

Predictors of frequency of condom use and attitudes among sexually active female military personnel in Nigeria

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Background: Despite awareness of condom efficacy, in protecting against both human immunodeficiency virus/sexually transmitted diseases (HIV/STDs) and unintended pregnancy; some females find it difficult to use or permit condom use consistently because of the power imbalances or other dynamics operating in their relationships with males. The purpose of this study was to determine the factors that predict the frequency of condom use and attitudes among sexually active female military personnel in Nigeria.

Methods: This study used a cross-sectional design in which a total of 346 responses were obtained from consenting female military personnel in two cantonments in Southwestern Nigeria between 2006 and 2008. The study instrument was designed to assess HIV/acquired immunodeficiency syndrome (AIDS) knowledge (HAK), HIV risk behaviors (HRB), alcohol and drug use, condom attitudes and barriers (CAS) condom use self-efficacy (CUS) and social support to condom use (SSC). The sociodemographic characteristics of participants were also captured. Univariate analysis and multivariable logistic regression were used for modeling the predictors of condom use.

Results: The results showed that 63% of the respondents reported using condoms always, 26% sometimes used condoms and 11% never used condoms during a sexual encounter in the past three months. Univariate analysis revealed that significant associations existed between CAB ($P < 0.05$), HRB ($P < 0.01$) and SSC ($P < 0.01$) with the frequency of condom use. The following sociodemographic variables: age, marital status, number of children, employment status and type of sexual relationship were also significantly ($P \leq 0.05$) associated with consistent condom use in the study group. Multivariate analysis indicated that marital status, type of relationship and CAB were the only significant predictors ($r^2 = 0.37$; $P \leq 0.05$) of condom use behaviors after adjusting for all other factors in the model.

Conclusions: Findings indicate that consistent condom use could be enhanced through gender-specific intervention programs that incorporate the predictor variables identified. These are likely to be successful in decreasing sexual risk behaviors in the subpopulation.

Keywords: HIV/AIDS, condom use, risky behavior, military personnel, Nigeria

Introduction

The HIV/AIDS epidemic is a growing public health problem in Nigeria. The epidemic has extended beyond the commonly classified high-risk groups and is now common in the general population. The Joint United Nations Program on HIV/AIDS (UNAIDS) estimates that around 3.1% of adults, between ages 15–49 are living with HIV and AIDS in Nigeria.¹ Although the HIV prevalence is much lower in Nigeria than in other African countries such as South Africa and Zambia, the size of Nigeria's

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population (around 148 million) meant that by the end of 2007, there were an estimated 2.6 million people infected with HIV.¹ The gender differences in the epidemic remain glaring, with women being infected more often than men. In 2006 UNAIDS estimated that women accounted for 61.5% of all adults aged 15 years and above living with HIV.² Heterosexual transmission is the main portal of entry of HIV in Nigeria. While awareness on HIV is relatively high especially among urban populations, it appears that the high level of knowledge of HIV has little impact on the myths and misconceptions about HIV transmission.³ Risky sexual practices have been reported in several subpopulations such as in young persons,⁴ commercial sex workers,⁵ commercial drivers,⁶ and Nigerian military,⁷⁻⁹ thus indicating the need for improved intervention programs in these populations.

Military populations, in general, have increased vulnerability to HIV infection, compared to the general civilian populations. Several factors place men and women in military services at increased risk of HIV infection. Nigerian military personnel, like most militaries are in the most sexually active age group (15 to 35 years) and thus are at greatest risk of contracting HIV. Since they are regularly away from home for long periods, away from their regular sexual partners, many of them engage in risky behaviors as a means of relieving the tension of loneliness and stress.¹⁰ In addition, the occupation gives them a sense of invulnerability and exposes them to alcohol and drug consumption and commercial sex workers. Risk factors among the military also include high rates of sexual partner change, elevated rates of STDs, low rates of condom use with commercial sex workers and other casual partners, and significant mixing between groups having high and low risk behavior patterns.¹¹ In an intervention study to evaluate the effectiveness of a situationally-based HIV risk-reduction for the Nigerian uniformed services,¹² it was noted that at baseline, 36% of the participants reported that they had not thought of using condoms with their casual partners.

