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Multiple-Recent Sexual Partnerships and Alcohol Use among Sexually Transmitted Infection Clinic Patients, Cape Town South Africa

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Abstract

Background—Multiple recent sex partners promote the rapid spread of sexually transmitted infections (STI), including HIV. Alcohol use is also closely associated with HIV transmission risks but alcohol use has not been investigated as a factor contributing to multiple recent sex partners in southern Africa.

Purpose—To examine the combined risks of multiple recent sex partners and alcohol use among people seeking treatment for an identified STI in Cape Town South Africa.

Methods—Men ($n = 529$) and women ($n = 210$) receiving STI clinic services completed anonymous surveys of sexual behaviors and substance use over a two-month retrospective period. Sexual risk was defined by frequencies of unprotected intercourse and drinking alcohol before sexual intercourse.

Results—A total of 264 (31%) participants reported two or more sex partners in the previous two months; 87% of these partnerships occurred within one month of each other. Substantially greater multiple recent partners, including a greater fraction of sexual relationships estimated concurrent were observed among men than women. Alcohol use was common in the sample and drinking in sexual contexts was associated with multiple partners. Moderator analyses failed to show alcohol use played a significant role in sexual exposure risks stemming from multiple recent partners.

Conclusions—Multiple recent partners and drinking appear independently related to unprotected sex and both multiple partners and alcohol use should be targeted in HIV risk reduction interventions.

Keywords

HIV/AIDS; South Africa; sexual concurrency; multiple partners; alcohol use

Introduction

Rapid turnover of sexual partners in brief intervals of time (e.g., multiple recent partners) as well as repeated sexual encounters with multiple partners that overlap in time (e.g., sexual concurrency) are critical factors in sexually transmitted HIV epidemics. Evidence from mathematical modeling and field research shows that multiple sexual partnerships may

amplify sexually transmitted infections (STI), including HIV. [1–3] A national study of Native American men who have sex with men found 34% HIV prevalence and a cumulative concurrency prevalence of 55%, indicating an alarmingly high risk for HIV transmission. [4] Multiple recent sex partners can increase exposures proximal to the acute phase of HIV infection when individuals are most infectious. [2,5,6] In addition, STI themselves cause HIV shedding in genital secretions, further elevating HIV infectiousness. [7] The combination of multiple recent sex partners and co-occurring STI is particularly alarming for the potential spread of HIV infection. Senn et al. [8] found that two out of three STI clinic patients in steady relationships reported at least one additional concurrent sex partner. High prevalence of multiple recent sex partners in combination with STI has been reported in other studies. [9–11]

The rapid spread of HIV in southern Africa has been attributed, at least in part, to multiple sex partners.[3,12] Of particular importance are overlapping sex partners, a subset of multiple partners referred to as concurrent. For example, a household survey in Botswana found that 23% of sexually active persons reported concurrent sexual partners. [13] A study of South African youth found that 13% of 16 to 26 year olds living in Cape Town reported concurrent sex partners.[14] In addition, reductions in HIV incidence observed in Uganda during the 1990s are believed to have occurred following reductions in concurrent sex partnerships. [15] Men are more likely to have concurrent sex partners and are therefore more likely to expose multiple partners to HIV during acute infection and during episodes of co-occurring STI. [16]

Multiple sex partners are also known to co-occur with other behavioral risks for STI. Senn et al. [8] found that men in the northeastern US who were recently diagnosed with an STI commonly reported multiple sex partners and drank alcohol before sex. A national study of men in the US also found that men who had concurrent partners were more than twice as likely to use drugs or drink alcohol before sex. [10] These findings have been replicated in other studies of men to suggest a link between multiple and concurrent sex partners and substance use. [17] In South Africa, a country with among the world's fastest growing HIV epidemics, alcohol use is a known risk factor for STI/HIV.[18,19] For example, Townsend et al. [20] found that problem drinking was associated with relationship violence among men who reported multiple sex partners. The study did not, however, investigate whether alcohol use was tied to having multiple recent sex partners. To our knowledge no study has examined alcohol use as a contributing factor to HIV transmission risks in relation to multiple recent sex partners in southern Africa.

The current study examined the association between alcohol use and multiple recent sexual partnerships among men and women seeking treatment for an identified STI in South Africa. We hypothesized that alcohol use would be associated with multiple recent sex partners and that alcohol use would moderate the relationship between multiple recent partners and frequency of unprotected sex. We also examined a population estimate of sexual concurrency among men and women seeking treatment for an identified STI in Cape Town.

