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# Associations between alcohol misuse and risks for HIV infection among men who have multiple female sexual partners in Cape Town, South Africa

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## Associations between alcohol misuse and risks for HIV infection among men who have multiple female sexual partners in Cape Town, South Africa

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The occurrence of high rates of alcohol consumption in a context of high HIV prevalence in South Africa poses a significant health challenge for this country. This paper aims to answer three questions that could further our knowledge regarding the links between alcohol use and HIV infection: (a) “Are problem drinkers more likely to have multiple concurrent partners than those who are not?”; (b) “Are condoms applied less effectively and less consistently by problem drinkers compared to those who are not?”; (c) “Are the female sexual partners of problem drinkers different from those who are not?” Two cross-sectional HIV bio-behavioural surveillance surveys using Respondent-Driven Sampling were conducted in two peri-urban settings on the outskirts of Cape Town, South Africa. Eight hundred and forty-eight men aged 25–55 years who have multiple, concurrent female sexual partners were recruited. Problem drinkers had a score of  $\geq 3$  on the CAGE questionnaire. Questions enquired about partner numbers, condom use and partner traits. Multivariate logistic regression models were developed to determine significant associations between outcome variables and problem drinking. Fifty-eight percent of men were problem drinkers. Compared to non-problem drinkers, problem drinkers were significantly more likely to report having any symptom of a STI; not using condoms due to drinking; inconsistent condom use with all partner types; that their most recent once-off partner was unemployed; having met their most recent partner at an alcohol-serving venue; and having had a once-off sexual relationship. Alcohol may fuel once-off sexual encounters, often characterised by transactional sex and women’s limited authority to negotiate sex and condom use; factors that can facilitate transmission of HIV. HIV prevention interventions specifically targeting drinkers, the contexts in which problem drinking occurs and multiple sexual partnering are urgently needed.

**Keywords:** HIV; alcohol misuse; multiple sexual partners; Respondent-Driven Sampling; South Africa

### Introduction

A substantial body of scientific literature provides consistent evidence of the strong association between alcohol use and HIV/AIDS. Four recent systematic reviews or meta-analyses conclude that there is a clear association between alcohol use and risk of HIV infection, and between alcohol use and HIV infection. First, problem drinking is consistently associated with an increased risk of sexually transmitted diseases (STDs) across a wide variety of populations internationally (Cook & Clark, 2005). Second, in other international studies, unprotected sex among people living with HIV/AIDS is significantly associated with any alcohol consumption compared to no alcohol consumption, problem alcohol use compared to no or moderate alcohol use, and alcohol use in the context

of sex compared to no alcohol use in the context of sex (Shuper, Joharchi, Irving, & Rehm, 2009). A number of African studies showed that alcohol drinkers compared to non-drinkers and problematic alcohol drinkers compared to non-problematic drinkers were significantly more likely to be infected with HIV (Fisher, Ban, & Kapiga, 2007). Based on a review of studies conducted in sub-Saharan Africa, Kalichman and colleagues concluded that any alcohol use as opposed to none and drinking greater quantities of alcohol compared to lesser quantities, were associated with sexual risks for HIV (Kalichman, Simbayi, Kaufman, Cain, & Jooste, 2007).

The occurrence of high rates of alcohol consumption in a context of high HIV prevalence in South Africa poses a significant health challenge for this country. Southern Africa is home to just 10% of the

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world's population and yet accounts for more than two-thirds of people living with HIV (UNAIDS, 2008). This burden is felt most strongly in South Africa, which has the largest number of people living with HIV (estimated 5.7 million) and one of the highest adult HIV prevalences (18.1%) in the world (UNAIDS, 2008). South Africa also has one of the highest rates of alcohol consumption in the world, estimated to be about 20 litres of pure alcohol per drinker per annum (Rehm et al., 2003). Recognising that heavy drinkers engage in behaviours that place them at considerable risk for HIV infection and transmission, high-risk drinkers (defined as those who score 8 or more on the Alcohol Use Disorders Identification Test (AUDIT) questionnaire) have been classified as a most at risk population (MARP) in the recent South African national HIV prevalence, incidence, behaviour and communication survey (Shisana et al., 2009).