Therefore, a reduction in HIV incidence in Nigeria would require not only a fall in the level of higher-risk sex but also a rise in condom use during higher-risk sex; and condom use during sexual intercourse is the most effective strategy for the prevention of heterosexual transmission of STDs and HIV infection. Condoms, when used correctly and consistently, can reduce the rate of HIV transmission by 80% to 90%^{13,14} and pregnancy by 91% to 99%.¹⁵

In Nigeria, females constitute 6% to 10% of the military¹⁶ and are exposed to the same, sometimes even greater, pressure as men to enter into casual sexual relationships. Despite awareness of condom efficacy, most females

generally find it difficult to use condoms consistently because of the power imbalances or other dynamics operating in their relationships with males. Studies comparing condom use among women who had access to both male and female condoms and those with access to male condoms alone have shown that female condom availability does increase protection.¹⁷⁻¹⁹

Negative attitudes toward using male condoms tend to be associated with higher rates of sexual risk. Little has been written about the factors that influence women's attitudes toward condom use, and this has implications for HIV intervention efforts. Understanding factors associated with safer sexual practices and condom use among female military personnel is considered a vital component of HIV/STD prevention strategies. In this article, we determine the predictors of the frequency of condom use and condom-related attitudes among sexually active female military personnel in Nigeria. Such information can help improve the design of intervention campaigns to reduce the spread of HIV in this group, among high-risk groups and the general population.

Methods

Participants and procedures

Using a cross-sectional design, 346 female military personnel were recruited from two military cantonments in the Southwestern part of Nigeria to participate in the study. The number represented 90% of the initial sample population of 386 screened. The two cantonments were chosen because they served as camps for recruitment, training and entry points for returning military personnel deployed on peacekeeping operations and foreign missions; and therefore, offered an ideal environment for our study. The participants formed the baseline population of an intervention study.²⁰ In order to consider the participants at risk of potential HIV infection, this study required them to be sexually active and to meet certain criteria, which include: aged 18 years or older, 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, residence at the study sites, ability to communicate in English language, and willingness to sign a consent form for study participation. The study was conducted between 2006 and 2008 and received Institutional Review Board (IRB) approval from both the University of Houston in the United States and Institute for Health Research and Development in Nigeria. More details of the settings and procedures are available elsewhere.²⁰

Measures

The study used an adapted version of a previously validated instrument²¹ with minor modifications made to fit the cultural settings in Nigeria. The instrument which was cross-validated with the present study population comprised of composite items used to capture socio-demographic information, and to measure HIV/AIDS-related knowledge (HAK), condom use and attitudes, HIV risk avoidance intentions, risk reduction strategies, alcohol consumption and substance use behaviors. Condom use, as defined in our study refers to using either the female condom or allowing use of the male condom by a partner during sexual encounter. The main outcome variable was frequency of condom use during the past three months. The variables of interest used in the present analysis are described in detail below.

Sociodemographics

Standard questions were used to assess participants' age, marital status, race/ethnicity, employment status, annual income, level of education, religion, sexual relationships, number of children, incarceration history, and personally knowing someone with HIV/AIDS.

HIV/AIDS related knowledge

A 10-item test was used to assess HIV/AIDS risk prevention knowledge. The items elicited information on HIV transmission knowledge, condom use knowledge, and AIDS-related knowledge. A categorical scale with three levels of responses (yes, no, don't know) was used. Example items included "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 was scored 1 point, and a total score of 10 points was attainable based on the number of questions. Participants that scored 5 points or less were classified as having 'low' knowledge and those that score above 5 points were classified as having 'high' knowledge. The internal consistency of the HIV/AIDS knowledge scale in our sample was (Cronbach's $\alpha = 0.74$).

Frequency of condom use

Participants were asked when they have sex, how often they used a condom in the past 3 months prior to the study. Responses were categorized into never, sometimes or always. We based our classification and definition of condom usage after the work of Davis and Weller.¹⁵ The never-used category indicated that condoms were not used during any acts of vaginal intercourse (0%). The sometimes-used category included intermediate estimates of use (1%–99%)

and combinations of never-used, sometimes-used (0%–99%) or always-used (100%). The always-used category indicated that a condom was used for 100% of penetrative acts of vaginal intercourse.

Condom attitudes and barriers

Attitudes toward male and female condoms were assessed using items that measured intent and utilization of condoms. Condom attitudes were assessed using a four-item test. The participants responded on a four-point Likert scale ranging from 1 (strongly disagree) to 4 (strongly agree). The sample items included: "Using female condoms interrupt the pleasure of sex", "Male condoms reduce the fun of sex", "I would be embarrassed to buy condoms", and "Male condoms are a hassle to use". Negative attitudinal items were reversed scored and all items were summed for an overall measure, in which lowest scores represented more positive attitudes toward condoms (range = 17–74). The scale was found to have satisfactory internal consistency (Cronbach's $\alpha = 0.58$).

Condom use self-efficacy

Condom use self-efficacy (CUS) was assessed using a six-item scale that examined the participants' self-efficacy for condom use, HIV testing and substance use prior to sexual intercourse. Examples of statements in the past three months prior to study: "Talked with sex partner about using male condoms for safer sex", "Did not have sex because you did not have a condom". The questions were anchored on the best estimate of number of times an event occurred within the past three-months. The total number of times the different event scenarios occurred represented the self-efficacy level, with the highest value indicating a more favorable self-efficacy and lowest value the less favorable self-efficacy. The internal consistency of the CUS scale in our sample was (Cronbach's $\alpha = 0.78$).

