

## REVIEW OF INTERVENTIONS TO REDUCE ALCOHOL USE-RELATED SEXUAL RISK BEHAVIOUR IN AFRICA

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### ABSTRACT

The harmful use of alcohol has long been recognised as a major contributor to mortality and morbidity in many parts of the globe, and in various parts of Sub-Saharan Africa in particular. During the past decade, numerous studies have pointed to alcohol's potential role in sexual risk behaviours and HIV infection. Consequently, there is an urgent need for the identification, development and implementation of efficacious and effective HIV prevention interventions to reduce levels of sexual risk behaviour that are associated with alcohol use. A systematic literature review was conducted to locate and synthesize peer-reviewed, published and unpublished studies addressing the effectiveness of HIV prevention interventions that have been conducted among alcohol-users in Africa. Eight published studies were found, comprising school, community, STI clinic, and bar-based interventions. The studies provided some evidence for the effectiveness of the interventions within those settings, but were limited by methodological issues, including the intervention designs (lack of control groups), short follow-up periods, and the use of self-report measures of sexual risk behaviour outcomes. The results have implications for policies and programmes, and for further research on interventions to reduce sexual risk behaviour among alcohol users in South Africa.

**KEY WORDS:** alcohol, harmful use, sexual risk behaviours, South Africa

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### INTRODUCTION

The harmful use of alcohol has long been recognised as a major contributor to mortality and morbidity in many parts of the globe, and in various parts of Sub-Saharan Africa in particular (WHO, 2004). Levels of alcohol consumption among those who consume alcohol are extremely high (Roerecke, Obot, Patra, & Rehm, 2008; WHO, 2004), and in some regions of Sub-Saharan Africa, those who

drink are particularly involved in heavy/binge drinking patterns of consumption (Clausen et al., 2009), which make them prone to acute problems such as intentional injuries, unintentional injuries and a range of other social and health problems (Babor et al., 2003; Rehm et al., 2010).

Alcohol consumption is increasingly being recognized to be associated with HIV infection in various parts of Africa (Fritz, Morojele & Kalichman, 2010), and particularly, in those

regions of the continent, such as Southern and Eastern Africa, that have the greatest burden of HIV (UNAIDS & WHO, 2009). A recent meta-analysis of studies globally found that alcohol consumption was associated with incident HIV (Baliunas et al., 2009), and its findings were similar to those of a meta-analysis (Fisher et al., 2007) and a descriptive review (Pithey & Parry, 2009) of studies in Africa which showed strong associations between alcohol consumption and HIV infection. Sexual risk behaviour is understood to be the main mediator between alcohol consumption and HIV infection (Kalichman et al., 2007a). Indeed, Kalichman et al.'s systematic review of studies conducted in Africa provides substantial evidence of alcohol's association with sexual risk behaviour. Qualitative and quantitative research has uncovered some of the moderators of the relationship between drinking and sexual risk behaviour. They suggest that alcohol's link with sexual risk behaviour may be a function of (a) the quantities consumed, with heavy users being more likely to be at risk (Fisher et al., 2007; Morojele et al., 2006); (b) the drinking contexts, with people's risk of engaging in sexual risk behaviour being related to the contexts, such as drinking venues (Fritz, et al., 2002; Kalichman et al., 2008; Lewis et al., 2005; Morojele et al., 2006); (c) the consumers of alcohol, with commercial sex workers and people who sell and serve alcohol being at particular risk (Fisher et al., 2008; Morojele et al., 2006); and (d) intra-personal factors, with norms, alcohol expectancies/outcome beliefs, and sensation seeking, playing an apparent role in sexual risk behaviour (e.g. Kalichman et al., 2007a; Kalichman et al., 2008a; Morojele et al., 2004).

Given these associations, interventions are urgently needed to reduce sexual risk behaviour among alcohol users (Fritz, Morojele & Kalichman, 2010). A variety of both structural and behavioural interventions are needed to address the particular needs of different target populations (Fritz, 2009; Fritz, Morojele & Kalichman, 2010). Knowledge about what works and what does not work can have implications for policies and programmes for reduc-

ing sexual risk behaviour among alcohol users on the continent. The primary objective of this review was to locate and synthesize peer-reviewed, published and unpublished studies that have evaluated the effectiveness of HIV prevention interventions among alcohol-users in Africa.

