

Determinants of Uptake and Compliance With Cervical Cancer Screening Among Women of Reproductive Age Attending Clinical Health Care Facilities in Lafiagi, Edu Local Government Area Kwara State

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Research Article

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**DETERMINANTS OF UPTAKE AND COMPLIANCE WITH CERVICAL CANCER
SCREENING AMONG WOMEN OF REPRODUCTIVE AGE ATTENDING
CLINICAL HEALTH CARE FACILITIES IN LAFIAGI, EDU LOCAL
GOVERNMENT AREA KWARA STATE.**

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Abstract

Background: Cervical cancer remains a leading cause of cancer-related morbidity and mortality among women in sub-Saharan Africa, with Nigeria bearing a disproportionately high burden. Despite the availability of cost-effective screening methods, uptake remains alarmingly low, particularly in semi-urban and rural communities where health literacy is limited and socio-cultural barriers are pronounced.

Aim: This study assessed knowledge, awareness, perception, and attitude as determinants of uptake and compliance with cervical cancer screening among women of reproductive age attending a clinical health care facility in Lafiagi, Edu Local Government Area, Kwara State, Nigeria.

Methods: A descriptive cross-sectional study was conducted among 300 women of reproductive age (15–49 years) attending General Hospital, Lafiagi, selected using a multistage sampling technique. Data were collected with a structured, interviewer-administered questionnaire covering socio-demographic characteristics, knowledge, awareness, perception, attitude, and screening uptake, and were analyzed using descriptive statistics and the chi-square test, with significance set at $p < 0.05$.

Results: Most respondents were aged 15–24 years (33.7%), married (83.3%), had only primary education (50.0%), and were traders (36.3%). Knowledge of cervical cancer was poor: only 30.0% had heard of the disease, 16.7% knew it affects the cervix, and 10.0% identified human papillomavirus (HPV) as a major cause. Awareness of screening services was low (26.7%). Negative perceptions were common - 55.0% believed screening is painful, 50.0% considered it unnecessary for healthy women, and 43.3% perceived stigma. Despite these barriers, 83.7% of respondents were willing to be screened if recommended by a health worker. Screening uptake was exceptionally low (20.3%), with fear (52.3%) and lack of awareness (41.8%) the most frequently cited barriers. Knowledge was significantly associated with uptake ($\chi^2 = 42.16$, $df = 1$, $p = 0.001$), and perception was significantly associated with compliance ($\chi^2 = 24.38$, $df = 1$, $p = 0.003$).

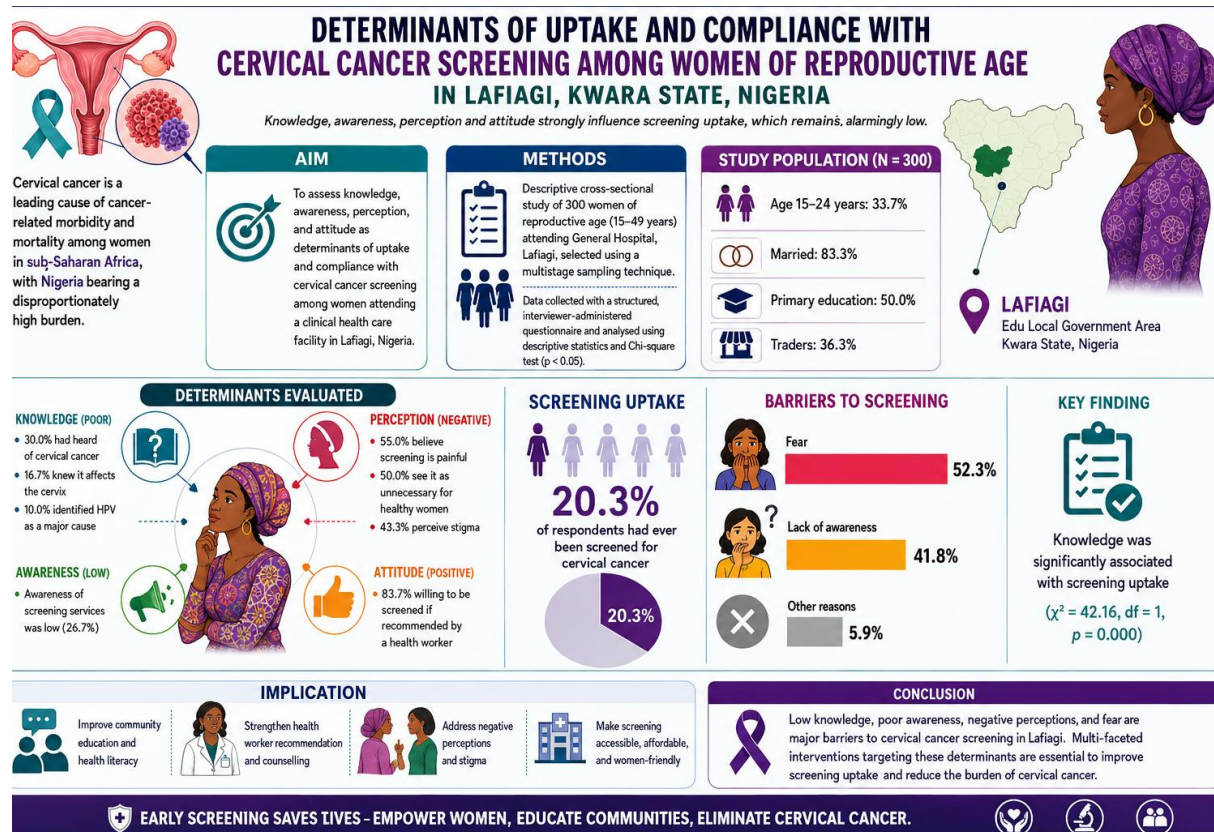
Conclusion: Knowledge, awareness, and uptake of cervical cancer screening in Lafiagi are critically low, and perceptions are predominantly negative, yet attitudes are positive, indicating that women are receptive to screening when properly informed.

Recommendations: Health education should be intensified, health workers should routinely recommend screening during clinical encounters, and policymakers should prioritize resources for screening services, provider training, and sustained community sensitisation.

Keywords

Cervical Cancer; Screening Uptake; Human Papilloma Virus; Cross-sectional study.