Social support to condom use

Twelve-item scale was used to measure participants' perceived social support for condom use. Sample statements of the item scale included: "My partner(s) prefer(s) that we use a male condom during sex", "My friends always use male condoms during sex", "Most of my friends think that female condoms are just too much of a hassle to use", "My friends believe that insisting on using male condoms means that you don't trust your partner". These statements were endorsed with a four-point Likert-type response scale ranging from 1 (strongly disagree) to 4 (strongly agree). Negative attitudinal items were reversed scored, and all items were summed to determine

the overall measure. The possible range for social support measure was 12–48, with 48 indicating the highest perceived social support. The reliability for this scale was moderate (Cronbach's $\alpha = 0.52$).

HIV risk behaviors

Sexual- and drug-related risk behaviors among participants were assessed in the past three months using 10 items. Ten questions eliciting risky behaviors such as the following were asked: "Have you ever drank alcohol heavily before having sex", "Have you ever had sex with a man who you believe had sex with another man?", "Have you given someone money, drugs or other things to get sex?", "Have you had a sexual disease such as syphilis, gonorrhea, herpes or chlamydia?" "Have you ever been tested for HIV?" Answers to the questions were based on a 'yes' or 'no' response. All responses were coded as 1 for 'yes' and 2 for 'no', and later summed, with possible score range of 10–22. Higher scores indicate extreme involvement in risk behaviors. The HRB scale internal consistency was considered adequate (Cronbach's $\alpha = 0.66$).

Data analysis

Data analyses were based on 346 participants who reported being sexually active in the previous 12 months. The frequency of condom use was used as an outcome variable in the analysis. We examined the bivariate associations between individual socio-demographic variables and frequency of condom use using Pearson's χ^2 statistic. Analysis of variance (ANOVA) was used to assess the differences in means of continuous variables: HAK, CAB, HRB, CUS, and SSC based on frequency of condom use. Furthermore, condom use behavior was re-grouped into two categories as follows: consistent users (participants that used condoms always during sexual intercourse in the past three months prior to the study) and nonconsistent users (participants that either sometimes or never used condom during sexual intercourse in the past three months prior to the study). Appropriate dichotomous categories of predictor variables were created for HAK, CAB, HRB, CUS, and SSC. Univariate analysis was conducted to examine the magnitude and significance of the bivariate associations between independent dichotomous variables and the outcome variable. The corresponding probability level, unadjusted prevalence odds ratio (UPOR), and 95% confidence intervals (CI) were computed for each bivariate association.

Based on the outcome of this analysis, the predictor variables for use in multivariable logistic regressions were

selected *a priori*, if they were significant at the 0.10 level in the bivariate analysis or if they were considered important. Age, education level, and marital status were identified *a priori* as important variables and were selected for inclusion in the final multivariate models, regardless of whether they met the specified criteria. Factors identified as significantly associated with the condom use behavior in the bivariate analysis were entered into a multivariable logistic regression analysis to assess the independent contribution of each factor in predicting condom usage, and to simultaneously adjust for potential confounders. Finally, we conducted a model Likelihood ratio test to determine the goodness of fit of the model. Adjusted prevalence odds ratio (APOR) with 95% CI was computed for each association. All statistics were two-tailed at 0.05 significance level, and were performed using SPSS software (version 16.0; SPSS Inc., Chicago, USA).

Results

Factors associated with condom use

Of the total population of 386 sampled, complete responses were obtained from 346 female military personnel, with a response rate of 90%. A detailed description of the sociodemographic characteristics of the study population comprising of 346 participants has been given elsewhere by Essien et al.²² Table 1 presents the association between the socio-demographic characteristics and frequency of condom use in the study population. Overall, majority of the participants, 63%, reported using condoms always, while 26% indicated that they used condoms sometimes and 11% of them reported that they never used condoms during sexual encounters in the past three months prior to the study. There were significant associations ($P \leq 0.05$) across all variables considered, except for religion, annual income and personally knowing someone with HIV (Table 1). About 43.5% of the respondents in the age category greater than or equal to 30 years used condoms always compared to 9% that never used condoms. Also, a significantly ($P < 0.001$) higher proportion of singles than married ones, tend to use condoms always (54.8% vs 8.8%). Of those who used condoms always, a ratio of 1:1 was reported for singles and multiple partners, respectively. There was a tendency for female participants with casual partners to use condoms always compared to noncasual ones (36.4% vs. 27.0%), although majority of the later group used condoms sometimes (19.4%).