In an attempt to better understand the complex relationship between alcohol use and HIV, a group of international experts met in Cape Town in 2008 to examine the impact of alcohol on HIV and tuberculosis incidence and disease progression. With regard to HIV, the meeting concluded that the role of alcohol on worsening the course of HIV was clear: heavy alcohol use compromises the immune system, and impacts negatively on HIV treatment adherence. With regard to the linkage between alcohol and HIV incidence, the consensus from the meeting was that the relationship between alcohol use and risky sex is multifaceted, reflecting several underlying causal and non-causal processes. The panel identified several questions that, if investigated, could further our knowledge regarding the links between alcohol use and HIV (Parry, Rehm, Poznyak, & Room, 2009).

This paper aims to attempt to answer three of the questions derived from the expert meeting referred to above: (a) "Are men who drink heavily more likely to have multiple concurrent partners than those who do not?"; (b) "Are condoms applied less effectively and less consistently by men who drink heavily compared to those who do not?"; and (c) "Are the female sexual partners of men who drink heavily different from those who do not drink heavily?" (Parry et al., 2009).

## Method

### *Sampling strategy*

From June to September 2008, men who had multiple female sexual partners were recruited into two HIV bio-behavioural surveys using Respondent-Driven Sampling (RDS; Heckathorn, 1997, 2002, 2007). One survey was conducted in a peri-urban community on

the outskirts of Cape Town (Site 1); the other in a peri-urban community within a large rural town approximately 60 kilometres from Cape Town (Site 2). In both studies, eligible men lived, worked or socialised in the community in which the study was conducted; were 25–55 years of age; and had sex with two or more female sexual partners in the 3 months prior to the study, one of whom was five or more years younger. These eligibility criteria were chosen because men who have large numbers of, often younger and concurrent female sexual partners, compose a highly efficient network of HIV transmission (Parker, Makhubele, Nlabati, & Connolly, 2007; Soul City, 2008), yet little is known about their HIV-related risk behaviours.

Eight non-randomly selected seeds (initial recruits) who met the eligibility criteria began the recruitment of participants. Seeds and recruits received a telephone voucher worth R60 ( $\pm$  US\$6) for completing the survey. They also received three recruitment coupons which they used to recruit their eligible peers into the study. The recruitment coupons were numbered with unique numbers used to track who recruited whom. Seeds and recruits received an additional telephone voucher worth R30 ( $\pm$  US\$3) for each of their recruits who successfully completed the survey. Ethical clearance was obtained from the Research Ethics Committee, Faculty of Health Sciences, University of Cape Town.

### *Survey instrument*

The survey consisted of 113 questions about participants' and female sexual partners' demographics, participants' current and past sexual risk behaviours, concurrency (i.e., having begun a sexual relationship with a woman while still engaged in a sexual relationship with another), history of sexually transmitted infections and alcohol use. Formative research identified three types of female sexual partners: main (steady sexual partner or wife), casual (clandestine partners outside of the main relationship) and once-off partners (with whom men had sex with just once and never again).

This paper examines the sexual behaviours and sexual partner traits of eligible men who were categorised as problem drinkers or non-problem drinkers using the CAGE questionnaire, an instrument that has been shown to demonstrate reliability and validity across a variety of populations (Dhalla & Kopee, 2007; Ewing, 1968). Response options on the questionnaire allowed for a total score of between 0 and 4 for each participant (see Table 1). A cut-off score of  $\geq 3$  was used to classify participants as problem drinkers. Another question included in the survey was: "How often in the past year did you have sex without a

Table 1. Definitions and coding of variables used in the analysis.