Graphical Abstract



(Note: This graphical abstract was created with Biorender)

1.0 Introduction

Cervical cancer is the fourth most common cancer among women globally and remains a major public health problem in low- and middle-income countries, where more than 80,000 African women are diagnosed annually and mortality exceeds 75% (Anorlu & Deng, 2012). The crude incidence rate of cervical cancer in Western Africa is 19.9 per 100,000, compared with 19.3 in Nigeria and 15.8 globally; an estimated 14,550 new cases and 9,659 deaths occur in Nigeria each year (Akanbi *et al.*, 2015). Almost all cases are attributable to persistent infection with high-risk Human Papillomavirus (HPV), particularly types 16 and 18, which together account for approximately 70% of pre-cancerous lesions and invasive cancers (World Health Organization, 2019).

Effective, low-cost screening methods, including Visual Inspection with Acetic Acid (VIA), Papanicolaou (Pap) smear, and HPV DNA testing, can detect precancerous lesions long before progression to invasive disease, and the WHO (2021) has set a global target of 70% screening coverage as part of its strategy to eliminate cervical cancer as a public health problem by 2030. However, uptake across sub-Saharan Africa remains far below this threshold. Okaba (2024) and Jomusu *et al.* (2024) argue that the barrier to screening in Nigeria is no longer primarily about equipment availability, but a complex interplay of socio-cognitive factors, knowledge, awareness, perception, and attitude, that determine whether a woman presenting at a health facility ultimately accepts screening.

Many Nigerian women possess a general awareness of "cancer" as a terminal illness but lack specific understanding of the pre-invasive "window of opportunity" during which screening can prevent progression to malignancy (Ndikom & Ofi, 2012). Perceptions are frequently clouded by cultural taboos, fear of a positive diagnosis, and the perceived invasiveness of pelvic examination, and even educated women may avoid screening because of stigma associated with a reproductive-tract procedure (Ajayi, Adejumo, & Ogunyemi, 2022).

Lafiagi, the headquarters of Edu Local Government Area in Kwara State, is a semi-urban community where women routinely interact with clinical facilities for antenatal care and child immunisation. Each such encounter represents a potential, and frequently missed, opportunity for cervical cancer prevention counselling and opportunistic screening. Understanding why the

transition from "attending the clinic" to "accepting screening" so often fails to occur is essential to transforming cervical cancer prevention services in this setting from passive availability into active, compliant participation.

Despite the clinical availability of screening services at General Hospital, Lafiagi, anecdotal clinical experience and the broader Nigerian literature suggest that few eligible women accept screening even when it is offered. Existing Nigerian evidence on screening determinants is concentrated in tertiary hospitals and urban centres (Ndikom & Ofi, 2012; Owolabi *et al.*, 2024; Okaba, 2024), leaving semi-urban, facility-based populations such as Lafiagi under-represented despite plausibly distinct socio-cultural and health-system barriers.

Location-specific evidence is needed to design context-appropriate interventions rather than extrapolating from urban or tertiary-facility studies. Academically, the study extends the empirical literature on determinants of screening behaviour in semi-urban Nigeria. For policy and programming, it provides baseline evidence to guide the Kwara State Ministry of Health in allocating resources for screening services, provider training, and community sensitisation. For public health practice, it identifies which socio-cognitive domains, knowledge, awareness, perception, or attitude, most strongly predict uptake and compliance, allowing interventions to be targeted efficiently.

The aim of this study was to assess the determinants of uptake and compliance with cervical cancer screening among women of reproductive age attending clinical health care facilities in Lafiagi, Edu Local Government Area, Kwara State. Specific objectives were to: (i) describe the socio-demographic characteristics of respondents; (ii) assess respondents' knowledge and awareness of cervical cancer and its screening; (iii) assess perception and attitude towards screening; (iv) determine the level of uptake and compliance with screening and follow-up; and (v) examine the association between knowledge, perception, and screening behaviour.

2.0 Materials and Methods

2.1 Study Area and Setting

The study was conducted at General Hospital, Lafiagi, the headquarters of Edu Local Government Area, Kwara State, Nigeria. Lafiagi is a semi-urban town whose predominantly Nupe, Muslim population is engaged mainly in farming, trading, and civil service. General Hospital, Lafiagi was purposively chosen because it is the only facility in the area equipped and staffed to provide cervical cancer screening (VIA and Pap smear).

2.2 Study Design and Population

A descriptive cross-sectional design was adopted, allowing simultaneous assessment of knowledge, awareness, perception, and attitude and their association with screening uptake at a single point in time. The study population comprised women of reproductive age (15–49 years) attending General Hospital, Lafiagi during the data-collection period. Women were included if they were aged 15 - 49 years, attended the facility, and gave informed consent; women who were severely ill, declined consent, were health workers (to avoid professional bias), or did not reside in the study area were excluded.

2.3 Sample Size Determination

The minimum sample size was calculated using the Cochran (1997) formula for a single proportion, $n_0 = Z^2 p (1-p) / d^2$, with $Z = 1.96$ (95% confidence level), an assumed prevalence of screening uptake of 50% (no prior local estimate was available, so a conservative value was used to maximise sample size), and a margin of error $d = 0.05$, yielding $n_0 \approx 384$. This was adjusted for an anticipated 10% non-response rate ($n \approx 427$) and then for the finite study population of approximately 1,200 eligible women using the finite-population correction, giving a minimum adjusted sample size of 315. To allow for incomplete questionnaires, 300 questionnaires were administered; all were returned complete and usable, yielding a 100% response rate and a final analytic sample of 300 respondents.

2.4 Sampling Technique

A multistage sampling technique was used. In stage one, General Hospital, Lafiagi was purposively selected as the only facility in the study area offering cervical cancer screening. In stage two, systematic sampling was used to select eligible women attending the facility during designated clinic days. In stage three, proportional allocation ensured fair representation across clinic days and service points.

