

# HIV/AIDS Risk Reduction Counseling for Alcohol Using Sexually Transmitted Infections Clinic Patients in Cape Town, South Africa

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**Background:** HIV is ravaging southern Africa, and HIV transmission risk behaviors are facilitated by alcohol use in sexual contexts. There are no known interventions that directly target HIV risk behavior among people who drink and are at risk for HIV in Africa.

**Purpose:** To test a behavioral risk reduction counseling intervention for use in sexually transmitted infection (STI) clinics in southern Africa.

**Methods:** A randomized intervention trial was conducted with 143 STI clinic patients in Cape Town, South Africa. Participants received an experimental 60-minute HIV and alcohol risk reduction behavioral skills intervention or a control 20-minute HIV education condition. Participants were followed for 3 and 6 months after the intervention, with 73% retention.

**Results:** Overall, the experimental intervention demonstrated more than a 25% increase in condom use and a 65% reduction in unprotected intercourse over the 6-month follow-up period, with risk reduction significantly greater for the experimental condition than for the control condition at both follow-ups. Alcohol use in sexual contexts [ $F(1,94) = 6.2$ ;  $P < 0.05$ ] and expectancies that alcohol enhances sexual experiences [ $F(1,94) = 8.3$ ;  $P < 0.01$ ] were also significantly lower for the experimental condition at the 3-month follow-up.

**Conclusions:** An HIV prevention counseling intervention reduced HIV transmission risks for up to 6 months in this STI clinic population. Effects may be sustained with structural interventions to reduce alcohol use in sexual contexts and support risk reduction behavior changes over the long-term.

**Key Words:** alcohol use and HIV risk, HIV/AIDS prevention, intervention trial, South Africa

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Among the more than 40 million HIV-infected people in the world, 2 of 3 live in sub-Saharan Africa.<sup>1</sup> Coinciding with the world's greatest HIV/AIDS burden, southern Africa also consumes great quantities of alcohol,<sup>2</sup> and there is considerable evidence that alcohol use contributes to the spread of sexually transmitted infections (STIs), including HIV.<sup>3–5</sup> People living with HIV/AIDS in southern Africa are more than 2 times as likely as uninfected individuals to report a history of alcohol use.<sup>6</sup> Africans living with HIV/AIDS are also more likely to use alcohol at least daily compared with Africans who are not HIV-positive.<sup>7,8</sup> In townships in Cape Town, South Africa, as many as 85% of the places where people meet new sex partners are alcohol-serving establishments.<sup>9</sup> Also in Cape Town, 42% of men and 12% of women receiving STI clinic services report drinking before sex, and the rate of alcohol use before sex jumps to 61% among STI clinic patients who are problem drinkers.<sup>10</sup> HIV risk reduction interventions for STI clinic patients may therefore require particular attention to alcohol use, especially in terms of drinking in sexual contexts.

Brief HIV prevention counseling interventions have shown promise when delivered in STI clinic settings.<sup>11–14</sup> In the South African context, Simbayi et al<sup>15</sup> and Mathiti et al<sup>16</sup> found that a 60-minute skills building HIV prevention counseling intervention demonstrated significantly greater reductions in unprotected intercourse among men and women receiving STI clinic services compared with a 20-minute HIV educational counseling session. Participants randomized to the skills building counseling reduced their rate of unprotected intercourse by 72% compared with a 34% reduction in the control condition. Although these findings were promising, they were only measured over a 3-month follow-up period, not allowing for an assessment of their durability. In addition, although alcohol use was common among patients at the clinic where the intervention was conducted, Simbayi et al<sup>15</sup> did not include an intervention component to address alcohol use in relation to sexual risk behavior.

The current study was conducted to test an HIV prevention counseling intervention for men and women who use alcohol and are receiving STI clinic services in South Africa. Using a randomized clinical design, we tested the efficacy of a brief HIV risk reduction counseling intervention for men and women receiving STI clinic services in Cape Town, South Africa. The experimental counseling intervention was grounded in a well-known theory of behavior change and

was based on Simbayi et al's risk reduction counseling model.<sup>15</sup> The intervention model tested in the current study was adapted to include a substantial component to address alcohol use directly in sexual contexts. The 2 primary hypotheses of this intervention trial were that the experimental counseling intervention would demonstrate reduced unprotected intercourse and increased condom use compared with the control and that the experimental counseling would demonstrate reduced alcohol use in sexual contexts compared with the control. The secondary hypothesis was that the experimental counseling would change theoretic constructs (eg, AIDS knowledge, stigmas, beliefs, alcohol expectancies) compared with the control condition.

