Published in final edited form as:

J Acquir Immune Defic Syndr. 2011 July 1; 57(3): 230–237. doi:10.1097/QAI.0b013e3182167e7a.

Mental Health and HIV Sexual Risk Behavior among Patrons of Alcohol Serving Venues in Cape Town, South Africa

Kathleen J. Sikkema, PhD^{1,2,3}, Melissa H. Watt, PhD², Christina S. Meade, PhD^{1,2,3}, Krista W. Ranby, PhD⁴, Seth C. Kalichman, PhD⁵, Donald Skinner, PhD⁶, and Desiree Pieterse, MPH⁶

¹Duke University, Department of Psychology and Neuroscience

²Duke University, Global Health Institute

³Duke University, Department of Psychiatry and Behavioral Sciences

⁴Duke University, Center for Child and Family Policy

⁵University of Connecticut, Department of Psychology

⁶Stellenbosch University, Faculty of Health Sciences

Abstract

Background—Alcohol-serving venues in South Africa provide a location for HIV prevention interventions due to risk factors of patrons in these establishments. Understanding the association between mental health and risk behaviors in these settings may inform interventions that address alcohol use and HIV prevention.

Methods—Participants (N=738) were surveyed in six alcohol-serving venues in Cape Town to assess post-traumatic stress disorder (PTSD) and depression symptoms, traumatic experiences, sexual behavior and substance use. Logistic regression models examined whether traumatic experiences predicted PTSD and depression. Generalized linear models examined whether substance use, PTSD, and depressive symptoms, predicted unprotected sexual intercourse. Men and women were analyzed separately.

Results—Participants exhibited high rates of traumatic experiences, PTSD, depression, alcohol consumption, and HIV risk behaviors. For men, PTSD was associated with being hit by a sex partner, physical child abuse, sexual child abuse and HIV diagnosis; depression was associated with being hit by a sex partner, forced sex and physical child abuse. For women, both PTSD and depression were associated with being hit by a sex partner, forced sex, and physical child abuse. Unprotected sexual intercourse was associated with age, frequency and quantity of alcohol use, drug use, and PTSD for men and frequency and quantity of alcohol use, depression, and PTSD for women.

Conclusion—Mental health in this setting was poor and was associated with sexual risk behavior. Treating mental health and substance use problems may aid in reducing HIV infection. Sexual assault prevention and treatment following sexual assault may strengthen HIV prevention efforts.

Correspondence: Kathleen J. Sikkema, PhD, Duke University, Department of Psychology and Neuroscience, 417 Chapel Drive, Box 90086, Durham, NC 27708, Tel: 919-684-9073, Fax: 919-660-5726, kathleen.sikkema@duke.edu.

Publisher's Disclaimer: This is a PDF file of an unedited manuscript that has been accepted for publication. As a service to our customers we are providing this early version of the manuscript. The manuscript will undergo copyediting, typesetting, and review of the resulting proof before it is published in its final citable form. Please note that during the production process errors may be discovered which could affect the content, and all legal disclaimers that apply to the journal pertain.

Keywords

HIV/AIDS; HIV prevention; Mental health; Alcohol; South Africa

INTRODUCTION

An estimated 5.7 million people were living with HIV in South Africa in 2008, the highest number of any country in the world¹. With an adult HIV prevalence rate of 18% and a primarily heterosexual driven epidemic, research is needed to better understand the context of sexual risk behavior in South Africa. HIV risk behavior may be situated in a syndemic of co-occurring and interacting psychosocial health conditions, which includes use of alcohol and other substances, abuse and traumatic experiences, and poor mental health²⁻⁵. In the framework of syndemics, it is the social context that creates vulnerabilities for these overlapping and synergistic influences, and therefore leads to greater risk for HIV⁴. Alcohol-serving venues in communities characterized by poverty and high rates of HIV infection are settings where many of the factors in the HIV syndemic co-exist and studies about the psychosocial predictors of HIV risk behavior could be of great benefit^{6,7}.

Mental disorders in South Africa are often under-diagnosed and untreated⁸. Previous studies suggest that depression in South Africa may be lower than other countries, but that post-traumatic stress disorder (PTSD) may be higher. The high rates of PTSD are likely associated with South Africa's recent history of political violence and gross inequalities, which have contributed to a society in which violence, including child abuse and intimate partner violence, is commonplace⁹⁻¹¹. In a representative household survey of South Africans, major depression was experienced by 9.7% of respondents within their lifetime and 4.9% within the previous year¹². Surveys in the primary care setting have reported between 12.4% and 19.9% of patients in South Africa have PTSD^{13,14}. Given evidence that people often use alcohol to cope with stressors and negative emotions^{15,16}, it is likely that mental health disorders such as depression and PTSD are more common among heavy drinkers, compared with the general population¹⁵. Although the proportion of South Africans who drink alcohol is fairly low (in the most recent Demographic and Health Survey, 39% of men and 16% of women reported alcohol use in the past year), heavy drinking is common among those who use alcohol, with 23% of men and 25% of women reporting harmful levels in the past weekend¹⁷.

Multiple studies in Africa have found that alcohol use is associated with HIV risk behaviors, including unprotected sex and multiple sex partners¹⁸⁻²¹. Greater alcohol use has also been shown to relate to increased HIV infections^{22,23}. The reasons for this association include physiological changes that lead to less inhibition and poorer decision making^{7,24}, greater susceptibility to violence and forced sex encounters^{25,26}, social influences that create opportunities for sexual encounters²⁷, and potentially a weakened immune system²⁸. Other substances, including methamphetamine and marijuana in South Africa, may co-occur with alcohol use and further contribute to sexual risk behavior^{29,30}.