## METHOD

In conducting the systematic literature review we largely followed the five key steps utilised by Bimrose et al. (2005), namely: searching, screening, data-extraction, synthesis and reporting. The first stage of the process involved searching for potentially relevant studies in nine public research databases and through Google and Google Scholar. We identified appropriate electronic databases and websites to be searched, a list of which is shown in Table 1.

We developed a search strategy to ensure that all the searches of each database were consistent and comparable. We decided on keywords and phrases based on the topic being examined i.e HIV prevention interventions that have been conducted among alcohol-users in Africa. These included: HIV prevention OR HIV/AIDS prevention AND drinking OR alcohol use OR alcohol abuse AND Africa. The documents (peer-reviewed, published and unpublished studies) yielded from the keyword searches were screened online, to determine whether they met our inclusion criteria, and hence, their suitability for inclusion in the systematic literature review. Our inclusion criteria were: (1) Year: Conducted from 1990 onwards; (2) Types of reports: Published and unpublished articles, conference papers, abstracts, theses, books; (3) Population: Alcohol using populations; (4) Countries: Studies conducted anywhere in Africa; (5) Primary focus of intervention: HIV/AIDS or sexual risk reduction; (6) Type of intervention: Structural or behavioural intervention; (7) Design: Randomised-controlled trials; controlled trials without randomisation; pre- and post-intervention data collection with no control; and (8) Language: English.

**Table 1:** List of electronic databases searched

Database	Region covered
Ebsco Information Services: Ebscohost Web	International and Africa
Elsevier Science: <a href="#">ScienceDirect</a>	International
SABINET: Sabinet Online complete list of databases	South Africa
ProQuest: ProQuest databases (institution had access to only to 3 business databases thus irrelevant)	International
IngentaConnect	International
JSTOR	International
Oxford journals	International
PubMed	International
Springerlink	International
Google scholar	International and South Africa
Google	International and South Africa

We also browsed through the reference lists of the articles that we found initially, to identify further relevant articles. We developed and agreed on a summary table designed to provide a framework for extracting, assessing and analysing the data contained within the relevant publications/reports. The data were synthesised according to four types of interventions that emerged, in relation to the reduction of alcohol use-related sexual risk behaviour in Africa.

## RESULTS

From the 65 “hits”, a total of 8 publications/reports met the inclusion criteria. These publications were categorized based on their target populations and settings of implementation. Three studies evaluated school-based interventions (Cupp et al., 2008; Karnell et al., 2006; Smith et al., 2008;); another three involved community-based interventions (Deveau, 2008; Wechsberg et al., 2006; 2008); one involved an STI clinic-based intervention (Kalichman et al., 2007b); and one was an intervention involving individuals who were recruited from shebeens (informal alcohol-serving establishments), referred to for present

purposes as a bar-based intervention (Kalichman et al., 2008b).

### School-based interventions

All three evaluations of school-based interventions were conducted in South Africa. None of the interventions were limited to alcohol users, but the studies were included because they all aimed to intervene with respect to participants’ alcohol consumption, as well as their sexual risk behaviours. Smith et al. (2008) tested an adapted version of the HealthWise programme which sought to reduce students’ sexual risk and substance use, and increase their leisure experiences. This programme consisted of 12 lessons/sessions in Grade 8, and 6 booster lessons/sessions in Grade 9. Participants comprised Grade 8 students in nine township-based high schools in Cape Town. A controlled trial without randomisation was conducted; five schools were assigned to receive the intervention, and four schools served as comparisons. The paper reports on five waves of data collection, at approximately 6-monthly intervals, which were ongoing for over 24 months; and about 62% of the original sample (1350/2176) were followed up at Wave 5.

Karnell et al. (2006) tested an adapted alcohol and HIV prevention intervention among 9<sup>th</sup>

Grade students in Pietermaritzburg. The aim of the intervention was to impact on knowledge and skills regarding alcohol consumption and HIV-related issues. The curriculum was delivered in 10 lessons (of 30 minutes each) over 8 weeks. A pre-post quasi-experimental design was employed with three schools randomly assigned to the intervention and two schools to the comparison condition. Students in the intervention schools received the curriculum, and those in the comparison schools continued to receive the standard life orientation classes. A total of 81% of the original participants (536/661) who received the intervention were followed up 5 months after baseline, approximately 1.5 months after the end of the intervention.