Outcome variables	Survey questions and responses		Coded for analysis
<b>Condom use indicators</b>			
1. Condom use with main sexual partner(s) past three months	How often have you used condoms with your [main partner, casual partner, or sexual partner you had sex with just once and never again] in the last three months?	1	Always
2. Condom use with casual sexual partner(s) past three months	Would you say never, sometimes, often or always?	2	Inconsistent (often/sometimes)
3. Condom use with once-off sexual partner(s) past three months	How often in the past year did you have sex without a condom because of your drinking? Was it never, rarely, sometimes or often?	3	Never
4. Sex without condom due to drinking past 12 months		1	Never or rarely
		2	Sometimes or often
<b>Sexual partner traits</b>			
5. Had once-off sexual partner(s) past three months	How many once-off partners have you had sex with in the last three months?	0	None = NO
6. Most recent main partner employment	Think about the last [main partner, casual partner, once-off partner] you had sex with. What does she do for a living?	1	1+ partners = YES
7. Most recent casual partner employment		0	Unemployed
8. Most recent once-off partner employment		1	Employed (excluding 'don't know' or missing responses)
9. Met most recent main partner at a shebeen <sup>a</sup> /tavern	Where did you meet your last [main partner, casual partner, once-off partner]? Response options: Shebeen/tavern, bar, restaurant, sports club/game, nightclub, braai, friend's house, other.	0	No
10. Met most recent casual partner at a shebeen/tavern		1	Yes
11. Met most recent once-off partner at a shebeen/tavern			
<b>Drinking status variable</b>			
<b>PROBLEM ALCOHOL USE AS MEASURED BY THE CAGE QUESTIONNAIRE</b>			
Have you ever felt you should CUT DOWN on your drinking?	Never	0	No
Have people ANNOYED you by criticizing your drinking?	Sometimes, often or rarely	1	Yes
Have you ever felt bad or GUILTY about your drinking?			
Have you ever had a drink first thing in the morning to steady your nerves or get rid of a hangover (EYE-OPENER)?			

<sup>a</sup>A "shebeen" is an informal venue where alcohol is served, largely unregulated in the study settings.

condom because of your drinking?" Response options were either "never" (coded as No) or one of "sometimes", "often", "rarely" (coded as Yes). The definitions and coding for analysis of the outcome variables are detailed in Table 1.

### Procedures

We implemented RDS using standard RDS recruitment and analytical methods (Johnston, 2007). Eligible recruits received information about the study and

provided written informed consent before being interviewed by a trained interviewer. The survey was administered by trained interviewers in either the home language of the participants, which was isiXhosa, or English. Dried blood spots (DBS) were collected by a trained nurse.

### Biological testing

The DBS samples were sent to a referral laboratory for anonymous HIV testing, where serum was eluted

from samples and tested with a fourth-generation HIV ELISA (Vironostika Uniform II plus 0). Initially, reactive samples were re-tested with a third-generation (antibody only) HIV ELISA (SD Bioline). Samples that were reactive in both assays were reported as positive. Discordant samples were tested by western blot (HIV1/2 Biorad).

### Data analysis

We first compared participants from Site 1 to those from Site 2 on demographic characteristics with Chi-square tests using STATA, 10.0. We then compared problem and non-problem drinkers on sociodemographic and sexual behaviour categories. In these analyses, we estimated odds ratios of drinking status by all independent variables separately and adjusting for study site. We then examined whether there were any interactions between study site and all independent variables. Finally, we developed multinomial and multivariable logistic regression models for each of the 11 outcome variables as applicable to determine which variables were significantly associated with problem drinking, controlling statistically for study site and all identified confounders. The following categorical variables were assessed for confounding for each logistic regression model: marital status, age, education and employment. Potential confounders were included in the final adjusted model if, when independently controlled for, altered the odds ratio by 10% or more (Vittinghoff, Glidden, Shiboski, & McCullough, 2005). Outcome variable weights were generated and imported into STATA 10.0 from Respondent-Driven Sampling Analysis Tool 6.0 (RDSAT; [www.respondentdrivensampling.org](http://www.respondentdrivensampling.org)). This weighting takes into account the variation in participants' network sizes (degree weight), differential recruitment effectiveness across groups and homophily (recruitment weight; Heckathorn, 2007). All odds ratios and corresponding *p*-values were calculated using STATA, 10.0.

### Results

Eight hundred and forty-eight men participated in the surveys. Men in the combined samples reported having a mean of five female sexual partners in the three months prior to the studies (range 2–35), and 94% reported concurrent relationships having answered affirmatively to the question: “think about the last three months, have you been in a sexual relationship with one woman whilst still having a sexual relationship with another?” Compared to men from Site 2, those from Site 1 were more likely to be employed (59.5% vs. 41.8%). Men were not significantly

different across study sites on all other demographic characteristics.