## METHODS

### Participants and Setting

Participants were 122 men and 21 women receiving services at an urban STI clinic in Cape Town, South Africa. The STI clinic that participated in this research is the largest STI clinic in Cape Town, a city with a population of greater than 3 million. Patients come for services to this clinic from areas throughout Cape Town because they are ensured greater confidentiality than they are at neighborhood primary health care centers. The clinic sees approximately 1800 patients, including patients with repeat infections, in a typical month. The clinic population consists of approximately 25% women and 90% indigenous Africans. Although the clinic primarily delivers STI treatment services, it also provides HIV voluntary counseling and testing (VCT), tuberculosis (TB) diagnosis and treatment, and maternal-infant health services. The estimated HIV prevalence is 25% of clinic patients, based on reactive tests among the approximately 50% of patients who accept HIV testing.

### Participant Recruitment and Enrollment

Between March 2005 and March 2006, potential participants were referred by a nurse clinician in the clinic to participate in a prevention counseling study that involved receiving a single session of counseling. The criterion for referral to the study was that the patient was being seen at the clinic for STI diagnostic or treatment services. In addition, participants were screened for current use of alcohol. Among the 221 participants offered enrollment, 78 (35%) were not currently drinking and were therefore excluded from the study. Patients who agreed to enroll in the study provided informed consent and were scheduled for a baseline assessment and counseling session. Sampling occurred throughout all hours of clinic operation. We capped participant enrollment to no more than 5 individuals per day to ensure a range of participants recruited over time and to work within the constraints of the counseling resources available to the study. Using the outcomes of our previous HIV risk reduction counseling study conducted with STI clinic patients in Cape Town, we estimated the effect size for reductions in frequencies of unprotected intercourse as the Cohen  $d = 0.35$ .<sup>15</sup> With this expected magnitude of change and an  $\alpha$ -level of 0.05, a sample size of 120 would allow for the detection of intervention effects with a power of 0.80.

### Study Design and Procedures

Participants provided informed consent and completed baseline questionnaires administered using audio computer-assisted interviewing (ACASI). After the baseline assessment, participants were randomly assigned to receive (1) a 60-minute experimental behavioral skills building HIV and alcohol risk reduction counseling session or (2) a 20-minute HIV information/educational control intervention. Participants were scheduled for follow-up assessments 3 months and 6 months after counseling, with the final 6-month follow-up collected in September 2006. Participants received 100 South African rand (ZAR100 or approximately US \$12) to compensate them for returning to the clinic and completing the baseline and immediate postcounseling assessments. They also received ZAR110 (approximately US \$15) for completing the 3-month and 6-month follow-up assessments. All study procedures were approved by US and South African Institutional Review Boards.

### Participant Randomization

We randomly assigned participants to the experimental or control condition. Participants were enrolled in the study and assigned to a time slot for baseline assessment. Participants who returned to the clinic for their baseline assessment were then randomly assigned to receive the experimental or control condition. Randomization was accomplished using a randomly generated list of counseling session scheduling slots for the 2 conditions.

### Experimental Condition: HIV and Alcohol Risk Reduction Counseling

An adapted version of a social cognitive model of health behavior change was used as the theoretic framework for the risk reduction skills counseling intervention developed and tested in this research.<sup>17,18</sup> As described by Simbayi et al<sup>15</sup> and Mathiti et al,<sup>16</sup> the information/education (20 minutes) component of the counseling reviewed facts about HIV transmission and risk behaviors, discussed the local prevalence of HIV, clarified misconceptions, dispelled myths about AIDS, and described HIV antibody testing. The education was delivered using a tabletop flipchart and visual materials to illustrate key concepts. The motivation component (20 minutes) was adapted from motivational counseling techniques that included motivation for change and strengthening commitment to change.<sup>19,20</sup> Alcohol use was first integrated within the motivational component. We used the brief alcohol counseling model of the World Health Organization (WHO) as the basis for the alcohol risk reduction component.<sup>21</sup> The model provides feedback to patients on their alcohol consumption and associated risks. Participants were given their Alcohol Use Disorders Identification Test (AUDIT) score and were shown how their score represents potential hazards of drinking. Alcohol risk reduction was tailored to the level of drinking indicated by the AUDIT score using the algorithm suggested by the WHO. Decisional balance techniques, including a "pros and cons" activity as well as self-confidence and perceived importance of reducing alcohol-related risk exercises, were used to elicit self-motivating statements for alcohol reduction. Alcohol use in sexual contexts was specifically discussed in relation to the

participant's self-identified risk situations. Alcohol use was integrated into the remaining segments of counseling.

In the final component of the risk reduction counseling, behavioral self-management and sexual communication skills building exercises (20 minutes) were adapted from previous cognitive behavioral skills building interventions. Counselors engaged participants in a functional analysis of their risk behavior by having individuals discuss personal risk situations and cues related to their sexual risks. Counselors taught participants how to identify environmental and cognitive-affective cues that serve as "triggers" for high-risk situations, including mood states, substance use, settings, and sexual partner characteristics that have served as risk-related factors in the participant's past. Alcohol was elaborated on as a major trigger for risk behaviors. Participants were asked to think of ways to manage triggers that may contribute to their personal risks and were taught methods of rearranging their environment and strategies to reduce their risks by performing specific acts: redirecting sexual activities toward safer sex alternatives, carrying condoms, and avoiding sex after drinking. Practice was conducted in role plays to increase risk reduction skills. Proper male and female condom use was also instructed and modeled, allowing participants to practice condom application with corrective feedback from the counselor.