Cupp et al. (2008) tested the same alcohol and HIV prevention intervention also in

schools in Pietermaritzburg. The intervention was delivered to 9<sup>th</sup> Grade students in 15 lessons over 8 weeks. The format was didactic and interactive. A cluster randomised controlled trial was conducted; four schools were randomly assigned to receive the intervention while four schools served as comparisons. The comparison schools received standard life orientation classes and additional information on alcohol and HIV. There were 3 waves of data collection: baseline (Time 1), 4-6 months (Time 2), and 15-18 months (Time 3). The response rates were 69% (754/1095) and 45% (492/1095), for the Time 2 and Time 3 follow-up periods, respectively.

The results of the school-based intervention studies can be seen in Table 2. The three studies examined four different sexual

**Table 2:** School-based intervention studies - Key findings

Sexual behaviours	Smith et al. (2008)	Karnell et al. (2006)	Cupp et al. (2008)	
	Wave 5 Experimental vs comparison	Wave 2 Experimental vs comparison	Wave 2 Experimental vs comparison	Wave 3 Experimental vs comparison
Initiated sex (%)				
Overall	22 vs 21	---	16.4 vs 28.3* <sup>b</sup>	28.3 vs 45.0*
Males	26 vs 29*	---	---	---
Females	19 vs 14	---	---	---
Sex in past month, among sexually active (%)	NS <sup>a</sup>	---	---	---
Consistent condom use, among sexually active (%)	NS <sup>a</sup>	---	---	---
Condom use at last sex (%)	---	---	36.9 vs 45.4	24.9 vs 33.4
Condom use at last sex (% change scores)				
Overall	---	4.2 vs 2.2	---	---
Males	---	3.5 vs -0.5	---	---
Females	---	2.5 vs 2.5	---	---
Had had sex at pre-test	---	-2.1 vs -5.5	---	---
Had not had sex at pre-test	---	5.7 vs 6.4	---	---
Alcohol use by self or partner at last sex (% change scores)				
Overall	---	-0.9 vs 4.5	---	---
Male	---	-2.7 vs 11.1	---	---
Female	---	2.6 vs -1.3	---	---
Had had sex at pre-test	---	-0.6 vs 0.7	---	---
Had not had sex at pre-test	---	-0.1 vs 14.9*	---	---

--- Not assessed/reported; NS - Not significant; <sup>a</sup>Actual figures not shown in report

behaviour outcomes: initiation of sex among those who were not sexually active at baseline (Cupp et al., 2008; Smith et al., 2008), condom use at last sex (Cupp et al., 2008; Karnell et al., 2006; Smith et al., 2008), sex in the past month amongst those who were sexually active (only for the HealthWise study; Smith et al., 2008), and self or partner drinking at last sex (Karnell et al., 2006). The two papers reporting on this outcome found significant reductions in the onset of sexual activity among virgins at baseline; for males only in the HealthWise study (Smith et al., 2008), but for both males and females in the Pietermaritzburg study (Cupp et al., 2008). However, no intervention effects were evident with respect to participants' levels of sex in the past month (only the HealthWise study examined this outcome), or their condom use at last sex (for all studies). Karnell et al. (2006) found no significant intervention effects on self or partner drinking at last sex for the total sample, males or females, or among those who had been sexually active at baseline. However, significant intervention effects were in evidence for the sub-sample who were virgins at baseline ( $p < .05$ ).

The very few effects on sexual behaviour that were evident in the HealthWise study were attributed to the experimental group's higher rates of sex than the control group's at baseline, the problematic measurement of condom use, and the non-random assignment of schools to the intervention and control conditions. Karnell et al. (2006) reported that their study was limited by possible 'intervention decay' since the follow-up period was short; baseline differences with the experimental group having had higher levels of HIV-related knowledge and condom use self-efficacy than the control group; the reliance on self-reports; the lack of privacy among many participants to complete the questionnaire; and possible limitations in the validity of the instrument. Cupp et al. (2008) reported that the failure to impact on sexual behaviour in the past month and condom use at last sex could be due to attrition, with those remaining in the study having had safer attitudes and behaviours at baseline than those who did not remain in the study.