Based on the scores, the study participants generally had high level of HAK, with no significant difference noted between the frequency of condom use and HAK

Table 1 Sociodemographic characteristics of study participants by frequency of condom use

Variables	Frequency of condom use						Test statistics ^a	
	Always (n = 218)		Sometimes (n = 88)		Never (n = 39)		χ^2	P-value
	n	%	n	%	n	%		
Age (years)								
<30 years	68	19.7	11	3.2	8	2.3		
≥30 years	150	43.5	77	22.3	31	9.0	12.1	0.002**
Education level								
Less than high school	24	7.0	8	2.3	13	3.8		
High school and above	194	56.4	79	23.0	26	7.6	16.1	0.000***
Marital status^b								
Single	187	54.8	32	9.4	15	4.4		
Married	30	8.8	55	16.1	22	6.5	85.6	0.000***
Number of children								
No child	169	49.0	32	9.3	14	4.1		
One or more child(ren)	49	14.2	56	16.2	25	7.2	58.3	0.000***
Race/ethnicity								
Hausa	39	11.3	19	5.5	9	2.6		
Ibo	43	12.5	5	1.4	5	1.4		
Yoruba	74	21.4	27	7.8	11	3.2		
Other	62	18.0	37	10.7	14	4.1	13.1	0.041*
Religion								
Christian	172	50.3	65	19.0	31	9.1		
Muslim	45	13.2	21	6.1	8	2.3	0.53	0.769
Employment status								
Trainee	6	1.7	2	0.6	7	2.0		
Active service	210	61.2	86	25.1	32	9.3	19.4	0.000***
Annual income								
Low	150	43.6	64	18.6	28	8.1		
High	68	19.8	24	7.0	10	2.9	0.69	0.708
Number of partners								
Single partner	107	31.0	71	20.6	26	7.5		
Multiple partners	111	32.2	17	4.9	13	3.8	26.0	0.000***
Type of relationship								
Casual	124	36.4	20	5.9	7	2.1		
Noncasual	92	27.0	66	19.4	32	9.4	41.45	0.000***
Personally known someone with HIV								
Yes	57	16.5	26	7.5	6	1.7		
No	161	46.7	62	18.0	33	9.6	0.287	0.238

Note: ^aExcept for race/ethnicity with df = 6, all other variables have df = 2. ^bMarital status: 'single' represents unmarried persons, divorcees, those who were previously married and now separated and the widowed; and 'Married' include those who were legally married or living together as married couples. Significance level: * $P < 0.05$; ** $P < 0.01$; *** $P < 0.001$.

(Table 2). However, participants that used condoms always (55.19 ± 5.64) and sometimes (55.69 ± 4.51) tend to have significantly ($P < 0.001$) positive CAB than those that never used condoms (60.15 ± 6.37) during sexual intercourse in the past three months prior to the study. The level of involvement of the participants that used condoms

sometimes in HRB and the peers support to condom use they received were significantly lower ($P \leq 0.05$) than those that used condoms always and those that never used condoms, respectively (Table 2). There were no significant differences ($P > 0.05$) in CUS by the frequency of condom use by participants.

Table 2 Relationships between HIV/AIDS knowledge, psychosocial and risk behavior variables and frequency of condom use

Variable ^a	Frequency of condom use			F-value	P-value
	Always (n = 218)	Sometimes (n = 88)	Never (n = 39)		
	Mean (SD)	Mean (SD)	Mean (SD)		
HAK	7.47 (2.02)	7.61 (2.08)	7.59 (2.05)	0.17	0.842 ^{ns}
CAB	55.19 (5.64) ^a	55.69 (4.51) ^a	60.15 (6.37) ^b	13.75	0.000 ^{***}
HRB	11.73 (1.43) ^a	11.16 (0.99) ^b	11.87 (1.24) ^a	6.86	0.001 ^{***}
CUS	3.14 (1.79)	2.99 (1.52)	3.07 (1.51)	0.20	0.818 ^{ns}
SSC	34.69 (3.26) ^a	33.50 (2.75) ^b	34.54 (4.39) ^a	4.18	0.016 [*]

Notes: ^aVariable scores range: HAK (1–10); CAB (17–74); HRB (10–22); CUS (1–23); SSC (12–48). Within rows, means (SD) with the different superscripts are significantly different at $P < 0.05$. Significance level: * $P < 0.05$; *** $P < 0.001$; ns, not significant ($P > 0.05$).

Abbreviations: HAK, HIV/AIDS-related knowledge; CAB, condom attitudes and barriers; HRB, HIV risk behaviors; CUS, condom use self-efficacy; SSC, social support to condom use.