## Control Condition

### HIV Information/Education Counseling

An alternative HIV risk reduction counseling session was included in the study as a control intervention. Participants randomized to the control condition received the same 20-minute HIV risk information and education session that was included in the first part of the motivational/skills counseling intervention. The 20-minute HIV/AIDS education session represents a didactic educational experience similar to that used in past research and STI clinic services.<sup>11,12</sup>

### Counselor Training and Intervention Quality Assurance

The intervention counselors consisted of 1 African man and 1 African woman with minimal counseling experience outside the study protocol. Both counselors were college graduates with bachelor degrees, were bilingual in the English and Xhosa languages, and delivered the experimental and control interventions to men and women in keeping with standard clinic services. To help protect against counselor drift, the intervention was completely manualized and a tabletop flipchart was used to guide the counselor and participant through the session content. Both counselors attended weekly 2-hour supervision meetings with the project manager and a professionally registered counseling psychologist.

## MEASURES

Measures were adapted from previous research conducted in Cape Town, South Africa.<sup>15</sup> All measures were administered at the baseline, 3-month, and 6-month follow-up assessments in English and Xhosa, the 2 languages spoken by nearly all clinic patients. Participants viewed assessment items on a 15-inch color monitor, heard items read by machine voice using

headphones, and responded by clicking a mouse. Research has shown that ACASI procedures yield reliable responses in sexual behavior interviews.<sup>22</sup> Participants were briefly instructed on how to use the mouse before the baseline assessment.

## Descriptive Information

### Descriptive Characteristics

Participants reported demographic information; history of alcohol and other drug use; and history of exchanging sexual relations for money, a place to stay, or to meet survival needs.

### Alcohol and Other Drug Use

As an initial screening for alcohol use, we administered the AUDIT,<sup>23</sup> 10-item self-report instrument that includes quantity and frequency of alcohol use and was designed to identify individuals who the use of alcohol places at risk for developing alcohol problems or who are experiencing alcohol-related problems. AUDIT scores range from 0 to 40, and scores of 9 or greater are used to identify individuals who may be at risk or who are experiencing alcohol problems.<sup>24</sup> The AUDIT has been used in research in South Africa<sup>10,25</sup> and is reliable and valid.<sup>23-25</sup> We used a South African adaptation of the AUDIT that included traditional sorghum beer in the definition of standard drinks. Participants were also asked whether they had ever used alcohol, dagga (marijuana), cocaine, mandrax (methaqualone), or other drugs.

## Primary Outcomes: Risk and Protective Behaviors

### Sexual Risk and Protective Behaviors

Participants responded to items assessing their number of male and female sex partners and frequency of sexual behaviors in the previous month, specifically vaginal and anal intercourse with and without condoms. A 1-month retrospective period was selected, because previous research has shown reliable reports of numbers of partners and sexual events over this period of time.<sup>26,27</sup> Participants were instructed to think back over the past month and estimate the number of their sex partners and the number of sexual occasions on which they practiced each behavior. In addition, we calculated the percentage of intercourse occasions protected by condoms using the ratio [Condom Protected Vaginal + Anal Intercourse/Total Vaginal + Anal Intercourse]. To assess condom use at the event level, participants were asked whether a condom was used by them or their partner the last time they had sexual intercourse. Responses to the event level item were dichotomous (yes or no).

### Drinking in Sexual Contexts

Participants indicated the number of times that they drank alcohol, defined as beer, wine, or other alcoholic beverages, before sex in the previous month. Responses were made using open formats to record continuous frequencies of occurrences.

## Secondary Outcomes: Theoretic Constructs

### HIV Prevention Knowledge

An 11-item test was used to assess HIV risk and prevention-related knowledge. Items were adapted from a

measure reported by Carey and Schroder<sup>28</sup> and reflected information about HIV transmission, condom use, and AIDS-related knowledge and were responded to as “yes,” “no,” or “don’t know.” The AIDS knowledge test was scored for the number of correct responses, with “don’t know” responses scored incorrect and a possible range of scores from 0 to 11 expressed as the percent correct. The AIDS knowledge test demonstrated heterogeneity of item content as is typical of knowledge tests ( $\alpha = 0.64$ ).