2.5 Data Collection Instrument and Scoring

Data were collected using a structured, interviewer-administered questionnaire developed from the literature and the study objectives, comprising five sections: (A) socio-demographic characteristics; (B) knowledge of cervical cancer and screening; (C) awareness of screening services; (D) perception and attitude towards screening; and (E) uptake and compliance with screening. Knowledge was assessed with four items (awareness of the disease, organ affected, major cause, and preventability through screening); each correct response scored 1 and each incorrect or "don't know" response scored 0, and respondents scoring $\geq 50\%$ were classified as having good knowledge and those below 50% as having poor knowledge. Perception was assessed using four-point Likert-scale statements (Strongly Agree = 4 to Strongly Disagree = 1, with negatively worded items reverse-scored); respondents scoring $\geq 50\%$ were classified as having a positive perception and those below 50% as having a negative perception. Categorised knowledge and perception scores were used for chi-square analysis of their association with uptake and compliance, respectively.

2.6 Validity and Reliability

Content and face validity were established through review by experts in Public Health and Community Medicine, with corrections incorporated before administration. The instrument was pre-tested among women of reproductive age at a health facility outside the study area, and internal consistency was assessed using Cronbach's alpha, with a coefficient of ≥ 0.7 considered acceptable.

2.7 Data Collection Procedure

Trained research assistants approached eligible women during clinic hours, explained the study purpose, and obtained written informed consent before administering the questionnaire. Privacy and confidentiality were maintained throughout data collection.

2.8 Data Analysis

Data were entered and analyzed using the Statistical Package for the Social Sciences (SPSS). Descriptive statistics (frequencies, percentages, and means) summarized socio-demographic and outcome variables, while the chi-square test of association examined relationships between knowledge and uptake, and between perception and compliance. Statistical significance was set at $p < 0.05$.

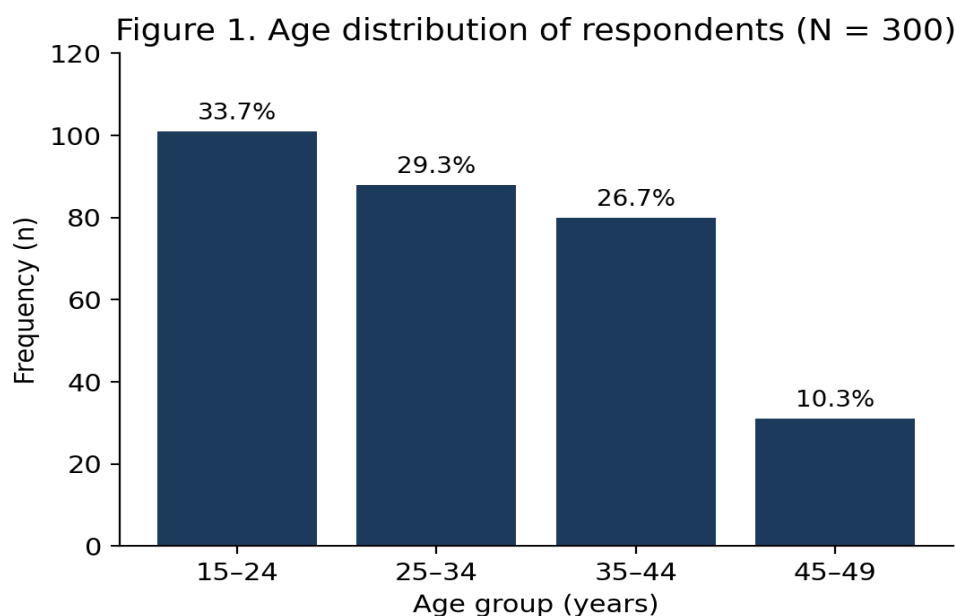
2.9 Ethical Considerations

Ethical approval was obtained from the appropriate Research Ethics Committee, and permission was obtained from the management of the study facility. Participation was voluntary and confidential; respondents were informed of their right to withdraw at any time without penalty, and no personal identifiers were recorded on completed questionnaires.

3.0 Results

3.1 Socio-Demographic Characteristics

Of the 300 respondents, the largest proportion (101; 33.7%) were aged 15–24 years, followed by 88 (29.3%) aged 25–34 years, 80 (26.7%) aged 35–44 years, and 31 (10.3%) aged 45–49 years (Figure 1). Most respondents were married (250; 83.3%), 40 (13.3%) were single, and 10 (3.4%) were divorced; none were widowed (Figure 2). Half of the respondents (150; 50.0%) had only primary education, 115 (38.3%) had secondary education, and 35 (11.7%) had tertiary education (Figure 3). Trading was the most common occupation (109; 36.3%), followed by farming (77; 25.7%), civil service (73; 24.3%), and student status (41; 13.7%) (Figure 4).



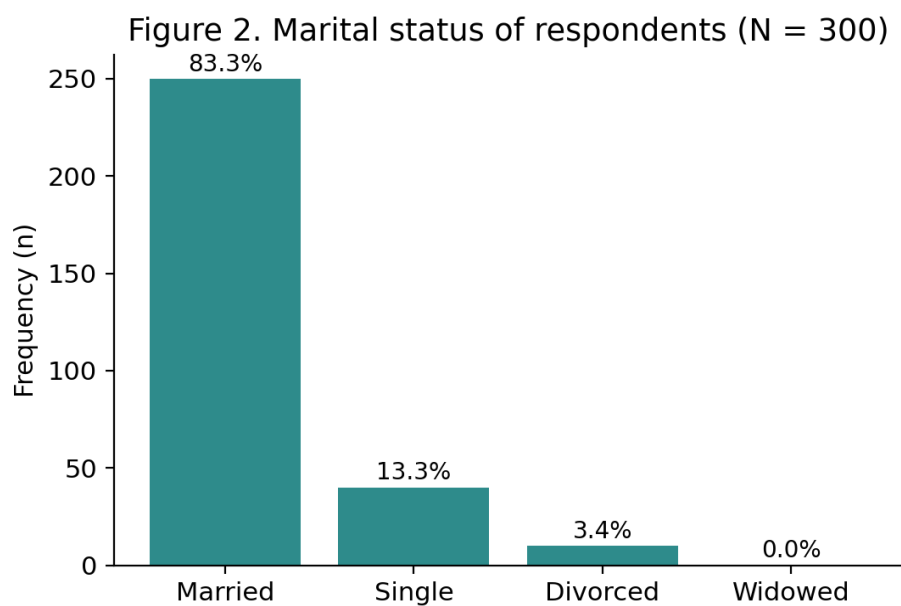


Figure 3. Educational level of respondents (N = 300)