Predictors of condom use

Table 3 presents the result from the univariate analysis of factors associated with consistent and nonconsistent condom use during the past three months prior to the study. Among the independent variables considered in the study, age, marital status, number of children, employment status, type of relationship, CAB, HRB, and SSC were significantly associated ($P \leq 0.05$) with condom use behavior among the participants. Although, majority of the UPORs were generally protective for nonconsistent condom use, participants who were 30 years and above, were 34% more likely than those below 30 years to use condoms consistently (UPOR = 1.34; 95% CI: 1.16–1.56). Married respondents were more likely to use condoms consistently than were singles (UPOR = 2.85; 95% CI: 2.09–3.89) during sexual encounters, while those with one or more children were twice more likely than those with no children to use condoms consistently.

Participants who engage in casual relationships during the past three months were significantly ($P < 0.001$) more likely than those who had noncasual relationships to use condoms consistently (UPOR = 1.70; 95% CI: 1.44–2.00). Participants who exhibited positive CAB were associated with consistent condom use (UPOR = 1.22; 95% CI: 1.04–1.43) compared to those who had negative attitudes and barriers. However, participants involved in high HRB and those with SSC were 47% (UPOR = 1.47; 95% CI: 1.08–1.99) and 42% (UPOR = 1.42; 95% CI: 1.08–1.86) more likely than those with low HRB or limited SSC, respectively, to use condoms inconsistently (Table 3).

Of the ten predictor variables that met the criteria for entry into the multivariate logistic regression model, only marital status ($P < 0.001$), type of relationship ($P < 0.05$) and CAB ($P < 0.001$) were the significant predictors ($r^2 = 0.37$) of condom use among the participants, after adjusting for all variables in the model (Table 4). Respondents who

were married recorded an elevated likelihood of consistent condom use during sexual intercourse (APOR = 7.9; 95% CI: 2.71–13.17), compared to those who were single. However, slightly wide CI associated with the APOR, may indicate a reduced precision of the estimate and calls for caution in interpreting the value. Although 78.4% of the nonconsistent users of condoms had steady (noncasual) relationships, those that maintained casual relationships were twice more likely than the later to use condoms inconsistently (APOR = 2.14; 95% CI: 1.16–3.94). CAB significantly ($P < 0.001$) predicted condom use among the participants with those having positive CAB being approximately three times (APOR = 2.76; 95% CI: 1.52–5.02) more likely than those with negative CAB to use condoms consistently (Table 4).

Discussion

In the present study, we found robust relationships between attitudes toward condom use and condom use behaviors for the overall sample, beyond the effects of sociodemographic and risk characteristics. Overall, majority of the study participants (63%) used condoms consistently compared to nonconsistent users (37%). The social environments in the Nigerian military barracks have significant mixing between groups having high and low sexual risk behavior patterns¹¹ and may be responsible for the high level of consistent condom users in our sample. Overall, the preponderance of available epidemiologic studies have reported that when used consistently and correctly, condoms are highly effective in reducing both the rate of HIV transmission and other STDs by 80% to 90%^{13,14} and pregnancy by 91% to 99%.¹⁵

A higher proportion of participants in our study reported that they used condoms consistently because their partners welcomed it, compared to the nonconsistent users who felt that condom use with long-term partners was unnecessary (data not shown). About 78% of the nonconsistent condom

