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Knowledge and Perception of Cervical Cancer and Pap-Smear Screening Among Antenatal Women in Ogun State, Nigeria

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ABSTRACT

Cervical cancer remains an important cause of cancer morbidity and mortality among women in Nigeria despite the availability of preventive screening such as the Pap smear. This study assessed knowledge, perceptions and uptake of cervical cancer screening among women attending antenatal clinics in Ogun State, Nigeria. A descriptive cross-sectional study was conducted using a multistage sampling approach. Selected antenatal care facilities were identified using predefined eligibility criteria, the sample was allocated proportionately by clinic attendance, and eligible women were recruited by systematic random sampling. Data were collected using a semi-structured questionnaire and analysed with descriptive and regression methods. Awareness of cervical cancer was reported by 61.3% of respondents, and 74.7% had heard of the Pap smear, yet only 18.2% had previously undergone screening. Frequently reported barriers included cost of screening (70.3%), embarrassment (69.4%), anticipated pain (47.5%), misconceptions such as perceived loss of virginity (83.0%) and partner disapproval (51.9%). Reduced uptake of screening was associated with higher service costs, longer waiting times and greater distance to the health facility. Although awareness of cervical cancer and Pap smear testing was relatively high, screening utilisation remained low. Improving affordability, reducing service-related barriers and strengthening education within routine antenatal care may help increase uptake.

1 | Introduction

Cervical cancer remains a major public health challenge worldwide despite the availability of effective preventive strategies. Over the past two decades, the global burden has increased in absolute terms, rising from approximately 468,000 incident cases in 2000 to an estimated 604,000 cases in 2020, while annual deaths increased from about 233,000 to 342,000 during the same period [1, 2]. These increases largely reflect population growth and ageing as well as persistent inequalities in access to preventive services. The burden remains disproportionately concentrated in low- and middle-income countries, where organized screening programmes and human papillomavirus (HPV) vaccination coverage remain limited [3].

Nigeria contributes substantially to this global burden. Cervical cancer is among the most frequently diagnosed cancers among Nigerian women and remains a leading cause of cancer-related

mortality. Recent estimates indicate that approximately 14,943 new cases and 10,403 deaths occur annually in Nigeria, highlighting significant gaps in prevention and early detection services [4, 5]. Although low-cost screening approaches, including visual inspection with acetic acid combined with immediate treatment ("see-and-treat"), have been shown to be feasible in resource-limited settings, population coverage of screening services remains low [4–6].

Cervical cancer develops through progressive neoplastic transformation of cervical epithelial cells, most commonly following persistent infection with oncogenic human papillomavirus (HPV) types. Persistent HPV infection has been identified in more than 90% of invasive cervical cancer cases worldwide [7, 8]. Several additional factors, including early sexual debut, high parity, prolonged use of hormonal contraceptives, tobacco exposure and immunosuppression, have been associated with increased risk [8, 9]. Because early-stage disease is often asymptomatic, many women in low-resource settings are diagnosed at advanced stages, when treatment options are more limited and outcomes are poorer [3, 10].

Substantial reductions in cervical cancer incidence and mortality have been achieved in countries with well-established screening programmes. Cytology-based screening using the Papanicolaou (Pap) smear has historically served as a cornerstone of secondary prevention, enabling detection and treatment of precancerous lesions before malignant transformation [11]. More recently, HPV-based testing has been recommended as an effective alternative or complementary screening strategy [12]. Screening services may be delivered through organized population programmes or opportunistically through routine health services such as antenatal care, family planning clinics and sexually transmitted infection services. However, implementation of these strategies remains uneven across many parts of sub-Saharan Africa [3].

Evidence from several African settings suggests that awareness of cervical cancer does not consistently translate into screening uptake. Studies in Nigeria and other countries in the region have reported relatively high levels of awareness but persistently low participation in screening programmes, often due to financial constraints, misconceptions about the screening procedure, fear of diagnosis and limited access to services [13]. These findings highlight the importance of considering not only knowledge but also structural and socio-cultural determinants that influence screening behaviour.

Recent interdisciplinary studies provide complementary insights into cervical cancer biology, prediction and patient-centred care that contextualize the findings of this study. For instance, Zhou et al. [14] demonstrated through network pharmacology and experimental validation that naringenin exerts anti-cancer effects by modulating multiple signalling pathways, highlighting the growing role of bioactive compounds in cervical cancer therapeutics. Building on this molecular perspective, Zhou et al. [15] identified chrysotoxine as a regulator of ferroptosis through the PI3K/AKT/mTOR pathway, underscoring the importance of targeted molecular mechanisms in cancer prevention and treatment. From a computational standpoint, Ye et al. [16] applied deep convolutional neural networks to predict metastasis and recurrence risk, illustrating the potential of AI-driven models for early detection and prognosis, which aligns with the need for improved screening uptake identified in this study. Beyond oncology-specific mechanisms, broader reproductive and immunological factors have also been explored; Hu et al. [17, 18] reported that viral infections such as the Omicron variant may influence female reproductive outcomes, while Kang et al. [19] highlighted dysfunction and tissue residency patterns of uterine $CD4^+$ and $CD8^+$ T cells, emphasising the role of immune microenvironments in female reproductive health and disease susceptibility. Additionally, psychosocial dimensions of cancer care are increasingly recognised, as shown by Qiao et al. [20], who explored how travel experiences can provide therapeutic benefits for cancer patients coping with mortality. Collectively, these studies underscore a multidimensional understanding of cervical cancer spanning molecular therapeutics, artificial intelligence, immunology and psychosocial care, thereby reinforcing the need for integrated approaches that combine biomedical innovation with improved awareness and accessibility of screening services, as highlighted in the present study.