HIV prevention interventions in alcohol-serving venues may be an effective way to reach groups with high risk behaviors. Research in South Africa has shown that people commonly meet sex partners in these venues^{31,32}, and that these venues are settings of heightened gender based violence and transactional sex^{6,33}. Despite their potential as intervention settings, bars and informal taverns are relatively untapped sites for HIV prevention programs³⁴.

Multiple studies have found that poor mental health, including depression and PTSD, is associated with greater sexual risk behaviors^{35–39}. At the same time, meta-analytic reviews of the literature have identified mixed results in the relationship between mental health and sexual risk behavior, suggesting that moderators may be overlooked, or a U-shaped relationship may exist^{40,41}. Specifically, the association may depend on the extent to which people in the population being studied experience mental health problems and engage in sexual risk behaviors. This study attempts to fill a gap in the literature by exploring the impact of mental health and substance use on sexual risk behavior in a setting where people may be vulnerable to poor mental health, traumatic experiences and high risk sexual behavior.

The purpose of the study incorporates three related aims. First, we describe mental health indicators, substance use, and HIV sexual risk behaviors among patrons of alcohol-serving venues in a Cape Town township. Second, we assess the prevalence of potentially relevant traumatic experiences and examine the association between these experiences and a positive screen for PTSD and depression. Third, we examine whether PTSD and depressive symptoms are associated with HIV sexual risk behaviors while accounting for alcohol and other drug use. All analyses are reported separately for men and women.

METHODS

Study site

The study took place in a peri-urban township in Cape Town, South Africa. Alcohol-serving venues in the township were systematically identified using an adaptation of the Priorities for Local AIDS Control Efforts (PLACE) methodology³². A total of 210 members of the community, approached at public places such as bus stands and markets, were asked to identify places where people go to drink alcohol. Sites included both *shebeens*, small unlicensed venues, and *taverns*, larger licensed venues. The research team visited 88 identified venues to assess for study eligibility. Venues were eligible if they had space for patrons to sit and drink, reported >50 unique patrons per week, had >10% female patrons, and were willing to have the research team visit over the course of a year. Twenty four venues were identified as eligible; six were selected that represented both small and large venues geographically dispersed throughout the township. Because venues attracted customers who were primarily either Black African (Xhosa speaking) or Coloured (Afrikaans speaking), three of each type were selected.

Procedure

Participants were recruited from the six alcohol-serving venues. The fieldwork teams (South Africans who were matched by language and ethnicity to the venues) initially visited the sites for a minimum of 4-hour blocks every day (generally late afternoon to mid-evening) over a 1-week period to conduct ethnographic and behavioral observations, and to establish familiarity with the setting. Following this observational period, the teams visited the sites during the same period of times the following week to collect survey data. Individuals inside the venue were approached to complete the 96-item survey questionnaire, which took on average 10–15 minutes to complete. Care was taken to approach people as soon as they entered the venue, in order to complete the assessment process before they became intoxicated.

Cross sectional surveys were repeated four times over a one-year period. The data presented here represents one time point (data collected June–September 2009) because measures of mental health were only included in this single time point. A total of 879 individuals were approached to participate, and 738 (84%) agreed. Consent for the anonymous survey was

obtained using an oral text. Participants were given the option of self-administering the survey or having it read to them by a staff member (94% self administered), with sensitivity to privacy issues in the venue. Participants were given the choice of completing the survey in English, Xhosa or Afrikaans, and received a small token of appreciation for participating in the study (e.g., a key ring). Surveys were scanned into a database using Remark Office OMR Version 6 (Gravic, Inc., Malvern, PA) and manual checks were done to identify errors.

All study procedures were approved by the ethical review boards of Stellenbosch University, the University of Connecticut, and Duke University.

Measures

Post traumatic stress disorder (PTSD)—A 7-item screener ($\alpha=0.81$) was used to identify PTSD symptoms in the past month⁴². Items asked whether the respondent had experienced difficulties related to a traumatic experience (e.g., “Did you begin to feel more isolated and distant from other people?”, “Did you become jumpy or get easily startled by ordinary noises or movements?”). Consistent with epidemiological evidence, participants who answered affirmatively to at least four of the questions were considered to have a positive screen for PTSD⁴². In analyses predicting mental health, PTSD was measured using a dichotomous screen (yes, no). When PTSD was used as a predictor for sexual risk behavior, variability of the PTSD measure was retained by using it as a continuous measure.

Depression—The PHQ-2, a 2-item screener, was used to identify the presence of depressive symptoms^{43,44}. This screener asked participants whether or not in the last month they had “often been bothered by feeling down, depressed or hopeless” and “often been bothered by little interest or pleasure in doing things”. Participants who answered yes to either of these questions were considered to have a positive screen for depression⁴³. Although brief, this two-item measure of depression has high sensitivity and moderate specificity, making it a good screener when time is limited⁴⁵.

Traumatic experiences—Participants were asked if they had ever been hit by a sex partner; forced to have sex; physically abused as a child; sexually abused as a child; and been diagnosed as HIV positive. Traumatic experience items were coded as yes/no.

Alcohol use—Participants completed the first two questions from the Alcohol Use Disorders Identification Test (AUDIT)⁴⁶. These included frequency of drinking (“How often do you have a drink containing alcohol?” response choices from 0=never to 4=more than four times a week), and typical quantity (“How many drinks containing alcohol do you have on a typical day when you are drinking?” response choices from 0=1–2 drinks to 4=10 or more drink). Because nearly all participants met the traditional definition of hazardous drinking using these measures, we considered frequency and quantity of alcohol as separate items in the analysis.