### **Community-based interventions**

We found three studies of interventions in community settings (Deveau, 2008; Wechsberg et al., 2006; Wechsberg et al., 2008). Deveau (2008) reported on the Academy for Educational Development (AED) Capable Partners Programme in Kenya. This overall programme provided support to eight non-governmental organisations (NGOs) to reduce HIV transmission among substance abusers via outreach; community education; HIV testing and case management; addiction treatment; and HIV treatment centre-based services. Deveau (2008) presented data from one NGO that delivered outreach services to substance users in urban areas in Kenya, including Malindi, Lamu and Kilifi. The participants comprised substance abusers, some of whom were alcohol users. A pre- and post-intervention design was used, with an apparent 15-month follow-up period (February 2007 to May 2008). Follow-up data were reported for 1,104 out of an original sample of 2,623 individuals (42%).

Wechsberg et al. (2006) compared a standard HIV intervention, with a woman-focused intervention which aimed to increase knowledge and skills regarding sexual and drug risk, and violence prevention. The Standard Intervention consisted of two, one-hour, educational and skills building sessions. The Woman-Focused intervention consisted of two individual sessions, lasting for over one hour each, and had a special emphasis on gender issues, sexual risk behaviour, violence prevention, and issues particularly of relevance to sex work. The participants comprised sex working and cocaine-using women in Pretoria, South Africa.

Wechsberg et al.'s (2008) sample consisted of women in Cape Town who had used alcohol or illicit drugs during at least 13 of the past 90 days, with results reported for 'black African' and 'coloured' women separately. The Woman-focused intervention that was implemented was an adaptation of the Pretoria intervention. The study compared group and individual formats of the intervention.

Both studies utilised a pre- and post-intervention design, and a one-month follow-up

period, and they both had excellent follow-up rates of 86% (Wechsberg et al., 2006) and 98% (Wechsberg et al., 2008).

The three community-based studies examined the effects of the interventions on four main sexual risk behaviour outcomes, namely: (1) number of sexual partners; (2) number of sexual episodes; (3) condom use; and (4) alcohol and other drug (AOD) use before sex. The results of the studies are summarised in Table 3.

#### *Number of sexual partners:*

Deveau (2008) reported reductions among participants in the mean number of sexual partners in the past 30 days, and past six months. Wechsberg et al. (2006) did not report on the Pretoria-based participants' number of sexual partners. Wechsberg et al. (2008) found non-significant changes in the mean number of sexual partners, and the mean number of male sexual partners the black African and coloured participants had had in the past 30 days.

#### *Number of sexual episodes:*

Only one of the studies (Wechsberg et al., 2008) reported on the effects of the intervention on participants' number of sexual episodes. The black African women had a non-significant reduction in the mean number of episodes of sex in the past month, while for the coloured women there was a significant reduction ( $p < .01$ ) in the mean on this measure.

#### *Condom use:*

Varied measures of condom use were employed in the three studies. Deveau's (2008) study reported large increases in condom use in the past week, and modest increases in condom use at least 50% of the time during sex in the past week. Wechsberg et al. (2006) reported a significant increase in the proportion of women reporting condom use at last sex, but no significant change in the other condom use measures (consistent condom use in the past month with clients and with the partner).

**Table 3:** Community-based intervention studies - Key findings: Baseline to follow-up scores

Risky behaviours	Deveau (2008)	Wechsberg et al. (2006)	Wechsberg et al. (2008)	
			Black	Coloured
Number of sex partners in past 30 days (mean)	1.7-1.2 <sup>a</sup>	---	0.98-1.02	1.53-1.60
Number of sex partners in past 6 months (mean)	3.9-2.4 <sup>a</sup>	---	---	---
Number of sex episodes in past month (mean)	---	---	9.72-8.48	5.75-2.08*
Number of unprotected sex episodes in past month (mean)	---	---	5.50-3.80	3.79-0.73*
Frequency of condom use during vaginal/anal sex in past week (%)	19-55 <sup>a</sup>	---	---	---
Condom use at least 50% of the time during vaginal/anal sex in past week (%)	11-23 <sup>a</sup>	---	---	---
Consistent condom use with clients in past month (%)	---	94-97	---	---
Consistent condom use with boyfriends in past month (%)	---	23-33	---	---
Condom use at last sex (%)	---	28-55 <sup>b*</sup>	50-66 <sup>c*</sup>	15-27 <sup>c</sup>
Times AOD use before sex (sex work) past month (mean)	---	---	7.70-6.50	1.47-0.12*
AODs used during sex in the last week (%)	---	65-54	---	---
Any female condom use with clients in past month (%)	---	12-68*	---	---
Any female condom use with boyfriends in past month (%)	---	3-48*	---	---