Recent studies have explored cervical cancer across molecular, clinical and reproductive contexts. Chen et al. [1] identified YTHDC1 as a regulator of tumour progression via m6A modification, while Jiang et al. [21] highlighted the anti-cancer potential of xanthohumol through apoptosis and signalling pathway modulation. Jiang et al. [22] provided a clinical consensus for managing locally advanced cervical cancer, emphasising treatment standardisation. Beyond oncology, Hu et al. [17, 18] demonstrated regulatory mechanisms in cellular processes using CRISPR screening, and Yang et al. [23] examined reproductive health outcomes following COVID-19 vaccination. However, these studies largely overlook behavioural determinants of screening uptake in routine maternal healthcare settings.

Within Nigeria, maternal health services—particularly antenatal care—represent one of the most widely utilised points of contact between women and the health system. National reproductive and maternal health policies emphasise antenatal clinics as platforms for delivering integrated preventive services, including health education, screening and early detection interventions [24]. Antenatal attendance rates in Nigeria remain relatively high compared with participation in other preventive programmes, making antenatal clinics a strategic entry point for expanding cervical cancer prevention services. Integrating cervical cancer screening into routine antenatal services has therefore been proposed as a practical approach to improving coverage among women of reproductive age [25, 26].

Despite these opportunities, evidence from Nigeria and other parts of sub-Saharan Africa suggests that awareness of cervical cancer does not consistently translate into screening utilisation. Studies in several Nigerian states have reported moderate levels of knowledge but persistently low uptake of screening services, often attributed to financial barriers, fear of the screening procedure, misconceptions about cancer risk and limited access to services [13, 27–28]. Similar patterns have been documented

among women in other African countries, indicating that screening behaviour is influenced not only by knowledge but also by structural and socio-cultural determinants.

Although previous studies in Nigeria have examined awareness of cervical cancer and barriers to screening, much of the available literature has focused on specific occupational groups, urban populations or women presenting with established disease. Less attention has been given to how women attending routine maternal health services perceive cervical cancer prevention and make screening decisions within everyday healthcare settings. This gap is particularly relevant in Ogun State, where evidence describing knowledge, perceptions and barriers to cervical cancer screening among antenatal attendees remains limited.

Against this background, the present study examined knowledge, perceptions and uptake of Pap smear screening among women attending antenatal clinics in Ogun State, Nigeria. Antenatal clinics represent an important point of contact between women of reproductive age and the health system and therefore provide a potential platform for expanding cervical cancer prevention services. In addition to describing levels of awareness and screening utilisation, the study investigated whether structural and service-related factors including screening cost, waiting time and distance to health facilities are associated with screening behaviour among antenatal attendees. By identifying determinants of screening uptake within routine maternal health services, the study aims to generate context-specific evidence to inform policies that integrate cervical cancer screening into antenatal care programmes in Nigeria.

2 | Materials and Methods

2.1 | Research Design

The study employed a descriptive approach. The survey design was selected as it provides a practical and unbiased means of gathering individuals' perspectives regarding a specific issue that concerns them [29]. The findings of this study were derived from a self-administered structured questionnaire comprising two sections: Section A and Section B in Supporting Information.

2.2 | Study Area

The study was conducted in Ogun State, Southwest Nigeria. Ogun State is bordered to the north by Oyo State and to the south by Lagos State. It is the sixteenth most populous state in Nigeria. The region has a tropical wet-and-dry (savanna) climate, with an average yearly temperature of 29.34°C (84.81°F), slightly lower than Nigeria's overall average. Ogun State is the 24th-largest state in Nigeria, with a total land area of over 16,762 km^2 and a population density of 222/km^2 [30]. The population of Ogun State was estimated at 3,920,208 in 2006 [31] and 4,791,670 in 2015, with an average annual growth rate of 2.47%. Ogun State has 20 local government areas, which is 45% urban and 55% rural, and the predominant occupations of the inhabitants of the state are farming, civil service, transport services, artisanship and trading [32].