Methods

Participants and Setting

The clinic that served as the site for this study is located in an urban neighborhood adjacent to Cape Town's downtown business district. The clinic serves over 1800 patients per month, more than 90% of which are seeking STI diagnostic and treatment services. Approximately half of all patients seen at the clinic have previously received STI services. The estimated HIV prevalence at the clinic is 25% among persons opting for HIV testing. Participants were

529 men and 210 women receiving STI services. The majority (60%) had previously received STI treatment services from the clinic.

Measures

Demographic and health characteristics—Participants reported their age, race, years of formal education, whether they were employed and their marital status. Participants also indicated whether they had ever traded sex for money, a place to stay, or material goods. The survey included HIV testing history and experience of STI symptoms and diagnoses.

Sexual behaviors and multiple recent partners—Participants reported their number of male and female sex partners and frequency of vaginal/anal intercourse in the previous two months. Sexual behavior assessments were constructed using partner-level measures such that participants were instructed to think about the previous two months and for each of up to three sex partners in that time period report their frequency of intercourse occasions, with and without condoms and the frequency of intercourse occasions that included alcohol use before or during sex. For each partner, we also asked the partner's age, their relationship status, the time that they last had sex with that person, and whether they believed the partner was having sex with other partners. Following the first partner assessment, the questions were repeated for a second partner and repeated again for a third partner. Participants with only one partner did not complete additional measures for partners two and three, and participants with two partners did not complete measures for partner three. Age differences between participants and their partners were also calculated (participant age – partner age). For participants with two or more partners we calculated the participant-partner age difference using the most recent non-primary partner. We also asked participants to report the number of sexual partners they believe most of their current friends have.

Substance use—Participants reported their frequency of alcohol use in the previous two months and whether they had consumed six more drinks in a single drinking episode during that time period. Measures were adapted from the frequency and quantity items of the Alcohol Use Disorders Identification Test. [21] In addition, participants reported whether they used cannabis (dagga), the most common non-alcohol substance in South Africa, in the previous two months.

Procedures

Participants were referred to the study after their consultation with a nurse for STI diagnosis and treatment. All potential participants present in the clinic were referred to the project recruiter and 87% of patients approached consented to the study and completed the survey. Less than 10% of participants could not complete the surveys on their own and required interviewer administration. All measures were administered in English and Xhosa (an indigenous African language), the two languages spoken by nearly all clinic patients. Participants received 15 South African Rand (approximately US\$12) for completing the survey.

Statistical analyses

For all analyses, participants were defined as either not having or having multiple recent sex partners. Participants who reported only one partner in the previous two months were defined as having one partner and participants with two or more partners in the past two months, including those with concurrent and non-concurrent partners, were defined as having multiple recent sex partners. Restricting multiple partnerships to a two month timeframe increases the likelihood of partner exposures during acute HIV infection.[12,22] Multiple recent sex partners was further described by examining the timeframes within

which the specific sexual partnerships occurred. We also calculated the concurrency index developed by Ktrezschmar and Morris [23] in previous descriptive studies of sexual concurrency. [24] The concurrency index (k) measures the fraction of sexual partnerships that are concurrent at any given point in time; $k = \sigma^2/\mu + \mu - 1$. Higher values of k indicate greater concurrency in the population. Initial analyses determined that only 16 of the 210 women (9%) reported multiple recent sex partners. We therefore conducted the main study analyses comparing participants with one partner to those with multiple recent partners for men only.

Sexual behaviors were examined using frequencies of both unprotected and protected sex acts. Frequencies of sexual behaviors were summed across partners. We also calculated the proportion of sexual occasions that were protected by condoms and the proportion of sexual occasions that involved alcohol use, including when the participant drank and when their partner drank. The proportions were calculated across partners and therefore allowed comparisons between participants with varying numbers of partners. Group comparisons were made between participants who did and did not have multiple recent sex partners using bivariate logistic regressions, reporting odds ratios (OR) and 95% confidence intervals. We also conducted separate logistic regressions to compare men who reported drinking (drinkers) and those who did not drink (non-drinkers) on sexual behaviors. Finally, to test for moderating effects of alcohol on sexual risks in relation to multiple recent sex partners separate logistic regression models were performed comparing multiple partnership groups while controlling for alcohol use in sexual contexts. For all analyses, a list-wise deletion procedure was used for missing values and statistical significance was defined as $p < .05$.

