Changing trends and the impact of alcohol on the HIV/AIDS epidemic in South Africa: Review

Mashiko Setshedi and Suzanne M de la Monte

Abstract

The association between increased HIV infection and alcohol use has been extensively studied and is established. South Africa is among one of the sub-Saharan African countries with the highest prevalence and number of people living with HIV/AIDS in the world. Although recent evidence suggests that the epidemic has stabilised, infection rates remain unacceptably high. Alcohol use is on the increase, particularly in the groups most susceptible to HIV infection, namely women and young adults, and informs poor choices with respect to safer sexual practices. This paper reviews the association between alcohol and HIV. More specifically, however, it aims to explore the potential socio-politico-biological and cultural explanations as to the factors that intersect to drive these two epidemic diseases: alcoholism and HIV/AIDS in South Africa. Understanding some of the underlying factors will provide a framework to implement public health measures to curb HIV.

Keywords: *HIV, AIDS, South Africa, alcohol, politics of South Africa.*

Résumé

L'association entre l'augmentation du VIH et la consommation d'alcool fait l'objet d'une étude. L'Afrique du Sud reste l'un des pays Sub-Saharien les plus touché par un taux de prévalence élevé et par le nombre de personnes vivant avec le VIH/SIDA dans le monde. Bien que les dernières objectives fussent de stabiliser l'épidémie, néanmoins le taux d'infection reste inacceptable. L'utilisation de l'alcool, particulièrement chez les femmes et les jeunes, est susceptible d'augmenter l'infection du VIH, et le peu d'information qu'ils ont sur le respect des pratiques sexuels sûr. L'article examine le lien entre l'association de l'alcool et le VIH, plus spécifiquement, cependant elle vise à explorer des explications potentielles socio-politico-culturelles et biologiques sur les facteurs de ces maladies épidémiques alcoolisme et le VIH/SIDA en Afrique du Sud. Il faut comprendre que les facteurs sous-jacents fourniront un cadre pour mettre en œuvre des mesures de santé publique pour lutter contre le VIH.

Mots clés: *VIH, SIDA, Afrique du Sud, alcool, la politique en Afrique du Sud.*

Introduction

South Africa has a rich history brought about by the heterogeneity of its people and historical events that firmly impacted the socio-politico-economical landscape. The ushering in of democracy in the early 1990s produced unprecedented changes in lifestyle and perhaps core values. For example, the apparent relaxation of perceptions, reduced concern, and increased tolerance over the use and misuse of alcohol became problematic, and quite likely, those shifts in attitude were at the very least permissive, and may even have contributed to the ever-growing rates of violence, crime and unemployment, particularly among blacks. Furthermore, expansion of the HIV/AIDS epidemic in the last decade added to the social burden. South Africa now boasts the highest number of people living with HIV/AIDS relative to all other nations, with approximately 5.7 million people living with HIV/AIDS (UNAIDS, 2008) compared with 0.5 million people in USA (CDC, 2009). We ask ourselves why, and what can be done to stem this tide?

Although a number of published articles have drawn links between alcohol misuse/abuse and sexual risk behaviour (Kalichman, Simbayi, Cain & Jooste, 2009; Kalichman, Simbayi, Kaufman, Cai, & Jooste, 2007; Simbayi, Kalichman, Cain *et al.*, 2006; Simbayi *et al.*, 2004; Weir *et al.*, 2003; Zuma, Gouws, Williams & Lurie, 2003) the matter deserves further consideration with respect to problems specific to South Africa. Effective preventive measures cannot be effectively implemented unless we first gain a better understanding of the social and behavioural contexts that influence and perpetuate alcohol misuse and the attendant risky sexual practices that promote HIV transmission. No doubt, the advent of highly active antiretroviral therapy (HAART) has helped prolong survival and improve health status of people suffering with HIV/AIDS; however, access to treatment is not universal. Therefore, the priority should focus on public health preventative measures. We hypothesise that the widespread and reckless misuse of alcohol, beginning at relatively young ages, is a major contributing factor

Mashiko Setshedi, MD, MPH, is currently a Research Fellow at The Warren Alpert Medical School of Brown University in Providence, RI. She is on a 3-year research fellowship and is studying the epidemiological and molecular aspects of alcoholic liver disease and hepatitis B virus-related liver cancer. She will return to Cape Town on completion of her fellowship to work as a researcher and clinician.

Suzanne M de la Monte, MD, MPH, is Professor of Pathology, Neurology, and Neurosurgery at the Rhode Island Hospital and Warren Alpert Medical School of Brown University, Providence, RI. She is also a member or trainer/educator in the Pathobiology, Neuroscience, and Molecular Pharmacology and Physiology Graduate Programs at Brown University.

Supported by AA-11431, AA-12908, and K24-AA-16126 from the National Institutes of Health, and the Gastroenterology Foundation of South Africa.

Correspondence to: Suzanne M de la Monte (Suzanne_DeLaMonte_MD@Brown.edu)

fuelling the HIV/AIDS epidemic in South Africa. This review utilises government statistics and published literature (mainly specific to SA) to highlight the importance of alcohol as a prime mediator of high-risk behaviour leading to continued rampant spread of HIV/AIDS in South Africa.

Alcohol in apartheid South Africa

It has been said that alcohol played an important and 'controversial' role in South Africa's history since the arrival of colonialists in the 1700s (Parry, 2005; Parry & Bennetts, 1998). European settlers established a refreshment base in the Cape to service ships in transit to the Far East. However, over time, drunkenness, smuggling, and alcohol bartering for labour and cattle from indigenous people became commonplace and problematic (Parry, 2005). On the other hand, under 'petty apartheid' blacks were prohibited from buying hard liquor (Schneider, Norman, Parry, Bradshaw & Pluddemann, 2007). Therefore, the law suppressed the potential for alcohol misuse among blacks.

Concurrently, a formalised 'dop' system was established whereby black wine farm labourers in the Western and Northern Cape were paid with tobacco, bread and inferior wine instead of money (London, 2000; McKinstry, 2005). The 'dop' system became so entrenched that, despite having been outlawed, the practice continues today with a prevalence of 2 - 25% (London, Nell, Thompson & Myers, 1998; McKinstry, 2005; Te Water Naude, London, Pitt & Mahomed, 1998). Similarly, alcohol was used *in lieu* of wages as remuneration for the unskilled mine workers in the Witwatersrand (Schneider *et al.*, 2007). These practices prohibited blacks from gaining access to legitimate economic opportunities, and thus worsened their poverty. To some extent, these factors led to the establishment of *shebeens*, i.e. illegal trading posts used for selling home-brewed alcohol within black townships. *Shebeens* provided a means for blacks to gain access to currency, to expand their social networks, and also to protest against the policies of apartheid (Parry, 2005; Schneider *et al.*, 2007). Over time however, *shebeens* have become breeding grounds for engagement in risky sexual behaviours (see below).