It lies approximately between latitude 3°30 N and 4°30 N and longitude 6°30 E and 7°30 E. The state shares a boundary with the Republic of Benin in the West, Lagos State and the Atlantic Ocean in the South, Ondo State in the east, and Oyo State in the North. It is located within the humid tropical lowland region with two distinct seasons. Average annual rainfall ranges from 1200 mm in the Northern part to 1470 mm in the Southern part. The monthly temperature ranges from 230°C in July to 320°C in February. The mean daily sunshine hours range between 3.8 and 6.8. The state has a relative humidity which ranges between 76% and 95% (coinciding with dry and wet seasons, respectively). The northern part of the state is mainly of derived savannah vegetation, the southern part has mangrove swamp vegetation, while the central part falls in the rainforest belt. Ogun State is endowed with fertile soil, which supports the growth of food crops, permanent crops and livestock [33].

2.3 | Inclusion and Exclusion Criteria

In this study, the inclusion criterion was women who attended antenatal clinics in selected hospitals within Ogun State, and they were identified as the eligible group for this study. The exclusion criteria also excluded those not attending antenatal clinics and all men in the selected hospitals as inadmissible for the study.

2.4 | Sample Size Determination

Sample size was calculated using the single-proportion formula of:

$$n = \frac{z^2 \times P(1-P)}{e^2}$$

Assuming a 95% confidence interval level ($z = 1.96$), a prevalence of 50% ($p = 0.50$), and a precision of 4.35% ($e = 0.0435$), the minimum required sample size was 507.54, which was rounded up to 508 participants.

2.5 | Sampling and Sampling Technique

A multistage probability sampling technique was used to select study participants. In the first stage, health facilities providing antenatal care services in Ogun State were stratified by level of care. From each stratum, eligible facilities were selected by simple random sampling. This ensured representation across the different levels of antenatal care delivery in the state.

In the second stage, the total sample size was allocated proportionally to the selected facilities based on their average monthly antenatal clinic attendance. Facilities with larger antenatal attendance contributed a correspondingly larger number of participants. In the third stage, eligible antenatal attendees were

selected within each facility using systematic random sampling. For each facility, the sampling interval was determined by dividing the estimated number of eligible attendees during the study period by the number of participants allocated to that facility. A random starting point was selected from among the first *k* eligible attendees, after which every *k*-th eligible woman was recruited until the required number for that facility was reached. This approach provided a transparent and reproducible sampling framework and reduced selection bias in participant recruitment.

2.6 | Validity of the Instrument

The questionnaire was validated stringently to gain accuracy and reliability. It was first prepared by the researcher and then forwarded to three experts from the Department of Public Health, which included the research supervisor. The experts provided valid input on the appropriateness of the content, the relevance of the questions and the structure of the questions. Their input on changes and corrections was considered to enhance the questionnaire's clarity, appropriateness and validity. The rationale behind this iterative review was to produce a final draft that would better align with the study's objectives and more effectively capture the required data from the population under study.

2.7 | Reliability of the Instrument

The reliability of the questionnaire was assessed using the test–retest method, one of the most common methods for evaluating instrument consistency over time. To apply this method, the questionnaire was first administered to 10 women not from the study area to avoid any possibility of their inclusion in the final sample. This was repeated after 2 weeks with the same women. This period was chosen to be long enough to avoid memory effects but short enough to allow comparison of responses.

The responses were then administered on two separate occasions, and their consistency was assessed using the Pearson Product–Moment Correlation Coefficient, which quantifies the degree of association between two sets of data. In this case, the derived reliability coefficient was 0.82, representing a strong positive correlation. This high reliability coefficient indicates that the questionnaire elicits stable, consistent responses over time, thereby confirming it as a reliable instrument for data collection in this study.

2.8 | Method of Data Collection

The data collection process was thoroughly organized to ensure that each activity was accurate and effective. The researcher interviewed, with the assistance of trained research assistants, those involved in the qualitative processes. The approach was also hands-on, leading to a process of elucidation with improved communication. This would allow for direct clarification and responses to participants' queries during the process.

To improve the reliability of the data in this study, the research team used the "on-the-spot" data collection approach. Questionnaires were collected and checked on the spot immediately after the conclusion. This practice enabled the team to fill in incomplete and unclear responses, reducing the chance of incomplete data or missing information. This approach warranted a high response rate and brought the data collection period to a timely close, both of which contributed to the overall quality and validity of the study.

2.9 | Method of Data Analysis

Every stage of the data-gathering process involved verifying that the completed questionnaires were consistent and comprehensive. Before data analysis, the answers were graded. One mark was given for each correct response and zero for each incorrect one. The equal total attainable correct score marks were converted to 100% to grade the correct scores. A score of 0%–49% was considered poor knowledge for this study, 41%–69% was considered fair knowledge, and 70%–100% was considered high knowledge. A score between 0% and 49% was classified as negative, 41%–69% as neutral and between 70% and 100% as positive. Good behavioural intention was defined as a score of 0%–49%, fair behavioural intention as 41%–69% and bad behavioural intention as 70%–100%. For the investigation, both descriptive and inferential statistics were used. Statistical Package for Social Sciences (SPSS) version 23 was used to sort, code and analyse the data using charts, frequency and percentages.