Problem drinking—The 4-item CAGE measure⁴⁷ was used to assess lifetime experience of problem drinking. The yes/no item responses were summed (ranging from 0–4); a score ≥ 2 was considered clinically significant for problem drinking⁴⁷.

Drug use—Participants were asked how often in the past 4 months they had used marijuana (“dagga”), methamphetamine (“tik”), inhalants (e.g., glue, petrol) and injection drugs. Due to the high correlation among these drugs, analyses considered use of any drug as compared to no drug use.

Sexual behavior—Participants were asked a series of questions about their sexual behavior in the last four months, including the number of sex partners, and the number of vaginal and anal sexual intercourse occasions with and without a condom. The total number of unprotected intercourse occasions was used in analyses.

Statistical analysis

SPSS version 17.0 (SPSS Inc., Chicago, IL) was used for all analyses. First, gender differences were examined for all variables of interest using chi-square tests for categorical variables and t-tests for continuous variables. Given significant gender differences found on multiple variables of interest, subsequent models were conducted separately for men and women. Second, logistic regression analyses were conducted to identify traumatic experiences that were univariately associated with a positive screen for PTSD and a positive screen for depression. Analyses were initially explored with the inclusion of race and age as covariates, but this did not change the univariate results. Third, a generalized linear model was estimated to identify factors that were associated with number of unprotected sexual acts in the past four months. To account for potential overdispersion in the outcome, negative binomial regression was used. Predictor variables were entered in a single step. Comparisons are expressed in terms of relative rates (RR).

RESULTS

Description of the sample

The sample was fairly evenly split between men and women, and people who identified as Black and Coloured (Table 1). About half had less than a high school education and half were unemployed. The majority of participants were single and lived within a short walk from the venue. Several demographic variables differed for men and women. In bi-variate analyses, women were more likely to be Coloured (56% vs. 33%), to be unemployed (74% vs. 38%), and to live close to the venue (81% vs. 68%). Women were less likely to have a high school education (30% vs. 54%) and to live in a house without electricity or water (7% vs. 14%).

Mental health among both male and female patrons in this setting was poor; however, women were significantly more likely than men to screen positive for both PTSD (45% vs. 25%) and depression (68% vs. 51%; Table 2). As expected, screening positive for depression and PTSD were closely associated ($\chi^2=68.48$, $p<.001$). About half (48.4%) of the sample reported having at least one of the traumatic experiences assessed. Women were more likely to report ever being hit by a sexual partner (37% vs. 18%), but all other traumatic experiences were endorsed at similar rates.

Participants reported heavy drinking, as expected given the recruitment strategy (Table 2). Women and men were equally likely to drink large quantities, but men drank more often. The majority of respondents had indications of problem drinking, with no gender difference. In total, 21% of the sample reported using one or more drugs in the past four months.

The sample exhibited high rates of HIV sexual risk behaviors in the past four months (Table 2). Respondents reported a mean of 1.8 sexual partners (range 0–30, s.d. 3.2). Almost half (44%) reported having unprotected sexual intercourse at least once, with a mean of 4.03 unprotected sex acts (range 0–100, s.d. 10.4). Men were more likely to report any sexual activity, as well as a significantly greater number of partners. However, women were more likely to report any unprotected sexual intercourse. The majority (62% of men and 74% of women) had been tested for HIV, and 6.3% of men and 5.5% of women had received an HIV positive diagnosis.

Predictors of mental health variables

Tables 3 and 4 summarize the univariate logistic regression analyses predicting a positive screen for PTSD and depression, respectively. Among men, PTSD was associated with reporting intimate partner violence, physical or sexual child abuse, and being diagnosed with HIV. Depression was associated with reporting intimate partner violence, forced sex, and physical child abuse. For women, both PTSD and depression were associated with reporting intimate partner violence, forced sex, and physical child abuse.

Predictors of high risk sexual behavior

Table 5 summarizes the results of the negative binomial regression models predicting number of unprotected sexual intercourse occasions in the previous four months. For men, increased frequency of unprotected sex was associated with older age, greater frequency of alcohol use, greater quantity of alcohol use, any drug use, and a higher level of PTSD symptoms. Specifically, the rate of unprotected sex in men was 26% higher for every 1-point increase in alcohol frequency, 19% higher for every 1-point increase in alcohol quantity, 72% higher for men who used drugs, and 15% higher for every 1-point increase on the PTSD scale. For women, increased frequency of unprotected sex was associated with greater frequency of alcohol use, greater quantity of alcohol use, a positive screen for depression, and higher level of PTSD symptoms. Specifically, the rate of unprotected sex in women was 18% higher for every 1-point increase in alcohol frequency, 26% higher for every 1-point increase in alcohol quantity, 53% higher for women who screen positive for depression, and 7% higher for every 1-point increase on the PTSD scale.