Alcohol in the democratic era

Post-apartheid, commercially produced alcohol quickly became more readily available to Blacks; the sale of alcohol at *shebeens* (especially over weekends) became more widespread and open, and consequently, alcohol consumption steadily rose over the same period, particularly among adolescents, university students (Peltzer & Ramlagan, 2009), and women (Parry *et al.*, 2004; Peltzer & Ramlagan, 2009; WHO, 2005). The South African Health and Demographic survey showed that the rate of hazardous drinking was higher for female adolescents (23%) than their male counterparts (8%) (Department of Health, 2003). More concerning however was that the survey demonstrated that binge drinking over weekends increased 21-fold among females (Department of Health, 2003). Notwithstanding the ushering in of democracy and various changes in legislation, in reality, tangible change on the ground was slow. Due to lack of infrastructure in poor black areas, alcohol consumption and sex were possibly among the most accessible and inexpensive yet legal forms of entertainment. Furthermore, television advertisements that portrayed alcohol as a commodity and sign of success were rife. All of these factors quite likely contributed to the relaxation of attitudes about alcohol consumption and subsequent misuse, especially among adolescents and young adults.

A report commissioned by the World Health Organization (WHO) states that alcohol was considered by many South Africans to be 'a sort of lifestyle in urban areas, and a social necessity' (WHO, 2005). Moreover, 'alcohol control measures by the government were either absent or largely ignored in SA' (WHO, 2005), likely due to competition from more pressing sociopolitical agendas. The lack of tight controls over access to alcohol, particularly for under-age individuals, contributed to growth in alcohol abuse. Correspondingly, recent statistics show that, although each adult in South Africa only drinks 7.1 liters alcohol per annum, after adjusting the numbers to exclude the large number of abstainers, consumption escalates to a striking 16.6 - 20 liters per drinker per year (Parry, 2005; Rehm *et al.*, 2003) making South Africa 'one of the highest levels of alcohol consumption per drinker anywhere in the world' (Peltzer & Ramlagan, 2009).

HIV/AIDS in South Africa

In 2008, there were approximately 31 million adults living with HIV/AIDS worldwide, of whom two-thirds are in sub-Saharan Africa (UNAIDS/WHO, 2009). With 5.7 million, South Africa has the highest number of people living with HIV in the world (UNAIDS, 2008), with adult prevalence rates reported as ranging between 11% and 28% (Connolly, Shisana, Colvin & Stoker, 2004; UNAIDS/WHO, 2009). The greatest brunt of the disease is disproportionally borne by blacks, women and young adults (Connolly *et al.*, 2004; Simbayi *et al.*, 2007b). Between 1997 and 2006, the deaths from HIV/AIDS increased by a staggering 91% (http://www.avert.org/aidssouthafrica.htm, accessed 16 April 2010), and in 2008, an estimated quarter of a million people died of AIDS in South Africa (http://www.statssa.gov.za/publications/P0302/P03022009.pdf, accessed 11 March 2010). The impact of these statistics is perhaps better appreciated in the context of the 1.4 million orphaned children in South Africa (UNAIDS, 2008; UNAIDS/WHO, 2009), many of whom must fend for themselves, or bear the responsibility of looking after their younger siblings. Although the number of people accessing highly active antiretroviral therapy (HAART) in South Africa continues to grow (UNAIDS, 2008), the impact of the HIV/AIDS epidemic in South Africa is still evident.

Factors increasing HIV prevalence in SA

As in the USA, the earliest reports of HIV infection in South Africa were in homosexual men (Ras, Simson, Anderson, Prozesky & Hamersma, 1983; Sher, 1989), thus entrenching the notion that it was exclusively a 'gay' disease. As public awareness and knowledge grew, it became increasingly recognised that haemophiliacs and intravenous drug abusers were also at increased risk. Disconcertingly, there were reports that some people in SA believed that whites had engineered the HIV virus to 'kill off' blacks and thereby perpetuate their domination, or that HIV was a disease that afflicted only those who engaged in high-risk behaviours, i.e. casual sex workers or promiscuous women (Petros, Airhihenbuwa, Simbayi, Ramlagan & Brown, 2006), mostly considered to be black. Therefore, despite widespread availability

of data about HIV transmission, value-based perceptions prevailed and the stigma associated with HIV/AIDS became commonplace (Simbayi *et al.*, 2007a).

Several factors contributed to the explosive expansion of the HIV/AIDS epidemic in South Africa. First, due to the asymptomatic nature of early disease, infected persons could have spread the infection unwittingly. On the other hand, there were a number of disturbing reports of men who intentionally had sex with virgins to 'cure' themselves of the infection (Fassin, 2002). Second, reported delays in the South African government's response to the HIV epidemic may have contributed to the surge in cases over time (Mbali, 2004). A third factor was that migrant labourers forced to seek work in urban areas, leaving their usual partners behind (Evian, 1993; Jochelson, Mothibeli & Leger, 1991; Lurie *et al.*, 2000) were placed at increased risk of sex with casual sex workers or multiple sex partners of unknown HIV status (Simbayi *et al.*, 2004). In many instances, condom use with paying clients was not practised (Peltzer, Seoka, & Raphala, 2004). Correspondingly, one study conducted among a population of migrant women in Carletonville, South Africa, found that migration *per se* was associated with a 4-fold increase in HIV prevalence (Zuma *et al.*, 2003).

A fourth factor contributing to South Africa's HIV/AIDS epidemic is that the expectation that condoms should be used with regular partners (including spouses) carries a negative connotation and signals mistrust (Trigg, Peterson & Meekers, 1997); therefore they tend not to be used (Lurie *et al.*, 2008; Trigg *et al.*, 1997). Ironically, men who are unfaithful tend not to carry or use condoms for fear that their infidelity will be discovered by their regular partners (WHO, 2005). Finally, as in any patriarchal society there are deep-rooted gender inequalities; as such, women are economically and socially disenfranchised. Women often knowingly have sex with unfaithful partners and fail to exercise their rights to refuse sex, or negotiate condom use, as they are financially dependent upon their partners; they believe that a woman's role is to 'please her man' (Morojele, Brook, & Kachieng'a, 2006; WHO, 2005).