3 | Results

Out of the 508 questionnaires distributed for this study, 499 were retrieved. This put the response rate at 98%.

Table 1 shows the distribution of respondents. The age distribution of the respondents shows that the majority, 158 (31.7%) are between 25 and 29 years, 136 (27.3%) are between 30 and 34 years, 86 (17.2%) are between 35 and 39 years, 27 (5.4%) are between 15 and 19 years, while the least 14 (2.8%) is 40 years old and above. The majority, 328 (65.7%), attained tertiary education; 81 (16.2%) attained secondary education; 52 (10.4%) attained primary education; and 23 (7.6%) had only non-formal education. The majority, 236 (47.3%), are civil servants; 187 (37.5%) are self-employed; 45 (9.0%) are traders; 23 (4.6%) are unemployed; and 8 (1.6%) are farmers.

Table 2 shows that all 499 (100%) of the respondents have had sex before. Majority 346 (69.3%) had sex when they were 18 years and above, 467 (93.6%) have not had casual sex before, 378 (75.8%) are modern contraceptive users, 331 (66.3%) are not oral contraceptive users, 486 (97.4%) have used condom before, 467 (93.6%) have not smoked before, 497 (99.6%) do not know mothers with cervical cancer, 363 (72.7%) are not currently using oral contraceptive pills and majority 328 (65.7%) have given birth to 1–4 children.

The respondents' degree of awareness of Pap smear and cervical cancer screening is displayed in Table 3. Most respondents, 306 (61.3%), had prior knowledge of cervical cancer. According to 286 (57.3%), 119 (23.8%) and 94 (18.8%) people, cancer is defined as unchecked cell development, an expansion of any organ in the

TABLE 1 | Socio-demographic characteristics.

Parameter	Variables	Frequency ($n = 499$)	Percentage
Age range	25–29 years	158	31.7
	30–34 years	136	27.3
	35–39 years	86	17.2
	15–19 years	27	5.4
	40 years old and above	14	2.8
Level of education	Tertiary education	328	65.7
	Secondary education	81	16.2
	Primary education	52	10.4
	Non-formal education	23	7.6
Occupation	Civil servants	236	47.3
	Self-employed	187	37.5
	Traders	45	9.0
	Unemployed	23	4.6
	Farmers	8	1.6

TABLE 2 | Reproductive characteristics of the respondents attending the hospitals.

Parameter	Variables	Frequency	Percentage
Ever had sex	Yes	499	100
	No	0	0.0
Age at first sex	< 15 years	26	5.2
	15–18 years	127	25.5
	> 18 years	346	69.3
History of casual sex	Yes	32	6.4
	No	467	93.6
Modern contraceptive user	Yes	378	75.8
	No	121	24.2
Oral contraceptives user	Yes	168	33.7
	No	331	66.3
History of condom use	Yes	486	97.4
	No	13	2.6
History of cigarette smoking	Yes	32	6.4
	No	467	93.6
Know mothers with cervical cancer	Yes	2	0.4
	No	497	99.6
Currently, oral contraceptive pill users	Yes	136	27.3
	No	363	72.7
Parity	0	149	29.9
	1–4	328	65.7
	> 4	22	6.4

TABLE 3 | Level of knowledge of Pap smear and cervical cancer screening among women.

Parameter	Variables	Frequency	Percentage
Have you heard of cervical cancer?	Yes	306	61.3
	No	193	38.7
To the best of your knowledge, what is cancer?	Uncontrolled and rapid growth of tissue cells	286	57.3
	Enlargement of any organ of the body	119	23.8
	Decaying of any part of the body	94	18.8
What is the source of your information?	Physician/health worker	238	47.7
	Family/friends	108	21.6
	School	96	19.2
	Newspaper	8	1.6
	TV/Radio	13	2.6
	Internet	36	7.2
What do you understand by the term cervical cancer?	Disease of the womb	52	10.4
	Disease of the cervix	37	7.4
	Disease of the vagina	41	8.2
	Cancer of the cervix	369	73.9
Have you heard of Pap smear screening?	Yes	373	74.7
	No	126	25.3
If yes, what is the source of your information?	Physician/health worker	198	39.7
	Family/friend	81	16.2
	School	56	11.2
	Newspaper	8	1.6
	TV/Radio	9	1.8
	Internet	32	6.4
What do you think causes cervical cancer?	Human papiloma virus (HPV)	89	17.8
	Eating canned/processed food	172	34.5
	Using a traditional concoction in the vagina	136	27.3
	Family planning	6	1.2
	HIV	58	11.6
	Malaria/Yellow fever/Typhoid fever	2	0.4
	Not sure	36	7.2
Malaria/Yellow fever/Typhoid fever	Smoking	126	25.3
	Human papillomavirus (HPV) infection	67	13.4
	Drinking alcohol	28	5.6
	Sexual history	28	5.6
	Having a weakened immune system	43	8.6
	Chlamydia infection	6	1.2
	Long-term use of oral contraceptives (birth control pills)	13	2.6
	Having multiple full-term pregnancies	1	0.2
	Young age at first full-term pregnancies	2	0.4
	Unprotected sex	23	4.6
	Early engagement in sex	23	4.6
	Bad oral hygiene	1	0.2
	HIV	57	11.4
	Multiple sex partners	102	20.4

