

Risk behaviours and level of knowledge as contributing factors to cervical screening among tertiary institutions in North Central Nigeria

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Abstract

Despite growing awareness of cervical cancer across sub-Saharan Africa, screening uptake remains disproportionately low. This study examined the interplay between information sources, knowledge levels and cervical cancer screening behaviour among female academic and non-academic staff in two Nigerian tertiary institutions. A cross-sectional survey was conducted using structured, pre-tested questionnaires. Data were collected on sociodemographics, risk-associated behaviours, awareness, information exposure and knowledge of cervical cancer. Composite scores were calculated for the knowledge domains (risk factors, prevention and screening methods). Bivariate associations with screening behaviour

2022, the World Health Organisation (WHO) recorded 660,000 newly registered cases and 350,000 deaths [1, 2]. Low- and middle-income countries (LMICs), including Sub-Saharan African countries, have the highest incidence and mortality, which are reflective of significant inequalities in access to human papillomavirus (HPV) vaccination and cervical screening. Even though it is now reducing in most regions globally, it remains a significant cause of cancer mortality in West African women, as the cases hover around 84% and deaths are 88% [3].

Cervical cancer develops as a result of persistent infection with HPV on the cervix. HPV is a sexually transmitted virus and has been reported to cause the majority of identified cases of cervical cancer. Persistent HPV infection of the cervix causes approximately 95% of cervical cancers, with abnormal cells often taking 15–20 years to turn into cancer [4]. This is followed by integration of the viral DNA into the host genome, resulting in loss of genomic stability, inactivation of tumour suppressor genes and a long-term course to malignant transformation [5].

Cervical cancer poses a global public health problem, especially in LMICs, where risk-taking behaviours like unprotected intercourse and early sexual debuts are more prevalent [6]. Other risk factors include smoking, multiple sex partners and long-term use of oral contraceptives, which enhance the chance of acquiring cervical malignancies [7]. HPV persistence and cervical cancer are also increased by the immunosuppression that occurs, particularly among persons living with HIV [8].

Regardless of prevention, awareness of cervical cancer and HPV has been relatively low in most parts of the world, especially in low-income countries. A substantial proportion of women do not know that HPV causes cervical cancer and this causes a low rate of uptake of preventive measures (such as Pap smears and HPV vaccination) due to the combination of lack of knowledge and cultural stigmatisation associated with sexually transmitted infections [9]. The occurrence of misunderstandings about the safety of the HPV vaccine and logistical obstacles, such as cost and access, also lowers vaccination rates [10]. They have been found to enhance awareness, screening and vaccination rates and to increase awareness through public health campaigns, community-based outreach and school vaccination programs, particularly in underserved areas [11].

Knowing the risk factors and their preventive measures, which are HPV vaccination and routine cervical screening, are the major cost-effective strategies in preventing this cancer. Although this disease is associated with grave consequences if left untreated, it is highly preventable and treatable and curable if detected in its premalignant or very early stages [2, 12]. More importantly, it is best prevented by detecting the preinvasive (precancerous) stage of the disease, which should culminate in prompt intervention and management before its progression to full-blown cervical cancer.

Methodology

Study location

This study was conducted in the University of Ilorin and the University of Ilorin Teaching Hospital (UITH) communities. The UITH is located at Oke-Ose, in Ilorin East Local Government Area of Kwara State, North Central Nigeria. It is connected to the University of Ilorin by a linkage road. Both communities are tertiary institutions, with the Teaching Hospital being an affiliate of the University, both being in Ilorin, Nigeria.

Study design

This was a cross-sectional questionnaire-based study. This research was a questionnaire-based survey in the UITH and the University of Ilorin Communities tertiary hospitals in North-central Nigeria.

Study population

The study involved all female staff of the University of Ilorin and the UITH.

The inclusion criteria were eligible and consenting female staff of the University of Ilorin and the UITH. Females already diagnosed with cervical malignancy or other genital tract malignancies were excluded from the study, which was obtained by asking the staff individually in private before administering the questionnaire.

Scoring and grouping for analysis

The variables were scored and grouped to facilitate data understanding and statistical analysis.