Problem drinkers were not significantly different from non-problem drinkers on demographic characteristics, but significantly more problem drinkers drank five or more alcoholic drinks on the last occasion (Table 2). Compared to non-problem drinkers, problem drinkers were significantly more likely to report any symptom of a STI in the past three months and that they thought themselves likely to have HIV (Table 2). All other sexual behaviour and sexual health characteristics were not significantly different by drinking status. We found no significant interactions between study site and the independent variables.

Significantly, more problem drinkers compared to non-problem drinkers reported that they went to shebeens (unlicensed liquor outlets operating out of homes or backyard shacks) or taverns (larger outlets, typically licensed) most often in the past month with their friends (65.8% vs. 55.9%), visited these venues more than six times in the last month (58.0% vs. 49.0%), spent more than six hours at these venues on the last occasion (56.8% vs. 49.3%), reported meeting new sexual partners most often at these venues (78.6% vs. 61.3%) and reported that their friends went to these venues most often to meet new sexual partners (63.3% vs. 44.3%). More than half of the men ( $n = 496$ : 58.5%) met the definition for problem drinking.

Four different condom use indicators were examined as outcomes (Table 3) for which no confounders were identified. When controlling for study site, problem drinkers compared to non-problem drinkers were significantly more likely to use condoms inconsistently or never with main and casual partners in the three months prior to the survey, and significantly more likely to use condoms inconsistently but not never with once-off partners. Problem drinkers compared to non-problem drinkers were more likely to report not having used a condom in the past year due to drinking.

The remaining seven outcomes refer to traits of the study participants' female sexual partners. Problem drinkers compared to non-problem drinkers were more likely to report that their most recent once-off partner was unemployed; to report having met their most recent main, casual and once-off partners at a shebeen or tavern; and more likely to have had at least one once-off sexual relationship in the three months prior to the survey (Table 4).

### Discussion

The majority of men who have multiple, concurrent female sexual partners in our studies drank at levels

Table 2. Demographic characteristics, quantity of alcoholic drinks consumed on the last occasion, sexual behaviour, sexual health characteristics of male adults aged 25–55 years ( $n = 848$ ) by drinking status.

	Non-problematic drinkers		Problematic drinkers		OR (95% CI)	AOR (adjusted for site) (95% CI)	<i>p</i>
	<i>n</i>	Percentage (%)	<i>n</i>	Percentage (%)			
Total	352	41.5	496	58.5			
Demographic characteristics							
Study site							
Study Site 1	159	45.2	263	53.0	1.00		
Study Site 2	193	54.8	233	47.0	0.88 (0.67, 1.16)		0.369
Marital status							
Not married	310	89.9	462	93.3	1.00	1.00	
Married	35	10.1	33	6.7	1.55 (0.94, 2.56)	1.53 (0.93, 2.52)	0.092
Age							
25–29	240	69.6	336	67.7	1.00	1.00	
30–44	94	27.2	146	29.4	1.11 (0.82, 1.51)	1.10 (0.81, 1.50)	0.533
45–55	11	3.2	14	2.8	0.86 (0.38, 1.92)	0.82 (0.36, 1.85)	0.625
Education							
<8 years	34	9.9	35	7.2	1.00	1.00	
8–11 years	172	50.2	261	53.5	1.46 (0.88, 2.43)	1.45 (0.87, 2.42)	0.156
12 years	137	39.9	192	39.3	1.35 (0.80, 2.27)	1.33 (0.79, 2.25)	0.281
Employment							
Unemployed	122	34.7	174	35.1	1.00	1.00	
Employed	204	57.9	298	60.1	1.06 (0.79, 1.41)	1.09 (0.81, 1.47)	0.577
Students	26	7.4	24	4.8	0.63 (0.34, 1.15)	0.61 (0.33, 1.13)	0.116
Alcoholic drinks consumed on the last occasion, sexual behaviour, sexual health characteristics							
Quantity of alcohol consumed on the last occasion							
None or <5 drinks	156	45.4	123	24.9	1.00	1.00	
5+ drinks	188	54.7	372	75.1	2.54 (1.89, 3.41)	2.57 (1.91, 3.45)	0.000
Sexual partners past three months							
<3	131	37.2	164	33.1	1.00	1.00	
4+	221	62.8	332	66.9	1.24 (0.93, 1.65)	1.28 (0.95, 1.71)	0.101
Concurrent partners past three months							
No	19	5.5	30	6.1	1.00	1.00	
Yes	325	94.5	463	93.9	0.91 (0.50, 1.65)	0.92 (0.50, 1.67)	0.773
Any symptom of a STI past three months							
No	265	77.0	349	70.5	1.00	1.00	