### AIDS-Related Stigmas

Eleven AIDS-related stigma items were adapted from previous research and developed for use in South Africa.<sup>29</sup> The AIDS stigma items reflected beliefs about negative qualities of people living with AIDS (eg, dirty, cursed, untrustworthy), shamefulness of the behavior of people with AIDS (eg, guilt, shame), and the endorsement of social sanctions against people with HIV/AIDS (eg, should not work with children, restrictions on freedom, isolation). These items were responded to on a 4-point response set (1 = agree, 4 = disagree), with mean responses with higher scores representing stronger endorsement of stigmas ( $\alpha = 0.68$ ).

### Risk Reduction Behavioral Intentions

Theories of behavior change postulate a close temporal relation between intentions to change behavior and changes in actual behavior.<sup>30</sup> Participants responded to a 7-item measure assessing personal intentions to engage in risk-reducing behaviors used in previous research in Cape Town<sup>15</sup> (eg, “I will use a condom even if my partner does not want to,” “I will remind myself to use a condom during sex”) anchored on a 3-point response set ranging from 1 (I will not do) to 3 (I will do). Higher mean responses indicate stronger behavioral intentions ( $\alpha = 0.76$ ).

### Risk Reduction Self-Efficacy

Defined as the personal sense of confidence that one can perform specific behaviors under specified conditions, self-efficacy is often used as a proxy for behavioral skills in HIV prevention research.<sup>17,18</sup> The self-efficacy scale consisted of 6 items (eg, “I am confident about suggesting using condoms with a new sex partner,” “I am certain that I can use a condom when having sex”). Items were responded to on a 4-point response set (1 = disagree, 4 = agree). Higher mean responses indicate stronger self-efficacy ( $\alpha = 0.77$ ).

### Alcohol Outcome Expectancies

We adapted an alcohol outcome expectancy measure from items used in previous research.<sup>10,31,32</sup> Two dimensions of alcohol expectancies were assessed: expected sexual enhancement assessed with 10 items (eg, “I am a better sex partner after I have been drinking” [ $\alpha = 0.70$ ]) and expected loss of control assessed with 6 items (eg, “When I’m drinking, I do things I wouldn’t usually do” [ $\alpha = 0.71$ ]). Items were presented together and responded to on 4-point scales (1 = strongly disagree, 4 = strongly agree). Higher scores indicate stronger endorsement of the expectancy beliefs.

## DATA ANALYSES

We inspected outcome variables for distribution properties. Behavioral outcomes for sexual intercourse and alcohol use in sexual contexts were significantly skewed, and were therefore transformed using the formula  $\text{Log}_{10}(x + 1)$ , with nontransformed observed values presented in the tables.<sup>27,33</sup> To test for differential attrition across conditions, a 2-attrition (lost vs. retained)  $\times$  2-condition (experimental vs. control) contingency table  $\chi^2$  test was performed at each assessment point. We also conducted attrition analyses for differences on baseline measures as recommended by Jurs and Glass<sup>34</sup> using 2 (attrition)  $\times$  2 (conditions) analyses of variance (ANOVAs), where: (1) an attrition effect signals differences between participants lost and retained, (2) an intervention effect indicates a breakdown in randomization, and (3) an attrition  $\times$  intervention condition interaction indicates differential loss between conditions.

To test the primary and secondary study hypotheses, we conducted analyses of covariance (ANCOVAs) for all outcome variables. Differences between conditions were examined at the 3-month and 6-month follow-ups using baseline values as a covariate. Analyses also controlled for gender, age, and education. The Cohen<sup>35</sup> *d* statistic is reported as an index of effect size; values of 0.25 represent small effects and those of 0.50 represent medium effects. Comparisons on categorical outcomes were tested using logistic regression adjusting for baseline values, gender, age, and education, reporting odds ratios and 95% confidence intervals. We used an intent-to-treat approach by including all participants who completed baseline assessments and were randomized to counseling conditions. Individual cell sizes vary because of missing values.

