Second, we did not include measures of psychological constructs such as sex-related alcohol expectancies or relevant personality traits that may underlie both alcohol use and sexually risky behavior. Third, we focused on the effects of a single drug, alcohol, on the day of the sexual event. Unlike our alcohol measure, cocaine use was measured globally during the period under review. Fourth, we did not have detailed data on the partner's drinking on a daily basis. Most people who report drinking in a sexual encounter report that their sexual partner was also drinking (Temple and Leigh, 1992). Women reporting a partner's intoxication during sex are significantly more likely to have a sexually transmitted infection (Crosby et al., 2008). Finally, this study included only incarcerated women who drank hazardously. Thus the generalizability of our findings to other populations of women, or to men, may be limited.

The relationship of drinking and risky sex is a result of a complex interaction of personality, situation, and behaviors. Incarcerated women live at the intersection of two significant and prevalent health problems: hazardous drinking and risky sexual behavior. In summary, alcohol use led to an increased likelihood of sexual activity, but drinking (including heavy

drinking) at the time of sexual behavior did not lead to decreased condom use. Our findings are consistent with these results across different populations, giving us confidence that our results are not unique to hazardously drinking incarcerated women. Decreasing alcohol use in general may decrease sexual behavior and, according to our findings, risky sexual behavior as well. This may explain, in part, the finding of recent studies documenting that alcohol treatment as well as combined HIV and alcohol risk reduction can reduce unprotected sexual behaviors (Avins et al., 1997; Kalichman et al., 2007; Stein et al., 2002).

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