Table 2 (Continued)

	Non-problematic drinkers		Problematic drinkers		AOR (adjusted for site) (95% CI)	p
	n	Percentage (%)	n	Percentage (%)		
Yes	79	23.0	146	29.5	1.45 (1.06, 1.99)	0.012
HIV status						
Negative	275	84.9	401	85.9	1.00	1.00
Positive	49	15.1	66	14.1	0.92 (0.61, 1.37)	0.662
Self-reported likelihood of HIV						
Likely	179	52.1	327	66.3	1.00	1.00
Unlikely	164	47.8	166	33.7	1.81 (1.37, 2.41)	0.000

Note: OR, odds ratios of drinking status (problematic vs. non-problematic) by all independent variables separately; AOR, odds ratios of drinking status (problematic vs. non-problematic) by all independent variables separately, adjusted for study site; CI, confidence intervals.

suggesting problematic drinking. They socialised most often at shebeens or taverns and met new sexual partners there. Their already high HIV risk profile was exacerbated by a greater propensity for STIs, inconsistent and non-condom use, and multiple once-off sexual encounters. They may have been aware of their elevated HIV risk as they perceived themselves likely to be infected with HIV.

Other studies found lower rates of problem alcohol use than in our study, suggesting that men who have multiple partners in our study contexts are at elevated risk for alcohol problems. Findings from the first demographic and health survey in South Africa (Parry et al., 2005) revealed lifetime problem drinking (defined as  $\geq 2$  on the CAGE questionnaire) in 27.9% of men in urban contexts in the Western Cape, considerably lower than the 58.5% found among men in our study contexts – also in the Western Cape.

Findings from our study confirmed those from other research in peri-urban contexts in South Africa that identified shebeens and taverns where men commonly met to socialise as places where extensive and diverse social networks, characterised by high rates of new sexual partner formation, concurrency and low condom use are common (Morojele et al., 2006; Weir, Morroni, Coetzee, Spencer, & Boerma, 2002; Weir et al., 2003). The absence of alternative forms of leisure activity and the paucity of recreational facilities available in the study settings is common in urban and peri-urban communities in South Africa (Morojele et al., 2006).

Given that alcohol use is strongly related to STI (Cook & Clark, 2005), it was not unexpected that problem drinkers in our study were more likely than non-problem drinkers to report symptoms of STI in the three months prior to the study. That men in our study who thought they were likely to be infected with HIV were also more likely to be problem drinkers, has not been assessed in previous work. This finding suggests that alcohol may be used to mitigate the stress of thinking one is infected with HIV and adds another benefit to knowing one's HIV status.

With regard to the first question derived from Parry and colleagues (Parry et al., 2009), we found that problem drinkers were not more likely than non-problem drinkers to have four or more partners in the past three months (66.9% vs. 62.7%). Our findings differed from Kalichman, Simbayi, Jooste and Cain (2007) who found that greater numbers of sexual partners among male and female STI patients in Cape Town was related to greater frequency and quantities of alcohol consumption. However, whereas they measured quantity and frequency of drinking as

Table 3. Associations between condom use indicators and drinking status, controlling for study site.