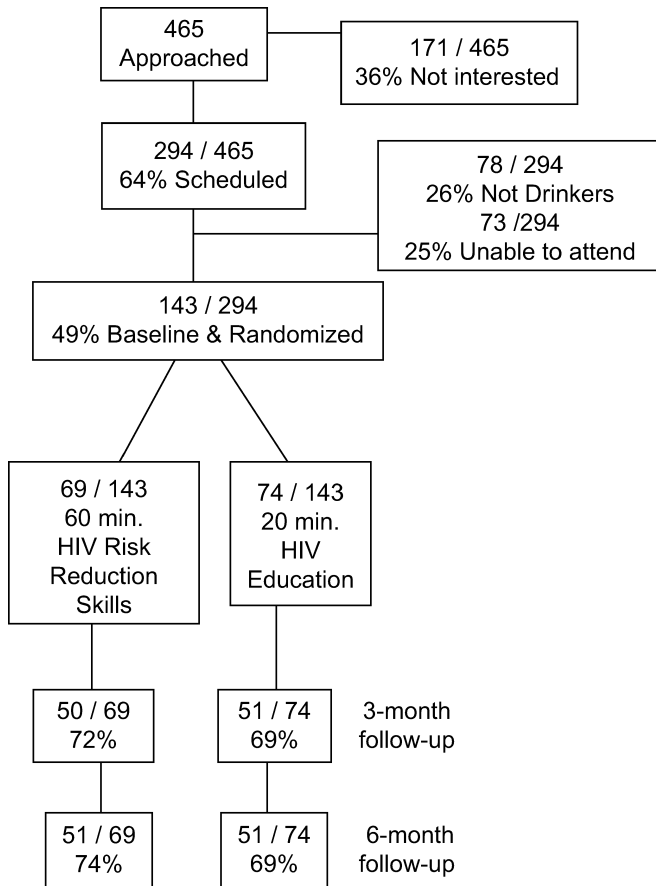
## RESULTS

A total of 465 patients were referred to the study and approached to participate; 294 were scheduled for enrollment, 73 of whom were unable to participate because of work and other obligations. Thus, 221 (75%) individuals were screened for alcohol use; 143 were current drinkers, consented to participate in the study, and were randomized to conditions (Fig. 1).

### Tests for Internal Validity, Confounds, and Bias

Table 1 presents the participant characteristics for the 2 intervention conditions. The age (in years) of the patients (Mean [M] = 29.3, SD = 5.7) and years of education (M = 11.5, SD = 2.3) for the experimental condition did not differ from those of the control condition (age: M = 28.2, SD = 5.5; years of education: M = 11.4, SD = 2.0). To examine the potential bias introduced by differential attrition across study conditions, we tested intervention condition differences on the basis of the number of participants lost at each follow-up. Results showed that 28% (n = 41) of participants were lost at the 3-month follow-up and 31% (n = 45) were lost at 6 months. There were no differences between conditions for the number of participants lost at either follow-up.

Comparisons of intervention conditions and participants who were retained or lost to attrition were conducted on demographic characteristics and baseline rates of unprotected intercourse. There were no effects for condition, indicating



**FIGURE 1.** Flow diagram of participant progress through phases of the randomized trial.

that the randomization scheme resulted in equalized groups. There were no differences between participants lost and those retained on the basis of demographic characteristics or baseline rates of behavior. Two interaction effects for condition and attrition groups were indicated. For participant age, individuals who were lost from the experimental condition were older than those retained and those lost and retained in the control group [ $F(1,169) = 4.2; P < 0.05$ ]. Similarly, participants lost from the experimental condition had less education than the other 3 groups [ $F(1,169) = 8.9, P < 0.01$ ]. There were no other significant interactions. Participant age and education were therefore included as covariates in all subsequent analyses.

### Primary Outcomes: Sexual Risk and Protective Behaviors

Results for the primary study outcome analyses are shown in Table 2. Analyses comparing groups and controlling for baseline behaviors and gender, age, and education did not indicate differences between conditions on the basis of numbers of sex partners at either follow-up assessment. Groups did differ significantly in their rates of unprotected vaginal intercourse at the 3-month and 6-month follow-ups, however; the experimental intervention demonstrated less unprotected

**TABLE 1.** Baseline Characteristics of Participants in the Experimental and Control Conditions

	Experimental Condition (n = 69)		Control Condition (n = 74)		$\chi^2$
	n	%	n	%	
Gender					
Men	60	87	62	84	—
Women	9	13	12	16	0.3
Preferred language					
English	34	48	42	56	—
Xhosa	35	52	32	43	2.0
Employed	41	59	37	50	1.3
Unmarried	55	80	59	79	1.1
AUDIT score 1–9	42	61	50	68	0.7
AUDIT score 13+	29	42	38	51	1.2
Used dagga (marijuana)	23	33	26	35	0.1
Used mandrax (methaqualone)	6	9	3	4	1.3
Self-report tested for HIV	40	58	45	61	0.2
HIV-negative	34	84	36	80	0.4
HIV-positive	3	8	4	9	—
Unknown status	3	8	5	11	—

vaginal intercourse than the control intervention. In addition, condom use was significantly greater among participants who received the experimental intervention at the 3-month and 6-month follow-ups. Results also showed that the participants in the experimental condition were significantly more likely to have used a condom the last time they had sex compared with those in the control condition at the 3-month follow-up, with the difference reduced to a statistical trend at the 6-month follow-up. Finally, results indicated that participants in the experimental condition reduced their drinking in sexual contexts in the 3 months after counseling but not at the 6-month follow-up.

### Secondary Outcomes: Theoretic Constructs

Analyses comparing intervention conditions on HIV-related knowledge, AIDS stigmas, intentions to change risk behaviors, and risk reduction self-efficacy controlling for baseline values, gender, age, and education did not indicate any significant differences between conditions at either follow-up assessment (Table 3). In contrast, alcohol expectancies for sexual enhancement did differ significantly between conditions at the 3-month follow-up, but the difference was not sustained at the 6-month follow-up. There were no differences between conditions for loss of control alcohol outcome expectancies.