(Continues)

TABLE 3 | (Continued)

Parameter	Variables	Frequency	Percentage
What are the signs of cervical cancer?	Vaginal bleeding after sex	76	15.2
	Vaginal bleeding after menopause	9	1.8
	Vaginal bleeding between periods or periods that are heavier or longer than normal	48	9.6
	Vaginal discharge that is watery and has a strong odour or that contains blood	16	3.2
	Pelvic pain or pain during sex	268	53.7
	Genital warts	3	0.6
	Virginal bleeding	21	4.2
	Prolonged cough	1	0.2
	Foul-smelling vaginal discharge	57	11.4
Do you think cervical cancer is preventable?	Yes	472	94.6
	No	27	5.4
If "Yes" How?	Human papilloma virus vaccination	76	16.1
	Not eating canned/processed food	124	26.3
	Not having multiple sexual partners	91	19.3
	By not using traditional concoctions in the vagina	98	20.8
	Family planning	5	1.1
	HIV screening	8	1.7
	Good hygiene	7	1.5
	Pap-smear screening	21	4.4
	Avoid early sexual intercourse	9	1.9
	Avoid long-term use of oral contraceptive pills	6	1.3
	Early screening	2	0.4
	Avoid smoking	25	5.3
What are the methods of treating cervical cancer?	Surgery	79	15.8
	Chemotherapy	342	68.5
	Radiotherapy	49	9.8
	Do not know	3	0.6
What are the means of screening for cervical cancer?	Pap-smear	291	58.3
	HPV test	19	3.8
	Visual inspected with acetic acid (VIA)	183	36.7
	Do not know	6	1.2

body or the deterioration of any portion of the body. Information was obtained from 108 (21.6%) and 238 (47.7%) family members, friends and medical professionals. According to 52 (10.4%), 37 (7.4%), 41 (8.2%) and 369 (73.9%) people, cervical cancer is a disease of the womb, a cervical illness, a vaginal sickness or a cancer that starts in the cells of the cervix. Three hundred and seventy-three people (74.7%) had previously heard of pap smear screening, although misinformation was obtained from 198 (53.1%) family or friends and 81 (21.7%) medical professionals, respectively. The majority of 172 people (34.5%) believe that consuming processed or canned food might lead to cervical cancer. One hundred and twenty-six people (25.3%) believe that smoking increases the risk of cervical cancer. Of those surveyed, 268 (53.7%) believe that pelvic pain or pain during intercourse is indicative of cervical cancer. The majority of 472 (94.6%) believe that cervical cancer is avoidable. Of 126 respondents, 26.3% said avoiding processed and canned foods may help prevent cervical cancer. The majority of 342 people (68.5%) believe that chemotherapy is a cancer treatment option. Furthermore, the majority of 291 people (58.3%) believe that Pap smears may detect cervical cancer.

From Table 4, it can be observed that the majority, 340 (68.1%), disagreed that they are too young to have cervical cancer, 2 (0.4%) were unsure, while 157 (31.5%) agreed that they are too young to have cervical cancer. The majority, 237 (47.5%), agreed that cervical cancer screening is painful, and 351 (70.3%) also agreed that cervical cancer screening is expensive. 346 (69.39%) of the respondents agreed that it is too embarrassing to go for cervical screening. 414 (83.0%) agreed that cervical cancer screening causes loss of virginity. 259 (51.9%) agreed that their partner does not accept going for cervical cancer screening. On

TABLE 4 | Level of perception of cervical cancer and Pap smear screening among women.