Compared with regular, stable relationships, casual sex partnering often results in about 20% of women having transactional sex (where sex is consented to in exchange for material goods) (Dunkle *et al.*, 2007; Dunkle *et al.*, 2004b). This practice is associated with higher rates of alcohol misuse (Smit *et al.*, 2006), violence, including rape against these women, and HIV seropositivity (Dunkle *et al.*, 2007; Dunkle *et al.*, 2004a; Simbayi, Kalichman, Jooste *et al.*, 2006; Smit *et al.*, 2006). A study evaluating substance abuse and sexual behavior amongst coloured and black women revealed that whilst both groups faced sexual violence, black women did not trust men to use condoms, whereas coloured women considered condom use to be the rule (Sawyer, Wechsberg & Myers, 2006). This suggests that coloured women may feel more confident or less threatened to discuss sexual preferences with their partners, and that they may have a higher self-regard compared with black women. In addition, these findings could reflect a greater degree of psychological dominance that black men have over black women. Altogether, these data provide some insight into the question of why the HIV/AIDS epidemic largely affects black women, but all studies have not yielded robust or consistent results. For example another study conducted in similar settings showed that black women used condoms and had a single partner compared to coloureds (Wechsberg, Luseno, Karg *et al.*, 2008), suggesting that vulnerability to HIV infection may be a function of socio-economic status rather than race. When financially dependent on men, the feeling of powerlessness prevents women from taking control and making their own choices. Therefore, although speculative a considerable number of factors, most of them social and economic, have contributed to the spread of HIV/AIDS over the last decade.

Relationship between alcohol and HIV

Many studies including four recently conducted meta-analyses have consistently shown strong positive associations between alcohol misuse and behaviours that increase the risk of acquiring HIV (Baliunas, Rehm, Irving & Shuper, 2010; Fisher, Bang & Kapiga, 2007; Pithey & Parry, 2009; Shuper *et al.*, 2010). The prevalence of alcohol misuse and/or dependency amongst individuals at increased risk of contracting sexually transmitted infections is 17% (Smit *et al.*, 2006). Conversely, in those with a recent diagnosis of HIV (mean of 6 months since diagnosis), the prevalence of alcohol dependency is 10% (Olley *et al.*, 2003). Among students, alcohol use is associated with early sexual debut (McGrath, Nyirenda, Hosegood & Newell, 2009), and a 3-fold increase in current sexual activity, with only half the participants consistently utilising condoms (Taylor, Dlamini, Kagoro, Jinabhai & de Vries, 2003). It has been stated that drinking in Africa is associated with a two-fold increase in HIV risk (Chersich & Rees); one study reported an independent causal association between drinking at least once per day in the past 1 month and HIV infection (Zuma *et al.*, 2003). Significantly increased rates of HIV-1 sero-prevalence were correlated with having sexual intercourse under the influence of alcohol (17.6% in drinkers versus 6.9% in non-drinkers) (Mnyika, Klepp, Kvale & Ole-King'ori, 1996), linking alcohol use to increased risks for HIV infection.

Alcohol effects on sexual behaviour

How does alcohol increase HIV risk? Alcohol misuse increases risky sexual behaviours that in turn increase the risk of HIV transmission. As early as 1989, a study in Zambia showed that sexual promiscuity was associated with excessive alcohol consumption (Peltzer *et al.*, 1989) and in turn alcoholism was associated with sexually transmitted infections (Cook & Clark, 2005). In young people, alcohol facilitates communication among peers of the opposite sex (Zimba, 1995), but it also impairs cognitive function, and in sexually charged situations, especially among the young and impressionable, it negatively impacts choices. Moreover, recent data suggest that gender may significantly influence alcohol dependence and propensity for alcohol to facilitate participation in risky sexual practices. For example, most studies report that alcohol use is more prevalent in men (approximately 50 - 58% versus 17 - 28% in women) (Andersson *et al.*, 2009; Frank, Esterhuizen, Jinabhai, Sullivan & Taylor, 2008; Kalichman, Simbayi, Jooste & Cain, 2007; Olley *et al.*, 2003; Simbayi, Kalichman, Cain *et al.*, 2006; Simbayi *et al.*, 2004), and that alcohol use among men before or during sex is more common, particularly with irregular partners (Andersson *et al.*, 2009; Myer, Mathews & Little, 2002; Simbayi, Kalichman,

Cain *et al.*, 2006), and is associated with either not using condoms (Hoffman, O'Sullivan, Harrison, Dolezal & Monroe-Wise, 2006; Kiene *et al.*, 2008; Moore, Beeker, Harrison, Eng & Doll, 1995; Myer *et al.*, 2002; Simbayi *et al.*, 2004) or higher rates of condom failure (Kalichman, Simbayi, Cain *et al.*, 2009; Simbayi *et al.*, 2004). Heavy alcohol consumption among men is also associated with violent or coercive sex that is mostly perpetuated by men (Abrahams, Jewkes, Hoffman & Laubsher, 2004; Simbayi, Kalichman, Cain *et al.*, 2006; Strebel *et al.*, 2006; Zablotska *et al.*, 2009), and in some instances, deliberate engagement in unprotected sex with known or suspected HIV-positive women (Andersson *et al.*, 2009). Sex violence increases the risk of HIV transmission because conceivably the resultant mucosal breaks facilitate virus entry. In addition, in men, alcohol consumption increases expectations for enhanced sexual encounters (Kalichman, Simbayi, Jooste, Vermaak & Cain, 2008; Kalichman, Simbayi, Cain & Jooste, 2007). Moreover, men tend to use alcohol to 'control' women and to feel more powerful (WHO, 2005); as a matter of fact, high levels of control in a relationship were found to be associated with HIV seropositivity (Dunkle *et al.*, 2004b).

Women with drinking problems are more likely to have multiple sex partners and engage in transactional relationships (Simbayi, Kalichman, Cain *et al.*, 2006; Simbayi, Kalichman, Jooste *et al.*, 2006). In addition, substance abuse prior to sex reinforces women's traditional views of sex (Wechsberg, Luseno, Riehman *et al.*, 2008), rendering them less likely to refuse or impose safe-sex practices. Thus alcohol makes women more susceptible to abusive and controlling relationships. Interestingly, women also report enhancement of sexual experiences when their partners consume alcohol prior to sex (Kalichman, Simbayi, Cain *et al.*, 2007), yet excessive alcohol consumption is associated with sexual assault, use of sex for material gain, multiple sex partners, and unprotected sex (Kalichman & Simbayi, 2004). Therefore, women who drink excessively often submit to unsafe practices and put themselves at increased risk for sexual abuse, sex violence, and HIV transmission.