## DISCUSSION

The intervention in the current research was tested in a phase 2a study design within a dedicated STI clinic. The generalizability of the current intervention findings to other settings is therefore unknown. Also limiting the generalizability of the findings is the number of persons who refused to

**TABLE 2.** Primary Outcomes: Sexual Risk Behaviors, Condom Use, and Alcohol Use in Sexual Contexts

	Experimental Condition		Control Condition		F(1,94)	d
	M	SD	M	SD		
No. sex partners						
Baseline	2.5	4.8	2.8	6.1	—	—
3-month follow-up	1.9	1.8	2.0	3.0	0.1	0.06
6-month follow-up	1.6	1.2	2.5	5.4	0.3	0.13
Unprotected vaginal intercourse occasions						
Baseline	3.6	10.1	3.0	3.8	—	—
3-month follow-up	0.8	2.1	2.1	5.8	3.9*	0.41
6-month follow-up	1.3	4.5	2.1	4.2	5.6*	0.53
Unprotected anal intercourse occasions						
Baseline	0.2	0.8	0.6	1.7	—	—
3-month follow-up	0.2	0.8	0.6	1.8	0.9	0.20
6-month follow-up	0.1	0.3	0.4	1.3	0.1	0.06
Percent condom use						
Baseline	64.8	33.7	58.6	39.3	—	—
3-month follow-up	90.5	22.8	78.4	31.9	5.1*	0.47
6-month follow-up	87.8	24.9	76.4	38.6	5.7*	0.54
Alcohol use in sexual contexts						
Baseline	3.7	5.6	4.5	8.5	—	—
3-month follow-up	1.5	2.8	3.4	6.9	6.2†	0.53
6-month follow-up	2.1	5.3	1.2	2.3	0.1	0.06
	Experimental Condition		Control Condition		OR	95% CI
	N	%	N	%		
Condom use at last intercourse						
Baseline	37	74	36	71	—	—
3-month follow-up	49	98	43	84	10.5†	1.2–90.4
6-month follow-up	46	96	41	82	5.3	1.0–2.9

\*P < 0.05; †P < 0.01.

All statistical tests adjusted for gender, age, years of education, and baseline values.

participate in the study and the number lost to follow-up. Our sample was also limited by the small number of women enrolled in the trial. Future studies should oversample women to increase their numbers for outcome analyses. In addition, the current study represented an initial efficacy test of a new counseling model, and therefore only extended follow-up assessments for 6 months after counseling. Our measures of theoretic constructs did not yield useful results and may not have effectively tapped the active agents of change in the intervention. It is not possible to know from the current study which intervention components, including the alcohol components, were necessary for producing risk behavior change. Another factor that complicates the interpretation of the study findings is the contact time difference between conditions. It is possible that the additional 40 minutes of contact in the experimental condition accounts for the observed differences. Like nearly all behavioral interventions, we were not able to blind our counselors or study participants to the experimental intervention conditions. Finally, our initial test of intervention efficacy relied on self-report measures of sexual risk and alcohol use behaviors. Future studies should have sufficient statistical power to examine

**TABLE 3.** Secondary Outcomes for HIV Risk Reduction Constructs

	Experimental Condition		Control Condition		F(1,94)	d
	M	SD	M	SD		
HIV-related knowledge						
Baseline	80.5	18.9	83.7	16.3	—	—
3-month follow-up	87.6	17.3	90.3	11.1	0.3	0.12
6-month follow-up	85.9	19.5	91.1	10.2	0.1	0.06
AIDS-related stigmas						
Baseline	3.2	0.5	3.2	0.06	—	—
3-month follow-up	3.3	0.5	3.4	0.4	0.5	0.14
6-month follow-up	3.3	0.6	3.2	0.4	0.4	0.13
Risk reduction behavioral intentions						
Baseline	2.6	0.3	2.4	0.4	—	—
3-month follow-up	2.7	0.4	2.5	0.4	0.5	0.14
6-month follow-up	2.6	0.5	2.5	0.4	0.1	0.06
Risk reduction self-efficacy						
Baseline	1.1	0.3	1.3	0.5	—	—
3-month follow-up	1.1	0.2	1.1	0.3	0.3	0.12
6-month follow-up	1.1	0.2	1.1	0.2	0.2	0.09
Sexual enhancement alcohol expectancies						
Baseline	2.2	0.8	2.3	0.8	—	—
3-month follow-up	1.9	0.8	2.3	0.9	8.38*	0.59
6-month follow-up	1.9	0.9	2.2	0.2	1.5	0.24
Loss of control alcohol expectancies						
Baseline	2.6	0.8	2.6	0.8	—	—
3-month follow-up	2.3	0.7	2.6	0.8	3.3	0.40
6-month follow-up	2.4	0.8	2.6	0.8	0.1	0.06

\*P < 0.05.

