Published in final edited form as:

Soc Sci Med. 2011 January ; 72(1): 63–71. doi:10.1016/j.socscimed.2010.10.012.

Effectiveness of a Video-Based Motivational Skills-Building HIV Risk-Reduction Intervention for Female Military Personnel

E. James Essien, MD, DrPH^{1,2}, Osaro Mgbere, PhD, MPH^{1,3}, Emmanuel Monjok, MD, MPH¹, Ernest Ekong, MD, MPH⁴, Marcia M. Holstad, DSN.⁵, and Seth C. Kalichman, PhD⁶

¹ Institute of Community Health, University of Houston, Texas Medical Center, 1441 Moursund Street, Houston, Texas 77030, USA

² The University of Texas School of Public Health, 7000 Fannin Street, Houston, Texas 77030, USA

³ Houston Department of Health and Human Services, 8000 N. Stadium Drive, Houston, Texas 77054, USA

⁴ Institute for Health Research and Development, Yaba, Lagos, Nigeria

⁵ Nell Hodgson School of Nursing, Emory University, 1520 Clifton Road, Atlanta, GA 30322, USA

⁶ Department of Psychology, University of Connecticut, Storrs, CT 06269, USA

Abstract

Anecdotal evidence suggests that the HIV/AIDS prevalence rates in several African armed forces are high, with gender inequality rendering female military personnel more vulnerable to the disease. The object of this study was to replicate a successful videotape-based HIV prevention intervention among Nigerian female military personnel in an effort to establish the cross-cultural stability, feasible and cost-effectiveness of this approach in resource-limited countries. Enlisted women (N=346) were recruited from two cantonments in Southwestern Nigeria and randomly assigned to either (a) a 5-session video-based, small group, cognitive-behavioral, HIV prevention intervention or (b) a 5-session, video-based, contact-matched, HIV education control condition. Participants provided self-report of their HIV/AIDS-related knowledge and sexual behaviors at baseline, 3 and 6 months after completing the intervention. The results indicate that the motivational skills-building intervention did not improve participants' knowledge of HIV/AIDS any better than did the HIV education control condition at each assessment period, but it significantly ($p<0.05$) increased condom use among women in this group by 53.6% at 3-month follow-up. HIV preventive behaviors among women in the motivational skills-building intervention group improved significantly ($p<0.01$), being 2 and 3 times more, compared to women in the HIV education control group at 3-month and 6-month follow-up assessments. The intervention also significantly ($p<0.001$) improved behavioral intentions of participants as well as reduced alcohol use before sex by 25% ($p<0.01$), after 3 months; and number of sexual partners by 12% ($p<0.05$) after 6 months. Women in the intervention group were five times more likely than women in HIV education control group to suggest that their new male partners use condom. These findings indicate that a videotape-based, HIV prevention intervention is a feasible and effective approach to HIV prevention among female military personnel from sub-Saharan Africa.

Keywords

HIV/AIDS; Sexual Risk behaviors; Female; Military personnel; Nigeria

Introduction

The Federal Republic of Nigeria has been disproportionately impacted by human immunodeficiency virus (HIV) infection. Nigeria has the second highest prevalence of HIV disease in sub-Saharan Africa, representing 14% of HIV cases in the region (UNAIDS, 2007). Although official reports have suggested that the HIV epidemic has been slower to impact Nigeria than other countries in the region, HIV surveillance reports indicate that HIV is widely distributed in Nigeria. For example, using a sample of 2,300 persons drawn from five states in Nigeria, Esu-Williams et al. (1997) reported that HIV-1 appeared in 60% of commercial sex workers (CSW), 8% of blood donors in some states, 8% of male clients of CSWs, 9% of truck drivers, and 21% of STD patients. Other studies have also revealed HIV prevalence rates of 48.8% among commercial sex workers (Imade et al., 2008), 34.8% among attendees at a university teaching hospital (Nwokedi & Azeez-Akande, 2007), and 15% among Nigerian military personnel (Essien et al., 2006). Taken together, these studies indicate that there is a need for low-tech, transportable, cost-effective HIV prevention programs for multiple populations in Nigeria.

Nigerian military personnel are a subpopulation with social norms that place them at an increased risk of sexually-transmitted HIV infection (UNAIDS, 1998; Nwokoji & Ajuwon, 2004; Ekong, 2006; Essien et al., 2007; Okulate et al., 2008). As noted by Okulate et al. (2008), most soldiers are young and sexually active with a sense of invulnerability that sometimes leads to risky sexual practices and reduced condom use. Soldiers are often deployed from home for extended periods of time; they have a regular income, as well as opportunities for transactional sex (Yeager et al., 2000). In Nigeria, females constitute approximately 6% to 10% of military personnel (Adebayo et al., 2002). They are at a particularly heightened risk of HIV infection due to contextual issues that affect HIV transmission in this population including inequalities in relationships between men and women, coercive sex by senior colleagues, cultural values that promote polygamy, and gender inequalities in income and wealth.

In the absence of a vaccine for HIV infection, effective behavioral interventions will remain the most promising approach for preventing HIV transmission among sexually-active individuals (Pequegnat & Stover, 2000). Interventions that have produced reductions in high-risk sexual behaviors to date have been based on theoretical models such as the Social Cognitive Theory (Bandura, 2001), Information-Motivation-Behavioral Skills Theory (Fisher & Fisher 2002) and Theory of Reasoned Action (Ajzen et al., 2007). These interventions have focused on providing participants with accurate information about HIV transmission, sensitizing participants to risky situations, instructing participants on techniques that they can use to reduce their risk of infection, teaching participants how to identify and manage risky situations, and teaching participants how to identify and manage barriers to behavior change (Rhodes et al., 2007; Malow et al., 2009; Operario et al., 2010; El-Bassel et al. 2010).

Most HIV prevention interventions that are based on Social-cognitive theory have used a multiple-session, small group format and the groups have been led by skilled and highly-trained, professional facilitators. Although the outcomes from these interventions have been encouraging, their ultimate dissemination and implementation by community-based organizations, particularly in resource-limited settings has, thus far, been met with limited

success. Across formats and structures, cognitive behavioral interventions have been limited by their reliance on expert interventionist for delivery in a face-to-face format (Kalichman et al., 1999a). In contrast, empirical evidence has shown that videotape-based HIV prevention interventions could be delivered by staff from community-based organization that have minimal training in skills building techniques (Rotheram-Borus & Leonard, 2000; Kalichman et al., 2007). The use of Community-Based Organization (CBO) staff addresses many obstacles that would arise if an HIV prevention intervention had to be delivered by expert interventionists. In the present study, we were interested in replicating a successful videotape-based HIV prevention intervention among Nigerian female military personnel in an effort to establish the generalizability and cross-cultural stability of video-based, skills training intervention as a feasible and cost-effective approach for HIV prevention in a resource limited country.