Drinking establishments and HIV-risk behaviour

Combining alcohol with sex is commonplace in venues where alcohol is readily available, including nightclubs, bars, highway eating restaurants, and motels (WHO, 2005). Such places attract people seeking opportunities to socialise, and who intend to use alcohol as a social lubricant. Unintended consequences include poor selection of mates and irresponsible behaviour that could lead to violence and behaviours that can increase risk of transmission of HIV. In South Africa, the alcohol-HIV link is quite pronounced in 'high-risk' locations. Kalichman *et al.*, 2008 showed that among participants recruited from 4 *shebeens* in a racially integrated township, 28% met their sexual partners at the *shebeens* versus other locations, and that meeting sex partners at *shebeens* is correlated with significantly increased rates of HIV transmission (Kalichman, Simbayi, Vermaak, Jooste & Cain, 2008). Similarly, other studies found that meeting sex partners at drinking establishments is correlated with increased sexual risk taking compared with outcomes associated with non-alcohol-related venues (Kalichman, Simbayi, Cain *et al.*, 2007; Weir *et al.*, 2003). Moreover, high sex risk behaviour is particularly prevalent at Stokvels, i.e. community-based savings clubs in which members host social events on a rotational basis. In this context therefore, the finding that *Stokvel* attendees were more likely to be HIV positive, drink and have casual sex partners is not surprising (Campbell, Williams & Gilgen, 2002).

Alcohol use and misuse in people with HIV

Risky sexual practices are commonplace across all sectors of the population, including persons with HIV/AIDS. In South Africa the prevalence of alcohol misuse is as high as 7 - 10% among people with HIV in general (Myer *et al.*, 2008; Olley *et al.*, 2003), and 50% to 85% of HIV-positive individuals are sexually active (Kiene *et al.*, 2006; Olley, Seedat, Gxamza, Reuter & Stein, 2005; Simbayi *et al.*, 2007b). Reports however, that 16 - 80% of people with known HIV-positive status have unprotected vaginal or anal sex with uninfected or unknown HIV status partners are disconcerting (Kalichman, Simbayi, Cain *et al.*, 2009; Kiene *et al.*, 2008; Palepu *et al.*, 2005; Simbayi *et al.*, 2007b), and alcohol use during sex is one of the independent predictors of this behaviour (Kiene *et al.*, 2006). In addition, over two-thirds (78%) of HIV-positive individuals do not disclose their HIV status to their regular and current partners, while at the same time 46%, most of whom are male, have no knowledge of their partners' status, engage in unprotected sex, misuse alcohol, and tend to have multiple partners (Olley, Seedat & Stein, 2004; Simbayi *et al.*, 2007b). Furthermore, alcohol misuse significantly impedes compliance with HAART (Cook *et al.*, 2001; Dahab *et al.*, 2008; Hendershot, Stoner, Pantalone & Simoni, 2009; Wagner *et al.*, 2001), which leads to rebounds in viral replication and high viral loads, increasing the likelihood of transmission. Therefore alcohol misuse by HIV-positive people is an important mediator of HIV transmission in South Africa.

Implications for public health

Numerous studies have confirmed that alcohol-induced risky sexual behaviour fuels the HIV epidemic in all socioeconomic, social and ethnic groups, including adolescents. Although causality in these studies has been difficult to prove, and despite the fact that many of these studies suffer from biases and confounding (Howe, Sander, Plankey,& Cole, 2010; Shuper , 2010), there is sufficient evidence to warrant action. HIV prevalence peaked around 2002 - 2003, and while it is expected to remain stable, projected to the year 2025, new infections and AIDS deaths will still be between 400 000 and 500 000 per annum (Nathea, 2008). Therefore, comprehensive public health intervention strategies are sorely needed to curb the epidemic. The most economically active segment of the population is also the most reproductively active, yet countless numbers in these groups have already succumbed to HIV/AIDS and consequently, innumerable children have become orphaned. The cycle is being perpetuated by the fact that a major risk factor for early sexual debut is being orphaned by HIV/AIDS-related parental demise (McGrath *et al.*, 2009).

The factors that determine drinking patterns and risky behaviour among South Africans are complex (summarised in Table 1). Nonetheless, approaches that could curb misuse of alcohol and boldly educate people about the risks, consequences and methods of preventing HIV infections are necessary.

Potential preventive strategies

Although mechanisms to curb HIV transmission have been implemented, few of them specifically target alcohol misuse.

Table 1. Gender-related factors associated with increased risk of HIV

	Male	Female
Personality	Perception of reduced risk Denial Fear of stigmatisation Sensation-seeking Need to 'control' women Early sexual debut > than females	Denial Fear of stigmatisation Possible self-esteem issues Early sexual debut
Social factors	Patriarchal society Place of women not always respected in society Poor education Relaxed attitudes towards alcohol use Migrant labourer system	Traditional beliefs of women's 'inferior' position relative to men Poor education Relaxed attitudes towards alcohol use Victims of sexual violence Migrant labourer system leaves women financially vulnerable
Economic factors	Providers, therefore dictate sexual practices and can pay for commercial sex	Financially dependent therefore dictated to about condom-less sex. Casual sex workers under pressure to insist on condoms with paying clients
Biological factors	Sexually transmitted infections	Place women at increased risk Sexually transmitted infections

In fact, most of the existing alcohol awareness campaigns address problems related to motor vehicle accidents and crime. Implementing measures that target the use and misuse of alcohol in the context of risk-taking behaviour would be an important step toward helping the most vulnerable communities to lower the risk of HIV transmission.

Education

Programmes that incorporate integrated alcohol and HIV counselling interventions can successfully reduce HIV/AIDS risk (Kalichman, Simbayi, Vermaak *et al.*, 2007). Therefore, such programmes should be expanded, intensified and made widely available to all vulnerable communities and HIV clinics. Individuals who are known to be HIV positive, and those presenting for voluntary counselling and testing (VCT) could be captured at various facilities, and in addition to their usual medical care, could be offered the opportunity to participate in educational classes, or provided with didactic and explicit reading material explaining these risks. In addition, whenever necessary, individuals could be guided to participate in or be referred for specialised education and counselling. Attendees would have the opportunity to discuss and unpack psychological and personality-related behavioural patterns related to HIV risk in a relatively comfortable and protected setting. Input from counsellors could help clients to link choices, with impact on behaviour, including likelihood of contracting HIV. Utilising gender- (Kalichman, Simbayi, Cloete *et al.*, 2009) and high-risk group (Wechsberg, Luseno, Lam, Parry & Morojele, 2006) specific intervention strategies may also better address problems related to sexual violence and substance abuse, particularly among women.

Other key strategies should include targeting both sexually active and inactive teenagers. At the high school level, two studies conducted in South Africa showed that this approach effectively leads to improved self-awareness, intentions to practise safer sex (Karnell, Cupp, Zimmerman, Feist-Price & Bennie, 2006), and reduced heavy use of alcohol (Smith *et al.*, 2008). Similarly conducted interventions applied to both adolescents and adults are likely to help shape and change views about sex that are traditionally held by women. Since young women are socially and biologically the most vulnerable, these approaches may eventually help to sustain a long-lasting decline in incident HIV infection. Men too need to be educated, as they are the primary perpetrators of sexual violence and socially threatening sexual behaviours that place women as well as themselves at risk for contracting HIV infection. Education campaigns could also help reduce the stigma of HIV, and thereby improve rates of HIV status disclosure to sexual partners and family members. Failure to disclose such information is associated with alcohol misuse, unprotected sex and consorting with multiple partners (Olley *et al.*, 2004), whereas HIV status disclosure reduces the number of unprotected sexual encounters (Kiene *et al.*, 2006).