Table 3 Univariate analysis of factors associated with condom use

Variables	Frequency of condom use				P-value
	Consistent (n = 218)		Nonconsistent (n = 127)		
	%	UPOR (95% CI)	%	UPOR (95% CI)	
Age (years)					
<30 years	31.2	1.00 (referent)	15.0	1.00 (referent)	
≥30 years	68.8	1.34 (1.16–1.57)	85.0	0.52 (0.34–0.80)	0.000***
Education level					
Less than high school	11.0	1.00 (referent)	16.7	1.00 (referent)	
High school and above	89.0	0.82 (0.62–1.09)	83.3	1.33 (0.94–1.88)	0.134
Marital status					
Single	86.2	1.00 (referent)	37.9	1.00 (referent)	
Married	13.8	2.85 (2.09–3.89)	62.1	0.28 (0.21–0.37)***	0.000***
Number of children					
No child	77.5	1.00 (referent)	36.2	1.00 (referent)	
One or more child(ren)	22.5	2.09 (1.65–2.63)	63.8	0.34 (0.26–0.46)	0.000***
Race/ethnicity					
Yoruba	33.9	1.00 (referent)	29.9	1.00 (referent)	
Other	66.1	1.07 (0.91–1.26)	70.1	0.89 (0.65–1.21)	0.441
Religion					
Christian	79.3	1.00 (referent)	76.8	1.00 (referent)	
Muslim	20.7	1.06 (0.86–1.29)	23.2	0.91 (0.66–1.27)	0.594
Employment status					
Trainee	2.8	1.00 (referent)	7.1	1.00 (referent)	
Active service	97.2	1.60 (0.86–2.99)	92.9	0.60 (0.39–0.93)	0.000***
Annual income					
Low	68.8	1.00 (referent)	73.0	1.00 (referent)	
High	31.2	0.93 (0.79–1.10)	27.0	1.14 (0.83–1.57)	0.410
Number of partners					
Single partner	49.1	1.00 (referent)	76.4	1.00 (referent)	
Multiple partners	50.9	0.66 (0.57–0.78)	23.6	2.24 (1.58–3.17)	0.060
Type of relationship					
Noncasual	42.6	1.00 (referent)	78.4	1.00 (referent)	
Casual	57.4	1.70 (1.44–2.00)	21.6	0.35 (0.24–0.50)	0.000***
Personally known someone with HIV					
No	73.9	1.00 (referent)	74.8	1.00 (referent)	
Yes	26.1	1.02 (0.85–1.22)	25.2	0.97 (0.70–1.33)	0.846
HIV/AIDS-related knowledge					
Low	17.9	1.00 (referent)	17.3	1.00 (referent)	
High	82.1	1.01 (0.82–1.25)	82.7	0.98 (0.68–1.41)	0.894
Condom attitudes and barriers					
Negative	51.4	1.00 (referent)	37.8	1.00 (referent)	
Positive	48.6	1.22 (1.04–1.43)	62.2	0.70 (0.53–0.94)	0.015*
HIV risk behaviors					
Low	53.7	1.00 (referent)	67.7	1.00 (referent)	
High	46.3	0.81 (0.69–0.95)	32.3	1.47 (1.08–1.99)	0.011**
Condom use self-efficacy					
Low	52.8	1.00 (referent)	59.1	1.00 (referent)	
High	47.2	0.91 (0.78–1.07)	40.9	1.18 (0.89–1.56)	0.256
Social support to condom use					
Low	31.7	1.00 (referent)	44.9	1.00 (referent)	
High	68.3	0.81 (0.67–0.97)	55.1	1.42 (1.08–1.86)	0.014**

Notes: Significance levels: *P < 0.05; ***P < 0.001.

Abbreviations: referent, reference category; UPOR, unadjusted prevalence odds ratio; 95% CI, 95% confidence interval.

Table 4 Multivariable logistic regression model assessing characteristics associated with condom use

Factors	Frequency of condom use			
	Consistent (n = 218)		Nonconsistent (n = 127)	
	%	APOR (95% CI)	%	APOR (95% CI)
Age (years)				
<30 years	31.2	1.00 (referent)	15.0	1.00 (referent)
≥30 years	68.8	1.30 (0.66–2.58)	85.0	0.78 (0.39–1.52)
Education level				
Less than high school	11.0	1.00 (referent)	16.7	1.00 (referent)
High school and above	89.0	0.55 (0.26–1.19)	83.3	1.81 (0.84–3.91)
Marital status				
Single	86.2	1.00 (referent)	37.9	1.00 (referent)
Married	13.8	7.93 (2.71–13.17)***	62.1	0.13 (0.04–0.37)***
Number of children				
No child	77.5	1.00 (referent)	36.2	1.00 (referent)
One or more child(ren)	22.5	1.04 (0.36–2.99)	63.8	0.96 (0.33–2.77)
Employment status				
Trainee	2.8	1.00 (referent)	7.1	1.00 (referent)
Active service	97.2	1.14 (0.29–4.40)	92.9	0.88 (0.23–3.42)
Number of partners				
Single partner	49.1	1.00 (referent)	76.4	1.00 (referent)
Multiple partners	50.9	1.02 (0.53–1.96)	23.6	0.98 (0.51–1.89)
Type of relationship				
Noncasual	42.6	1.00 (referent)	78.4	1.00 (referent)
Casual	57.4	0.47 (0.25–0.86)*	21.6	2.14 (1.16–3.94)*
Condom attitudes and barriers				
Negative	51.4	1.00 (referent)	37.8	1.00 (referent)
Positive	48.6	2.76 (1.52–5.02)***	62.2	0.36 (0.20–0.66)***
HIV risk behaviors				
Low	53.7	1.00 (referent)	67.7	1.00 (referent)
High	46.3	0.82 (0.46–1.46)	32.3	1.22 (0.69–2.16)
Social support to condom use				
Low	31.7	1.00 (referent)	44.9	1.00 (referent)
High	68.3	0.87 (0.50–1.54)	55.1	1.15 (0.65–2.02)

Notes: Only factors that met the entry criteria of $P \leq 0.10$ in the univariate analysis were included in the multivariate logistic regression model; Final Model Likelihood ratio test: $\chi^2 = 104.4$ (df = 10)***; Pseudo R-Square (Nagelkerke) = 0.37. Significance level: * $P < 0.05$; *** $P < 0.001$.