Results

Among the 844 STI clinic patients invited to participate in the study, 739 (87%) consented and completed the measures. The distributions of sex partners for men and women are shown in Table 1. The mean number of sex partners was 1.45 (SD = .83, range 1–12) in the previous two months. A total of 264 (31%) participants reported two or more sex partners in the previous two months. However, less than 1% of persons reporting multiple recent sex partners were women. Using the mean ($\mu = 1.45$) and variance ($\sigma^2 = 0.69$) as a population estimate we calculated a concurrency index k of .92, indicating a high level of sexual concurrency in the entire sample. Among men, the mean number of sex partners was 1.58 and $\sigma^2 = 0.61$, yielding $k = 0.96$. For women, the mean number of sex partners was 1.11, $\sigma^2 = 0.76$, $k = 0.79$. Thus, the fractions of concurrency were high among men and moderate among women.

Rapid turnover of sex partners was common among men with multiple recent sex partners; 31 (12%) men had sex with at least two of their partners less than a week apart, 87 (35%) had two partners about a week apart, and 97 (39%) had sex with two or more partners within a month of each other. The remaining 33 (13%) men with multiple partners indicated sexual contacts beyond one month but less than two months apart. These overlapping timeframes also support substantial concurrency in sexual relationships.

Risk factors associated with multiple-recent sex partners

Comparisons of participants defined as having one partner and those having multiple partners are shown in Table 2. The demographic characteristics associated with multiple recent sex partners were gender and employment status; men and employed participants were significantly more likely to report multiple recent partners. Individuals who reported multiple recent sex partners were also less likely to have been tested for HIV and less likely to have tested HIV positive. Multiple recent sex partners was also significantly related to perceptions that their friends have more sex partners.

Among men who had multiple recent sex partners, we found a greater likelihood of being unmarried, slightly younger age, and having greater years of education (see Table 3). Men who had multiple recent sex partners also reported knowing more men and women who they believed had multiple partners. In addition, multiple partners was related to greater age disparity between themselves and their sex partners; men with multiple partners were significantly older than their partners relative to men who reported one recent partner.

Men with multiple recent sex partners were more likely to have experienced genital pain and more likely to have paid for sex than men who reported one partner (see Table 4). There were no differences between the sexual partner groups for having had previous STI diagnoses, experienced genital ulcers, or genital discharge.

Multiple recent sex partners and substance use

Participants who reported multiple recent partners also drank more frequently, drank in greater quantities, and were more likely to use cannabis (see Table 5). Men with multiple recent partners were also significantly more likely to drink alcohol and report partners drinking before or during sexual encounters. Because frequencies of alcohol use in sexual contexts may have been weighted by numbers of sex partners, we also examined the proportion of sexual occasions that involved the participant or their partner drinking. Results showed that men with multiple recent sex partners had a significantly greater proportion of sexual encounters in which they drank before sex. Men with multiple recent sex partners indicated a significantly greater proportion of sexual encounters that involved any alcohol use by them or their partners. The difference between groups for the proportion of sexual encounters in which their partners drank before sex was not significant.

Table 6 shows sexual behaviors, proportion of sexual behaviors protected by condoms, and perceptions of partner concurrency comparing men who had one partner and men with multiple recent partners stratified for current alcohol use. Results showed that multiple recent sex partners was associated with higher rates of unprotected and protected sexual intercourse (see Table 6, first column OR). In addition, men with multiple partners were more likely to believe that their sex partners also had concurrent partners.

In a second analysis, comparisons of men who reported alcohol use and men who did not report alcohol use showed that drinkers reported more sex partners in the past two months than men who did not drink (see Table 6 second column OR). However, global alcohol use was not associated with rates of unprotected sex or proportion of sexual behaviors protected by condoms. Finally, comparison of recent multiple partner groups controlling for alcohol use indicated that drinking did not moderate the association between multiple recent sex partners and unprotected intercourse.

Discussion

A growing body of evidence suggests that rapid turnover of sexual partnerships promotes the spread of HIV. [21] The current study found that nearly half of men seeking treatment for an identified STI had two or more sex partners in two months, well within the timeframe of acute HIV infection. The rate of sexual concurrency among men (k statistic .96) exceeded concurrency observed in women (k statistic .79) as well as concurrency reported in non-clinic samples in southern Africa. [22] For example, research conducted in general populations throughout southern Africa has found a considerable range of sexual concurrency, with fractions of relationships that were concurrent (k index) ranging from .98 in Yaounde' Cameroon to .44 in Kisumu Kenya, and .18 in Dakar Senegal.[24] We found that one in five men with multiple recent sex partners were married and men with multiple partners had more years of education, were more likely to believe the people they know

have concurrent sex partners, and were significantly older than their partners. These factors replicate previous research to suggest that characteristics associated with multiple recent sex partners are reliable across vastly different samples. [12,14–15,22]