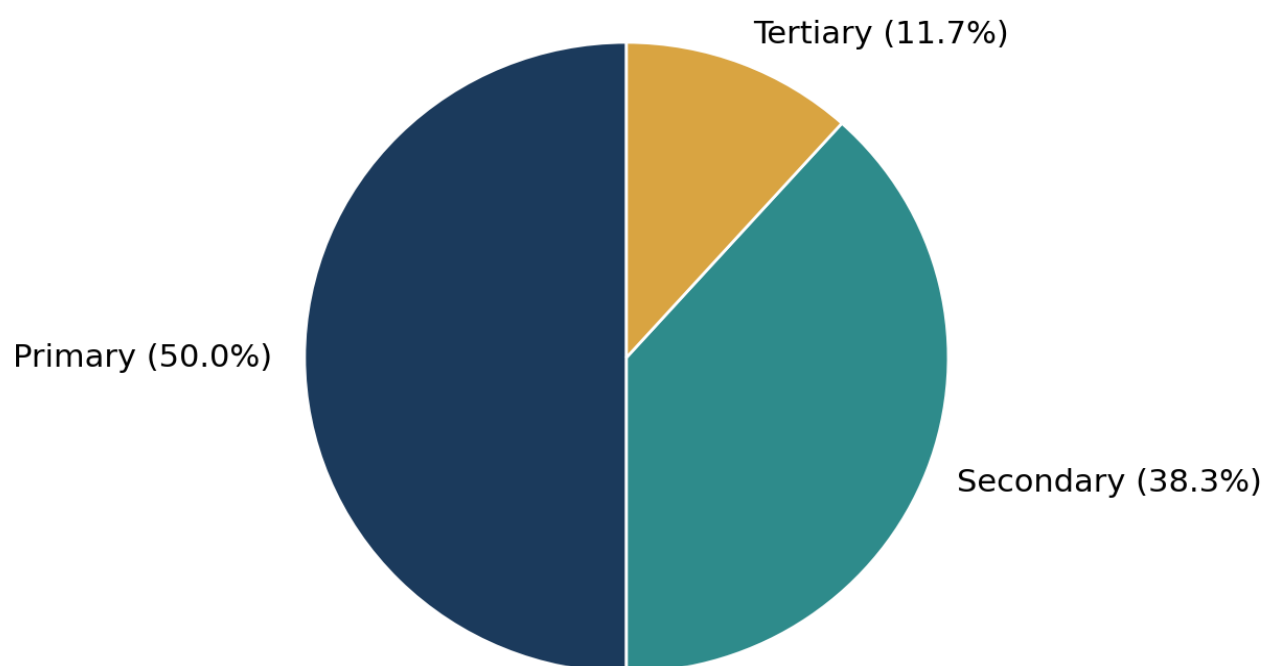
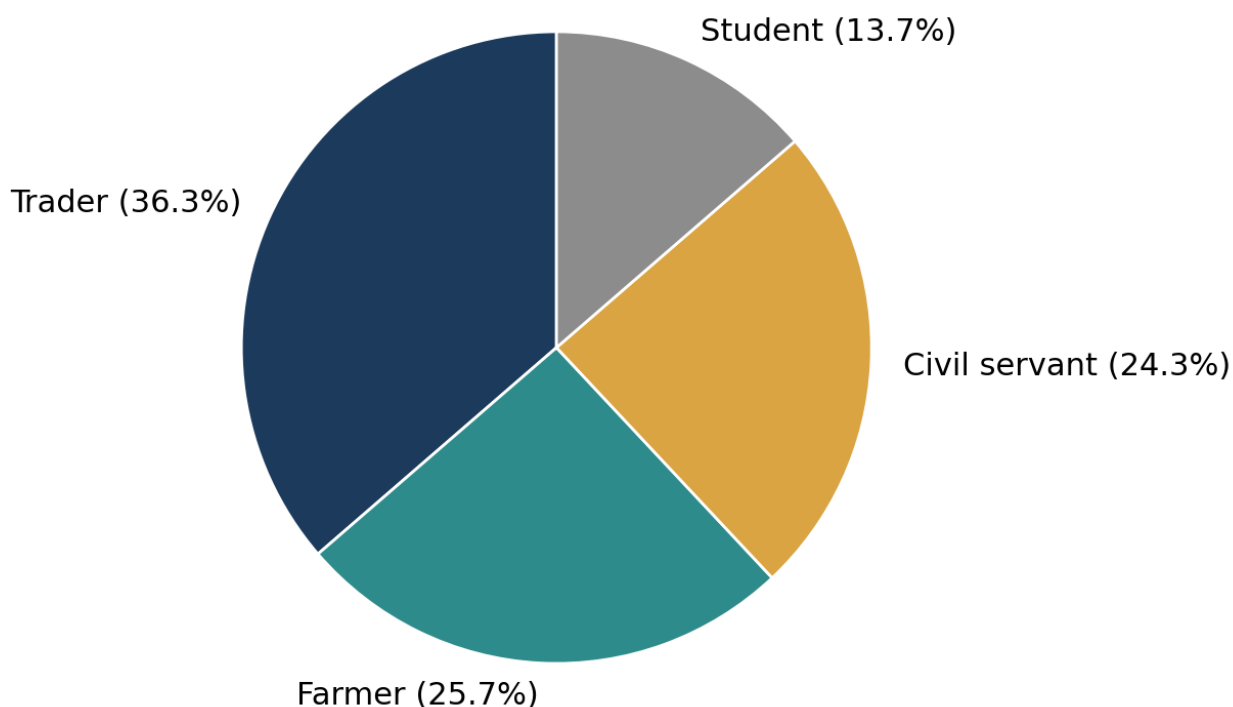


Figure 4. Occupational distribution of respondents (N = 300)



3.2 Knowledge of Cervical Cancer and Screening

Table 1 summarises respondents' knowledge. Only 90 (30.0%) had heard of cervical cancer, 50 (16.7%) correctly identified that it affects the cervix, 30 (10.0%) correctly identified HPV as a major cause, and 50 (16.7%) knew that cervical cancer can be prevented through screening. Overall, knowledge of cervical cancer and its screening was poor among respondents.