DISCUSSION

Mental health distress, traumatic experiences, and substance use may synergistically interact to increase HIV sexual risk behavior. Male and female patrons in alcohol serving venues in a peri-urban township in Cape Town, South Africa reported high rates of mental health problems, alcohol and drug use, and HIV sexual risk behaviors. Women were more likely than men to screen positive for both depression and PTSD, although the screening indicators for men and women were much higher than population rates for depression¹² and primary care rates for PTSD^{13,14}. While the estimates of depression and PTSD in the current sample were based on brief screening measures, the psychosocial issues and life stressors faced by venue patrons in this socially and economically disadvantaged context support the high levels of reported emotional distress. Given that respondents were recruited from alcohol serving venues in the community, the high levels of alcohol use were not surprising. The finding that approximately 70% of patrons reported problem drinking, however, is markedly higher than a nationally representative sample that classified 27.6% of men and 9.9% of women as alcohol dependent using the same measure as the current study¹⁷. Unlike the gender differences reported in the national sample, problem drinking in the current study sample was equally high among men and women. This suggests that women who frequent drinking venues exhibit markedly different drinking behaviors than the general population and may be an appropriate target group for HIV prevention with regard to the interaction of sexual risk and alcohol use.

Reported rates of traumatic experiences were not as high as expected in comparison to both South African and high risk U.S. populations^{3,48}, and only intimate partner violence differed by gender, with twice as many women reporting ever having been hit by a sexual partner. Lifetime experiences of physical violence (both intimate partner violence and childhood physical abuse) were associated with depression and PTSD in both women and men. High rates of mental health distress are commonly reported among women experiencing intimate partner violence, but this has not been studied among men⁴⁹. Reporting any experience of

forced sex was also associated with depression and PTSD for women and with depression for men. Surprisingly, men and women reported similar rates of forced sex. In future research we plan to pursue a better understanding of the meaning and continuum of forced sex, especially with regard to lingual and cultural interpretations of forced sex that may include a man perceiving that a woman had tricked him into having sex⁵⁰. Childhood sexual abuse was associated with PTSD among men, but unexpectedly, not among women, although a trend in that direction was evident. Since PTSD and depression are common among women and men with childhood sexual abuse histories^{51–54}, further research is needed to understand the lack of association among women in our sample, and whether this may be due to underreporting or the more recent psychological impact of adult physical and sexual violence among women. Social and contextual influences such as stigma and shame among men who have experienced childhood sexual abuse⁵⁵, and women's use of alcohol and drug use to cope in a violent relationship⁵⁶, may help explain the associations between these traumatic experiences and mental health symptoms. Finally, an HIV diagnosis was associated with PTSD among men, but not among women. Incidence of lifetime and HIV-related PTSD among a public clinic sample of HIV positive adults in the Western Cape was 54% and 40%⁵⁷, respectively; thus we expected that having been diagnosed with HIV would be related to PTSD.

To our knowledge, this is the first study examining the association between mental health, substance use, and sexual risk behavior in alcohol serving venues in South Africa. As expected, the frequency and quantity of alcohol use was associated with sexual risk behavior for both men and women. Sexual risk behavior was also strongly associated with drug use, but only among men, with the most commonly used drugs being marijuana and methamphetamine. In South Africa and globally, methamphetamine use in particular has been associated with higher levels of sexual risk behavior^{29,30,58} and is commonly used concurrently with other substances, including marijuana⁵⁹.

Importantly, findings revealed that mental health distress was predictive of the frequency of unprotected sexual intercourse while accounting for the significant effect of alcohol and drug use. PTSD symptomatology was an important predictor of sexual risk behavior for both men and women; depressive symptomatology was also a significant predictor for women. Although the cross-sectional nature of the research does not permit causal attributions, the findings do provide further support that poor mental health is associated with sexual risk behavior^{3,35–37}.

This study is not without limitations. The study included a small number of alcohol serving venues in a single South African township, and findings may not generalize to other settings. Even though the surveys were self-administered and interviewers made efforts to ensure that participants had privacy to complete the survey, the public nature of the setting and reliance on self-report may have introduced social desirability bias. The mental health measures were brief screenings, though highly sensitive, and must be interpreted only as indicators of mental health distress. Questions with greater specificity on alcohol quantity may have increased validity of our findings. While we examined a number of traumatic experiences that may be associated with mental health distress, other traumatic experiences, stressful life events, and psychosocial problems frequently encountered should be explored and further examined to better inform the etiology of PTSD and depression. Finally, this study employed a cross-sectional methodology, and hence, inferences regarding causality are unwarranted.

In summary, in addition to problem drinking, mental health distress was common among women and men in alcohol serving venues in a peri-urban township in Cape Town, South Africa. Depression, PTSD, and substance abuse frequently co-occurred and were predictive

of HIV sexual risk behavior. This type of syndemic, in which psychological distress, substance use, and traumatic life experiences synergistically interact to increase HIV risk behavior, was initially described among men in the U.S.^{60,61} and more recently among both women and men in the U.S.³ and South Africa^{53,62}. Findings from this study support the need to develop HIV prevention interventions that address both mental health problems and their predictors, including intimate partner violence and sexual assault, while also aiming to reduce substance use.

Acknowledgments

We are grateful to all the men and women who participated in this study. We would like to acknowledge the South African research team that collected the data, specifically Simphiwe Dekeda, Albert Africa, Judia Adams, Bulelwa Nyamza and Jabulile Mantantana. We appreciate the support of Rene Macy and Annemie Stewart in management of the data. We also thank Frances Aunon for assistance in preparation of the manuscript (supported by the Duke Center for AIDS Research, NIAID grant P30-AI064518).

Funding:

This project was supported by a grant (R01 AA018074) from the National Institute of Alcohol Abuse and Alcoholism (NIAAA).