Drinking status	Frequency of condom use past 3 months <sup>a</sup>								
	Main partner/s			Casual partner/s			Once-off partner/s		
	Always <i>N</i> (%)	Inconsistent <i>N</i> (%)	Never <i>N</i> (%)	Always <i>N</i> (%)	Inconsistent <i>N</i> (%)	Never <i>N</i> (%)	Always <i>N</i> (%)	Inconsistent <i>N</i> (%)	Never <i>N</i> (%)
Non-problem	103 (55.1)	76 (32.3)	148 (40.6)	214 (46.0)	70 (33.3)	51 (37.0)	146 (44.7)	40 (26.9)	42 (36.2)
Problem	84 (44.9)	159 (67.7)	217 (59.5)	251 (54.0)	140 (66.7)	87 (63.0)	181 (55.4)	109 (73.2)	74 (63.8)
RRR (CI)	1.00	2.39 (1.60, 3.59)	1.86 (1.29, 2.66)	1.00	1.63 (1.16, 2.30)	1.57 (1.06, 2.35)	1.00	2.09 (1.36, 3.21)	1.47 (0.94, 2.31)
<i>P</i>		0.000	0.001		0.005	0.026		0.001	0.141
Drinking status	Non-condom use, any partner, past year due to drinking <sup>b</sup>								
	Sometimes/often <i>N</i> (%)	Rarely/never <i>N</i> (%)	AOR (95% CI)	<i>p</i>					
Non-problem	123 (27.0)	158 (49.0)	1.00						
Problem	332 (73.0)	164 (50.9)	2.62 (1.94, 3.55)	0.000					

<sup>a</sup>Multinomial logistic regression analysis including outcome variable weights generated by RDSAT.

<sup>b</sup>Logistic regression analysis including outcome variable weights generated by RDSAT.

Note: RRR, relative risk ratios of condom use variables by drinking status (problematic vs. non-problematic), adjusted for study site; CI, confidence intervals; AOR, odds ratio of non-condom use due to drinking by drinking status (problematic vs. non-problematic), adjusted for study site.

Table 4. Associations between sexual partner traits and drinking status, controlling for study site.

Most recent partner employed												
Drinking status	Main partner				Casual partner				Once-off partner <sup>a</sup>			
	No <i>N</i> (%)	Yes <i>N</i> (%)	AOR (95% CI)	<i>p</i>	No <i>N</i> (%)	Yes <i>N</i> (%)	AOR (95% CI)	<i>p</i>	No <i>N</i> (%)	Yes <i>N</i> (%)	AOR (95% CI)	<i>p</i>
Non-problem	43 (35.8)	291 (41.9)	1.00		51 (38.4)	290 (41.5)	1.00		224 (40.4)	15 (24.2)	1.00	
Problem	77 (64.1)	404 (58.1)	0.71 (0.47,1.08)	0.110	82 (61.7)	409 (58.5)	0.85 (0.58,1.24)	0.388	330 (59.6)	47 (75.8)	2.36 (1.25,4.47)	0.008
Met most recent partner at a shebeen/tavern												
Drinking status	Main partner				Casual partner				Once-off partner			
	No <i>N</i> (%)	Yes <i>N</i> (%)	AOR (95% CI)	<i>p</i>	No <i>N</i> (%)	Yes <i>N</i> (%)	AOR (95% CI)	<i>p</i>	No <i>N</i> (%)	Yes <i>N</i> (%)	AOR (95% CI)	<i>p</i>
Non-problem	268 (42.7)	67 (35.1)	1.00		195 (50.5)	147 (32.9)	1.00		99 (44.8)	140 (35.3)	1.00	
Problem	360 (57.3)	124 (64.9)	1.44 (1.03,2.01)	0.035	191 (49.5)	300 (67.1)	2.12 (1.60, 2.82)	0.000	122 (55.2)	257 (64.7)	1.59 (1.13, 2.23)	0.008
Had a one-off partner past 3 months												
Drinking status	No <i>N</i> (%)		Yes <i>N</i> (%)		AOR (95% CI)		<i>p</i>					
Non-problem	114 (47.1)		231 (38.6)		1.00							
Problem	128 (52.9)		368 (61.4)		1.49 (1.10, 2.02)		0.011					

<sup>a</sup>This model also controlled for education.

Note: AOR, odds ratios of partner traits by drinking status (problematic vs. non-problematic), adjusted for study site; CI, confidence intervals. Logistic regression analysis includes outcome variable weights generated by RDSAT.

indicators of heavy drinking, in our study we classified men as problem/non-problem drinkers using the CAGE questionnaire and these differences may account for the different findings.

