



International Journal of Obstetrics and Gynaecological Nursing

E-ISSN: 2664-2301

P-ISSN: 2664-2298

www.gynaecologicalnursing.com

IJOGN 2025; 7(1): 167-174

Received: 06-03-2025

Accepted: 08-04-2025

Chidimma Akudo Omeke
Department of Obstetrics and
Gynaecology, Enugu State
University of Science and
Technology, College of
Medicine, Teaching Hospital,
Parklane, Enugu, Nigeria

Joseph Tochukwu Enebe
Department of Obstetrics and
Gynaecology, Enugu State
University of Science and
Technology, College of
Medicine, Teaching Hospital,
Parklane, Enugu, Nigeria

Dr. Calistus Obiora Nevo
Department of Obstetrics and
Gynaecology, Enugu State
University of Science and
Technology, College of
Medicine/Teaching Hospital,
Parklane, Enugu, Nigeria

Corresponding Author:
Dr. Calistus Obiora Nevo
Department of Obstetrics and
Gynaecology, Enugu State
University of Science and
Technology, College of
Medicine/Teaching Hospital,
Parklane, Enugu, Nigeria

Challenges and opportunities in cervical cancer screening: Insights from Enugu, Southeast Nigeria

Chidimma Akudo Omeke, Joseph Tochukwu Enebe and Calistus Obiora Nevo

DOI: <https://www.doi.org/10.33545/26642298.2025.v7.i1c.199>

Abstract

Introduction: The uptake of cervical cancer screening among women in Enugu has remained low. The objective of this study was to determine the awareness and uptake of cervical cancer screening and the factors affecting cervical cancer screening in Enugu metropolis.

Methods: A multi-centre, cross-sectional analytical study was conducted over six months (from October 2020 to March 2021) in Enugu metropolis among 240 sexually active women aged 25 to 65 years from five health facilities in Enugu Metropolis using interviewer-administered questionnaire for data collection. A multi-stage sampling technique was used to select the health facilities. Ethical approval was obtained from the Enugu State University Teaching Hospital Ethical Research Committee with approval number ESUTHP/C-MAC/RA/034/VOL.1/248. Data were analysed using IBM-SPSS version 25 and a p-value < 0.05 at 95% confidence interval considered statistically significant.

Results: Only 93(39.4%) were aware of cervical cancer screening while only 9.7% had ever had any form of cervical cancer screening. Awareness of cervical cancer screening was significantly lower among those with primary (OR 0.10, 95% CI 0.02 to 0.46) and secondary (OR 0.25, 95%CI: 0.12 to 0.54) education compared to those with tertiary education. Middle-class women had higher odds of awareness than those in the lower class (OR 2.38, 95% CI: 0.86-6.58), while upper-class women were ten times more likely to be aware (OR 10.41, 95%CI: 2.72 to 39.78). Participants in the upper social class were about 7.5 times more likely to have undergone cervical cancer screening compared to those from the lower social class (OR 7.53, 95% CI: 1.82-3.49). Lack of awareness (58.7%) and not knowing where to access screening (21.1%) were the primary barriers to screening.

Conclusion: Both the awareness and uptake of cervical cancer screening were low among women in Enugu metropolis. Education and social class significantly influenced cervical cancer screening awareness.

Keywords: Enugu, challenges, opportunities, cervical, cancer, screening

Introduction

Cervical cancer is a major public health challenge, ranking as the second leading cause of cancer-related deaths among Nigerian women and the fourth most common cancer in women worldwide. Globally, approximately 570,000 new cases and 311,000 deaths were recorded in 2018 ^[1]. In Nigeria alone, an estimated 14,089 new cases of cervical cancer are diagnosed annually, with a corresponding mortality rate of 8,240. The crude mortality rate for cervical cancer globally is 7.6 per 100,000 women per year, whereas Nigeria's rate is significantly higher, at 10.8 per 100,000 women per year ^[2]. These alarming statistics highlight the urgent need for effective screening and prevention strategies, particularly in resource-limited settings like Nigeria.

The burden of cervical cancer in Nigeria demonstrates a stark disparity between developed and developing nations. Over the last few decades, developed countries have achieved significant reductions in cervical cancer incidence and mortality, by up to 80% in some cases, attributed to the implementation of effective prevention and screening programs. In contrast, developing countries like Nigeria continue to experience high rates of morbidity and mortality due to limited or non-existent access to screening services, as well as poor awareness and low uptake where services are available ^[2, 3].

The high incidence of cervical cancer is exacerbated by factors such as the increased prevalence of HIV infection, which is known to heighten the risk of developing cervical cancer [4, 5]. Despite being a largely preventable disease, cervical cancer continues to pose a significant burden due to limited access to prevention and early detection services. Effective prevention strategies include primary methods such as Human Papillomavirus (HPV) vaccination and public health education, and secondary methods like regular cervical cancer screening using pap smear, visual inspection with acetic acid, visual inspection with Lugol's iodine, and tertiary methods like early treatment of pre-malignant cervical lesions [6]. However, these approaches are underutilized in many African countries due to financial, infrastructural, and systemic barriers [7].