Abbreviations: referent, reference category; APOR = adjusted Prevalence odds ratio; 95% CI = 95% confidence interval.

users in our study had steady partners and were unwilling to use condoms because they believed condom use connotes distrust, lack of intimacy, and they did not feel that their partners were at risk. This is in line with most military personnel belief, who by virtue of their training and accepted norms, are imbued with feelings of invulnerability that distort their perceptions of risk. This suggests that educational programs aimed at enabling individuals to correctly assess their own HIV risk, encouraging behavior change based on self-assessment of risk, and development of negotiation skills with partners, could increase condom use among those practicing unprotected sex. A number of studies have shown

that improved partner communication skills are important in increasing condom use.^{23–26}

We found in our study that older respondents (30 years and above) were 34% more likely than younger ones to use a condom consistently, a finding that was similarly noted by some researchers.^{27,28} This observation may help explain in part why young women accounted for the persistently high number (61.5%) of adults aged 15 years and above living with HIV disease in Nigeria.² Other studies have found the reverse to be true: that younger subjects were significantly more likely to report frequent and consistent condom use during intercourse.^{23,29} Also, we found that

married female military personnel were three times more likely than singles to use condoms consistently; likewise those with one or more children, were twice more likely to do so. Apart from attempting to protect against unwanted pregnancy, they could also be using condoms to protect themselves from HIV or STDs because of their partner's infidelity and the associated risky behaviors and lifestyles common in the Nigerian military barracks. We noted that 56.4% of our study population had not been tested for HIV, and of this proportion, 28.9% of them were classified as being at high risk of contracting HIV because of their lifestyles, which include drug and alcohol abuse and engaging in unprotected sexual relationships with casuals. The bivariate analysis showed a high prevalence of consistent condom use on casual partners. In contrast, the nonconsistent users were 65% less likely to use condoms on casual partners, suggesting that this group would be at elevated risk of HIV/STDs infection. Similarly, 36% of Nigerian uniformed service personnel reported that they had not thought of using condoms with their casual partners.¹² These observations suggest that HIV risk assessment should be based both on personal perception of risk and the epidemiologic notions of risk. Although behavior changes may be indicative of one's perception of risk, but recognizing one's current behaviors as risky is the first step toward behavior changes such as adopting condom use.³⁰ With the high HIV prevalence in Nigeria,¹ it is important to encourage condom use in all types of sexual relationships, including consensual and legal unions, since both married and unmarried individuals tend to engage in risky sexual behaviors eg, multiple partners and unprotected sex with nonregular partners).

Active service personnel in the sample population were 1.6 times more likely than trainees to use condoms consistently. Cost has been reported as a barrier to condom use.³¹ For optimal condom use, all barriers to condom acquisition should be removed. Free condoms should be made available to military personnel to encourage their use by persons at risk of HIV and other sexually transmitted diseases.

CUS is an important factor in the promotion of safer sex. But we noted that this variable was not significantly associated with condom use at all levels in our study, contrary to the findings of other researchers that higher levels of self-efficacy were associated with condom use.^{27,32} Self-efficacy is assessed frequently in HIV prevention research but there has been mixed evidence for the relationship between self-efficacy, safer sex, and sexual risk behavior.³³ It is however, possible that some methodological issues may have attenuated

observed efficacy-behavior relationships in our study population. Weinhardt et al similarly, reported that self-efficacy risk reduction associations may be influenced by ceiling effects, response bias, and measurement error associated with self-report measures of risk behavior.³⁴ In an earlier study using the same population²² we reported that more than 70% of our population had lower CUS and were engaged in risk-taking behaviors, despite having a high degree of HIV/AIDS knowledge.

Bivariate analysis indicated that participants who perceived high social support from peers were 42% more likely than those receiving low peers support to use condoms inconsistently. Although this factor was not significant after adjusting for other variables in the final model, it may serve as a pointer for unraveling misconceptions about condoms, and as an entry for HIV prevention efforts in this group. Since the norms within a given social network can help or retard the efforts of an individual to change behaviors, especially those related to sexual practices, such efforts should tap into existing social dynamics and patterns of communication to promote pro-condom norms. Social support is important in facilitating an individual's change either in attitude or behaviors; and such changes take place within a network of social influences.³⁵ According to Bandura, social networks are important sources of social support, and social support is vital to self-efficacy.³⁶ Social network research also indicates that close bonds with network members may be a protective factor independent of self-efficacy.^{36,37} This statement supports our current findings.