Theoretical Framework

The Information-Motivation-Behavioral Skills (IMB) model developed by Fisher and others (Fisher & Fisher, 2002; Fisher et al. 2009) provided the theoretical underpinnings for the present intervention. The model provides a three-factor conceptualization of AIDS-preventive behavior: information, motivation, and behavioral skills. The model assumes that individuals need to be knowledgeable about the causes of HIV infection before they can be expected to adopt the behaviors that can reduce their risk of infection. In addition, individuals have to be motivated to change their behavior if they are to act on the information they have about the causes of HIV infection and the steps that they can take to reduce their risk for infection. That is, knowledge alone is not sufficient to lead to behavior change. The model also posits that behavioral skills related to preventive actions provide the final common pathway for information and motivation that result in behavior change. Fisher and co-researchers (Fisher & Fisher, 2002; Fisher et al. 2009) have shown that the model's components predict HIV risk-reduction behaviors and serve as the basis for an HIV prevention intervention. Kalichman et al. (1999b) have indicated that most facets of the IMB model may be implemented using videotapes. In a cognitive-behavioral intervention that was designed to reduce HIV risk among heterosexual African-American men, they assigned 117 men to either a 6-hour, video-based, small group, motivational-skills intervention or, a 6-hour, video-based, contact-matched (similar conditions, except for the intervention skills), HIV education comparison group. Kalichman et al. (1999b) found that intervention participants reported that they had engaged in fewer occasions of unprotected intercourse in the past three months than had control group participants. The current study was an attempt to adapt Kalichman et al.'s (1999b) video-based intervention for use with women in Nigeria, and tested its effects in a sample of women enlisted in the Nigerian army.

Methods

Design

There were two groups – intervention and control – to whom the program was delivered in small groups. Outcomes were assessed at baseline, before the program, and again at 3-month and 6-month follow-ups. Data were collected between 2006 and 2008.

Participants, Recruitment and Randomization

The investigative team distributed flyers and display posters announcing the project at strategic locations in the military establishments including such places as apartments, storefronts, clinics, and recreational areas informing enlisted women about the study and requesting their participation. Information about the study was also distributed through established ethno-cultural and civic organizations in the military. The flyers listed the study inclusion criteria: (1) 18 years of age or older; (2) self-reported unprotected vaginal

intercourse with two or more different partners in the past six months, or having been diagnosed and treated for a sexually transmitted disease in the last year; (3) residence at the study sites; (4) ability to communicate in English Language; and (5) willingness to sign an informed consent for study participation. The flyer also listed the collaborating community-based organization's telephone number that prospective participants could call to obtain additional information or schedule an appointment to participate in the study. Eligible participants were asked to visit the study recruitment center where non-military project staff (health educators) introduced the study aims and procedures to the participants.

A convenience sampling approach was used for participants' recruitment – those selected for participation were encouraged to invite their friends to participate. A total sample of 386 female enlisted personnel from two permanent military bases in Southwestern Nigeria was initially recruited for this study. After the screening process, 346 of the participants met the inclusion criteria for participation in the study (Figure 1). They were randomly assigned to one of two groups. Specifically, 174 females were assigned to the intervention group and received a 5-session, small group, videotape-based HIV prevention intervention, based on the IMB model, and 172 were assigned to the 5-session, HIV education comparison group, using a concealment of allocation technique.

Intervention and Control Conditions

For brevity, we will refer to the participants assigned to the motivational skills-building intervention as *intervention group (or participants)* and those assigned to the HIV education (only) condition as *control or comparison group*. The participants met twice a week, and the sessions were delivered in 90-minute blocks by two facilitators.

Videotape-based HIV Prevention Intervention

Formative research to develop intervention material—As suggested by the IMB model, a qualitative phase that included focus groups and personal interviews was conducted to adapt Kalichman et al.'s intervention (1999b) and to elicit the target population's level of HIV prevention information, motivation, and behavioral skills. We conducted six focus groups (N=36) and 20 one-to-one interviews with women in the Nigerian Army to elicit information on how to produce a video-based intervention that is feasible, efficacious, and acceptable in modifying HIV risk behaviors. Responses suggested that the intervention should address issues related to the three "Ws" (war, wine, and women) of the Nigerian Army, as well as situational factors that encourage coercive sex by senior officers. The participants emphasized the fact that alcohol and drug use increases the likelihood of HIV transmission among the Nigerian Army, coupled with a lack of knowledge on correct condom use. Furthermore, the women suggested that the intervention videos should incorporate local actors for cultural acceptability, and that participants' recruitment and retention could be bolstered by senior military administrators participating as project consultants in the study, and by providing the participants with incentives such as telephone calling cards, condoms, and mall gift certificates. These suggestions and the changes made allowed the investigators to focus their intervention on the peculiar HIV risk dynamics experienced by female enlisted personnel who were serving in the Nigerian Army.

The model given by Mathews et al. (2002) was used for adapting themes that emerged from the qualitative study into the videotape production. Focus groups were conducted with the women, which enabled them to view and comment on the contents of the original videotapes that were used for a similar study in the United States. These provided feedback on integrating the findings from the qualitative study into the intervention. The Principal Investigator, the two US-based behavioral scientists who served as project consultants and the local Nigerian health educators teamed up with a local video production company in

Nigeria to develop the video tapes. This company had more than 10 years' experience in developing educational videos in Nigeria. The team hired local actors to portray the major themes identified from the qualitative studies through dramatic narratives.

The new video tapes produced depicted risk scenarios and emphasized issues identified in the qualitative studies such as recognizing triggers that promote alcohol and drug use and other risky sexual practices in the Nigerian Army, and also introduced methods of risk avoidance and risk management. The finished product was pilot-tested for appropriateness and cultural sensitivity using 20 enlisted women, who were excluded in the main intervention study. The community-based organization's staff also conducted mock sessions with their peers, and with a sample of the proposed study participants, to help identify strengths and weaknesses in the intervention as well as intervention implementation.

Implementation of the Intervention—The HIV prevention intervention comprised five sessions of 90 minutes each (Table 1). Each session consisted of videotape presentations, modeling, practice sessions and corrective feedback, and group sessions. The two facilitators did the modeling; supervised the practice sessions, and provided corrective feedback to study participants. The first session focused on HIV education/risk sensitization and situation cue identification and management. Similarly, the following sessions used videotapes, modeling, and discussion to address triggers, risk avoidance and risk management. In particular, they addressed the use of male and female condoms, communication with one's partner, and substance use. For example, in Session 4, sexual assertiveness was modeled and discussed on the videotape using different models and situation contexts. The participants were then asked to practice assertiveness responses to male silhouette figures presented in videotape vignettes constructed from formative study data. This was followed by a discussion of socio-cultural issues that affect sexuality in Nigeria such as the differing cultural and religious backgrounds, cross-cultural sex role norms, polygamy, extramarital sexual relationship, transactional and coercive sex, rape, gender inequalities in income and wealth among other issues. Understanding these factors was very critical for the design of a culturally and contextually tailored intervention for the reduction of sex-related health risks among Nigerian military personnel.