Government

The South African government has recommitted itself to tackling the HIV epidemic, and currently possesses one of the most comprehensive HIV/AIDS treatment plan. Whilst the numbers of those accessing HAART has increased (Nattrass, 2006; Stewart & Loveday, 2005), still more need treatment. Condoms are widely distributed free of charge in South Africa; however, availability and usage in the context of alcohol remains grossly inadequate (Weir *et al.*, 2003; WHO, 2005). Therefore more targeted distribution such as making them readily available in places where people socialise and drink is warranted (Kalichman, Simbayi, Vermaak, Cain *et al.*, 2008). In this regard, distributing condoms in bars, *shebeens*, or at border posts crossed by truck drivers, could help prevent the spread of HIV as well as other sexually transmitted diseases. Other potential indirect solutions to the problem might include escalating government-run social development programs, targeting unemployment (to help alleviate poverty-related factors that facilitate women to engage in transactional partnerships, and men to misuse alcohol due to unemployment and idleness), and enforcing tough legislation on illegal sales of liquor at *shebeens,* and to minors in general.

Statistics show that relationships with balanced gender attitudes are less likely to be transactional (Dunkle *et al.*, 2007). South Africa boasts one of the most gender-representative governments

worldwide with 43% of women represented in official national government positions (http://www.elsa.org.za/WEP/souwomenrepresent.htm, accessed 15 April 2010), this model may in the long term have a sustained positive impact on both women and men by engendering more modern and progressive ideologies about gender equality. More radical approaches might be to stringently legislate against customary laws that 'disempower' women, as suggested by Shisana *et al.* (Shisana & Davids, 2004). However, this route may prove difficult, and if considered, would require delicate diplomatic discussions between all the relevant stakeholders.

Individuals

Despite statistical links between poverty-related factors (Kalichman, Simbayi, Jooste, Cherry & Cain, 2005; Lane *et al.*, 2009) and alcohol or behaviours that increase risk of HIV infection (not exclusive to transactional/commercial sex), other factors must be included in the equation because not all men drink, and not all drunk men perpetuate coercive or reckless sex with their partners. By the same token, all poor women are not in hierarchal partnerships. Therefore, individual personality traits and circumstances must also play a role. Few studies have evaluated mechanisms by which psychoactive effect of alcohol cause high-risk behaviour (Morojele, Kachieng'a *et al.*, 2006), this is possibly because this type of research is difficult to conduct and quantify. In one study conducted in Zimbabwe, the authors mapped individual personality traits that were predictive of high-risk sex behaviour; one of the strongest associations was excessive alcohol use (Trigg *et al.*, 1997). These findings are important in that alcohol use is a modifiable behaviour, and this can be achieved with education. However, another trait that proved relevant to sexual risk taking was sensation-seeking behaviour. Recall from earlier in this discussion that alcohol usage with sex increases the expectation of increased pleasure (Kalichman, Simbayi, Jooste *et al.*, 2008; Morojele, Brook *et al.*, 2006), suggesting that sensation seekers might be more prone to misuse alcohol, take more sexual risks and therefore be more likely to contract and spread HIV infection.

Denial is another personality trait that results in unprotected sex (Olley *et al.*, 2005) because it interferes with one's ability to assess risk of transmitting or acquiring HIV infection (Siegel & Gibson, 1988). Integral to denial, some men believe their personal risk of contracting HIV is low (Morojele, Brook *et al.*, 2006). This impression is possibly reinforced by statistics showing that HIV/AIDS is a female-predominant disease in South Africa. Consequently, denial combined with a sense of invincibility likely promotes high-risk sexual behaviours. Together, these studies suggest that although priorities should be placed on population-directed efforts, acknowledging specific aspects of individuals' behaviours and personality traits could be helpful in setting policies that also target individual-level interventions. In this regard, from these studies we have gained important insights into psychological traits that could be identified and addressed to target individuals at risk. It is critical to remain mindful of the fact that the overall health of the population is linked to the health status of individuals. We posit this based on our hypothesis that the HIV/AIDS-alcohol epidemic in South Africa is intricately linked with the socio-politico-cultural societal fabric; as such, addressing these issues will ultimately help to achieve sustained control over HV/AIDS.

References

Abrahams, N., Jewkes, R., Hoffman, M., & Laubsher, R. (2004). Sexual violence against intimate partners in Cape Town: prevalence and risk factors reported by men. Bull World Health Organ, 82(5), 330-337.

Andersson, K. M., Van Niekerk, R. M., Niccolai, L. M., Mlungwana, O. N., Holdsworth, I. M., Bogoshi, M., et al. (2009). Sexual risk behaviour of the first cohort undergoing screening for enrollment into Phase I/II HIV vaccine trials in South Africa. Int J STD AIDS, 20(2), 95-101.

Baliunas, D., Rehm, J., Irving, H., & Shuper, P. (2010). Alcohol consumption and risk of incident human immunodeficiency virus infection: a meta-analysis. Int J Public Health, 55(3), 159-166.

Campbell, C., Williams, B., & Gilgen, D. (2002). Is social capital a useful conceptual tool for exploring community level influences on HIV infection? An exploratory case study from South Africa. AIDS Care, 14(1), 41-54.

CDC. (2009). HIV/AIDS Surveillance Report, 2007. Vol. 19, (Report). Atlanta: US: Centers for Disease Control and Preventiono. Document Number)

Chersich, M. F., & Rees, H. V. (2010). Causal links between binge drinking patterns, unsafe sex and HIV in South Africa: its time to intervene. Int J STD AIDS, 21(1), 2-7.

Connolly, C., Shisana, O., Colvin, M., & Stoker, D. (2004). Epidemiology of HIV in South Africa--results of a national, community-based survey. S Afr Med J, 94(9), 776-781.

Cook, R. L., & Clark, D. B. (2005). Is there an association between alcohol consumption and sexually transmitted diseases? A systematic review. Sex Transm Dis, 32(3), 156-164.

Cook, R. L., Sereika, S. M., Hunt, S. C., Woodward, W. C., Erlen, J. A., & Conigliaro, J. (2001). Problem drinking and medication adherence among persons with HIV infection. J Gen Intern Med, 16(2), 83-88.