While developed nations have significantly reduced cervical cancer mortality through widespread adoption of screening programs like Pap smears, developing countries face numerous challenges in implementing similar initiatives. In Nigeria, the lack of a national cervical cancer screening policy, coupled with insufficient awareness, poorly developed healthcare infrastructure, and widespread poverty, has hindered progress. Furthermore, cultural and socioeconomic factors contribute to low participation rates in screening programs, even when subsidized or free services are provided [8].

Despite these challenges, there are opportunities to improve cervical cancer outcomes in low-resource settings. Increasing awareness of screening methods, integrating screening services into existing healthcare systems, and addressing cost barriers are critical steps toward reducing the burden of this disease. This paper explores the unique challenges and potential strategies for cervical cancer screening in Enugu, a representative low-resource setting in Nigeria, and highlights opportunities for enhancing prevention and early detection efforts.

In Nigeria, previous studies, including those conducted in Enugu, Southeast Nigeria, have revealed alarmingly low levels of awareness and utilization of cervical cancer screening programs among women, even among healthcare workers. For instance, a study in Enugu, found that despite significant subsidies, fewer than 1% of women targeted for cervical cancer screening participated [9]. Another research in Onitsha, Southeast Nigeria, indicated that while 35.6% of women surveyed were aware of cervical cancer screening, only 1.78% had undergone testing [10]. Similarly, a cross-sectional study conducted in Makurdi, North-Central Nigeria, found that although many women were aware of cervical cancer and the need for screening, actual utilization of screening services remained extremely low [11]. These findings reflect a nationwide trend of poor uptake due to a combination of factors, including lack of awareness, financial constraints, competing priorities, low literacy levels, a false sense of immunity to the disease, fear of receiving a positive result, and general apathy toward preventive healthcare [12, 13].

Healthcare workers, who are expected to champion health education and preventive practices, are not exempt from these challenges. A study in South-Western Nigeria revealed that while awareness of cervical cancer among healthcare workers was high, their knowledge of risk factors and utilization of screening services were surprisingly low [14]. This highlights a critical gap in the effective

dissemination and implementation of screening practices, even among those tasked with driving awareness.

Efforts to improve cervical cancer screening uptake must address these multifaceted challenges. Interventions such as routine counselling and offering screening services with an opt-out option at outpatient clinics have been proposed as practical solutions to increase awareness and participation [15]. By embedding screening into routine healthcare encounters, women may be more likely to access these services, thereby bridging the gap between awareness and action.

In this context, Enugu provides a valuable case study to explore the unique challenges and opportunities for cervical cancer prevention in low-resource settings. This paper delves into the local barriers to screening, the patterns of awareness and service utilization, and the potential strategies to improve outcomes, offering insights that could inform similar efforts across Nigeria and other resource-limited regions. The study will provide the needed evidence by the state and federal government in providing an implementable road map towards reducing the cervical cancer burden in Nigeria and other middle and low-income countries.

Methods

Study design and setting

This was a multi-centre, cross-sectional analytical study and was conducted over six months (October 2020 to March 2021). The study was carried out in Enugu state in tertiary, secondary and privately owned hospitals in the state. Enugu State, located in South-Eastern Nigeria, is home to a population of over 4.4 million people and covers an area of 7,161 km². The state includes 17 Local Government Areas (LGAs), with Enugu city serving as the capital. The state's economy is largely rural and agricultural, with urban areas focused on trade and civil service. The Enugu metropolis, which consists of three LGAs (Enugu North, East, and South), has 267 health facilities, both public and private. Due to the concentration of health facilities in the urban areas, these hospitals are often accessed by patients from across the state and surrounding regions.

Study Population

The study targeted sexually active women aged 25 to 65 years in Enugu State.

Exclusion Criteria

Women were excluded if they were menstruating, had active vaginal bleeding, had undergone a total abdominal hysterectomy, had used vaginal douches within 48 hours, had huge vaginal, cervical masses and abdomino-pelvic masses that could not allow for the cervix to be accessed, had sexual intercourse in the 48 hours prior to the study or were too ill to allow for sample collection.

Sample Size Calculation

The sample size was obtained using the formula: $N = Z^2 pq / e^2$ [16], where Z = standard normal deviation at 95% confidence interval = 1.96, P = proportion of the population of women who utilized pap smear services in Jos North central Nigeria = 0.102 (10.2%)¹³, $q = 1 - p = 0.898$, e = precision limit = 0.05. The calculated sample size was 140.7, however, 240 women were studied to increase the power of the study.