Table 1. Distribution of respondents by knowledge of cervical cancer and screening (N = 300)

Item	Yes/True, n (%)	No/False, n (%)	Don't know, n (%)
Heard of cervical cancer	90 (30.0)	210 (70.0)	—
Cervical cancer affects the cervix	50 (16.7)	40 (13.3)	210 (70.0)
HPV is a major cause of cervical cancer	30 (10.0)	49 (16.3)	221 (73.7)

Item	Yes/True, n (%)	No/False, n (%)	Don't know, n (%)
Screening can prevent cervical cancer	50 (16.7)	40 (13.3)	210 (70.0)

3.3 Awareness of Cervical Cancer Screening Services

Only 80 (26.7%) respondents reported awareness of cervical cancer screening services, while 220 (73.3%) reported no awareness (Figure 5). Among the 80 aware respondents, 50 (62.5%) identified health workers as their source of information and 30 (37.5%) identified friends or family; no respondent cited television or radio (Figure 6).

Figure 5. Awareness of cervical cancer screening services (N = 300)

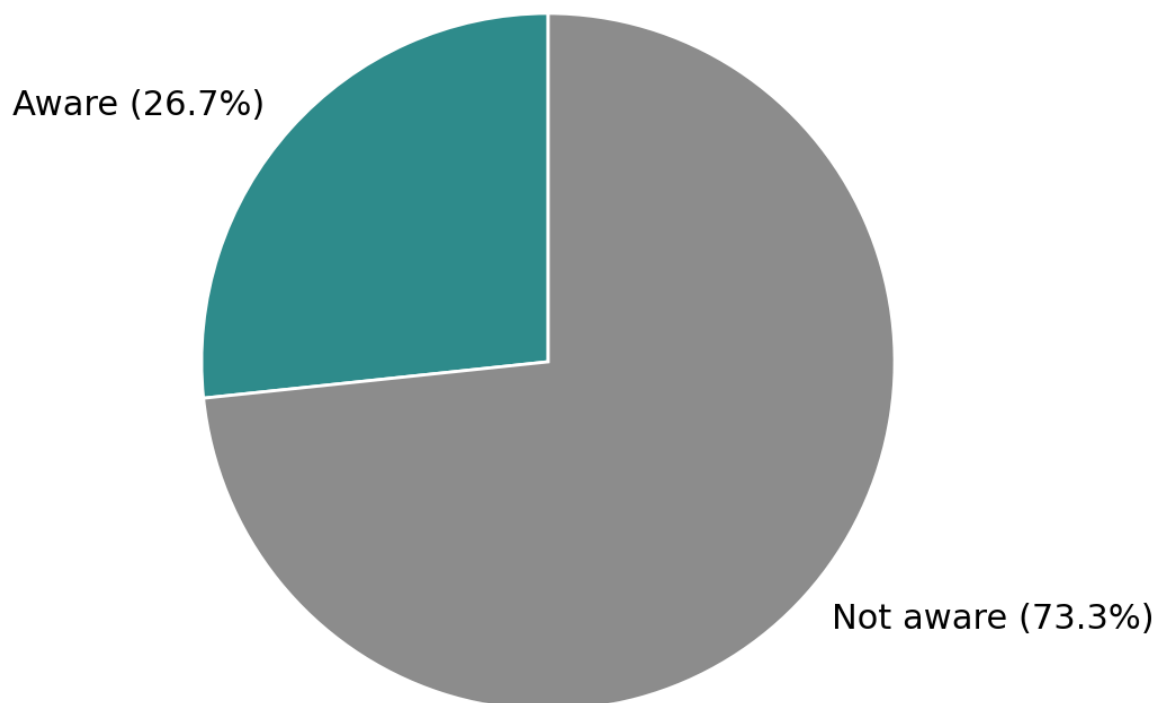
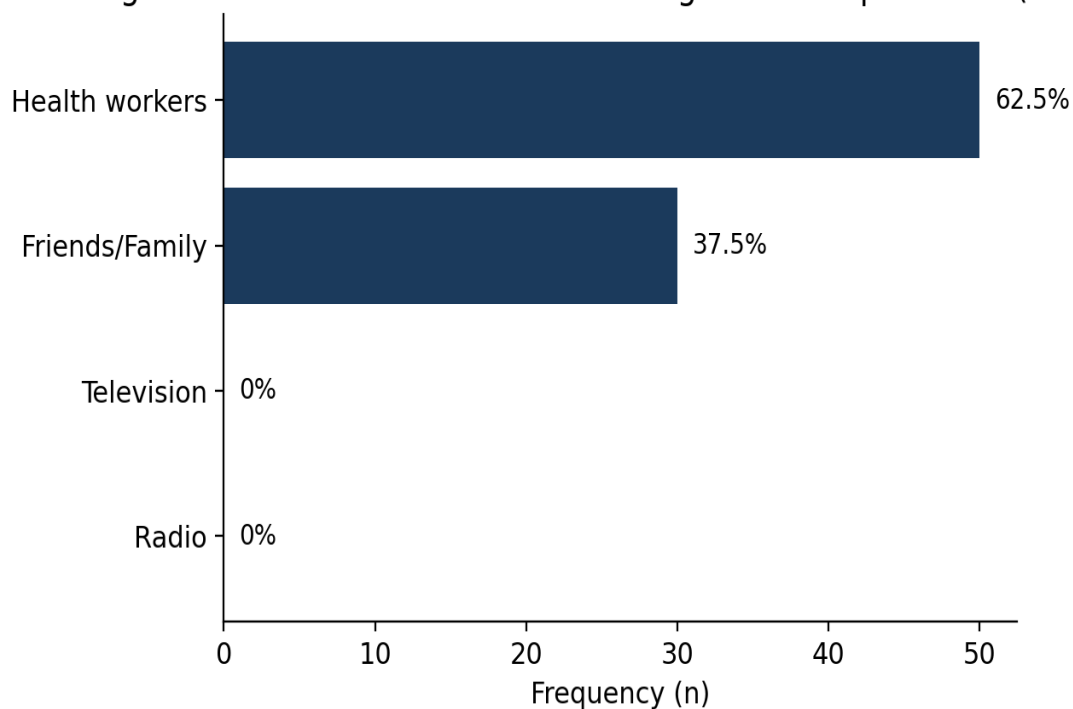


Figure 6. Source of information among aware respondents (n = 80)



3.4 Perception Towards Cervical Cancer Screening

Table 2 presents perception items. Regarding necessity of screening for healthy women, 50 (16.7%) strongly agreed and 90 (30.0%) agreed that it is necessary, while 150 (50.0%) disagreed and 10 (3.3%) strongly disagreed. Concerning painfulness, 45 (15.0%) strongly agreed and 165 (55.0%) agreed that screening is painful. Regarding stigma, 70 (23.3%) strongly agreed and 130 (43.3%) agreed that screened women risk stigma. Overall, unfavourable perceptions predominated.