Dahab, M., Charalambous, S., Hamilton, R., Fielding, K., Kielmann, K., Churchyard, G. J., et al. (2008). «That is why I stopped the ART»: patients' & providers' perspectives on barriers to and enablers of HIV treatment adherence in a South African workplace programme. BMC Public Health, 8, 63.

Department of Health, M. R. C., OrcMacro.2007. (2003). South Africa Demographic and Health Survey 2003. Pretoria: Department of Health, Medical Research Councilo. Document Number)

Dunkle, K. L., Jewkes, R., Nduna, M., Jama, N., Levin, J., Sikweyiya, Y., et al. (2007). Transactional sex with casual and main partners among young South African men in the rural Eastern Cape: prevalence, predictors, and associations with gender-based violence. Soc Sci Med, 65(6), 1235-1248.

Dunkle, K. L., Jewkes, R. K., Brown, H. C., Gray, G. E., McIntryre, J. A., & Harlow, S. D. (2004a). Gender-based violence, relationship power, and risk of HIV infection in women attending antenatal clinics in South Africa. Lancet, 363(9419), 1415-1421.

Dunkle, K. L., Jewkes, R. K., Brown, H. C., Gray, G. E., McIntryre, J. A., & Harlow, S. D. (2004b). Transactional sex among women in Soweto, South Africa: prevalence, risk factors and association with HIV infection. Soc Sci Med, 59(8), 1581-1592.

Evian, C. (1993). AIDS and the cycle of poverty. Nurs RSA, 8(1), 45.

Fassin, D. (2002). Embodied history. Uniqueness and exemplarity of South African AIDS. African Journal of AIDS Research, 1, 63-68.

Fisher, J., Bang, H., & Kapiga, S. H. (2007). The association between HIV infection and alcohol use: a systematic review and meta-analysis of African studies. Sex Transm Dis, 34(11), 856-863.

Frank, S., Esterhuizen, T., Jinabhai, C. C., Sullivan, K., & Taylor, M. (2008). Risky sexual behaviours of high-school pupils in an era of HIV and AIDS. S Afr Med J, 98(5), 394-398.

Hendershot, C. S., Stoner, S. A., Pantalone, D. W., & Simoni, J. M. (2009). Alcohol use and antiretroviral adherence: review and meta-analysis. J Acquir Immune Defic Syndr, 52(2), 180-202.

Hoffman, S., O'Sullivan, L. F., Harrison, A., Dolezal, C., & Monroe-Wise, A. (2006). HIV risk behaviors and the context of sexual coercion in young adults' sexual interactions: results from a diary study in rural South Africa. Sex Transm Dis, 33(1), 52-58.

Howe, C. J., Sander, P. M., Plankey, M. W., & Cole, S. R. (2010). Effects of time-varying exposures adjusting for time-varying confounders: the case of alcohol consumption and risk of incident human immunodeficiency virus infection. Int J Public Health, 55(3), 227-228.

Jochelson, K., Mothibeli, M., & Leger, J. P. (1991). Human immunodeficiency virus and migrant labor in South Africa. Int J Health Serv, 21(1), 157-173.

Kalichman, S. C., Simbayi, L., Jooste, S., Vermaak, R., & Cain, D. (2008). Sensation seeking and alcohol use predict HIV transmission risks: prospective study of sexually transmitted infection clinic patients, Cape Town, South Africa. Addict Behav, 33(12), 1630-1633.

Kalichman, S. C., & Simbayi, L. C. (2004). Sexual assault history and risks for sexually transmitted infections among women in an African township in Cape Town, South Africa. AIDS Care, 16(6), 681-689.

Kalichman, S. C., Simbayi, L. C., Cain, D., & Jooste, S. (2007). Alcohol expectancies and risky drinking among men and women at high-risk for HIV infection in Cape Town South Africa. Addict Behav, 32(10), 2304-2310.

Kalichman, S. C., Simbayi, L. C., Cain, D., & Jooste, S. (2009). Condom failure among men receiving sexually transmissible infection clinic services, Cape Town, South Africa. Sex Health, 6(4), 300-304.

Kalichman, S. C., Simbayi, L. C., Cloete, A., Clayford, M., Arnolds, W., Mxoli, M., et al. (2009). Integrated gender-based violence and HIV Risk reduction intervention for South African men: results of a quasi-experimental field trial. Prev Sci, 10(3), 260-269.

Kalichman, S. C., Simbayi, L. C., Jooste, S., & Cain, D. (2007). Frequency, quantity, and contextual use of alcohol among sexually transmitted infection clinic patients in Cape Town, South Africa. Am J Drug Alcohol Abuse, 33(5), 687-698.

Kalichman, S. C., Simbayi, L. C., Jooste, S., Cherry, C., & Cain, D. (2005). Poverty-related stressors and HIV/AIDS transmission risks in two South African communities. J Urban Health, 82(2), 237-249.

Kalichman, S. C., Simbayi, L. C., Kaufman, M., Cain, D., & Jooste, S. (2007). Alcohol use and sexual risks for HIV/AIDS in sub-Saharan Africa: systematic review of empirical findings. Prev Sci, 8(2), 141-151.

Kalichman, S. C., Simbayi, L. C., Vermaak, R., Cain, D., Jooste, S., & Peltzer, K. (2007). HIV/AIDS risk reduction counseling for alcohol using sexually transmitted infections clinic patients in Cape Town, South Africa. J Acquir Immune Defic Syndr, 44(5), 594-600.

Kalichman, S. C., Simbayi, L. C., Vermaak, R., Cain, D., Smith, G., Mthebu, J., et al. (2008). Randomized trial of a community-based alcohol-related HIV risk-reduction intervention for men and women in Cape Town South Africa. Ann Behav Med, 36(3), 270-279.

Kalichman, S. C., Simbayi, L. C., Vermaak, R., Jooste, S., & Cain, D. (2008). HIV/AIDS risks among men and women who drink at informal alcohol serving establishments (Shebeens) in Cape Town, South Africa. Prev Sci, 9(1), 55-62.

Karnell, A. P., Cupp, P. K., Zimmerman, R. S., Feist-Price, S., & Bennie, T. (2006). Efficacy of an American alcohol and HIV prevention curriculum adapted for use in South Africa: results of a pilot study in five township schools. AIDS Educ Prev, 18(4), 295-310.

Kiene, S. M., Christie, S., Cornman, D. H., Fisher, W. A., Shuper, P. A., Pillay, S., et al. (2006). Sexual risk behaviour among HIV-positive individuals in clinical care in urban KwaZulu-Natal, South Africa. AIDS, 20(13), 1781-1784.

Kiene, S. M., Simbayi, L. C., Abrams, A., Cloete, A., Tennen, H., & Fisher, J. D. (2008). 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, 49(2), 219-226.