REFERENCES

1. UNAIDS. Geneva: UNAIDS; 2008. Report on the Global AIDS Epidemic.
2. Romero-Daza N, Weeks M, Singer M. "Nobody gives a damn if I live or die": violence, drugs, and street-level prostitution in inner-city Hartford, Connecticut. *Med. Anthropol.* 2003 Jul-Sep; 22(3): 233–259. [PubMed: 12893541]
3. Senn TE, Carey MP, Vanable PA. The Intersection of Violence, Substance Use, Depression, and STDs: Testing of a Syndemic Pattern among Patients Attending an Urban STD Clinic. *J. Natl. Med. Assoc.* 2010; 102(7):614–620. [PubMed: 20690325]
4. Singer MC, Erickson PI, Badiane L, et al. Syndemics, sex and the city: Understanding sexually transmitted diseases in social and cultural context. *Soc. Sci. Med.* 2006; 63(8):2010–2021. [PubMed: 16782250]
5. Singer M. A dose of drugs, a touch of violence, a case of AIDS: Conceptualizing the SAVA Syndemic. *Free Inq Creat Sociol.* 1996; 24(2):99–110.
6. Wojcicki JM. "She drank his money": survival sex and the problem of violence in taverns in Gauteng province, South Africa. *Med. Anthropol. Q.* 2002 Sep; 16(3):267–293. [PubMed: 12227257]
7. Morojele NK, Kachieng'a MA, Mokoko E, et al. Alcohol use and sexual behaviour among risky drinkers and bar and shebeen patrons in Gauteng province, South Africa. *Soc. Sci. Med.* 2006 Jan; 62(1):217–227. [PubMed: 16054281]
8. Williams DR, Herman A, Stein DJ, et al. Twelve-month mental disorders in South Africa: prevalence, service use and demographic correlates in the population-based South African Stress and Health Study. *Psychol. Med.* 2008 Feb; 38(2):211–220. [PubMed: 17903333]
9. Jewkes R, Abrahams N. The epidemiology of rape and sexual coercion in South Africa: an overview. *Soc. Sci. Med.* 2002 Oct; 55(7):1231–1244. [PubMed: 12365533]
10. Kaminer D, Grimsrud A, Myer L, Stein DJ, Williams DR. Risk for post-traumatic stress disorder associated with different forms of interpersonal violence in South Africa. *Soc. Sci. Med.* 2008; 67(10):1589–1595. [PubMed: 18774211]
11. Williams SL, Williams DR, Stein DJ, Seedat S, Jackson PB, Moomal H. Multiple traumatic events and psychological distress: the South Africa stress and health study. *J. Trauma. Stress.* 2007 Oct; 20(5):845–855. [PubMed: 17955545]
12. Tomlinson M, Grimsrud AT, Stein DJ, Williams DR, Myer L. The epidemiology of major depression in South Africa: results from the South African stress and health study. *S. Afr. Med. J.* 2009 May; 99(5 Pt 2):367–373. [PubMed: 19588800]

13. Carey PD, Stein DJ, Zungu-Dirwayi N, Seedat S. Trauma and posttraumatic stress disorder in an urban Xhosa primary care population: prevalence, comorbidity, and service use patterns. *J. Nerv. Ment. Dis.* 2003 Apr; 191(4):230–236. [PubMed: 12695733]
14. Peltzer K, Seakamela MJ, Manganye L, Mamiane KG, Motsei MS, Mathebula TT. Trauma and posttraumatic stress disorder in a rural primary care population in South Africa. *Psychol. Rep.* 2007 Jun; 100(3 Pt 2):1115–1120. [PubMed: 17886497]
15. Jane-Llopis E, Matysina I. Mental health and alcohol, drugs and tobacco: a review of the comorbidity between mental disorders and the use of alcohol, tobacco and illicit drugs. *Drug Alcohol Rev.* 2006 Nov; 25(6):515–536. [PubMed: 17132571]
16. Kessler RC, Crum RM, Warner LA, Nelson CB, Schulenberg J, Anthony JC. Lifetime co-occurrence of DSM-III-R alcohol abuse and dependence with other psychiatric disorders in the National Comorbidity Survey. *Arch. Gen. Psychiatry.* 1997 Apr; 54(4):313–321. [PubMed: 9107147]
17. South African Demographic and Health Survey. Pretoria, South Africa: South African Department of Health; 2007. South African Department of Health, Medical Research Council, Macro O.
18. Avalos L, Mertens J, Ward C, Flisher A, Bresick G, Weisner C. Stress, Substance Use and Sexual Risk Behaviors Among Primary Care Patients in Cape Town, South Africa. *AIDS Behav.* 2010; 14(2):359–370. [PubMed: 19205865]
19. Kalichman SC, Simbayi LC, Cain D. HIV transmission risk behaviours among HIV seropositive sexually transmitted infection clinic patients in Cape Town, South Africa. *Eur J Public Health.* 2010 Apr; 20(2):202–206. [PubMed: 19726591]
20. Kiene SM, Simbayi LC, Abrams A, Cloete A, Tennen H, Fisher JD. High rates of unprotected sex occurring among HIV-positive individuals in a daily diary study in South Africa: the role of alcohol use. *J. Acquir. Immune Defic. Syndr.* 2008 Oct 1; 49(2):219–226. [PubMed: 18769345]
21. Kalichman SC, Simbayi LC, Kaufman M, Cain D, Jooste S. Alcohol use and sexual risks for HIV/AIDS in sub-Saharan Africa: systematic review of empirical findings. *Prev. Sci.* 2007 Jun; 8(2): 141–151. [PubMed: 17265194]
22. Baliunas D, Rehm J, Irving H, Shuper P. Alcohol consumption and risk of incident human immunodeficiency virus infection: a meta-analysis. *Int J Public Health.* 2010 Dec 1.
23. Chersich M, Rees H, Scorgie F, Martin G. Enhancing global control of alcohol to reduce unsafe sex and HIV in sub-Saharan Africa. *Global Health.* 2009; 5(1):16. [PubMed: 19919703]
24. Frohmader KS, Pitchers KK, Balfour ME, Coolen LM. Mixing pleasures: review of the effects of drugs on sex behavior in humans and animal models. *Horm. Behav.* 2010 Jun; 58(1):149–162. [PubMed: 20004662]
25. Chersich MF, Rees HV. Causal links between binge drinking patterns, unsafe sex and HIV in South Africa: its time to intervene. *Int. J. STD AIDS.* 2010 January 1; 21(1):2–7. 2010. [PubMed: 20029060]
26. Jewkes R, Kristin D, Mzikazi N, Nwabisa S. Intimate partner violence, relationship power inequity, and incidence of HIV infection in young women in South Africa: a cohort study. *Lancet.* 2010; 376(9734):41–48. [PubMed: 20557928]
27. Browne FA, Wechsberg WM. The intersecting risks of substance use and HIV risk among substance-using South African men and women. *Curr Opin Psychiatry.* 2010 Mar 19.
28. Friedman H, Pross S, Klein TW. Addictive drugs and their relationship with infectious diseases. *FEMS Immunol. Med. Microbiol.* 2006 Aug; 47(3):330–342. [PubMed: 16872369]
29. Morris K, Parry C. South African methamphetamine boom could fuel further HIV. *Lancet Infect. Dis.* 2006 Aug; 6(8):471. [PubMed: 16888875]
30. Wechsberg WM, Jones HE, Zule WA, et al. Methamphetamine (Tik) Use and Its Association with Condom Use among Out-of-School Females in Cape Town, South Africa. *Am. J. Drug Alcohol Abuse.* 2010; 36(4):208–213. [PubMed: 20560840]
31. Weir SS, Tate JE, Zhusupov B, Boerma JT. Where the action is: monitoring local trends in sexual behaviour. *Sex. Transm. Infect.* 2004 Dec; 80 Suppl 2:ii63–ii68. [PubMed: 15572642]
32. Weir SS, Pailman C, Mahlalela X, Coetzee N, Meidany F, Boerma JT. From people to places: focusing AIDS prevention efforts where it matters most. *AIDS.* 2003 Apr 11; 17(6):895–903. [PubMed: 12660537]