Video-Based Education Control Condition

The comparison condition was a purely didactic and discussion approach devoid of any motivational and skills building content. Five sessions of 90 minutes each were used for the delivery of educational information and discussion among participants in the control group. The facilitators provided information on common misperceptions about HIV/AIDS, information on where individuals could go to receive voluntary HIV/AIDS counseling and testing, and information on the HIV/AIDS epidemic in Nigeria. The facilitators also discussed the cultural and social factors that can contribute to HIV risk (e.g., being sexually active with multiple wives and not adopting safer sex practices, and sharing scarification instruments without their being thoroughly cleaned before reuse). The session concluded with the facilitators discussing with participants some of the environmental barriers to HIV prevention (e.g., poverty, limited access to care, lack of condoms) and steps that participants can take to overcome these barriers. The study used different facilitators for the intervention and control conditions.

Training of Program Facilitators

The groups were facilitated by two female commissioned officers with minimal training in counseling and facilitator techniques, who were trained using the model of Rotheram-Borus & Leonard (2000). Specifically, the facilitators attended a 12-hour course that trained individuals to be local HIV prevention instructors. The course, which had been developed by

the Institute for Health Research and Development in Nigeria and used, previously to train health care providers, was given at the Institute by Certified Health Education Specialists. In addition, the facilitators participated in a 3-day intensive workshop on the delivery of the videotape-based intervention organized by the project investigators.

Measures and Data Collection Procedure

Assessments were administered by research assistants during group sessions with the eight participants and two female commissioned officers who served as facilitators. The assistant used overhead projection transparencies of the items to walk the participants through the measures. This procedure has been found to be particularly effective in eliciting accurate responses to HIV risk assessments among populations with a low level of literacy (Kalichman et al., 1999b; Kalichman et al, 2007). Participants provided self-report of their HIV/AIDS-related knowledge and sexual behaviors at baseline, 3 and 6 months after completing the intervention. The measures were in English language; and each assessment took an average of 40 minutes to complete. Measures included socio-demographic characteristics, HIV/AIDS-related knowledge, condom use, negative condom attitudes, HIV preventive behaviors, behavioral intentions, substance use and sexual behaviors and Safer Sex Self-efficacy. The participants were reimbursed \$10 for completing the baseline assessment, \$15 for completing each of the 3-month and 6-month follow up assessments. The exchange rate during the period of the study was \$1 to ₦150; the incentive amounts offered to participants could pay for a good dinner in a standard restaurant in Nigeria.

Socio-demographic characteristics—Participants reported their age, marital status, race/ethnicity, religion, level of education, employment status, annual income, sexual relationships, and personally knowing someone with HIV/AIDS.

HIV/AIDS-related Knowledge—A 10-item test was used to assess HIV risk and prevention-related knowledge. The items elicited information about modes of HIV transmission, knowledge of condom use, and AIDS-related knowledge. The response format was Yes, No, Don't know. Example items include "Can a woman give the AIDS virus to a man?" (yes), "Can you get AIDS by touching a person with AIDS?" (no). Each correct answer received 1 point; an incorrect response or "don't know" response received 0 point, for a range of 0 to 10 (alpha 0.74). On the basis of their scores, participants were dichotomized as having poor knowledge (0–5) or good knowledge (6–10).

Condom Use—Condom use was measured with a 21-item scale that attempts to capture participants' knowledge and use of condom during sexual intercourse. Example of items in the scale include: "I have seen or heard about latex condom", "I have used latex condom", and "I plan to use latex condom within the next month." Responses to each item were either no (0) or yes (1) with a score range of 0–21 and alpha 0.67.

Negative Condom Attitudes—The negative condom attitudes scale included 22 statements such as: "Female condoms take away pleasure," "male condoms reduce the fun of sex," "I would be embarrassed to buy condoms," and "male condoms are a hassle to use" all examples were reversed scored. The response format was a four-point scale ranging from 1 (strongly disagree) to 4 (strongly agree). Ratings were summed for a composite score, in which low scores represented positive attitudes and high scores negative attitudes toward condoms (range = 17–74). The internal consistency was 0.58.

HIV Preventive Behaviors—HIV preventive behavior was defined as the ability of participants to practice HIV protective behaviors and assertive skills, and was assessed using a six-item scale involving self-efficacy for condom use, HIV testing, and substance use prior

to sexual intercourse. Examples of items are: In the past three months you have: “talked with sex partner about using male condoms for safer sex”, “did not have sex because you did not have a condom”, “talked with sex partner about getting tested for the HIV”, drank less or used drugs less before having sex to be safe. Participants responded with the best estimate of number of times an event occurred within the past three-months. High values indicated more favorable HIV preventive behaviors (alpha 0.78).

Behavioral Risk Avoidance Intentions—HIV risk avoidance intentions were measured using a 10-item scale. Participants were asked to imagine a situation in which they might be tempted or pressured to engage in unprotected sexual intercourse with a person they desired and to respond to each risk-reduction intention item accordingly. Sample items in the scale included: “I will keep a male condom nearby”, “I will remind myself to use a female condom during sex”, and “I will tell my partner I don’t want to have sex unless we use a condom”. Participants responded on a six-point scale ranging from 1 (definitely will not do) to 6 (definitely will do). Responses were summed to provide behavioral intentions score with a range of 10–60 (alpha 0.68). Higher scores indicated more likelihood to engage in actions that reduce HIV-related sexual risk.

Substance use and Sexual Behaviors—Drug use was classified into major substances with which ingestion could result in behavioral impairment and altered mentation. These agents were assessed in relation to sexual encounters and included alcohol, marijuana, cocaine, amphetamines, and ecstasy. Participants were asked to respond to the questions by stating the number of times that they engaged in the act during the past three months. Two items concerned use of substances and three items sexual behaviors. Questions included: In the past three months, “how many times have you used alcohol before sex?”, “how many times have you used drugs before sex?”, “how many times have you had vaginal sex without condom?” and “how many sex partners have you had?”

Safer Sex Self-efficacy—Participants risk reduction skills were assessed using questions that attempted to determine the level of confidence participants had in practicing safer sex in difficult situations in the past 3 months. Items included having confidence to suggest condom use with new and regular sexual partners, when drinking or using drugs, having satisfactory sex with condom and knowing how to use condom correctly. The participants initially responded on a four-point scale ranging from 1 (strongly disagree) to 4 (strongly agree). These were further categorized into two response groups as follows: “have confidence” (≥ 3 points) and “do not have confidence” (≤ 2 points) in practicing safer sex.