Diversity of information source

Grouped as none-never heard, one to two sources, three sources and more than three sources

Risk behaviour

Risk behaviour was assessed using a composite index based on established indicators such as early sexual debut, number of sexual partners and relationship type, which have been used in previous studies [19–21]. The score for risk behaviour and risk-associated behaviour was as follows: score of zero for monogamy and 1 for polygamy; early sex before 17 years was one and after 17 years, zero. The number of sex partners ever had was scored zero for one partner, 0.5 points for two partners, 1.0 points for three partners and 2 points for more than three partners. The maximum score for risk behaviour and risk-associated behaviour was 5 points (a higher score means engaging in more risky behaviour). The risk subgrouping was low (score of 0 to 1), intermediate (score of 1.5 to 2) and high (more than 2 points).

Knowledge

Results

The results are presented under four domains: A) sociodemographic characteristics; B) awareness and information sources related to screening behaviour; C) prevalence and correlates of risk-associated behaviours and D) knowledge of cervical cancer and its association with screening uptake.

Sociodemographic characteristics of respondents

A total of 1,311 eligible female staff responded to the survey. Their ages ranged from 18 to 73 years, with a mean age of 43 ± 11 years. In terms of professional roles, nurses comprised the largest group, accounting for 31.3% of respondents, followed by administrative officers at 23.3% and lecturers at 13%. Most respondents (84.3%) were married and among them, 85% were in monogamous unions. Religious affiliation was almost evenly split, with 52% identifying as Muslim and 47.8% as Christian.

Awareness and information sources in relation to screening behaviour

Awareness of cervical cancer among the study population was high, with 1,154 respondents (88%; 95% CI: 86%–90%) affirming that they had heard about the condition. In contrast, 157 participants (12%) reported no awareness. This awareness level was statistically significant ($p < 0.001$, binomial test), indicating a substantial level of disease recognition within this academic cohort.

Among those who were aware, the primary source of cervical cancer information was health facilities, followed by school-based programs, online platforms, family discussions, religious centres and the media. A majority (62%) of informed respondents reported having learned

Chi-square tests were used to assess associations between categorical variables, such as source diversity and screening uptake. The diversity of information sources was significantly associated with screening behaviour. As the number of information sources increased, so did the likelihood of having undergone cervical cancer screening ($p < 0.001$, χ^2 goodness-of-fit). Only 352 participants (27%; 95% CI: 24%–29%) had ever been screened for cervical cancer, while 959 (73%; 95% CI: 71%–76%) had never undergone screening. The overall distribution of screening status is shown in Figure 2.

Notably, the proportion of participants who had screened was highest among those who received information from religious institutions (42%), followed by those informed via hospitals (35%), schools (34%) and family members (34%). Further analysis demonstrated a progressive relationship between the diversity of information sources and screening uptake. Participants exposed to one or two sources had a 27% screening rate (95% CI: 25–38); those informed by three sources had a 35% rate (95% CI: 27–44); and those with exposure to more than three sources had the highest screening rate at 42% (95% CI: 33–51). This gradient was statistically significant ($p < 0.001$, χ^2 test). The corresponding risk difference in screening rates increased with information source diversity: from 1.0 for one to two sources, to 7.4 (95% CI: 1.1–1.6) for three sources and up to 14 (95% CI: 5.0–23) for more than three sources. These findings are further visualised in Figure 3.

Awareness also varied slightly with relationship type. Participants in monogamous unions had higher awareness (89%) compared to those in polygamous relationships (81%), a statistically significant difference ($p = 0.003$, χ^2 test). However, awareness levels did not significantly differ by age or marital status.

Prevalence and correlates of risk-associated behaviours

Risk-associated behaviours were measured using both individual items and a composite score. The overall prevalence of specific behaviours was relatively low. Only 1.7% of participants reported early sexual debut (defined as first intercourse before age 17), 15% reported being in polygamous unions and 25% had more than one lifetime sexual partner. The most striking finding was that 73% of all respondents had never undergone cervical screening, further highlighting a behavioural gap in preventive health engagement.

To evaluate cumulative behavioural risk, a composite risk score was calculated using responses across multiple risk items. A score of 0–1 was categorised as 'low risk,' while scores of 1.5–5 were considered 'intermediate or high risk.' In total, 77.6% of respondents were classified as low risk and 22.4% as intermediate or high risk. Awareness of cervical cancer was significantly associated with lower risk scores. Among those who had never heard of cervical cancer, 31.8% had elevated risk scores, compared to 21.1% among those who were aware ($p = 0.003$, χ^2 test). This association is summarised

Diversity of information sources also predicted knowledge outcomes. As shown in Table 3, participants exposed to more than three sources had the highest proportions of high (36%) and intermediate (39%) knowledge, compared with those exposed to one or two sources (8% and 25%, respectively). The association was highly significant ($p < 0.001$).