33. Townsend L, Ragnarsson A, Mathews C, et al. "Taking Care of Business": Alcohol as Currency in Transactional Sexual Relationships Among Players in Cape Town, South Africa. *Qual. Health Res.* 2010
34. Fritz K, Morojele NK, Kalichman S. Alcohol: the forgotten drug in HIV/AIDS. *The Lancet.* 2010
35. Hutton HE, Lyketos CG, Zenilman JM, Thompson RE, Erbeling EJ. Depression and HIV risk behaviors among patients in a sexually transmitted disease clinic. *Am. J. Psychiatry.* 2004 May; 161(5):912–914. [PubMed: 15121659]
36. Klein H, Elifson KW, Sterk CE. Depression and HIV risk behavior practices among at risk women. *Women Health.* 2008; 48(2):167–188. [PubMed: 19042215]
37. Sikkema KJ, Watt MH, Drabkin AS, Meade CS, Hansen NB, Pence BW. Mental Health Treatment to Reduce HIV Transmission Risk Behavior: A Positive Prevention Model. *AIDS Behav.* 2010 Apr; 14(2):252–262. [PubMed: 20013043]
38. Reisner SL, Mimiaga MJ, Safren S, Mayer K. Stressful or traumatic life events, post-traumatic stress disorder (PTSD) symptoms, and HIV sexual risk taking among men who have sex with men. *AIDS Care.* 2009; 21(12):1481–1489. [PubMed: 20024727]
39. Hutton HE, Treisman GJ, Hunt WR, et al. HIV risk behaviors and their relationship to posttraumatic stress disorder among women prisoners. *Psychiatr. Serv.* 2001 Apr; 52(4):508–513. [PubMed: 11274498]
40. Crepaz N, Marks G. Towards an understanding of sexual risk behavior in people living with HIV: a review of social, psychological, and medical findings. *AIDS.* 2002 Jan 25; 16(2):135–149. [PubMed: 11807297]
41. Crepaz N, Marks G. Are negative affective states associated with HIV sexual risk behaviors? A meta-analytic review. *Health Psychol.* 2001 Jul; 20(4):291–299. [PubMed: 11515741]
42. Kimerling R, Ouimette P, Prins A, et al. Brief report: Utility of a short screening scale for DSM-IV PTSD in primary care. *J. Gen. Intern. Med.* 2006 Jan; 21(1):65–67. [PubMed: 16423126]
43. Bennett IM, Coco A, Coyne JC, et al. Efficiency of a two-item pre-screen to reduce the burden of depression screening in pregnancy and postpartum: an IMPLICIT network study. *J. Am. Board Fam. Med.* 2008 Jul–Aug; 21(4):317–325. [PubMed: 18612058]
44. Kroenke K, Spitzer RL, Williams JB. The Patient Health Questionnaire-2: validity of a two-item depression screener. *Med. Care.* 2003 Nov; 41(11):1284–1292. [PubMed: 14583691]
45. Whooley MA, Avins AL, Miranda J, Browner WS. Case-finding instruments for depression. Two questions are as good as many. *J. Gen. Intern. Med.* 1997 Jul; 12(7):439–445. [PubMed: 9229283]
46. Babor, TF.; Higgins-Biddle, JC.; Saunders, JB.; Monteiro, MG. *The Alcohol Use Disorders Identification Test: Guidelines for use in primary care.* 2nd ed.. Geneva: WHO Department of Mental Health and Substance Dependence; 2001.
47. Ewing JA. Detecting alcoholism. The CAGE questionnaire. *JAMA.* 1984 Oct 12; 252(14):1905–1907. [PubMed: 6471323]
48. Jewkes RK, Dunkle K, Nduna M, Jama PN, Puren A. Associations between childhood adversity and depression, substance abuse and HIV and HSV2 incident infections in rural South African youth. *Child Abuse Negl.* 2010 Nov; 34(11):833–841. [PubMed: 20943270]
49. Bean J, Moller AT. Posttraumatic stress and depressive symptomatology in a sample of battered women from South Africa. *Psychol. Rep.* 2002 Jun; 90(3 Pt 1):750–752. [PubMed: 12090502]
50. Wood K, Lambert H, Jewkes R. "Showing roughness in a beautiful way": talk about love, coercion, and rape in South African youth sexual culture. *Med. Anthropol. Q.* 2007 Sep; 21(3):277–300. [PubMed: 17937250]
51. Kilpatrick DG, Ruggiero KJ, Acierno R, Saunders BE, Resnick HS, Best CL. Violence and risk of PTSD, major depression, substance abuse/dependence, and comorbidity: results from the National Survey of Adolescents. *J. Consult. Clin. Psychol.* 2003 Aug; 71(4):692–700. [PubMed: 12924674]
52. Putnam FW. Ten-year research update review: child sexual abuse. *J. Am. Acad. Child Adolesc. Psychiatry.* 2003 Mar; 42(3):269–278. [PubMed: 12595779]
53. Jewkes RK, Dunkle K, Nduna M, Jama PN, Puren A. Associations between childhood adversity and depression, substance abuse and HIV and HSV2 incident infections in rural South African youth. *Child Abuse Negl.* 2010 In Press, Corrected Proof.