Variables	SD	D	US	A	SA
You are too young to have cervical cancer	128 (25.7%)	212 (42.5%)	2 (0.4%)	89 (17.8%)	68 (13.6%)
Cervical cancer screening is painful	89 (17.8%)	60 (12.0%)	113 (22.6%)	111 (22.2%)	126 (25.3%)
Cervical cancer screening is too expensive	21 (4.2%)	36 (7.2%)	91 (18.2%)	162 (32.5%)	189 (37.9%)
It is too embarrassing to go for cervical cancer screening	36 (7.2%)	78 (15.6%)	39 (7.8%)	164 (32.9%)	182 (36.5%)
Cervical cancer screening causes loss of virginity	11 (2.2%)	23 (4.6%)	51 (10.2%)	196 (39.3%)	218 (43.7%)
Partner does not accept going for cervical cancer screening	82 (16.4%)	91 (18.2%)	67 (13.4%)	133 (26.7%)	126 (25.3%)
Women may not conceive after cervical cancer screening	22 (4.4%)	18 (3.6%)	167 (33.5%)	156 (31.3%)	136 (27.3%)
Cervical cancer screening is not effective	98 (19.6%)	96 (19.2%)	181 (36.3%)	71 (14.2%)	53 (10.6%)
You are afraid people may think you have the disease	96 (19.2%)	76 (15.2%)	42 (8.4%)	146 (29.3%)	139 (27.9%)
Since you have just one sexual partner, there is no need for screening	65 (13.0%)	71 (14.2%)	185 (37.1%)	98 (19.6%)	76 (15.2%)
Cervical cancer screening is only for women aged 30–45 years	162 (32.5%)	199 (39.9%)	56 (11.2%)	36 (7.2%)	46 (9.2%)

average, 292 (58.5%) believed that women may not conceive after cervical cancer screening. 181 (36.3%) were unsure if cervical cancer screening is effective. The majority, 285 (57.1%), were afraid people might think they had the disease, while 172 (34.5%) said they were not afraid that going for screening would make people think they had the disease. 185 (37.1%) were not sure if there was no need for screening since they had just one sexual partner. The majority, 361 (72.3%), believe that cervical cancer screening is only for women aged 30–45 years, while 82 (16.4%) pointed out that cervical cancer screening is not only for women aged 30–45 years, and 56 (11.2%) were not sure if cervical cancer screening is only for women aged 30–45 years.

3.1 | Testing the Research Hypothesis

Table 5 shows a significant relationship between knowledge of cervical cancer and uptake of Pap smear screening among women attending antenatal clinics in selected hospitals in Ogun State at a 0.01 significance level (1-tailed). The null hypothesis that there is no relationship between knowledge of cervical cancer and uptake of Pap smear screening among women attending antenatal clinics in selected hospitals in Ogun State is, therefore, rejected.

Table 6 reveals a statistically significant relationship between cervical cancer perception and uptake of Pap smear screening among women attending antenatal clinics in selected hospitals in Ogun State at a 0.01 significant level (1-tailed). Therefore, I reject the null hypothesis that there will be no relationship between cervical cancer perception and uptake of Pap smear screening among women attending antenatal clinics in selected hospitals in Ogun State.

Tables 7a–7c show that the regression model for reduced uptake of cervical cancer screening was statistically significant ($F = 25.8070$, $p < 0.0001$). The model explained 21.85% of the variation in reduced uptake ($R^2 = 0.2185$). Patient waiting time ($\beta = 0.8088$, $p = 0.0142$), distance to health facility ($\beta = 0.9444$, $p = 0.0046$) and the cost of service ($\beta = 0.9547$, $p = 0.0273$) were all positively associated with reduced screening uptake. This indicates that women were less likely to participate in cervical cancer screening when services were associated with longer waiting times, greater travel distance and higher out-of-pocket costs.

Table 8 shows the multivariable logistic regression analysis of factors associated with cervical cancer awareness. After adjustment for sexual behaviour, contraceptive practices and knowledge-related variables, only current oral contraceptive use and smoking were significantly associated with awareness of cervical cancer.

Current oral contraceptive users had higher odds of awareness than non-users (AOR 1.56, 95% CI 1.02–2.39; $p = 0.040$). By contrast, smokers had lower odds of awareness than non-smokers (AOR 0.40, 95% CI 0.19–0.85; $p = 0.017$). No significant associations were observed for casual sex, modern contraceptive use, ever use of oral contraceptives, condom use, awareness of Pap smear screening or knowledge that cervical cancer is preventable.

These findings suggest that awareness of cervical cancer was not uniformly distributed across respondents and may differ according to behavioural and contraceptive-related characteristics. However, most variables included in the model were not independently associated with awareness after adjustment.

4 | Discussion of Findings

This study assessed awareness of cervical cancer, knowledge of Pap smear screening and screening uptake among antenatal

TABLE 5 | Association between cervical cancer knowledge and uptake of Pap smear screening among women attending antenatal clinics in selected hospitals in Ogun State.

			Knowledge of cervical cancer	Uptake of Pap smear screening
Spearman's rho	Knowledge of cervical cancer	Correlation coefficient	1.000	0.489**
		Sig. (1-tailed)	—	0.000
		N	499	1.000
	Uptake of Pap smear screening	Correlation coefficient	0.489	1.000
		Sig. (1-tailed)	0.000	—
		N	499	499

**Correlation is significant at the 0.01 level (1-tailed).

TABLE 6 | Association between cervical cancer perception and the uptake of Pap smear screening among women attending antenatal clinics in selected hospitals in Ogun State.