Table 2. Perception towards cervical cancer screening (N = 300)

Statement	SA, n (%)	A, n (%)	D, n (%)	SD, n (%)
Screening is necessary for healthy women	50 (16.7)	90 (30.0)	150 (50.0)	10 (3.3)
Screening is painful	45 (15.0)	165 (55.0)	85 (28.3)	5 (1.7)
Screened women are at risk of stigma	70 (23.3)	130 (43.3)	98 (32.7)	2 (0.7)

3.5 Attitude Towards Cervical Cancer Screening

Despite low knowledge and negative perceptions, 251 (83.7%) respondents indicated willingness to undergo screening if recommended by a health worker, while 49 (16.3%) were unwilling. Similarly, 225 (75.0%) would encourage other women to be screened, while 75 (25.0%) would not. These findings suggest a generally positive attitude towards screening.

3.6 Uptake and Compliance with Screening

Only 61 (20.3%) respondents had ever undergone cervical cancer screening, while 239 (79.7%) had never been screened (Figure 7). Of those screened, 55 (90.2%) had been screened once and 6 (9.8%) more than once. Among the 239 respondents who had never been screened, fear was the most frequently cited reason (125; 52.3%), followed by lack of awareness (100; 41.8%), cost (10; 4.2%), and distance to the facility (4; 1.7%) (Figure 8). Among the 61 respondents who had been screened, 51 (83.6%) returned to receive their results and 49 (80.3%) received post-screening counselling (Figure 9).

Figure 7. Uptake of cervical cancer screening (N = 300)

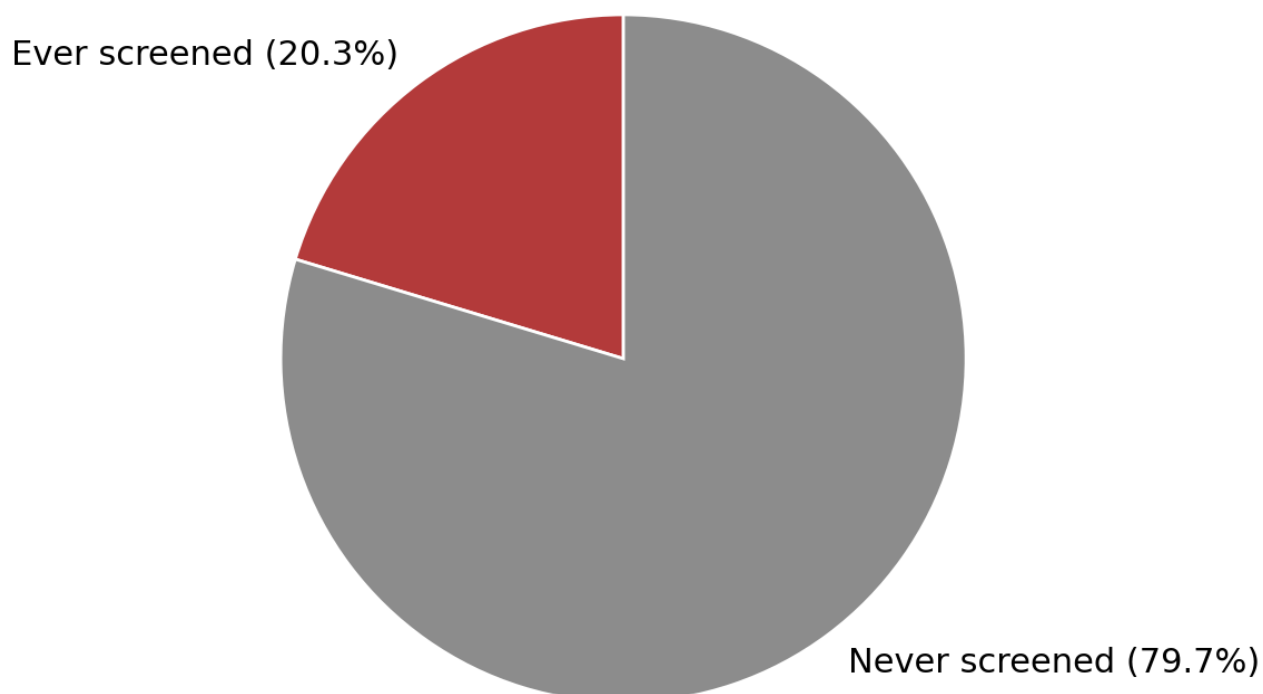
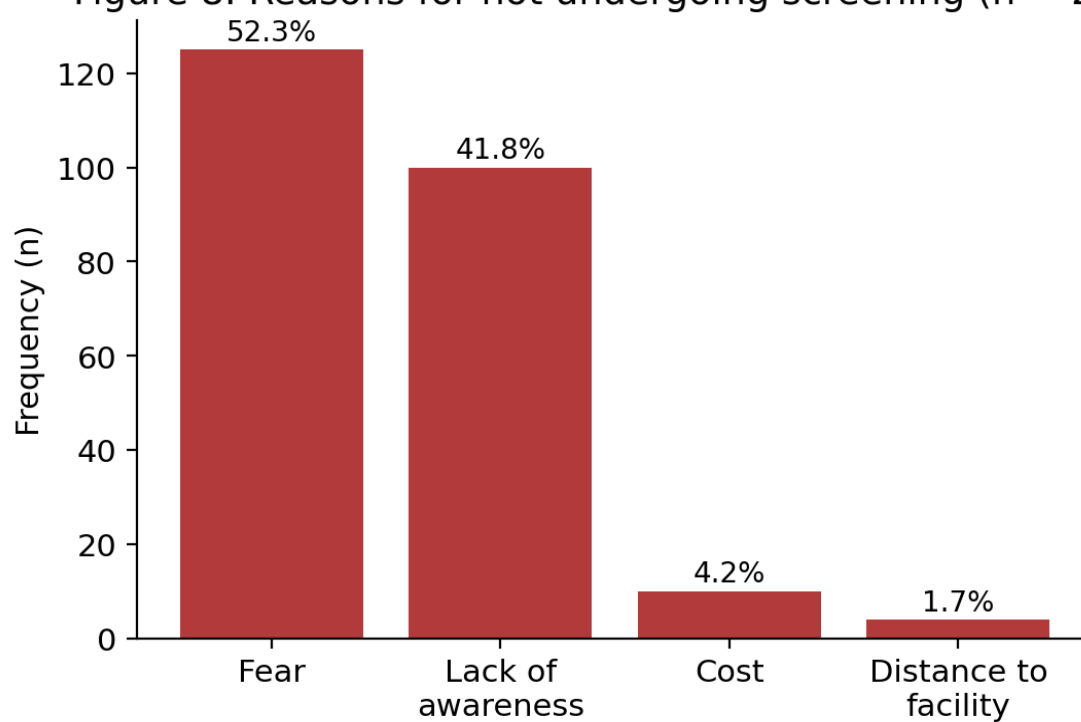
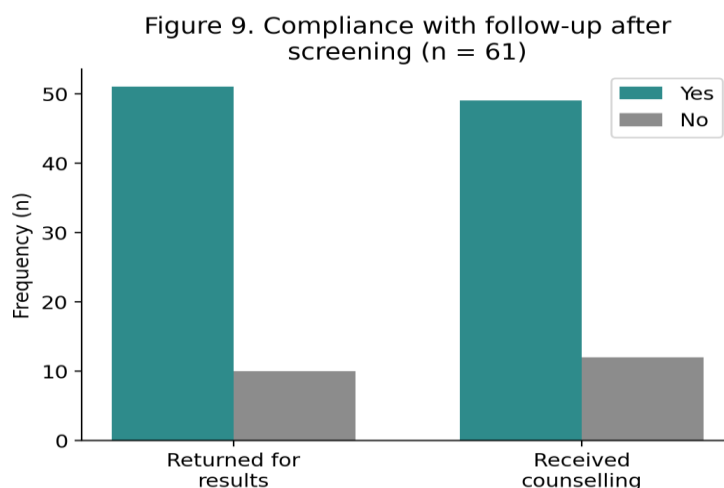