54. Maikovich AK, Koenen KC, Jaffee SR. Posttraumatic stress symptoms and trajectories in child sexual abuse victims: an analysis of sex differences using the national survey of child and adolescent well-being. *J. Abnorm. Child Psychol.* 2009 Jul; 37(5):727–737. [PubMed: 19221872]
55. Persons E, Kershaw T, Sikkema KJ, Hansen NB. The Impact of Shame on Health-Related Quality of Life Among HIV-Positive Adults with a History of Childhood Sexual Abuse. *AIDS Patient Care STDS.* 2010; 24(9):571–580. [PubMed: 20718687]
56. Wingood GM, DiClemente RJ, Raj A. Adverse consequences of intimate partner abuse among women in non-urban domestic violence shelters. *Am. J. Prev. Med.* 2000 Nov; 19(4):270–275. [PubMed: 11064231]
57. Martin L, Kagee A. Lifetime and HIV-Related PTSD Among Persons Recently Diagnosed with HIV. *AIDS Behav.* 2008:1–7.
58. Degenhardt L, Mathers B, Guarinieri M, et al. Meth/amphetamine use and associated HIV: Implications for global policy and public health. *Int J Drug Policy.* 2010 Jan 29.
59. Semple SJ, Patterson TL, Grant I. The context of sexual risk behavior among heterosexual methamphetamine users. *Addict. Behav.* 2004 Jun; 29(4):807–810. [PubMed: 15135564]
60. Stall R, Mills TC, Williamson J, et al. Association of co-occurring psychosocial health problems and increased vulnerability to HIV/AIDS among urban men who have sex with men. *Am. J. Public Health.* 2003 Jun; 93(6):939–942. [PubMed: 12773359]
61. Ibanez GE, Purcell DW, Stall R, Parsons JT, Gamez CA. Sexual risk, substance use, and psychological distress in HIV-positive gay and bisexual men who also inject drugs. *AIDS.* 2005; 19:S49–S55. [PubMed: 15838194]
62. Jewkes RK, Dunkle K, Nduna M, Shai N. Intimate partner violence, relationship power inequity, and incidence of HIV infection in young women in South Africa: a cohort study. *Lancet.* 2010 Jul 3; 376(9734):41–48. [PubMed: 20557928]

Table 1

Description of participant demographics

	Men (n=382)	Women (n=340)	Statistic^a
Age	Mean 31.4 (sd=9.9) Range (18–64)	Mean 32.8 (sd=11.7) Range (18–73)	–1.77
Race			37.58**
Black African	67.1%	44.4%	
Coloured	32.9%	55.6%	
Education			56.31**
Grade 7 or less	11.9%	22.1%	
Grade 8–11	33.7%	48.2%	
Completed secondary	31.0%	22.9%	
Post-secondary	23.3%	6.8%	
Relationship status			2.07
Married	25.3%	26.0%	
Single, not living with a partner	64.6%	60.7%	
Single, living with a partner	10.1%	13.3%	
SES indicators			
Unemployed	37.7%	73.7%	93.68**
Lives in a house without electricity or water	13.8%	6.5%	10.19**
Relationship to the drinking venue			
Lives within 15 min walk from venue	67.5%	80.9%	16.68**
Visits venue on at least a weekly basis	57.9%	51.2%	3.06
HIV testing experience			
Ever tested for HIV	62.3%	73.9%	11.09**

^a *t* statistic is reported to compare continuous variables; χ^2 statistic is reported to compare categorical variables.