--- Not reported/asked; <sup>a</sup>Statistical comparisons not reported; <sup>b</sup>condom use with boyfriends; <sup>c</sup>partner(s) not specified\*Statistically significant.

In Wechsberg et al.'s (2008) Cape Town study, a significant increase in condom use at last sex with their partner was observed for the black African women, but there were no significant changes in the number of episodes of unprotected sex they had had in the past month. The converse results were observed for the coloured women in that they evidenced a significant decrease in the number of unprotected episodes of sex in the past month, but there was no change in the proportions reporting having used a condom at last sex. The strongest intervention effects related to the women's use of female condoms with both clients and partners (as shown in Table 3).

*Sex after consuming alcohol and/or other drugs:*

One group (coloured sub-sample; Wechsberg et al., 2008) experienced a reduction in the mean number of times in the past 30 days that they had used alcohol and/or other drugs before/during sex, while there was no change on this variable for either the black African women in the same study, or the women in the Pretoria study (Wechsberg et al., 2006).

A limitation of two of the community-based studies was their lack of control groups (Deveau, 2008; Wechsberg et al., 2008). Wechsberg et al. (2006; 2008) had a very short (one month) follow-up period. Wechsberg et al. (2008) indicated that their Cape Town study may have been limited by a small sample size,

the use of self-reports, and "the risk of Hawthorne effects and competing history with media efforts" (page 137).

**STI clinic intervention**

We found one study of an HIV intervention in an STI clinic in Cape Town, South Africa (Kalichman et al., 2007b). Kalichman et al. tested an HIV risk reduction counselling intervention, with a specific component on alcohol use in sexual contexts. The sample comprised 122 men and 21 women (Total=143). Eligibility criteria for enrolment included, current drinking, and being seen for an STI diagnosis or treatment service at the STI clinic. A randomised controlled trial design was used. Participants were assigned either to a 60-minute behavioural skills building HIV and alcohol risk reduction counselling session, or a 20-minute HIV information/education control intervention. Participants were followed up at 3 months and 6 months post-intervention.

The three-month follow-up rates were 72% and 69% for participants in the intervention and comparison conditions, respectively; at six months they were 74% and 69%, respectively. The sexual risk behaviour outcomes included (a) number of sexual partners, (b) unprotected sex/condom use; and (c) alcohol use in sexual contexts. The results of the study are shown in Table 4. Between baseline and the three-month post-intervention point, there was no change in the participants' mean number of

**Table 4:** STI Clinic-based intervention (Kalichman et al., 2007b) - Key findings

Risky behaviours	Baseline-3 Month Follow-Up	Baseline-6 Month Follow-Up
Number of sexual partners in past month (mean)	2.5-1.9	2.5-1.6
Condom use/Unprotected sex		
Unprotected vaginal sex occasions in past month (Mean)	3.6-0.8*	3.6-1.3*
Unprotected anal sex occasions in past month(Mean)	0.2-0.2	0.2-0.1
Percent intercourse occasions protected by condoms in past month (%)	64.8-90.5*	64.8-87.8*
Condom use at last sex (%)	37-49*	37-46
Occasions of alcohol use in sexual contexts in past month (Mean)	3.7-1.5*	3.7-2.1

\*Significantly greater change in experimental group than control group.

sexual partners. With respect to condom use, there were significant reductions in unprotected vaginal sex, percentage of condom use, and condom use at last sex; however, there was no change in the participants' level of reported unprotected anal sex. Finally, there was a significant reduction in alcohol use in sexual contexts. For the six-month follow-up period fewer of the differences between the experimental and control groups' outcomes were statistically significant. The only statistically significant differences that remained at six months related to the unprotected vaginal sex and percent intercourse protected by condoms outcomes. Among possible limitations of the study were the reliance on self-reports of sexual behaviours, the longer contact time for those in the intervention than control intervention (60 minutes versus 20 minutes), and the lack of blinding of participants to condition.