Human Subjects Protection and Ethical Considerations

Appropriate steps were taken to ensure the protection of participants given the possibility of coercion in a military establishment. The research protocol was reviewed and approved by appropriate Institutional Review Boards in the United States and Nigeria. The women were informed verbally and in writing that their participation was voluntary, and that failure to complete all phases of the study or refusal to participate would not jeopardize their eligibility for benefits, to which they were otherwise eligible at the Armed Forces Program on AIDS Control or the collaborating community-based organization. The participants were also told that they reserved the right not to answer a question, if they so desired. In order to protect against the disclosure of sensitive personal information, the participants were required to sign a contract that they would not share others’ personal information with anyone outside the group. In addition, study data were collected by non-military project staff and military personnel did not have access to the study data. The study data were stored in a password protected computer file at the collaborating community-based organization, accessible only to the project Principal Investigator and Program Director.

Data Analysis

Data analyses were based on 346 female participants who provided data at baseline, 3-month and 6-month follow-up assessments. All participants that dropped out of the study at each level of assessment (Figure 1) were excluded from data analysis at that point. Chi-square tests of independence were conducted to determine if the participants in the intervention and control conditions differed with respect to ten socio-demographic characteristics at baseline. Initial analysis indicated that personally knowing someone with HIV differed at baseline ($p < 0.001$), and was a potential covariate for the behavioral outcomes. We used analysis of covariance with condition (intervention, control) as the between-subjects variable and baseline along with knowing someone with HIV as covariates to analyze the following five outcomes at 3- and 6-months: HIV/AIDS-related knowledge, condom use, negative condom attitudes, HIV preventive behaviors, and behavioral intentions.

We used McNemar's chi-square test to analyze change in substance use and safer sex self-efficacy. Odds ratio (OR) was also calculated to estimate intervention effects for all outcomes of interest. For sexual risk behaviors, ORs of 1.0 favor the intervention group in reducing HIV transmission risk and indicated a protective effect. For protective sex behavior (e.g., condom use), ORs of 1.0 favor the intervention group relative to the comparison group and indicate a protective effect. All tests were two-tailed and used $p < 0.05$ as the cut-off for statistical significance. For all analyses, cell sizes varied slightly because of attrition and missing data. All statistics were performed using SPSS software (version 16.0; SPSS Inc., Chicago, USA).

Results

Sociodemographic Characteristics

A total of 346 enlisted women in the Nigerian Armed Forces that enrolled in the study completed the baseline assessments and were randomly assigned to one of two groups, videotape-based HIV prevention intervention or HIV education control group. Retention rates at 3-month and 6-month follow-up assessments were high and ranged from 88% to 97%; and did not differ significantly ($p > 0.05$) across intervention and control groups (Figure 1).

Table 2 describes the socio-demographic characteristics of each group's participants at baseline. Comparison group participants were more likely than the intervention group to be single, without children, and be Christian. In contrast, the intervention group was more likely to report that they had a single partner; more of the participants in the intervention group had sexual intercourse with one male partner in the past three months, and were more likely to report that they personally knew someone who was infected with HIV. The majority of the participants were aged 30–39 years. Educational attainment was high. A more detailed description of the socio-demographic characteristics of the baseline population has been given elsewhere (Essien et al., 2010a). Chi-square tests indicated that only one variable differed between groups, namely personally knowing someone with HIV; it was therefore included as a covariate in subsequent analyses.

Impact of Intervention on HIV/AIDS-related Knowledge and Sexual Behaviors

Table 3 displays the groups mean scores for HIV/AIDS-related knowledge and sexual behaviors at each assessment period. The intervention did not improve intervention participants' knowledge any better than the control condition. A significant difference was found in condom use at 3-month and 6-month follow-ups. Participants in the motivational skills-building intervention group reported a significant increase in condom use, preventive

behaviors, and behavioral intentions to avoid risks at 3- and 6-months compared to controls. The two groups differed on negative condom attitudes at baseline, and continued to differ as controls became more negative.

Impact of interventions on Substance Use and Sexual Risk Reduction

Table 4 presents the group differences with respect to the tendency to use alcohol and other drugs before sexual intercourse, sexual behavior and to the propensity to enact risk reduction behaviors. Participants in the intervention group were less likely than the education-only controls to report that they had alcohol before they and their male partner had sexual intercourse at 3-month follow-up assessment. There were significant differences between participants in intervention and control groups for the number of acts of unprotected and protected vaginal intercourse at 3-month and 6-month follow-up assessments. Intervention participants had significantly lower rates of unprotected sex and greater use of condoms during sexual intercourse relative to those in the control group. Although, there were no significant differences between women in the two groups with respect to the average number of sexual partners at baseline and 3-month follow-up assessment, the difference became evidenced at 6-month follow-up assessment, where the mean of 1.29 and 1.47 partners were reported for intervention and control groups, respectively (Table 4). On average, women in the motivational skills-building intervention group significantly reduced the number of men that they had sex with by 31.4% compared to a 25.4% reduction noted among women in the HIV education control group after 6-month follow-up.

The proportion of study participants in the two groups who exhibited confidence in using risk-reduction skills during difficult sexual situations is presented in Table 5. Our findings indicate that intervention women used behavioral skills for HIV risk reduction to a greater extent than women in the comparison group. The effects were more pronounced at the 3-month follow-up assessment and less pronounced at the 6-month follow-up assessment. At the 3-month assessment, intervention participants were five times more likely than control participants to suggest that their new male partners use condom; while intervention participants were 1.4 times more likely than controls to suggest that their regular male partners use condoms. However, at the 6-month assessment, 81.6 % of the HIV education (only) females were more likely than intervention females (63.8%) to report that they were confident that they would remember to ask their male partner to use a condom prior to sexual intercourse when they and/or their male partner had been drinking or using other drugs (Table 5). The fit of our longitudinal model to participants' condom use knowledge scale scores indicated that the linear increase in participants' knowledge of correct condom use did not vary between the two conditions (Table 5).

Discussion

Using the IMB model (Fisher & Fisher, 2002), we partly replicate a successful videotape-based HIV prevention intervention (Kalichman et al., 1999b) among Nigerian female military personnel. Neither the motivational, skills-building HIV prevention intervention nor the non skills-based HIV education (only) control improved HIV/AIDS knowledge. This finding is similar to that of Kalichman et al. for inner-city African American men (Kalichman et al., 1999b; knowledge in this case was fairly high, perhaps at ceiling levels.). Similar findings of armed forces personnel having a high degree of knowledge and yet still engaging in risk-taking behaviors have been reported in other studies (Jenkins et al., 2000; Adebayo et al., 2002; Bing et al., 2007). For this reason, we focused on behavioral change.