All statistical tests adjusted for gender, age, years of education, and baseline values.

reductions in incidence rates of STIs. With these limitations recognized, we believe that HIV risk reduction counseling has great potential for preventing HIV transmission in South Africa.

Overall, the HIV risk reduction behavioral skills counseling intervention tested in the current study demonstrated more than a 25% increase in condom use and a 65% reduction in unprotected intercourse over the 6-month follow-up period. Rates of condom use and unprotected intercourse were significantly different between intervention conditions at both follow-up assessments, with the risk reduction skills intervention resulting in greater protective behaviors. We also observed significant reductions in beliefs that alcohol enhances sexual experiences and use of alcohol in sexual contexts in the experimental risk reduction intervention group. Differences between conditions on the alcohol outcome variables were not maintained at the 6-month follow-up, however. The lack of sustainability of the alcohol outcomes suggests that the sexual risk reduction behavior changes may also deteriorate over time and indicates the need for more intensive alcohol risk reduction intervention components and maintenance intervention strategies.

If the results of this intervention trial are confirmed, the relatively brief risk reduction counseling intervention tested could be widely disseminated for use in clinics that serve people at greatest risk for HIV infection in South Africa.

This intervention may be particularly useful because it can be delivered by nonprofessional counselors with minimal training. In addition, risk reduction counseling interventions can bolster the effects of other partially effective prevention strategies, such as vaginal and anal microbicides, circumcision, and vaccines, by producing additive preventive effects and suppressing the potential for risk-compensating behaviors and behavioral disinhibition. Risk reduction counseling is relatively inexpensive when delivered to individuals at greatest risk and is available now for use in clinical settings.

Changing sexual risk behaviors in the long term among persons at greatest risk for HIV infection therefore requires multilevel intervention strategies that address individual behavior change and also change the behavioral context and social milieu.<sup>36</sup> For example, the current intervention would be enhanced and supported by conducting a parallel intervention to change the risk environment of drinking places that STI clinic patients return to, such as shebeens and taverns. One potential community-level intervention that can change the risk levels in drinking establishments is the popular opinion leader intervention model developed by Kelly et al.<sup>37</sup> In studies of men who have sex with men who frequent bars, these investigators found that training opinion leaders in social conversational skills for advocating HIV prevention in their community resulted in significant reductions in unprotected intercourse over sustained periods of time. Community-level interventions for supporting risk reduction in drinking places could be applied to alcohol-serving establishments in parallel to risk reduction counseling for high-risk drinkers in southern Africa. Research is urgently needed to test such multilevel HIV risk reduction interventions for high-risk drinkers in southern Africa.