Lane, T., Raymond, H. F., Dladla, S., Rasethe, J., Struthers, H., McFarland, W., et al. (2009). High HIV Prevalence Among Men Who have Sex with Men in Soweto, South Africa: Results from the Soweto Men's Study. AIDS Behav.

London, L. (2000). Alcohol consumption amongst South African farm workers: a challenge for post-apartheid health sector transformation. Drug Alcohol Depend, 59(2), 199-206.

London, L., Nell, V., Thompson, M. L., & Myers, J. F. (1998). Health status among farm workers in the Western Cape--collateral evidence from a study of occupational hazards. S Afr Med J, 88(9), 1096-1101.

Lurie, M., Pronyk, P., de Moor, E., Heyer, A., de Bruyn, G., Struthers, H., et al. (2008). Sexual behavior and reproductive health among HIV-infected patients in urban and rural South Africa. J Acquir Immune Defic Syndr, 47(4), 484-493.

Lurie, M., Wiiliams, B., Sturm, A. W., Garnett, G., Zuma, K., Gittelsohn, J., et al. (2000). Migration and the spread of HIV in southern Africa: prevalence and risk factors among migrants and their partners, and non-migrants and their partners.

Mbali, M. (2004). AIDS discourses and the South African state: Government denialism an dpost-aprtheid policy-making. Transformation (54), 104-122.

McGrath, N., Nyirenda, M., Hosegood, V., & Newell, M. L. (2009). Age at first sex in rural South Africa. Sex Transm Infect, 85 Suppl 1, i49-55.

McKinstry, J. (2005). Using the past to step forward: fetal alcohol syndrome in the Western Cape Province of South Africa. Am J Public Health, 95(7), 1097-1099.

Mnyika, K. S., Klepp, K. I., Kvale, G., & Ole-King'ori, N. (1996). Risk factors for HIV-1 infection among women in the Arusha region of Tanzania. J Acquir Immune Defic Syndr Hum Retrovirol, 11(5), 484-491.

Moore, J., Beeker, C., Harrison, J. S., Eng, T. R., & Doll, L. S. (1995). HIV risk behavior among Peace Corps Volunteers. AIDS, 9(7), 795-799.

Morojele, N. K., Brook, J. S., & Kachieng'a, M. A. (2006). Perceptions of sexual risk behaviours and substance abuse among adolescents in South Africa: a qualitative investigation. AIDS Care, 18(3), 215-219.

Morojele, N. K., Kachieng'a, M. A., Mokoko, E., Nkoko, M. A., Parry, C. D., Nkowane, A. M., et al. (2006). Alcohol use and sexual behaviour among risky drinkers and bar and shebeen patrons in Gauteng province, South Africa. Soc Sci Med, 62(1), 217-227.

Myer, L., Mathews, C., & Little, F. (2002). Condom use and sexual behaviors among individuals procuring free male condoms in South Africa: a prospective study. Sex Transm Dis, 29(4), 239-241.

Myer, L., Smit, J., Roux, L. L., Parker, S., Stein, D. J., & Seedat, S. (2008). Common mental disorders among HIV-infected individuals in South Africa: prevalence, predictors, and validation of brief psychiatric rating scales. AIDS Patient Care STDS, 22(2), 147-158.

Nathea, N. (2008). Summary of provincial HIV and AIDS statisitics for South Africa: Metropolitano. Document Number)

Nattrass, N. (2006). South Africa's 'Roll-out' of highly active antiretroviral therapy: A critical assessment [Electronic Version]. Retrieved 04.15.2010,

Olley, B. O., Gxamza, F., Seedat, S., Theron, H., Taljaard, J., Reid, E., et al. (2003). Psychopathology and coping in recently diagnosed HIV/AIDS patients--the role of gender. S Afr Med J, 93(12), 928-931.

Olley, B. O., Seedat, S., Gxamza, F., Reuter, H., & Stein, D. J. (2005). Determinants of unprotected sex among HIV-positive patients in South Africa. AIDS Care, 17(1), 1-9.

Olley, B. O., Seedat, S., & Stein, D. J. (2004). Self-disclosure of HIV serostatus in recently diagnosed patients with HIV in South Africa. Afr J Reprod Health, 8(2), 71-76.

Palepu, A., Raj, A., Horton, N. J., Tibbetts, N., Meli, S., & Samet, J. H. (2005). Substance abuse treatment and risk behaviors among HIV-infected persons with alcohol problems. J Subst Abuse Treat, 28(1), 3-9.

Parry, C. D. (2005). South Africa: alcohol today. Addiction, 100(4), 426-429.

Parry, C. D., & Bennetts, A. L. (1998). Alcohol policy and public health in South Africa. Oxford University Press.

Parry, C. D., Myers, B., Morojele, N. K., Flisher, A. J., Bhana, A., Donson, H., et al. (2004). Trends in adolescent alcohol and other drug use: findings from three sentinel sites in South Africa (1997-2001). J Adolesc, 27(4), 429-440.

Peltzer, K., Hira, S. K., Wadhawan, D., Kamanga, J., Ferguson, D. C., & Perine, P. L. (1989). Psychosocial counselling of patients infected with human immunodeficiency virus (HIV) in Lusaka, Zambia. Trop Doct, 19(4), 164-168.

Peltzer, K., & Ramlagan, S. (2009). Alcohol use trends in South Africa. Journal of Social Sciences, 18(1), 1-12.

Peltzer, K., Seoka, P., & Raphala, S. (2004). Characteristics of female sex workers and their HIV/AIDS/STI knowledge, attitudes and behaviour in semi-urban areas in South Africa. Curationis, 27(1), 4-11.

Petros, G., Airhihenbuwa, C. O., Simbayi, L., Ramlagan, S., & Brown, B. (2006). HIV/AIDS and 'othering' in South Africa: the blame goes on. Cult Health Sex, 8(1), 67-77.

Pithey, A., & Parry, C. (2009). Descriptive systematic review of Sub-Saharan African studies on the association between alcohol use and HIV infection. SAHARA J, 6(4), 155-169.

Ras, G. J., Simson, I. W., Anderson, R., Prozesky, O. W., & Hamersma, T. (1983). Acquired immunodeficiency syndrome. A report of 2 South African cases. S Afr Med J, 64(4), 140-142.

Rehm, J., Rehn, N., Room, R., Monteiro, M., Gmel, G., Jernigan, D., et al. (2003). The global distribution of average volume of alcohol consumption and patterns of drinking. Eur Addict Res, 9(4), 147-156.

Sawyer, K. M., Wechsberg, W. M., & Myers, B. J. (2006). Cultural similarities and differences between a sample of Black/African and colored women in South Africa: convergence of risk related to substance use, sexual behavior, and violence. Women Health, 43(2), 73-92.