Participants in the motivational skill-building intervention demonstrated a significant reduction in unprotected intercourse and negative condom attitudes, and improved condom use and HIV preventive behaviors compared with the HIV education (only) group at 3-

month and 6-month follow-up assessments. Other researchers using the IMB model with different populations and at different points in time have reported similar findings (Bing et al., 2007; Kalichman et al. 2007; Malow et al., 2009). The efficacy of the skills-building HIV intervention in our sample may be attributable partly to the gender-tailored framework that highlighted the underlying social processes, such as the dyadic nature of sexual interactions, relationship power, and emotional commitment that may promote and reinforce risk behaviors (DiClemente et al., 2004). Furthermore, there was strong tendency for enlisted women in the intervention group, compared to the control group, to have positive behavioral intentions regarding their relationship with male partners. This could have a positive impact on behavioral change, leading to reduction in HIV.

It is recognized that reducing and eliminating sexual risk require concomitant reductions in substance use (Wong et al., 2008). In our study, we noted significant decreasing trends in alcohol and drug use before sex, and number of sexual partners from baseline through 6-month follow-up, with the effects being more pronounced in the motivational skills-building intervention group than in the HIV education (only) group. A reduction in alcohol use before sex was noted among participants on skill-building intervention at 3-month, however, this was short-lived, as it was not sustained at the 6-month follow-up. While the adoption and maintenance of healthier and safer sex behaviors over a long time may be challenging for the enlisted women, the lack of sustained effects on the alcohol outcomes suggests that the sexual risk reduction behavior changes may also deteriorate over time. This indicates the need for more intensive alcohol risk reduction intervention components and maintenance intervention strategies (Kalichman et al., 2007). Previous studies have similarly demonstrated that cognitive-behavioral interventions are good strategies for reducing substance use among women (Cohen & Hien, 2006) and adults (Semaan et al., 2002; Copenhagen et al., 2006).

Study Limitations

The present study relied on self-reported measures for all of its behavioral outcomes. Consequently, participants' reports of their sexual behavior in the past 3 months may have been biased by limits to recall. Some participants may have intentionally given socially-desirable responses. Nonetheless, these may partially have been balanced by the study design used and assessment procedures which equalized contact and reimbursements across intervention and control conditions, thereby minimizing potential differential demand characteristics for socially desirable responses. Also, since the study used a convenience sample from military cantonments in one of the six geopolitical regions in Nigeria, the findings may not be generalizable or representative of the female military personnel sexual behaviors in Nigeria. Nevertheless, these limitations are offset by a number of strengths. The use of random assignment, the comparability of intervention groups at baseline assessment, high retention rates for follow-up assessments, and the lack of differential attrition strengthen the external validity of our study findings.

Conclusions

These results are encouraging in that they support the notion that interventions designed to influence theoretical mediators of behavior change may exert their effects through the constructs used. This study also demonstrates the fact that video-based motivational skills-building HIV risk-reduction intervention is relatively inexpensive to implement, and can be successfully delivered by non-professional counselors with minimal training. Considering the social and economic vulnerability of female personnel in the Nigerian military barracks, changing sexual risk behaviors among persons at greatest risk for HIV infection will require multi-level intervention strategies that address both individual behavior change and social change. Since female military personnel live and interact freely with the civilian population,

they represent a potential bridging group for disseminating HIV into the larger population. The current study therefore presents evidence on the feasibility of transferring research-tested skills-building interventions for HIV risk reduction in military settings, where structures for group services already exist. Although, this approach is intensive and covers multiple sessions, the structure of the militaries generally allow for intensive prevention training, as well as follow-up sessions- techniques that are not easily implemented in civilian or non-workforce sectors. The cost effectiveness demonstrated by this intervention model makes it more adaptable to militaries in Nigeria and other resource-limited countries, which are burdened by substantial stressors and may need different skills and support systems to choose and maintain safer sexual behaviors.

Thus, increased efforts to prevent HIV among military personnel in general are necessary, if they are to protect themselves and the countries they serve from the HIV/AIDS pandemic. Such military-focused interventions, coupled with military culture – hierarchy, order through chains of command; and respect of soldiers by general population may help transform soldiers into positive agents of change who can communicate HIV prevention messages throughout the country's general public. While the long-term impact of these interventions should be confirmed in a larger study population, the preliminary results suggest that the videotape-based HIV prevention intervention holds great promise as a feasible approach for HIV prevention among Nigerian military personnel, and indeed, armed forces in other resource-limited countries.

Acknowledgments

The Nigerian Uniformed Services AIDS Project was funded by a grant from the United States National Institute of Mental Health (Grant number RO1 MH073361-02).

References

- Adebayo SB, Mafeni J, Moreland S, Murray N. Knowledge, attitude and sexual behavior among the Nigerian military concerning HIV/AIDS and STDs. Armed forces programme on AIDS control (AFPAC). Final technical report. 2002 September.:95. 2002.
- Ajzen, I.; Albarracin, D.; Hornik, R., editors. Prediction and change of health behavior: Applying the reasoned action approach. Mahwah, NJ: Lawrence Erlbaum Associates; 2007.
- Bandura A. Social cognitive theory: An agentive perspective. Annual Review of Psychology. 2001; 52:1–26.
- Bing EG, Ortiz DJ, Ovalle-Bahamon RE, Cheng KG, Huang FH, Enesto F, Duan N. HIV/AIDS behavioral surveillance among Angolan military men. AIDS and Behavior. 2007; 12:578–584. [PubMed: 17641966]
- Brownell KD, Marlatt GA, Lichtenstein E, Wilson GT. Understanding and preventing relapse. American Psychologist. 1986; 41:765–782. [PubMed: 3527003]
- Cohen LR, Hien DA. Treatment outcomes for women with substance abuse and PTSD who have experienced complex trauma. Psychiatry Services. 2006; 57:100–106.
- Copenhaver M, Johnson BT, Lee IC, Harman JJ, Carey MP. the SHARP Research Group. Behavioral HIV risk reduction among people who inject drugs: meta-analytic evidence of efficacy. Journal of Substance Abuse Treatment. 2006; 31:163–171. [PubMed: 16919744]
- DiClemente RJ, Wingood GM, Harrington KF, Lang DL, Davis SL, Hook EW, Oh MK, Crosby RA, Hertzberg VS, Gordon AB, Hardin JW, Parker S, Robillard A. Efficacy of an HIV Prevention Intervention for African American Adolescent Girls: A Randomized Controlled Trial. Journal of American Medical Association. 2004; 292:171–179.
- Ekong, E. HIV/AIDS and the Military. In: Adeyi, Olusoji; Kanki, Phyllis; Odutolu, Oluwole; Idoko, John, editors. AIDS in Nigeria. Harvard University Press; 2006.
- El-Bassel N, Jemmott JB, Landis JR, Pequegnat W, Wingood GM, Bellamy SL. National Institute of Mental Health Multisite Eban HIV/STD Prevention Intervention for African American HIV