			Perception of cervical cancer	Uptake of Pap smear screening
Spearman's rho	Perception of cervical cancer	Correlation coefficient	1.000	0.476**
		Sig. (1-tailed)	—	0.000
		N	499	499
	Uptake of Pap smear screening	Correlation coefficient	0.476	1.000
		Sig. (1-tailed)	0.000	—
		N	499	499

**Correlation is significant at the 0.01 level (1-tailed).

women attending selected health facilities in Ogun State, Nigeria. Although more than half of the respondents had heard of cervical cancer and almost three-quarters had heard of Pap smear testing, actual uptake of screening was low. These findings suggest that awareness of cervical cancer and its screening do not necessarily translate into screening practice.

In this study, 61.3% of respondents reported that they had heard of cervical cancer, whereas only 18.2% reported previous screening. One possible explanation is that antenatal care visits provide opportunities for exposure to health information through routine counselling and health talks. However, exposure to information may increase awareness without overcoming the practical, financial and attitudinal barriers that influence screening behaviour. This pattern is consistent with reports from similar settings in which awareness exceeded actual screening uptake. The level of awareness observed in this study was lower than that reported in some previous studies among female health workers and university students. This difference may reflect variation in educational background, health literacy and access to reliable health information. Health professionals are more likely to have formal medical knowledge, while women in tertiary institutions may have broader access to information through academic settings, digital media and peer networks. By contrast, respondents in the present study appeared to rely primarily on physicians and other health workers for information, while other channels, such as radio, television, print media and the internet, played a smaller role.

An important finding of this study is that awareness did not always correspond to accurate knowledge. Although many respondents had heard of cervical cancer, only a small proportion correctly identified human papillomavirus as a cause, while some attributed the disease to misconceptions such as the use of traditional concoctions. This finding is important because it suggests that exposure to information alone may be insufficient; the quality and accuracy of the information also matter. Persistent infection with high-risk human papillomavirus is an established necessary cause of cervical cancer, although progression to disease is influenced by additional cofactors. The low proportion of respondents who correctly identified HPV, therefore, indicates an important knowledge gap that may affect preventive behaviour. Awareness of Pap smear screening was also relatively high in this study, with 74.7% of respondents reporting that they had heard of the test. Despite this, screening uptake remained low. This gap between awareness and utilisation is consistent with findings from other studies in Nigeria and similar settings, where knowledge of screening has not necessarily been accompanied by participation in screening. The findings, therefore, suggest that improving awareness alone may be insufficient to increase screening coverage.

Several perceived barriers to screening were identified in this study. Respondents commonly described screening as expensive, embarrassing, painful or of uncertain benefit. Misconceptions were also reported, including beliefs that screening could result

in loss of virginity, impair fertility or provoke partner disapproval. Fear of stigma was another recurring concern. Taken together, these findings indicate that screening decisions are shaped not only by knowledge but also by cost, cultural beliefs, social norms and personal concerns about the procedure. These barriers may help explain why screening uptake remained low despite relatively high awareness of both cervical cancer and Pap smear screening. The regression analysis further indicated that reduced uptake of cervical cancer screening was significantly associated with service-related barriers. Higher service costs, longer waiting times and greater distance to the health facility were all associated with lower screening uptake. These findings suggest that practical barriers to access may substantially limit participation in screening, even where awareness of cervical cancer and Pap smear testing is relatively high.

The logistic regression model further showed that only current oral contraceptive use and smoking were independently associated with awareness of cervical cancer. Women who were current oral contraceptive users were more likely to have heard of cervical cancer, whereas smokers were less likely to be aware. Although the reasons for these associations cannot be established from this study, they may reflect differences in health-seeking behaviour, contact with health services or patterns of exposure to reproductive health information. The absence of significant associations for the remaining variables suggests

TABLE 7a | Relationship between cost of service, patient waiting hours, distance of health facility and the reduced uptake of cervical cancer screening.

Regression statistics	
Multiple *R*	0.4674
R^2	0.2185
Adjusted R^2	0.2138
Standard error	0.2404
Observations	499

TABLE 7b | ANOVA for the regression model of predictors of reduced cervical cancer screening uptake.

	Df	**SS**	**MS**	***F***	**Significance *F***
Regression	3	15.0449	5.0150	25.8070	0
Residual	496	96.394	0.1943		
Total	499	111.4389			

TABLE 7c | Regression estimates for predictors of reduced cervical cancer screening uptake.

	Coefficients	**Standard error**	***t* Stat**	***p***	**Lower 95%**	**Upper 95%**	**Lower 95%**	**Upper 95%**
Intercept	0.9912	0.2204	4.4978	0.0369	0.5583	1.4241	0.5583	1.4241
Patient waiting hours	0.8088	0.1805	4.4814	0.0142	0.4551	1.1625	0.4551	1.1625
Distance to the health facility	0.9444	0.2453	3.8507	0.0046	0.4638	1.425	0.4638	1.425
Cost of service	0.9547	0.3722	2.5652	0.0273	0.2253	1.6841	0.2253	1.6841

TABLE 8 | Logistic regression estimates for predictors of Pap smear screening uptake.