Schneider, M., Norman, R., Parry, C., Bradshaw, D., & Pluddemann, A. (2007). Estimating the burden of alcohol abuse in South Africa in 2000. Methodological note. Cape Town: South African Medical Research Councilo. Document Number)

Sher, R. (1989). HIV infection in South Africa, 1982-1988--a review. S Afr Med J, 76(7), 314-318.

Shisana, O., & Davids, A. (2004). Correcting gender inequalities is central to controlling HIV/AIDS. Bull World Health Organ, 82(11), 812.

Shuper, P. A., Neuman, M., Kanteres, F., Baliunas, D., Joharchi, N., & Rehm, J. (2010). Causal considerations on alcohol and HIV/AIDS--a systematic review. Alcohol Alcohol, 45(2), 159-166.

Siegel, K., & Gibson, W. C. (1988). Barriers to the modification of sexual behavior among heterosexuals at risk for acquired immunodeficiency syndrome. N Y State J Med, 88(2), 66-70.

Simbayi, L. C., Kalichman, S., Strebel, A., Cloete, A., Henda, N., & Mqeketo, A. (2007a). Internalized stigma, discrimination, and depression among men and women living with HIV/AIDS in Cape Town, South Africa. Soc Sci Med, 64(9), 1823-1831.

Simbayi, L. C., Kalichman, S. C., Cain, D., Cherry, C., Jooste, S., & Mathiti, V. (2006). Alcohol and risks for HIV/AIDS among sexually transmitted infection clinic patients in Cape Town, South Africa. Subst Abus, 27(4), 37-43.

Simbayi, L. C., Kalichman, S. C., Jooste, S., Mathiti, V., Cain, D., & Cherry, C. (2004). Alcohol use and sexual risks for HIV infection among men and women receiving sexually transmitted infection clinic services in Cape Town, South Africa. J Stud Alcohol, 65(4), 434-442.

Simbayi, L. C., Kalichman, S. C., Jooste, S., Mathiti, V., Cain, D., & Cherry, C. (2006). HIV/AIDS risks among South African men who report sexually assaulting women. Am J Health Behav, 30(2), 158-166.

Simbayi, L. C., Kalichman, S. C., Strebel, A., Cloete, A., Henda, N., & Mqeketo, A. (2007b). Disclosure of HIV status to sex partners and sexual risk behaviours among HIV-positive men and women, Cape Town, South Africa. Sex Transm Infect, 83(1), 29-34.

Smit, J., Myer, L., Middelkoop, K., Seedat, S., Wood, R., Bekker, L. G., et al. (2006). Mental health and sexual risk behaviours in a South African township: a community-based cross-sectional study. Public Health, 120(6), 534-542.

Smith, E. A., Palen, L. A., Caldwell, L. L., Flisher, A. J., Graham, J. W., Mathews, C., et al. (2008). Substance use and sexual risk prevention in Cape Town, South Africa: an evaluation of the HealthWise program. Prev Sci, 9(4), 311-321.

Stewart, R., & Loveday, M. (2005). «Public HAART Projects in South Africa-Progress to November 2004». Durban: Health Systems Trust. (H. S. Trust o. Document Number)

Strebel, A., Crawford, M., Shefer, T., Cloete, A., Henda, N., Kaufman, M., et al. (2006). Social constructions of gender roles, gender-based violence and HIV/AIDS in two communities of the Western Cape, South Africa. SAHARA J, 3(3), 516-528.

Taylor, M., Dlamini, S. B., Kagoro, H., Jinabhai, C. C., & de Vries, H. (2003). Understanding high school students' risk behaviors to help reduce the HIV/AIDS epidemic in KwaZulu-Natal, South Africa. J Sch Health, 73(3), 97-100.

Te Water Naude, J., London, L., Pitt, B., & Mahomed, C. (1998). The ‚dop' system around Stellenbosch--results of a farm survey. S Afr Med J, 88(9), 1102-1105.

Trigg, C., Peterson, K., & Meekers, D. (1997). Psychographic predictors of risky sexual practice. SAfAIDS News, 5(4), 13-15.

UNAIDS. (2008). Report on the global AIDS epidemic 2008: Executive summary. Geneva: Joint United Nations Programme on HIV/AIDS (UNAIDS) o. Document Number)

UNAIDS/WHO. (2009). AIDS epidemic update December 2009 (No. UNAIDS/09.36E / JC1700E). Geneva: Joint United Nations Programme on HIV/AIDS (UNAIDS) and World Health Organization (WHO) 2009o. Document Number)

Wagner, J. H., Justice, A. C., Chesney, M., Sinclair, G., Weissman, S., & Rodriguez-Barradas, M. (2001). Patient- and provider-reported adherence: toward a clinically useful approach to measuring antiretroviral adherence. J Clin Epidemiol, 54 Suppl 1, S91-98.

Wechsberg, W. M., Luseno, W., Riehman, K., Karg, R., Browne, F., & Parry, C. (2008). Substance use and sexual risk within the context of gender inequality in South Africa. Subst Use Misuse, 43(8-9), 1186-1201.

Wechsberg, W. M., Luseno, W. K., Karg, R. S., Young, S., Rodman, N., Myers, B., et al. (2008). Alcohol, cannabis, and methamphetamine use and other risk behaviours among Black and Coloured South African women: a small randomized trial in the Western Cape. Int J Drug Policy, 19(2), 130-139.

Wechsberg, W. M., Luseno, W. K., Lam, W. K., Parry, C. D., & Morojele, N. K. (2006). Substance use, sexual risk, and violence: HIV prevention intervention with sex workers in Pretoria. AIDS Behav, 10(2), 131-137.

Weir, S. S., Pailman, C., Mahlalela, X., Coetzee, N., Meidany, F., & Boerma, J. T. (2003). From people to places: focusing AIDS prevention efforts where it matters most. AIDS, 17(6), 895-903.

WHO. (2005). Alcohol use and sexual risk behaviour: A cross-cultural study in eight countries (Report). Geneva: World Health Organization. Document Number)

Zablotska, I. B., Gray, R. H., Koenig, M. A., Serwadda, D., Nalugoda, F., Kigozi, G., et al. (2009). Alcohol use, intimate partner violence, sexual coercion and HIV among women aged 15-24 in Rakai, Uganda. AIDS Behav, 13(2), 225-233.

Zimba, R. F. (1995). Secondary school students' risks that may promote HIV infection and the spread of AIDS. A Namibian study. Sch Psychol Int, 16(1), 67-78.

Zuma, K., Gouws, E., Williams, B., & Lurie, M. (2003). Risk factors for HIV infection among women in Carletonville, South Africa: migration, demography and sexually transmitted diseases. Int J STD AIDS, 14(12), 814-817.