- Serodiscordant Couples: A Cluster Randomized Trial. *Archives Internal Medicine*. 2010 Epub ahead of print. PMID 20625011.
- Essien EJ, Ogungbade OO, Kamiru HN, Ekong E, Ward D, Holmes L. Emerging socio-demographic and lifestyle predictors of intention to use a condom in human immunodeficiency virus (HIV) intervention among uniformed services personnel. *Military Medicine*. 2006; 171 (10):1027–1034. [PubMed: 17076460]
- Essien EJ, Ogungbade OO, Ward D, Ekong E, Ross MW, Meshack A, Holmes L. Influence of educational status and other variables on HIV risk perception among military personnel: A large cohort finding. *Military Medicine*. 2007; 72 (11):1177–1181. [PubMed: 18062392]
- Essien EJ, Monjok E, Chen H, Abughosh S, Ekong E, Peters RJ, Holmes L Jr, Holstad MM, Mgbere O. Correlates of HIV knowledge and sexual risk behaviors among Female Military Personnel. *AIDS and Behavior*. 2010a [Epub ahead of print].
- Essien EJ, Mgbere O, Monjok E, Ekong E, Abughosh S, Holstad MM. Predictors of Frequency of Condom use and Attitudes among Sexually Active Female Military Personnel in Nigeria. *HIV/AIDS - Research and Palliative Care*. 2010b; 2:77–88.
- Esu-Williams E, Mulanga-Kabeya C, Zwandor A, Aminu K. Seroprevalence of HIV, HIV-2, HIV-1 Group 0 in Nigeria: Evidence of an increase of HIV infection. *Journal of Acquired Immune Deficiency Syndromes*. 1997; 16:204–210.
- Fisher, JD.; Fisher, WA. The Information-Motivation-Behavioral Skills Model. In: DiClemente, R.; Crosby, R.; Kegler, M., editors. *Emerging Theories in Health Promotion Practice and Research*. San Francisco, CA: Jossey Bass Publishers; 2002. p. 40-70.
- Fisher, JD.; Fisher, WA.; Shuper, PA. The Information-Motivation-Behavioral Skills model of HIV preventive behavior. In: DiClemente, R.; Crosby, R.; Kegler, M., editors. *Emerging Theories in Health Promotion Practice and Research*. 2. San Francisco, CA: Jossey Bass Publishers; 2009. p. 22-63.
- Imade G, Sagay A, Egah D, Onwuliri V, Grigg M, Egbodo C, Thacher T, Potts M, Short R. Prevalence of HIV and other sexually transmissible infections in relation to lemon lime douching among female sex workers in Jos, Nigeria. *Sexual Health*. 2008; 5 (1):55–60. [PubMed: 18361855]
- Jenkins RA, Jenkins PR, Nannis ED, Mckee KT, Temoshok LR. Correlates of human immunodeficiency virus infection risk behavior in male attendees of a clinic for sexually transmitted diseases. *Clinical Infectious Diseases*. 2000; 30:723–729. [PubMed: 10770735]
- Kalichman SC, Williams E, Nachimson D. Brief behavioral skills building intervention for female controlled methods of STD-HIV prevention: Outcomes of a randomized clinical field trial. *International Journal of STD and AIDS*. 1999a; 10:174–181. [PubMed: 10340198]
- Kalichman SC, Cherry C, Brown-Sperling F. Effectiveness of a Video-Based Motivational Skills-Building HIV Risk-Reduction Intervention for Inner-City African American Men. *Journal of Clinical and Consulting Psychology*. 1999b; 67(6):959–966.
- Kalichman SC, Leickness CS, Vermaak R, Cain D, Jooste S, Peltzer K. HIV/AIDS risk reduction counseling for alcohol using sexually transmitted infections clinic patients in Cape Town, South Africa. *Journal of Acquired Immune Deficiency Syndrome*. 2007; 44 (5):594–600.
- Malow RM, Stein JA, McMahon RC, Devieux JG, Rosenberg R, Jean-Gilles M. Effects of a culturally adapted HIV prevention intervention in Haitian youth. *Journal of the Association of Nurses AIDS Care*. 2009; 20(2):110–21.
- Mathews C, Guttmacher SJ, Coetzee N, Magwaza S, Stein J, Lombard C, Goldstein S, Coetzee D. Evaluation of a video based health education strategy to improve sexually transmitted disease partner notification in South Africa. *Sexually Transmitted Infections*. 2002; 78:53–57. [PubMed: 11872861]
- Nwokoji UA, Ajuwon AJ. Knowledge of AIDS and HIV risk-related Sexual Behavior among Nigerian Naval personnel. *BMC Public Health*. 2004; 4:24. [PubMed: 15210055]
- Nwokedi EE, Azeez-Akande O. The trend of HIV infection in Kano, Nigeria – a seven-year study of adult attendees of Aminu Kano Teaching Hospital. *Nigeria Journal of Medicine*. 2007; 16 (4):344–347.

- Operario D, Smith CD, Arnold E, Kegeles S. The Bruthas Project: evaluation of a community-based HIV prevention intervention for African American men who have sex with men and women. *AIDS Education and Prevention*. 2010; 22 (1):37–48. [PubMed: 20166786]
- Okulate GT, Jones OB, Olorunda MB. Condom use and other HIV risk issues among Nigeria soldiers: challenges for identifying peer educators. *AIDS Care*. 2008; 20 (8):911–916. [PubMed: 18777219]
- Pequegnat W, Stover E. Behavioral prevention is today's AIDS Vaccine. *AIDS*. 2000; 14 (Suppl 2):S1–7. [PubMed: 11061636]
- Rhodes F, Stein JA, Fishbein M, Goldstein RB, Rotheram-Borus MJ. Using Theory to Understand How Interventions Work: Project RESPECT, Condom Use, and the Integrative Model. *AIDS and Behavior*. 2007; 11:393–407. [PubMed: 17323123]
- Rotheram-Borus, MJ.; Leonard, NR. Training facilitators to deliver HIV manual-based interventions to families. In: Pequegnat, W.; Szapocznik, J., editors. *Working with Families in the Era of AIDS*. Sage Publications, Inc; Thousand Oaks, CA: 2000.
- Semaan S, Des Jarlais DC, Sogolow E, Johnson WD, Hedges LV, Ramirez GS, Flores SA, Norman L, Sweat MD, Needle R. Meta-analysis of the effect of HIV prevention interventions on the sex behaviors of drug users in the United States. *Journal of Acquired Immune Deficiency Syndrome*. 2002; 30:S73–93.
- UNAIDS. 2007 Sub-Saharan Africa AIDS Epidemiology Update. July. 2008
- UNAIDS. Best Practice Collection. Geneva: 1998. *AIDS and the Military*.
- Wong FL, Rotheram-Borus MJ, Lightfoot M, Pequegnat W, Comulada WS, Cumberland W, Weinhardt LS, Remien RH, Chesney M, Johnson M. the Healthy Living Trial Group. Effects of behavioral intervention on substance use among people living with HIV: the Healthy Living Project randomized controlled study. *Addiction*. 2008; 103 (7):1206–1214. [PubMed: 18494840]
- Yeager R, Hendrix C, Kingma S. International Rights Dimensions of HIV/AIDS in Nigeria. *African Journal of Reproductive Health*. 2000; 6 (3):30–37.