### **Bar-based intervention**

A single-session, 3-hour HIV-alcohol risk-reduction skills intervention was tested in Kalichman's et al. (2008b) study. This intervention was delivered in group formats in community sites to patrons recruited from shebeens (informal alcohol-serving establishments) in a township in Cape Town. The participants consisted of adult males ( $n = 117$ ) and females ( $n = 236$ ), and they were eligible if they were 18 years or older, recruited from a shebeen, and had consumed alcohol during the previous month. A randomised controlled design was employed in which a one-hour HIV-alcohol education only control condition was compared with the three-hour HIV-alcohol risk reduction intervention condition. Participants were followed up at 3 months and 6 months after the intervention. Follow-up rates for the comparison and intervention groups at three months were 85% and 81%, respectively, and at six months they were 89% and 90%, respectively.

The results of the study can be seen in Table 5. The sexual risk behaviour outcomes that were reported on included (a) condom use/unprotected sex; (b) number of sexual partners; and (c) alcohol use prior to sex. At three months, there were no significant intervention

effects on the number of sexual partners. There were significant changes in the desired direction in the condom use/unprotected sex-related outcomes. Finally, there was a significant change in the number of episodes of alcohol use in sexual contexts. At the six month follow-up period, all of the results had dissipated, except for those pertaining to the alcohol use before sex outcome.

Additional analyses revealed that the intervention had a stronger effect on the light drinkers than the heavier drinkers in terms of most variables: at three months, the lighter drinkers in the experimental condition were most likely to exhibit the best outcomes on five of the seven outcomes (namely, unprotected vaginal and anal sex; % intercourse condom protected; alcohol use before sex; consistent condom use; and completely protected). However, at the six month follow-up these results were maintained for the consistent condom use and completely protected outcomes only.

## **DISCUSSION**

To the best of our knowledge, this is the first systematic review of studies of HIV prevention interventions that have been implemented amongst alcohol users in Africa. Our search only uncovered eight articles of interventions that have been evaluated, most of which were adaptations of evidence-based interventions from the USA. These interventions were focused on target populations in a variety of settings, including schools (x3), communities (x3), an STI clinic (x1), and a drinking establishment (x1).

A number of the studies' main strengths were their use of randomized controlled designs (Cupp et al., 2008; Kalichman et al., 2007b; 2008b), and very high follow-up rates of about 70% or above (Kalichman et al., 2007b; 2008b; Karnell et al., 2006; Wechsberg et al., 2006; Wechsberg et al., 2008). However, some of the studies had a number of limitations. First, the pre-post test intervention designs employed by some of the studies limited the reliability of their results (Deveau, 2008;

**Table 5:** Intervention among bar patrons (Kalichman et al., 2008b) – Key findings

Risky behaviours	Baseline-3 month follow-up	Baseline-6 month follow-up
Unprotected vaginal sex	Significant	NS
% intercourse condom protected	Significant	NS
Alcohol use before sex	Significant	Significant
Consistent condom use	Significant	NS
Completely protected	Significant	NS
2+ sexual partner	NS	NS

Significant: Significantly greater change in experimental group than control group; NS: Not significant

Wechsberg et al., 2008). Second, the duration of the follow-up period was extremely short in some cases (i.e. between one, and one and a half months for Karnell et al., 2006; Wechsberg et al., 2006; Wechsberg et al., 2008), thus limiting the generalisability of the results to the longer term. As seen in Kalichman et al.'s (2007b; 2008b) studies, for example, it is possible that short-term intervention gains disappear over time. Third, all the studies' reliance on self-reports of outcomes is of concern.