Table 4 presents the analysis of the knowledge level according to the type of job. The findings indicate that doctors, followed by nurses and lecturers, have higher knowledge levels compared to other staff. The table also shows that there is a statistically significant relationship between the type of job and the level of knowledge.

Knowledge level was also significantly associated with screening uptake. Table 5 presents the relationship between knowledge scores across all three domains and the probability of having ever screened. For example, within the risk factor domain, only 11.1% of those with no knowledge had ever been screened, compared to 45.8% among those with high knowledge. Similar gradients were observed across prevention and screening knowledge domains. The probability of screening was approximately four times higher among respondents with high knowledge than those with low knowledge (OR = 4.1; 95% CI: 3.0–5.9; $p < 0.001$).

Table 6 below shows a multivariate logistic regression analysis adjusting for variables. Those variables that had a significant association with screening uptake at the bivariate levels (χ^2 goodness of fit analysis) were selected for Multivariate Regression Analysis.

Parameters having an odds ratio of $>1</$

Table 5. Cervical cancer screening uptake by knowledge domain and level (N = 1,311).

Knowledge domain	Knowledge level	Ever screened - No	Ever screened - Yes	Row total
Risk factors	None	384 (88.9%)	48 (11.1%)	432 (33.0%)
	Low	317 (70.4%)	133 (29.6%)	450 (34.3%)
	Intermediate	180 (63.2%)	105 (36.8%)	285 (21.7%)
	High	78 (54.2%)	66 (45.8%)	144 (11.0%)
Prevention	None	516 (80.8%)	123 (19.2%)	639 (48.7%)
	Low	251 (67.7%)	120 (32.3%)	371 (28.3%)
	Intermediate	120 (63		

Table 7. Test for multicollinearity (regression analysis).

Source	SS	df	MS	Number of obs = 1311		
Model	80.887744	14	5.777696	F(14, 1296) = 42.40		
Residual	176.601196	1296	.136266355	Prob > F = 0.0000		
				R-squared = 0.3141		
				Adj R-squared = 0.3067		
Total	257.48894	1310	.196556443	Root MSE = .36914		

Table 9. Report of Cronbach's alpha for the knowledge domains.

Average interitem covariance: 2.021209
 Number of items in the scale: 3
 scale reliability coefficient: 0.6611

Test scale = mean(unstandardized items)

Item	obs	sign	item-test correlation	item-rest correlation	average interitem covariance	alpha
know~k_score	1311	+	0.9723	0.9364	.0786452	0.0258
total_know~e	1311	+	0.9858	0.8955	.0400405	0.0409
barrier_sc~e	1311	-	0.1654	0.0329	5.944941	0.8876
Test scale					2.021209	0.6611

Table 10. Cronbach's alpha - reliability estimates for knowledge of risk, prevention and screening.

Item	Observation	Sign	Item-test correlation	Item-rest correlation	Interitem covariance	Alpha
Risk score	1,311	+	0.9557	0.8170	.5760162	0.7654
Prevention score	1,311	+	0.8848	0.7891	1.191312	0.7172
Screening score	1,311	+	0.8256	0.6945	1.403216	0.7901
Test scale					1.056848	0.8235

Furthermore, our data demonstrate that the depth of content matters. Higher knowledge of cervical cancer risk factors, prevention strategies and screening modalities was associated with substantially higher screening rates, with odds ratios approximating a four-fold increase for high versus low knowledge tiers. This robust association aligns closely with findings from Nigerian cross-sectional and interventional studies, including those by

preventive behaviour. Multichannel credible communication, primarily through health institutions, schools and religious organisations, was associated with higher knowledge levels and greater screening participation. The finding of a significant link between information exposure sources and risk-related sexual behaviours further emphasizes the complexity of the need for robust information, which will further enhance screening uptake.

To move closer to the WHO's cervical cancer elimination targets, public health strategies must go beyond awareness campaigns, with interventions being multidimensional, incorporating health education with accessible, culturally responsive screening services to reach diverse female populations and reduce cervical cancer disparities effectively.

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Conflicts of interest

The authors declare that they have no conflicts of interest related to this study.

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