Figure 1.
Flowchart of the Distribution and Retention of Study Participants in Intervention and Control Groups

Table 1**HIV Prevention Intervention Sessions**

Intervention Session	Time and Mode of Presentation
Session 1	90 Minutes
Basic HIV information and dispelling myths about HIV/AIDS	15-minute video presentation
Misconceptions about HIV transmission in Nigeria	15-minute discussion
Identification of personal risk situations	15-minute video presentation
Appraisal of HIV risk using a continuum of risk activity	30-minute discussion
Trigger identification and management	15-minute video tutorial
Session 2	90 Minutes
Methods of risk avoidance and management	15-minute video presentation
Sexual risk management	15-minute discussion
Strategies for managing risk	15-minute video tutorial
Strategies for managing risky situations	15-minute discussion
Practice risk situation identification and avoidance	30-minute discussion
Session 3	90 Minutes
Safer sex practices and condom use	15-minute discussion
Safer sex practices and healthy relationships	15-minute video tutorial
How to use a condom	15-minute discussion
Practice male and female condom placement	45-minute video tutorial, practice and corrective feedback
Session 4	90 Minutes
Safer sex negotiation and assertiveness skills	15-minute video tutorial
Initiating conversations about safer sex	15-minute discussion
Practice assertiveness responses to video vignettes	30-minute video presentation, practice and corrective feedback
Socio-cultural issues and sexuality in the Nigerian army	30-minute discussion
Session 5	90 Minutes
Imbalance in power in sexual relations in the Nigerian army	15-minute video presentation
Role of relationship factors in HIV infection risks	30-minute discussion
Practice assertiveness responses to video vignettes	30-minute video presentation, practice and corrective feedback
Pitfalls and risk avoidance	15-minute discussion

Table 2Socio-demographic characteristics of participants by study group[‡]

Variable	Study Group		χ^2 (df)
	Intervention [% (n)]	Control [% (n)]	
<i>Age (yrs)</i>			
18–29	24.7 (43)	25.6 (44)	0.05 (2)
30–39	56.3 (98)	55.2 (95)	
40+	19.0 (33)	19.2 (33)	
<i>Education Level</i>			
Elementary School	6.9 (12)	6.4 (11)	0.34 (3)
Junior Secondary	5.8 (10)	7.0 (12)	
Senior Secondary	63.6 (110)	64.5 (111)	
College	23.7 (41)	22.1 (38)	
<i>Marital Status</i>			
Single	65.7 (113)	71.8 (122)	6.72 (3)
Married	25.0 (43)	19.4 (33)	
Separated/divorced/widowed	8.7 (15)	5.3 (9)	
Living as partner	0.6 (1)	3.5 (6)	
<i>Number of Child(ren)</i>			
None	58.6 (102)	66.3 (114)	4.08 (3)
One	10.3 (18)	9.9 (17)	
Two	14.4 (25)	8.1 (14)	
Three or more	16.7 (29)	15.7 (27)	
<i>Race/Ethnicity</i>			
Hausa	21.3 (37)	17.4 (30)	1.45 (3)
Ibo	14.9 (26)	15.7 (27)	
Yoruba	29.9 (52)	34.9 (60)	
Other	33.9 (59)	32.0 (55)	
<i>Religion</i>			
Christian	74.7 (130)	80.8 (139)	4.16 (2)
Muslim	23.6 (41)	19.2 (33)	
Other	1.7 (3)	0.0 (0)	
<i>Employment Status</i>			
Active Service	96.5 (167)	94.7 (162)	2.49 (1)
Trainee ⁺	3.5 (6)	5.3 (9)	
<i>Annual Income Level (x 1000)</i>			
₦120–240	19.7 (34)	20.9 (36)	1.75 (3)
₦241–360	49.1 (85)	51.2 (88)	

Variable	Study Group		χ^2 (df)
	Intervention [% (n)]	Control [% (n)]	
₦361–500	27.2 (47)	26.2 (45)	
₦500+	4.0 (7)	1.7 (3)	
<i>Sexual Partners[§]</i>			
Single partner	59.8 (101)	54.7 (87)	0.85 (1)
Multiple partners	40.2 (68)	45.3 (72)	
<i>Personally known someone with HIV (PKSH)</i>			
Yes	35.6 (62)	15.7 (27)	121.3 (1) ***
No	64.4 (112)	84.3 (145)	

[‡]Weighted % of those who responded

[§]Based on sexual relationship in the past 12 months

⁺Enlisted in the military but were undergoing some form of training or college education as of the study period.

₦ =Naira (Nigerian currency: ₦1= 100 kobo; ₦150=\$1(2007).

χ^2 (df) = Chi-square (degree of freedom).

P<0.001

Table 3

HIV/AIDS-related Knowledge and Sexual Behaviors of Participants on Intervention and Control Conditions at Baseline, 3-Month and 6-Month Assessments^{ac}

Measure and Assessment time	Intervention Group		Control Group		P-value [§]
	Mean (SD) ^ψ	95% CI of Mean	Mean (SD) ^ψ	95% CI of Mean	
Baseline (n=346)	n=174		n=172		
<i>HIV/AIDS-related Knowledge</i>	7.48 (1.86)	7.20–7.76	7.55 (2.55)	7.21–7.88	0.770 <i>ns</i>
<i>Condom use</i>	11.20 (2.33)	10.85–11.55	10.77 (2.96)	10.32–11.21	0.130 <i>ns</i>
<i>Negative Condom Attitudes</i>	54.18 (5.51)	53.38–54.99	57.56 (5.31)	56.75–58.37	<0.0001 ^{****}
<i>HIV Preventive Behaviors</i>	2.46 (1.76)	2.20–2.72	2.67 (2.10)	2.36–2.99	0.300 <i>ns</i>
<i>Behavioral Intentions</i>	41.10 (5.82)	40.21–41.99	40.88 (6.10)	39.99–41.78	0.739 <i>ns</i>
3 months Follow-up (n=333)	n=169		n=164		
<i>HIV/AIDS-related Knowledge</i>	7.85 (1.82)	7.58–8.13	7.59 (1.82)	7.31–7.87	0.203 <i>ns</i>
<i>Condom use</i>	13.67 (1.38)	13.46–13.88	12.78 (1.38)	12.56–12.99	<0.0001 ^{****}
<i>Negative Condom Attitudes</i>	54.62 (4.52)	53.93–55.30	58.99 (4.53)	58.29–59.68	<0.0001 ^{****}
<i>HIV Preventive Behaviors</i>	4.00 (2.94)	3.55–4.44	3.38 (2.95)	2.93–3.83	0.048 [*]
<i>Behavioral Intentions</i>	44.14 (5.85)	43.25–45.02	40.90 (5.85)	40.00–41.79	<0.0001 ^{****}
6 months Follow-up (n=312)	n=160		n=152		
<i>HIV/AIDS-related Knowledge</i>	7.68 (1.94)	7.38–7.98	7.47 (1.91)	7.17–7.78	0.347 <i>ns</i>
<i>Condom use</i>	14.38 (1.56)	14.15–14.62	14.01 (1.52)	13.77–14.25	0.033 [*]
<i>Negative Condom Attitudes</i>	54.22 (5.88)	53.33–55.11	59.13 (5.94)	58.22–60.04	<0.0001 ^{****}
<i>HIV Preventive Behaviors</i>	4.44 (3.46)	3.92–4.96	3.40 (3.50)	2.86–3.94	0.007 ^{**}
<i>Behavioral Intentions</i>	44.85 (6.00)	43.95–45.75	41.08 (5.84)	40.14–42.01	<0.0001 ^{****}