Putting aside the studies' limitations, the results of this review suggest that HIV prevention interventions delivered in different settings can be effective for changing certain sexual risk behaviours amongst alcohol-using populations in various contexts in Africa. Although the use of non-comparable measures of sexual risk behaviour made it impossible to pool the results of the studies, the findings suggest different trends dependent on the age group of the target population. Among adolescents, the interventions were more likely to affect (delay) initiation of sex among those who were not sexually active at baseline, than to affect condom use behaviours among those who were already sexually active. This concurs with the results of a review of intervention impact on condom use in Sub-Saharan Africa and Asia, indicating less consistent intervention success in increasing levels of condom use among young people than among adults (Foss et al., 2007). The interventions targeting adults were more likely to decrease levels of unprotected sex than to have an impact on fre-

quency of sexual episodes or number of sexual partners; none of the studies measuring number of sexual partners showed significant intervention effects on this behaviour (Kalichman et al., 2007b; Kalichman et al., 2008b; Wechsberg et al., 2006; 2008). Foss et al.'s (2007) review showed consistent evidence of improved post-intervention condom use behaviours in many studies, particularly among sex workers, but less consistent intervention effects on condom use within casual relationships and within primary partnerships. Interestingly, a national HIV prevalence and incidence survey conducted in South Africa has shown that levels of condom use among the general population increased significantly between 2002 and 2008, but that minimal change occurred over the same period in individuals' number of sexual partners (Shisana et al., 2009).

In some cases, the interventions were differentially effective among males and females (e.g. Smith et al., 2008). Smith et al. (2008) found that males, but not females, were less likely to initiate sex following the school-based HealthWise intervention. Unfortunately, the other studies did not provide results for each gender separately. In line with the work of Wechsberg et al. (2006; 2008), there is a need for more gender-sensitive intervention approaches to take account of differential effects on males and females (Fritz, Morojele & Kalichman, 2010).

In terms of the target population's drinking behaviour, one study (Kalichman et al., 2008b) found the intervention to be more ef-

fective among lighter than heavier drinkers. In keeping with other recommendations (Fritz, 2009) and frameworks for addressing alcohol problems (e.g. Babor et al., 2001), these findings suggest that more intensive intervention and/or treatment may be required for individuals with possible dependence on alcohol, whereas briefer interventions may suffice for lighter drinkers.

The interventions for adults were implemented mainly by outreach workers, lay counsellors, and other para-professionals. In the case of one intervention (Wechsberg et al., 2008), the group format was as effective as the individual format. These results have particular appeal regarding intervention delivery in resource-constrained settings (common in Africa) where professional staff are limited and their work demands reduce their ability to deliver more time-consuming individual services (Wechsberg et al., 2008).

Of further significance was the fact that many of the interventions involved a single session (or only two sessions) delivered over a few hours (Kalichman et al., 2007b; Kalichman et al., 2008b; Wechsberg et al. 2006; 2008). The studies with very short follow-ups (e.g. Wechsberg et al. 2006; 2008) showed evidence of change in some areas, while in the studies with repeat follow-ups (e.g. Kalichman et al., 2007b; 2008b), the short-term effects disappeared over time. Brief interventions may need to be revised and supplemented by booster sessions to maintain their short-term gains.

We found very few completed studies conducted among alcohol-using populations in Africa that met our inclusion criteria. While it may be the case that very few such studies have been completed, and that non-significant findings are less likely to be published (Csaga et al., 1996), it is also conceivable that our findings were limited by the search terms and strategies used, and the reliance on articles written in English. Moreover, we only relied on published and easily accessible sources, but 'grey literature' may exist reporting on results of evaluations of related interventions.

Given alcohol's role in HIV infection (Fisher et al., 2007), and in sexual risk be-

haviour (Kalichman et al., 2007), there is an urgent need for the development, pilot testing and evaluation of HIV prevention interventions for alcohol users. As proposed by a number of commentators, we would recommend that more interventions should be implemented and tested among staff working at drinking venues (Fisher et al., 2008), and patrons of such establishments (Lewis et al., 2005; Kalichman et al., 2007). We would also recommend that more high quality evaluations of interventions should be conducted using RCT designs, biological outcomes, and long-term follow-ups. Of value would be an evaluation of an intervention in multiple sites across the continent, using equivalent designs, methods and procedures, to assess the effectiveness of the intervention across different settings with populations at risk of alcohol use-related HIV risk behaviour. Identification and incorporation of indigenous intervention approaches within the existing interventions would be an additionally worthwhile pursuit (Karnell et al., 2006).

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