While we were unable to provide a definitive answer to the question, “Are condoms applied less effectively and consistently by men who drink heavily compared to those who do not?”, what this study does provide, however, is the knowledge that problem drinkers were likely to report not using condoms due to their drinking. This knowledge, in conjunction with the finding of inconsistent and non-condom use in the previous three months, confirms conclusions from other studies that among heavy drinkers, condom use is inconsistent if at all (Kalichman, Simbayi, Vermaak, Jooste, & Cain, 2008; Simbayi, Mwaba, & Kalichman, 2006; World Health Organization [WHO], 2005).

Finally, to answer the question whether the female sexual partners of men who drink heavily differ from those who do not drink heavily, we examined a number of traits of female partners. We found that problem drinkers were more likely to have once-off sexual encounters with women who were more likely to be unemployed. Once-off partners are arguably the “riskiest” of all sexual partner types because little is known about them, particularly their past and current HIV risk profile, which raises the already high HIV risk of men who have multiple partners, who drink heavily and who mostly practice unsafe sex. The fact that once-off partners were unemployed could suggest that these women engaged in sex with men for economic reciprocity, a common occurrence in sub-Saharan Africa (Hawkins, Mussa, & Abuxahama, 2005; Leclerc-Madlala, 2003). In situations where alcohol and/or money are exchanged for sex, women are likely less able to negotiate the terms on which sex takes place between her and her partner, including condom use (Kaufman & Stavrou, 2004; Luke, 2003; Silberschmidt & Rasch, 2001; Wojcicki & Malala, 2001). Ultimately, the study findings imply that alcohol may actually fuel once-off sexual encounters, which are most often characterised by transactional sex, and women’s limited authority to negotiate sex and condom use, all of which are factors that can facilitate the transmission of HIV.

Given that men in our studies spent a great deal of their leisure time at shebeens and taverns, it is not surprising that they commonly met their most recent casual and once-off partners at these venues. It is probable that women who frequent shebeens and taverns also drink alcohol, suggesting that the partners of men who drink heavily may also drink alcohol. Among STI patients in Cape Town, inconsistent

condom use was significantly related to situations where both partners drank alcohol (Kalichman, Simbayi et al., 2007), confirming our findings of inconsistent and non-condom use among problem drinkers. Further, another study conducted among shebeen patrons in Cape Town found that people who met sexual partners at shebeens drank greater quantities of alcohol more frequently, had higher scores on the AUDIT, were more likely to have a STI, engage in transactional sex, have two or more sexual partners in the past months and have more unprotected sex (Kalichman et al., 2008). Our findings are remarkably similar to these.

While the results from these studies begin to address the important gaps in our knowledge about the association between alcohol use and HIV, the studies have some limitations. First, the RDS methodology provides representative estimates of people with a particular set of characteristics based upon specific eligibility criteria, and it is, therefore, difficult to estimate what proportion of the total population this group of men represent. Second, given that our interviewers were all male, men may have over-reported behaviours perceived to be admired by fellow men. However, all interviewers were carefully selected and provided training to elicit honest and accurate recall, and to conduct interviews in a non-judgmental manner. Third, our conservative categorisation of problem drinkers on the CAGE questionnaire (score  $\geq 3$ ) may have underestimated the number of problem drinkers among men who have multiple, concurrent partners. Finally, we did not measure the frequency of sex with other men among our sample. Given that sex with other men is an important risk factor for HIV and likely influences condom use consistency with female sexual partners, it is suggested that future research should examine the frequency of this behaviour among men who might identify themselves as heterosexual but might also have sex with other men.

In conclusion, data already collected from men who have multiple, concurrent female sexual partners in two study settings close to Cape Town has provided initial insight into the questions posed by the international panel in 2008 (Parry et al., 2009). Men who have multiple, concurrent partners drink at problematic levels and have elevated HIV risk profiles given their higher incidence of STI, inconsistent and non-condom use and engaging in sex with once-off, unemployed sexual partners. These findings add to the growing body of evidence that problem drinkers are indeed MARP and that HIV prevention interventions specifically targeting drinkers, the contexts in which problem drinking occurs and multiple, concurrent sexual partnering are urgently needed.

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