Figure 8. Reasons for not undergoing screening (n = 239)





3.7 Tests of Hypotheses

H01 was tested using a 2×2 chi-square test of association between knowledge level and screening uptake (Table 3). A statistically significant association was found ($\chi^2 = 42.16$, $df = 1$, $p = 0.001$); H01 was therefore rejected, indicating that knowledge of cervical cancer is significantly associated with uptake of screening.

Table 3. Association between knowledge level and uptake of screening (N = 300)

Knowledge level	Screened, n	Not screened, n	Total, n
Good knowledge	40	50	90
Poor knowledge	21	189	210
Total	61	239	300

$\chi^2 = 42.16$, $df = 1$, $p = 0.001$

H02 was tested using a 2×2 chi-square test of association between perception level and compliance with screening (Table 4). A statistically significant association was found ($\chi^2 = 24.38$, $df = 1$, $p = 0.003$); H02 was therefore rejected, indicating that perception towards cervical cancer screening is significantly associated with compliance.

Table 4. Association between perception level and compliance with screening (N = 300)

Perception level	Complied, n	Did not comply, n	Total, n
Positive perception	45	95	140
Negative perception	16	144	160
Total	61	239	300

$\chi^2 = 24.38$, $df = 1$, $p = 0.003$

4.0 Discussion

The predominance of respondents aged 15–24 years is consistent with reproductive-health service-utilization patterns in semi-urban Nigerian communities, where younger women frequently access antenatal, family-planning, and immunisation services (Owolabi *et al.*, 2024), and suggests that clinical encounters in Lafiagi are a critical entry point for reaching younger women with cervical cancer prevention messages. The high proportion of married respondents (83.3%) corroborates Okaba (2024) in Bayelsa State, where married women constituted over 80% of the sample; however, the low screening uptake observed despite frequent facility contact for maternal and child health services indicates that facility attendance alone does not translate into screening compliance without targeted counselling and provider-initiated recommendation.

The low educational attainment of respondents (50.0% with only primary education) is consistent with known patterns of limited access to higher education among women in semi-urban Kwara State and provides a plausible explanation for the poor knowledge and low awareness observed, since education is a well-established determinant of health literacy and preventive health-seeking behaviour (Mafiana *et al.*, 2022). Similarly, the predominance of informal-sector occupations (trading, 36.3%; farming, 25.7%) implies financial constraints, limited health-insurance coverage, and reduced flexibility to attend health facilities, which may further suppress screening uptake (Jomusu *et al.*, 2024).

Knowledge of cervical cancer among respondents was markedly poor: 70.0% had never heard of the disease, higher than the 59% reported in the systematic review by Mafiana *et al.* (2022), suggesting that knowledge gaps may be more pronounced in semi-urban communities than in urban centres with greater media access. Poor knowledge of HPV as a causative agent (10.0%) mirrors findings from Bayelsa State (Okaba, 2024) and is concerning because appreciation of viral aetiology underpins recognition of susceptibility and the rationale for preventive screening. The strong, statistically significant association between knowledge and uptake ($\chi^2 = 42.16$, $p = 0.001$) is consistent with the umbrella review by Meresa *et al.* (2023), which found that adequate knowledge increases screening uptake nearly five-fold, reinforcing knowledge improvement as a priority intervention target.

Awareness of screening services (26.7%) was comparable to the 28.9% reported among female nurses in Asaba but far below the 96.6% awareness reported among the same professional population, illustrating a substantial gap between health workers and the general population

(Awareness and uptake of cervical cancer screening among female nurses at FMC Asaba, 2024). That health workers were the dominant information source (62.5%) among aware respondents underscores the clinical encounter as the principal - and currently under-utilised - channel for cervical cancer health education in this setting; reliance on informal sources such as friends and family (37.5%) raises the risk of inaccurate or incomplete information reinforcing misconceptions.