Our study provides among the first analyses of substance use in relation to multiple recent sex partners in southern Africa. Men receiving STI clinic services who had multiple recent sex partners reported greater alcohol use than their counterparts who reported one recent sex partner. One in four sexual occasions among men with multiple sex partners involved their using alcohol and nearly 40% of their sexual occasions involved either they or their sex partner drinking. Alcohol is a known correlate of sexual risk behaviors in southern Africa and these data further bolster the importance of alcohol's role in sexual risks. [16] Although drinkers reported a greater frequency of recent sex partners, we did not find that alcohol use moderated the association of multiple recent partners and unprotected sex acts. Specifically, higher rates of unprotected and protected sex among men with multiple recent sex partners remained significantly different from men who did not have multiple recent sex partners after controlling for alcohol use in sexual contexts. These findings therefore demonstrate that both multiple partners and alcohol use are critical, albeit independent, risk factors in South Africa.

The current findings should be interpreted in light of their methodological limitations. The study was conducted in a single STI clinic in Cape Town. Because the clinic was dedicated to STI services it may represent a different population of individuals who seek treatment for an identified STI. In addition, there are substantial cultural differences throughout South Africa that cannot be assumed similar to our mostly Xhosa sample. We therefore suggest caution when generalizing these results to other regions within South Africa. We also relied solely on self-report for behavioral assessments. Although we used anonymous survey methods our behavioral measures are subject to under-reporting biases and should be taken as lower-bound estimates of sexual risk and substance use behaviors. The surprisingly low rate of multiple recent partners among women in the STI clinic setting may have resulted from women under-reporting number of partners. We were also unable to link our behavioral data to new or recurrent STI and HIV infection. Future research should be conducted using prospective designs to confirm associations between multiple recent sex partners, behavioral risk factors and HIV infection. Despite these limitations, we believe that our findings have implications for STI/HIV prevention interventions for people seeking STI treatment.

Multiple recent sex partners and sexual concurrency are common in populations with high-rates of HIV infection. [4] Fortunately, behavioral interventions have demonstrated significant effects on reducing numbers of sex partners. [23] Although no behavioral intervention has yet specifically targeted reducing concurrent partners, reductions in numbers of sex partners will, by definition, reduce concurrent partners. There have also been reductions in numbers of partners when public policies have provided adequate resources for behavioral interventions and culturally relevant messages. [13] The urgent need to address multiple and concurrent sex partners for HIV prevention should look toward existing behavioral interventions and past public health messages that have demonstrated efficacy in reducing numbers of sex partners.

Short summary

Nearly one of three sexually transmitted infection clinic patients in Cape Town South Africa reports two or more sex partners in the previous two months with substantially higher rates of multiple recent partners observed among men than women. Alcohol use

was common and drinking was associated with multiple sex partners. However, alcohol use did not account for sexual exposure risks associated with multiple recent partners.

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Table 1

Distribution of sex partners in the previous two months among men and women seeking treatment for identified STI.

Number of partners	Men (N=529)		Women (N=210)	
	N	%	N	%
1	281	53	194	92
2	196	37	10	5
3	44	8	4	2
4	4	1	1	1
5	1	1	0	
6	3	1	0	
12	0		1	1
Mean	1.59		1.15	
SD	0.76		0.85	

Table 2

Demographic and health characteristics of STI clinic patients reporting one partner and patients reporting multiple recent sex partners.

	One Partner (N=475)		Multiple Partners (N=264)		OR	95%CI
	N	%	N	%		
Men	281	59	248	94	Reference	
Women	194	41	16	6	0.09**	0.06–0.16
Xhosa/Black	458	96	252	95	1.01	0.84–1.41
Employed	298	64	192	75	1.70**	1.21–2.39
Married	127	27	48	18	0.61	0.41–0.87
Children	306	65	167	64	0.95	0.70–1.31
Previous clinic visit	248	52	152	58	1.24	0.91–1.68
Tested for HIV	379	80	191	72	0.65**	0.45–0.92
HIV+	37	9	6	3	0.28**	0.12–0.69

	M	SD	M	SD
Age (years)	30.1	8.1	29.3	7.6
Education (years)	10.1	2.4	10.1	2.3
Times tested for HIV	2.5	2.2	2.3	2.0
Number of sex partners friends are believed to currently have	1.9	1.6	2.6	1.6

Demographic and health characteristics of men receiving STI clinic services reporting one partner and men reporting multiple recent sex partners.