^{ac} Baseline values and personally knowing someone with HIV (PKSH) were used as covariates in the analytical models for 3-month and 6-month follow-up assessments for all outcome measures.

^ψ Higher mean score, indicates an improvement or positive outcome except for negative condom attitudes where the reverse apply.

[§] Represents the p-value of the comparison between intervention and control groups within the measure and follow-up assessment time.

Significance level:

* P<0.05;
 ** P<0.01;
 *** P<0.0001;
 ns not significant (P>0.05).

Table 4

Substance Use and Sexual Behaviors of Participants in Intervention and Control Groups at Baseline, 3-Month and 6-Month Follow-up Assessments[‡]

Behavior and Assessment time	Intervention Group			Control Group		
	n	Mean (SD) ⁺	95% CI of Mean ⁺	n	Mean (SD) ⁺	95% CI of Mean ⁺
<i>Alcohol use before sex</i>						
Baseline	174	2.48 (1.82) ^a	2.20–2.75	172	2.55 (1.82) ^a	2.27–2.82
3 months	169	1.53 (1.84) ^b	1.25–1.81	164	2.04 (1.91) ^b	1.75–2.34
6 months	160	1.16 (1.41) ^{bc}	0.94–1.38	152	1.34 (1.73) ^c	1.07–1.62
<i>Drug use before sex</i>						
Baseline	174	0.28 (0.59) ^a	0.19–0.36	172	0.26 (0.55)	0.18–0.34
3 months	169	0.19 (0.61) ^b	0.10–0.28	164	0.16 (0.49)	0.09–0.24
6 months	160	0.13 (0.46) ^c	0.06–0.20	152	0.18 (0.44)	0.11–0.25
<i>Vaginal sex without condom</i>						
Baseline	174	6.23 (3.81) ^a	5.66–6.80	172	6.40 (4.76) ^a	5.68–7.11
3 months	169	4.54 (2.56) ^b	4.16–4.93	164	5.25 (2.47) ^b	4.87–5.63
6 months	160	3.86 (2.51) ^c	3.46–4.25	152	4.47 (2.81) ^b	4.02–4.92
<i>Vaginal sex with condom</i>						
Baseline	174	7.74 (3.14) ^a	7.27–8.21	172	7.31 (3.63)	6.77–7.86
3 months	169	8.46 (3.27) ^b	7.97–8.96	164	7.68 (2.63)	7.28–8.09
6 months	160	8.70 (3.54) ^b	8.15–9.25	152	7.86 (3.51)	7.29–8.42
<i>Number of sexual partners</i>						
Baseline	174	1.88 (0.67) ^a	1.78–1.98	172	1.97 (0.68) ^a	1.86–2.07
3 months	169	1.43 (0.78) ^b	1.31–1.55	164	1.59 (0.84) ^b	1.46–1.71
6 months	160	1.29 (0.77) ^b	1.17–1.41	152	1.47 (0.56) ^b	1.38–1.56

[‡] Substance use and sexual behaviors were based on estimated number of times over the past 3 months; Baseline values and PKSH were included as covariates in the analytical models for 3-month and 6-month follow-up assessments for all outcome measures.

⁺ SD=Standard Deviation; 95% CI = 95% Confidence Interval.

Within behaviors and follow-up time, mean (SD) with different superscripts (a, b, c, d...) differ significantly ($P \leq 0.05$).

Differences between Intervention and Control Groups by follow-up assessment times are indicated by appropriate p-values on the last column.

Significance level:

* $P < 0.05$;

** $P < 0.01$;

ns not significant ($P > 0.05$).

Table 5

Percentage of Female Military Personnel Exhibiting Confidence in Using Risk-Reduction Skills during difficult Sexual Situation at 3 months and 6 months of follow-up Assessments⁺

Behavior and Assessment Time	Intervention Group n (%)	Control Group n (%)	χ^2 §	P-value	OR (95%CI) ^ψ
<i>Suggest Use of condom with new Partners</i>					
3 months	157 (92.9)	80 (48.8)	78.9	0.001 ***	5.30 (3.10–9.07)
6 months	129 (80.6)	127 (83.6)	0.45	0.501 <i>ns</i>	0.91 (0.69–1.19)
<i>Remember to use condom when drinking or using drugs</i>					
3 months	117 (69.2)	101 (61.6)	2.15	0.142 <i>ns</i>	1.19 (0.94–1.50)
6 months	102 (63.8)	124 (81.6)	12.41	0.001 ***	0.67 (0.55–0.82)
<i>Have safer sex that is satisfying</i>					
3 months	150 (88.8)	157 (95.7)	5.62	0.018 *	0.67 (0.51–0.87)
6 months	144 (90.0)	143 (94.1)	1.76	0.185 <i>ns</i>	0.78 (0.57–1.08)
<i>Use condom with regular partner</i>					
3 months	120 (71.0)	94 (57.3)	6.79	0.010 **	1.36 (1.07–1.74)
6 months	106 (66.3)	98 (64.5)	0.11	0.740 <i>ns</i>	1.04 (0.83–1.31)
<i>Know how to use condom correctly</i>					
3 months	144 (85.2)	142 (86.6)	0.13	0.718 <i>ns</i>	0.95 (0.71–1.27)
6 months	147 (91.9)	141 (92.8)	0.09	0.769 <i>ns</i>	0.94 (0.64–1.39)

⁺ Baseline values and PKSH were included as covariates in the analytical models for 3-month and 6-month follow-up assessments.

§ χ^2 = Chi-square; Degree of freedom (df) for behaviors =1;

^ψ OR (95%CI)=adjusted Odds Ratio; 95% Confidence Interval;

Significance level:

* P<0.05;

** P<0.01;

P<0.001;
not significant (P>0.05).
ns