Negative perceptions were pervasive: over half of respondents believed screening is painful, half considered it unnecessary for healthy women, and 43.3% perceived stigma. These findings mirror reports from north-eastern Nigeria (Jomusu *et al.*, 2024) and from Ibadan (Ndikom & Ofi, 2012), and likely reflect inadequate pre-screening counselling and persistent cultural taboos surrounding reproductive-tract examinations. Notably, despite these negative perceptions, attitudes were positive - 83.7% of respondents were willing to be screened if a health worker recommended it - indicating that the barrier to uptake in Lafiagi is primarily informational and psychological rather than attitudinal, and that provider recommendation could substantially close the uptake gap.

Uptake of screening (20.3%) was low but not the lowest reported in Nigeria; it exceeded the 9.9% uptake reported among women in north-eastern Nigeria by Jomusu *et al.* (2024), yet remains far below the WHO's 70% coverage target (WHO, 2021). Among those screened, repeat screening was uncommon (9.8% screened more than once), consistent with the observation of Mafiana *et al.* (2022) that many women regard a single screening episode as sufficient lifelong protection - a misconception with direct implications for the effectiveness of screening programs, which depend on periodic re-testing. Fear (52.3%) and lack of awareness (41.8%) were far more prominent barriers than cost (4.2%) or distance (1.7%), indicating that psychological and informational barriers, rather than financial or geographic access, are the principal obstacles to screening uptake in this population - a pattern with direct implications for how limited public-health resources should be allocated. Encouragingly, compliance with follow-up among those screened was high (83.6% returned for results; 80.3% received counselling), suggesting that the central challenge in Lafiagi is the initial decision to accept screening rather than subsequent adherence to care.

The significant association between perception and compliance ($\chi^2 = 24.38$, $p = 0.003$) is consistent with Jomusu *et al.* (2024) and Sodipo *et al.* (2025), both of which demonstrated that women's perceptions meaningfully shape screening behaviour, reinforcing the value of

interventions that correct misconceptions and reduce fear alongside knowledge-building efforts.

4.1 Strengths and Limitations

This study benefits from a relatively large, facility-based sample ($n = 300$), a validated and pre-tested instrument, trained research assistants, and simultaneous assessment of multiple socio-cognitive domains, providing a comprehensive picture of screening determinants in an understudied semi-urban setting. Limitations include the cross-sectional design, which permits association but not causal inference; reliance on self-reported data, which may be subject to recall and social-desirability bias; the single-site, single-LGA design, which limits generalizability; exclusion of health workers, which may have removed a higher-awareness subgroup; and the absence of an assessment of the availability and quality of screening services at the study facility, which may independently influence uptake.

5.0 Conclusion

Knowledge, awareness, and uptake of cervical cancer screening among women of reproductive age attending General Hospital, Lafiagi are critically low, and perceptions are predominantly negative; however, attitudes towards screening are positive, indicating that women are receptive to screening once appropriately informed. Fear and lack of awareness, not cost or distance, are the principal barriers to uptake. Knowledge was significantly associated with screening uptake, and perception was significantly associated with compliance, underscoring the central role of targeted health education and provider-initiated counselling in improving screening participation in this population.

6.0 Recommendations

6.1 For Health Practice

Health workers should provide routine cervical cancer education and counselling to women attending reproductive and maternal health services; routinely recommend screening during antenatal care, family planning, immunization, and outpatient consultations; and address fear and misconceptions through accurate, reassuring information about the screening procedure. Health workers should also receive structured training on cervical cancer prevention, screening, and counselling.

6.2 For Health Policy

The Kwara State Ministry of Health should develop a comprehensive cervical cancer screening program for women of reproductive age, particularly in semi-urban and rural areas; launch sustained public awareness campaigns using mass media and facility-based education; allocate adequate resources for screening equipment, supplies, and personnel; and establish a monitoring and evaluation framework to track screening coverage.

6.3 For Community Engagement

Community leaders, religious organizations, and women's groups should be engaged in cervical cancer awareness promotion; trained peer educators should be deployed within community networks; and mobile screening outreach should be organised to reach women in underserved areas.

6.4 For Future Research

Future studies should evaluate the effectiveness of health education and provider-initiated interventions on uptake; conduct qualitative research into the socio-cultural and psychological drivers of fear and stigma; undertake multi-site comparative studies across local government areas; and assess the availability and quality of screening services within health facilities.

Declarations

Ethics Approval and Accordance:

Ethical approval for this study was obtained from the Research Ethics Committee of Al-Hikmah University, Ilorin, Kwara State, Nigeria (Approval Reference: AHU/REC/2024/089). Permission to conduct the study was also granted by the management of General Hospital, Lafiagi, Edu Local Government Area, Kwara State. The research was carried out in accordance with the guidelines and regulations of the Research Ethics Committee of Al-Hikmah University and the National Health Research Ethics Committee of Nigeria (NHREC). All procedures performed were in compliance with the ethical standards of the institutional and national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards.

Consent to Participate: Written informed consent was obtained from all individual participants included in the study. Prior to obtaining consent, the study purpose, procedures, potential risks and benefits were fully explained to each participant in the local language (English) to ensure complete understanding. Participants were informed that their participation was entirely voluntary and that they had the right to withdraw from the study at any time without penalty or loss of benefits to which they were otherwise entitled. Consent was obtained from literate participants in writing; for participants who were unable to read, the information sheet and consent form were read aloud by trained research assistants in the presence of a literate witness, and a thumbprint was obtained in lieu of a signature. No personal identifiers were recorded on completed questionnaires to ensure confidentiality and anonymity. For participants under 18 years of age, parental or guardian consent was obtained in addition to the participant's assent.

Consent for Publication: Not applicable.

Availability of Data and Materials: All data generated or analyzed during this study are included in this published article.

Clinical Trial Number: Not Applicable

Competing Interests: The authors declare that they have no competing interests.

Funding:

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Authors' Contributions:

Liman Sanni: Conceptualization, Data Collection, Formal Analysis.

Abdullahi Usman Ndabata: Supervision, Methodology, Manuscript Drafting, and Critical Review.

All authors read and approved the final manuscript.

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