## REFERENCES

1. Joint United Nations Program on HIV/AIDS. AIDS epidemic update. Available from the World Health Organization, 2005. Available at: <http://www.unaids.org>.
2. Parry CD. South Africa: alcohol today. *Addictions*. 2005;100:426–429.
3. Kalichman SC, Simbayi LC, Kaufman M, et al. Alcohol and HIV/AIDS risk behaviors in Southern Africa: systematic review of empirical findings. *Prev Sci*. 2007; e-pub ahead of print.
4. Shisana O, Rehle T, Simbayi L, et al. *South African National HIV Prevalence, Incidence, Behaviour And Communication Survey 2005*. Cape Town, South Africa: Human Sciences Research Council Press; 2005.
5. 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;62:217–227.
6. Mbulaiteye SM, Ruberantwari A, Nakiyingi JS, et al. Alcohol and HIV: a study among sexually active adults in rural southwest Uganda. *Int J Epidemiol*. 2000;29:911–915.
7. Hargreaves JR, Morison LA, Chege J, et al. Socioeconomic status and risk of HIV infection in an urban population in Kenya. *Trop Med Int Health*. 2002;7:793–802.
8. Zuma K, Gouws E, Willaims B, et al. Risk factors for HIV infection among women in Carletonville, South Africa: migration, demography and sexually transmitted diseases. *Int J STD AIDS*. 2003;14:814–817.
9. Weir SS, Pailman C, Mahlalela X, et al. From people to places: focusing AIDS prevention efforts where it matters most. *AIDS*. 2003;17:895–903.
10. Simbayi LC, Kalichman SC, Jooste S, et al. Alcohol use and sexual risks for HIV infection among men and women receiving sexually transmitted infection clinic services in Cape Town, South Africa. *J Alcohol Studies*. 2004;65:434–442.
11. Kamb M, Fishbein M, Douglas J, et al. Efficacy of risk-reduction counseling to prevent human immunodeficiency virus and sexually transmitted diseases. *JAMA*. 1998;280:1161–1167.
12. Belcher L, Kalichman S, Topping M, et al. Randomized trial of a brief HIV risk reduction counseling intervention for women. *J Consult Clin Psychol*. 1998;66:856–861.
13. Allen S, Tice J, Van de Perre P, et al. Effect of serotesting with counselling on condom use and seroconversion among HIV discordant couples in Africa. *BMJ*. 1992;304:1605–1609.
14. Kalichman SC, DiFonzo K, Kyomugsha F, et al. When briefer can be better: single session approaches to HIV risk reduction interventions. *InterAmerican Journal of Psychology*. 2001;35:41–58.
15. Simbayi LC, Kalichman SC, Skinner D, et al. Theory-based HIV risk reduction counseling for sexually transmitted infection clinic patients in Cape Town, South Africa. *Sex Transm Dis*. 2004;31:727–733.
16. Mathiti V, Kekana Q, Nibe X, et al. Development of an effective HIV risk reduction counseling intervention for use in the Western Cape, South Africa. *J Soc Aspects HIV/AIDS*. 2005;2:267–276.
17. Fisher JD, Fisher WA. Changing AIDS-risk behavior. *Psychol Bull*. 1992; 111:455–474.
18. Kalichman SC, Simbayi LC, Jooste S, et al. Generalizing the information-motivation-behavior skills (IMB) model to sexually transmitted infection clinic patients in Cape Town South Africa. *AIDS Care*. 2006;18:178–182.
19. Miller WR, Zweben A, DiClemente C, et al. *Motivational Enhancement Therapy Manual*. DHHS Publication No. ADM 92-1894. Washington, DC: US Government Printing Office; 1992.
20. Miller WR, Rollnick S. *Motivational Interviewing: Preparing People to Change Addictive Behavior*. New York: Guilford; 1991.
21. Babor TF, de la Fuente JR, Saunders J, et al. *The Alcohol Use Disorders Identification Test: Guidelines for Use in Primary Health Care*. Geneva: World Health Care Organization; 1992.
22. Gribble JN, Miller H, Rogers S, et al. Interview mode and measurement of sexual and other sensitive behaviors. *J Sex Res*. 1999;36:16–24.
23. Conigrave KM, Hall WD, Saunders JB. The AUDIT questionnaire: choosing a cut-off score. *Addictions*. 1995;90:1349–1356.
24. Saunders JB, Aasland OG, Babor TF, et al. Development of the Alcohol Use Disorders Identification Test (AUDIT): WHO collaborative project on early detection of persons with harmful alcohol consumption II. *Addictions*. 1993;88:791–804.
25. Bekker D, Van Velden DP. Alcohol misuse in patients attending a defense force general medical clinic. *South African Family Practice*. 2003;45:10–15.
26. Catania JA, Gibson D, Chitwood D, et al. Methodological problems in AIDS behavioral research: influences on measurement error and participation bias in studies of sexual behavior. *Psychol Bull*. 1990;108: 339–362.
27. Schroder K, Carey MP, Vanable P. Methodological challenges in research on sexual risk behavior: I. Item content, scaling, and data analytic options. *Ann Behav Med*. 2003;26:104–123.
28. Carey MP, Schroder KE. Development and psychometric evaluation of the brief HIV knowledge questionnaire (HIV-KQ-18). *AIDS Educ Prev*. 2002;14:174–184.
29. Kalichman S, Simbayi L, Jooste S, et al. Development of a brief scale to measure AIDS-related stigmas in South Africa. *AIDS Behav*. 2006;9: 141–152.
30. Ajzen I, Fishbein M. *Understanding Attitudes and Predicting Social Behavior*. Englewood Cliffs, NJ: Prentice-Hall; 1980.
31. Brown S, Goldman MS, Inn A, et al. Expectancies of reinforcement from alcohol: their domain and relation to drinking patterns. *J Consult Clin Psychol*. 1980;48:419–426.
32. Goldman M, Darkes J. Alcohol expectancy multiaxial assessment: a memory network-based approach. *Psychol Assess*. 2004;16:4–15.
33. Winer BJ. *Statistical Principles in Experimental Design*. New York: McGraw Hill; 1971.
34. Jurs SG, Glass G. The effect of experimental mortality on the internal and external validity of the randomized comparative experiment. *Journal of Experimental Education*. 1971;40:62–66.
35. Cohen J. *Statistical Power Analysis for the Behavioral Sciences*. 2nd ed. Hillsdale, NJ: Erlbaum; 1998.
36. Sweat M, Denison J. Reducing HIV incidence in developing countries with structural and environmental interventions. *AIDS*. 1995;9(Suppl A): S251–S257.
37. Kelly JA, Murphy D, Sikkema K, et al. Outcomes of a randomized controlled community-level HIV prevention intervention: effects on behavior among at-risk gay men in small U.S. cities. *Lancet*. 1992;350: 1500–1505.