* $p < .05$,

** $p < .01$

Table 2

Frequency of mental health problems, trauma, substance use and sexual behaviors

	Men (n=382)	Women (n=340)	Statistic ^a
<i>Mental health</i>			
Screened positive for PTSD	24.9%	44.5%	29.70**
Screened positive for depression	50.5%	68.0%	24.66**
<i>Traumatic experiences</i>			
Ever been hit by a sex partner	18.2%	36.8%	31.16**
Ever been forced to have sex	20.6%	21.3%	0.05
Childhood abuse – physical	20.1%	22.8%	0.77
Childhood abuse – sexual	8.6%	10.7%	0.98
Diagnosed as HIV positive	6.3%	5.5%	0.17
<i>Typical alcohol use</i>			
Frequency: ≥4 days/week	16.9%	8.9%	9.92**
Quantity: ≥5 drinks/day	48.7%	44.2%	1.41
Alcohol problems (CAGE≥2)	71.4%	68.7%	0.61
<i>Drug use in past 4 months</i>			
Marijuana (“dagga”)	21.4%	12.5%	9.83**
Methamphetamine (“tik”)	4.3%	7.4%	3.19
Inhalants	4.8%	3.6%	0.67
Injection drugs	2.2%	2.1%	0.00
<i>Sexual behavior in past 4 months</i>			
Any sexual activity	86.7%	78.6%	8.17**
>1 sex partner	42.0%	16.1%	58.88**
Any unprotected sex	40.3%	47.9%	4.11*
Number of sex partners	Mean 2.39 (sd=3.7) Range (0–30)	Mean 1.22 (sd=2.2) Range (0–24)	5.05**
Number of unprotected sexual intercourse occasions	Mean 3.47 (sd=9.9) Range (0–100)	Mean 4.66 (sd=10.8) Range (0–100)	–1.55

^a *t* statistic is reported to compare continuous variables; χ^2 statistic is reported to compare categorical variables.

* $p < .05$,

** $p < .01$

Table 3

Summary of logistic regression analyses predicting a positive screen for PTSD

	Men (n=371)			Women (n=336)		
	% among positive PTSD screen (n=91)	% among negative PTSD screen (n=280)	OR (95% CI)	% among positive PTSD screen (n=149)	% among negative PTSD screen (n=187)	OR (95% CI)
Ever been hit by a sex partner	27.5%	15.4%	2.09 (1.19, 3.67)*	47.0%	27.3%	2.36 (1.50, 3.72)**
Ever been forced to have sex	25.3%	19.3%	1.42 (.810, 2.47)	31.1%	12.4%	3.18 (1.82, 5.56)**
Physically abused as a child	34.1%	15.7%	2.77 (1.62, 4.76)**	27.5%	17.9%	1.74 (1.03, 2.92)*
Sexually abused as a child	22.0%	4.3%	6.29 (2.94, 13.48)**	14.1%	7.5%	2.02 (0.99, 4.12)
HIV positive	14.1%	3.9%	4.00 (1.63, 9.83)**	7.2%	4.1%	1.82 (0.67, 4.91)

*
p<.05,

**
p<.01

Table 4
Summary of logistic regression analyses predicting a positive screen for depression

	Men (n=377)			Women (n=340)		
	% among positive depr. screen (n=187)	% among negative depr. screen (n=190)	OR (95% CI)	% among positive depr. screen (n=230)	% among negative depr. screen (n=110)	OR (95% CI)
Ever been hit by a sex partner	23.5%	13.2%	2.03 (1.18, 3.48) *	45.2%	19.1%	3.50 (2.04, 6.01) **
Ever been forced to have sex	29.4%	14.2%	2.52 (1.50, 4.21) **	28.9%	3.7%	10.69 (3.79, 30.2) **
Physically abused as a child	25.1%	15.8%	1.79 (1.07, 2.99) *	26.1%	14.5%	2.08 (1.13, 3.81) *
Sexually abused as a child	11.2%	6.8%	1.72 (0.84, 3.56)	12.2%	6.4%	2.03 (0.86, 4.81)
HIV positive	9.3%	4.0%	2.43 (0.97, 6.13)	6.5%	3.1%	2.22 (0.62, 7.90)

* p<.05,
** p<.01

Table 5

Summary of models predicting number of unprotected sexual intercourse occasions

	Men (n=349) ^a			Women (n=321) ^b		
	RR (95% CI)	Wald Chi-Square	p-value	RR (95% CI)	Wald Chi-Square	p-value
Race	1.09 (0.82, 1.46)	0.34	.560	0.92 (0.70, 1.20)	0.38	.536
Age	1.02 (1.00, 1.03)	5.12	.024	0.99 (0.98, 1.00)	0.74	.389
Alcohol frequency	1.26 (1.13, 1.41)	16.71	<.001	1.18 (1.04, 1.33)	6.41	.011
Alcohol quantity	1.19 (1.10, 1.30)	16.62	<.001	1.26 (1.14, 1.39)	19.96	<.001
Any drug use	1.72 (1.27, 2.32)	12.35	<.001	1.33 (0.93, 1.91)	2.45	.118
Screen for depression	1.07 (0.83, 1.38)	0.27	.605	1.53 (1.13, 2.09)	7.29	.007
PTSD score	1.15 (1.08, 1.24)	15.90	<.001	1.07 (1.01, 1.14)	5.65	.018

^aModel fit: Likelihood chi-square=84.66, df=7, p<.001^bModel fit: Likelihood chi-square=77.69, df=7, p<.001