Table 3

	One Partner (N = 281)		Multiple Partners (N = 248)		OR	95%CI
	N	%	N	%		
Xhosa/Black	273	97	238	96	0.85	0.61–1.77
Employed	201	73	184	76	1.18	0.79–1.76
Married	80	29	47	19	0.58*	0.38–0.87
HIV tested	203	73	180	73	0.99	0.69–1.45
HIV+	11	5	5	3	0.48	0.16–1.43
Know men who have 2+ concurrent partners	168	60	195	79	2.52**	1.71–3.71
Know women who have 2+ recent partners	155	55	159	64	1.46*	1.03–2.08

	M		SD	
	M	SD	M	SD
Age (years)	31.6	8.9	29.5	7.6
			0.96**	0.95–0.99
Education (years)	9.6	2.5	10.1	2.4
			1.08*	1.01–1.16
Age difference from sex partners (years)	5.8	4.8	6.2	5.6
			1.22**	1.07–1.40

Table 4

Risk history and substance use among men receiving STI clinic services reporting one partner and men reporting multiple recent sex partners.

	One Partner (N = 281)		Multiple Partners (N = 248)		OR	95%CI
	N	%	N	%		
Lifetime condom use	259	89	224	90	1.15	0.65–2.03
Male sex partners	4	1	4	2	1.13	0.28–4.60
Previous STI history						
Previous diagnosis	198	71	184	74	1.16	0.79–1.71
Genital ulcers	46	17	42	17	1.04	0.66–1.66
Genital discharge	183	65	169	68	1.15	0.79–1.65
Genital pain	224	80	215	87	1.62*	1.01–2.60
Received money for sex	5	2	6	2	1.36	0.43–4.54
Paid money for sex	11	4	23	9	2.51**	1.19–5.15
Alcohol use weekly or more often	63	23	81	33	1.29**	1.12–1.47
6+ drinks on one occasion weekly or more	28	11	47	20	1.33**	1.14–1.55
Use cannabis	42	12	41	16	1.34*	1.01–1.77

Sex-related alcohol use in the previous two months among men receiving STI clinic services reporting one partner and men reporting multiple recent sex partners.

Table 5

	One Partner		Multiple Partners			OR	95%CI
	M	SD	M	SD			
Frequency of drinking before sex	1.03	1.82	3.54	4.75		1.30**	1.21–1.41
Frequency of partner drinking before sex	0.36	1.07	1.42	2.78		1.44**	1.25–1.65
Frequency either participant or partner drinking before sex	1.39	2.47	4.97	6.73		1.23**	1.15–1.30
% intercourse occasions in which participant drank before sex	18.49	34.5	27.30	36.33		2.06**	1.23–3.46
% intercourse occasions in which partner drank before sex	6.67	25.9	10.8	20.38		2.34	0.97–5.59
% intercourse occasions in which either participant or partner drank before sex	25.05	52.7	38.08	49.98		1.69**	1.16–2.46

Table 6

Sexual behaviors among men reporting one partner and men reporting multiple sex partners and current alcohol use.

	Does Not Drink Alcohol						Drinks Alcohol						Models									
	One partner (N = 96)			Multiple partners (N = 61)			One partner (N = 163)			Multiple partners (N = 197)												
	M	SD	N	%	M	SD	N	%	M	SD	N	%	M	SD	N	%	OR ^a	95%CI	OR ^b	95%CI	OR ^c	95%CI
Number partners	1.0		0		2.2		0.4		1.0		0		2.3		0.7		--		1.55**	1.2–2.0	--	
Unprotected intercourse	5.1	4.8	10.0	8.6	5.3	5.9	9.3	1.12**	1.1–1.2	1.00	0.9–1.0	1.12**	1.1–1.2	1.01	0.9–1.0	1.09**	1.1–1.4	1.12**	0.9–1.0	1.12**	1.1–1.2	
Condom protected Intercourse	3.9	13.1	5.6	5.3	3.3	4.2	7.1	1.09**	1.1–1.2	1.01	0.9–1.0	1.09**	1.1–1.2	1.01	0.9–1.0	1.09**	1.1–1.4	1.09**	0.9–1.0	1.09**	1.1–1.4	
Percent condom use	34.3	39.3	36.2	27.2	37.6	38.7	40.1	1.22	0.7–1.9	1.39	0.8–2.3	1.17	0.7–1.9					1.22	0.7–1.9	1.39	0.8–2.3	
N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%	N	%					
Partner has other partners	61	54	84	94	54	171	91	7.6**	4.6–12.3	1.11	0.7–1.6	7.5**	4.5–12.3									