Consistent and sustained condom use during sex is considered very important in the fight against HIV/AIDS and understanding the predictors of condom use can enhance effective interventions to elevate usage. In our study, we noted that marital status, type of relationship (noncasual and casual) and CAB were significant predictors of condom use during sex, and explained as much as 37% of the variability in condom use in the sample population. Married women had a high prevalence (APOR = 7.9) of consistent condom use than singles. This observation is not consistent with previous findings in the general population⁴ and national youth service corp members³⁸ in Nigeria, where condom use was more common among women who were single than among married women. However, it was not possible to distinguish condom use for family planning purposes from condom use to prevent STDs, in particular HIV infection. These, in addition to the small proportion of married women involved (13.8%), may offer plausible explanation for

the high APOR recorded. Since condom use remains an important approach for prevention of HIV and unwanted pregnancies among married couples and others in long-term partnerships, promotion of condoms as contraceptive methods or as dual protection against unwanted pregnancies and STDs may be an appropriate strategy among married women in this population.

Relationship dynamics also play a significant role in determining condom use. Participants with casual partners were twice more likely to use condoms inconsistently than those involved in steady relationships. This finding collaborates with those of Chatterjee et al who also noted lower rates of condom use with casual partners in the inner city African-American communities.³⁹ Unprotected sex with a casual partner has been documented as a risk factor for HIV infection among mobile populations like the military.^{16,22} Reasons such as financial dependence on male partners, feeling invincible, low self-esteem coupled with the need to feel loved by a male figure, and alcohol and drug use have been given for such risky behaviors.^{4,8,16,40}

There was a significant mix of outcomes on condom use and barriers, with participants having positive attitudes being three times more likely than those with negative attitudes to condom use consistently during sexual intercourse. Though some of the nonconsistent users had negative attitudes, they used condoms in perceived high-risk situations but reported that they dislike condoms because its use reduces sexual pleasure, a reason that has commonly been cited by other researchers for nonuse of condoms.^{12,22,27} Thus, a key to encouraging safer sex practices in this group is to find effective strategies for personalizing the risk that they take when they practice unsafe sex. Once risk perceptions are heightened, a focus on positive attitudes about condom use is likely to be most effective. In our study, the level of HIV knowledge, and perceived risk of getting HIV through sexual intercourse and peer social support were not significantly associated with consistent condom use in the multivariate analysis. These findings are consistent with results from other studies.^{6-9,23}

Limitations

When interpreting the results presented here, it may be necessary to take into account factors that might have influenced our findings. Because a cross-sectional design was used, we were unable to examine the direction of causality between condom attitudes and condom behaviors. It is also appropriate to indicate the limitations of self-reports, especially

for sensitive topics related to sexual practices and behaviors. Information bias may affect our results, since some participants could have given socially acceptable answers in response to sensitive questions. Given that the study used military cantonments from one of the six geopolitical regions in Nigeria, the findings may not be generalizable or representative of the female military personnel in Nigeria. Each of the regions has different socio-cultural characteristics and environmental settings that influence the type of sexual risk behaviors personnel serving in such areas are engaged in.

Furthermore, the CAB observed in the present study may be unique to our sample and should not be generalized to other members of populations who engage in risky behaviors. Because condom use behavior was measured retrospectively, and attitudes were measured at the time of the survey, we do not know whether attitudes preceded behavior, or attitudes were formed on the basis of the reported behaviors. It was not determined whether failure to use condoms resulted from use of other contraceptive methods or other contraceptive methods were used because of the women's reluctance to have their partners use condoms.

Finally, our instrument and/or analysis may have inadvertently omitted some predictors of consistent and nonconsistent condom use. Thus, in-depth studies using longitudinal designs would be necessary to understand the nature of the relations between these constructs, and to assess the significance, and stability of current predictors of condom use in the sample population. Attention should be given to community-level and structural-level factors affecting HIV infection and transmission in this population.

Conclusion

In summary, despite these limitations, our study found a comparatively high level of condom use among female military personnel in Nigeria that was significantly predicted by marital status, type of relationship (noncausal and casual) and condom use attitudes and barriers. In addition, the significant HRB exhibited by participants, coupled with strong peer social support recorded in the univariate analysis, call for gender-specific intervention programs taking into consideration the predictor variables. Such programs would help to increase awareness about the positive aspects of condom use, and work to eliminate misconceptions about condoms, partner risk level, HIV, and distribute free male and female condoms. These are likely to be successful in decreasing sexual risk behaviors in this population. It is also important that such intervention program should emphasize

the effectiveness of condoms in preventing the spread of HIV and other STDs and in protecting against unwanted pregnancy, while taking into account the psychosocial factors, social environments and lifestyles prevalent in the Nigerian military barracks.

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