		B	**SE**	**Wald**	**Df**	**Sig.**	**Exp (*B*)**
Step 1[a]	casual_sex	0.238	0.395	0.362	1	0.547	1.268
	modern_contra	0.250	0.216	1.339	1	0.247	1.284
	oc_user	−0.117	0.200	0.345	1	0.557	0.889
	condom_use	0.423	0.370	1.308	1	0.253	1.527
	smoking	−0.907	0.381	5.649	1	0.017	0.404
	current_oc	0.446	0.216	4.238	1	0.040	1.561
	heard_pap	−0.138	0.216	0.407	1	0.523	0.871
	cc_preventable	0.107	0.404	0.071	1	0.790	1.113
	Constant	−0.153	0.578	0.070	1	0.791	0.858

[a]Variables entered in Step 1: casual_sex, modern_contra, oc_user, condom_use, smoking, current_oc, heard_pap, and cc_preventable.

that awareness may not be strongly patterned by all behavioural factors examined in this population.

This study should be interpreted in light of several limitations. First, the cross-sectional design does not allow causal inferences to be made regarding the observed associations. Second, the study was conducted among antenatal attendees at selected health facilities, and the findings may therefore not be generalizable to all women in Ogun State, particularly those who do not access antenatal care. Third, information on awareness, perceptions and previous screening was based on self-report and may be subject to recall error or social desirability bias. In addition, the facility selection process may have introduced selection bias at the first stage of sampling. Despite these limitations, the study provides useful evidence on the gap between awareness and screening uptake and identifies practical barriers that may be amenable to intervention.

Overall, the findings indicate a clear gap between awareness and screening behaviour among antenatal women in Ogun State. The results suggest that efforts to improve screening uptake should not be limited to increasing awareness alone, but should also address the accuracy of knowledge, the cost of screening and misconceptions or negative perceptions surrounding the procedure. Antenatal care services may provide an important opportunity for such interventions because they offer regular contact with women of reproductive age.

5 | Conclusion

Although awareness of cervical cancer and Pap smear testing was relatively high among antenatal women in this study, screening uptake remained low. Lower uptake was associated with higher service costs, longer waiting times, greater distances to health facilities and limited understanding of the benefits of screening. These findings suggest that awareness alone is unlikely to increase uptake unless financial and service delivery barriers are also addressed.

5.1 | Recommendations

Interventions to improve Pap smear uptake among antenatal women should address the barriers identified in this study. Reducing out-of-pocket costs, shortening patient wait times, and improving physical access to screening services may increase participation. Education delivered during antenatal care should emphasise the benefits of screening in addition to awareness of cervical cancer. Health information should also be communicated through multiple channels to complement information provided by health workers. Approaches should be tailored to women with lower educational attainment, who may require more focused counselling and support to translate awareness into screening practice.

Author Contributions

Sesan E. Busayo: conceptualization, methodology, visualization, investigation, data curation, software, writing – original draft. **F. Lukman Adewale:** conceptualization, supervision, methodology, investigation, data curation, writing – review and editing. **Roseline Oluwaseun Ogundokun:** formal analysis, writing – review and editing, data curation, investigation, resources, validation, methodology. **Olajumoke F. Adewale:** data curation, validation, resources, writing – review and editing. **Syed Abid Hussain:** supervision, visualization, data curation, writing – review and editing.

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Ethics Statement

Ethical approval for this study, titled "Assessment of Women's Knowledge and Perception About Cervical Cancer and Pap-Smear Screening in Antenatal Clinics of Selected Hospitals in Ogun State, Nigeria," was obtained from the Health Research Ethics Committee (HREC) of the University of Medical Sciences, Ondo, Ondo State, Nigeria (approval number: NHREC/TR/UNIMED-HREC-Ondo St/22/06/2). The study was approved on June 30, 2023, and is valid until December 31, 2023. All procedures performed in this study complied with the ethical standards of the institution, and participants' anonymity and confidentiality were strictly maintained.

Consent

Participants were informed about the purpose and nature of the study through a consent form. They were assured that their participation was voluntary and that they could withdraw without any consequences. The consent form explicitly stated that all responses would remain anonymous and confidential, and participants were instructed not to include any personal identifying information. A tick-box system was employed to indicate participants' consent to participate.

Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

The data that support the findings of this study are available on request from the corresponding author. The data are not publicly available due to privacy or ethical restrictions.

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Supporting Information

Additional supporting information can be found online in the Supporting Information section. **Appendix S1:** University of Medical Sciences Ondo, School of Public Health, Postgraduate Studies Questionnaire.