Sampling Method

A multi-stage sampling technique was used. First, all health facilities in Enugu metropolis were grouped by type (public vs. private). Public hospitals were further categorized into tertiary, secondary, and primary healthcare centres, while private hospitals were divided into faith-based and non-faith based private hospitals. A proportionate sampling approach was then applied to select participants from each category, ensuring adequate representation from all hospital types. A total of 240 participants were recruited, with 80 respondents from tertiary hospitals, 64 from secondary hospitals, 48 from faith-based private hospitals, 32 from non-faith based private hospitals and 16 from primary healthcare centres.

Data Collection

Participants were recruited into the study after obtaining written informed consent. Data were collected using a structured, interviewer-administered questionnaire, which included questions on socio-demographic characteristics, awareness of cervical cancer and Pap smear, risk factors for cervical lesions, and barriers to screening.

Ethical Considerations

Ethical approval was obtained from the Enugu State University Teaching Hospital Ethical Research Committee with approval number ESUTHP/C-MAC/RA/034/VOL.1/248. All participants were fully counselled on the details, benefits, and risks of the study, and a written informed consent was obtained before each participant was recruited for the study. Privacy and confidentiality were maintained throughout the study. The research was designed

to ensure no harm, and participants were provided with free screening, with those testing positive referred for further management.

Data Analysis

Data were analysed using IBM-SPSS version 25.0. Descriptive statistics (tables) were used to summarize the data, and Pearson Chi-square was applied to compare proportions. A 95% confidence interval was used, with a p-value < 0.05 considered statistically significant.

Outcome measures: The primary outcome measure was the factors affecting cervical cancer screening in Enugu and the predictors while the secondary outcome measures were the level of awareness of cervical cancer prevention and prevalence of cervical cancer screening uptake in Enugu.

Results

A total of 240 women were recruited from five health facilities in Enugu Metropolis for the study. The facilities included Enugu State University Teaching Hospital Parklane (tertiary), Poly General Hospital Asata (secondary), Abakpa Health Centre (primary), Mater Misericordiae Hospital Uwani (faith-based), and Chrisantus Specialist Hospital Transekulu (non-faith based). The mean age of the respondents was 40.42 ± 10.36 years, with ages ranging from 25 to 65 years. Most of the participants were married (88.8%), within the age range of 35-44 years (39.8%), and in lower socio-economic class (49.6%) with tertiary level of education (68.2%). The details of the socio-demographic characteristics of the respondents are shown in Table 1.

Table 1: Socio-demographic characteristics of respondents

Variable	Frequency	Percentage
Age group (years)		
25-34	74	31.0
35-44	95	39.8
45-54	37	15.5
55 and above	33	13.8
Level of Education		
No formal education	3	1.3
Primary	22	9.2
Secondary	51	21.3
Tertiary	163	68.2
Occupation		
Civil/Public Service	122	51.0
Petty Trading	61	25.5
Unemployed	37	15.5
Skilled worker	14	5.9
Others	5	2.1
Marital Status		
Single	13	5.4
Married	213	88.8
Others(widowed/divorced)	14	5.8
Socio-economic class		
Lower class	119	49.6
Middle class	107	44.6
Upper class	14	5.8
Tribe		
Igbo	227	94.6
Others	13	5.4

Table 2: Cervical cancer awareness among respondents

Variable	Frequency	Percentage
Ever heard of Cervical Cancer		
Yes	155	65.7
No	81	34.3
Sources of Information		
Radio/TV	29	12.3
Health workers	56	23.7
School	12	5.1
Newspaper	4	1.7
Church	20	8.5
Market	1	0.4
Internet	18	7.6
Books	8	3.4
Other sources	7	3
Causes of Cervical cancer		
HPV	33	14
Bacteria	11	4.7
Fungi	1	0.4
Don't know	191	80.9
Mode of transmission		
Toilet/Toiletries	10	4.2
Sexual Contact	45	19.1
Drinking Water	2	0.9
Don't know	179	75.8

*HPV= Human Papilloma Virus

Table 2 shows that majority (65.7%) of the respondents have heard about cervical cancer, mostly from health

workers (23.7%). 80.9% of the respondents did not know the cause of cervical cancer.

Table 3: Respondents' awareness on prevention of cervical cancer

Variable	Frequency	Percentage
Cervical cancer can be prevented		
Yes	158	66.9
No	78	33.1
Mode of prevention		
Abstinence	7	3.0
Keeping one sexual partner	40	16.9
Vaccination	22	9.3
Stop smoking	1	0.4
Avoid early sexual intercourse	18	7.6
Prayers	8	3.4
Early detection	30	12.7
Public awareness	32	13.6
Don't know	78	33.1

Table 3 shows that majority of the respondents (66.9%) agreed that cervical cancer could be prevented but only

9.3% of the respondents knew that vaccination was a method of prevention.

Table 4: Cervical cancer screening among respondents

Variable	Frequency	Percentage
Awareness of screening		
Yes	93	39.4
No	143	60.6
Screening methods known		
Pap smear	60	25.4
Visual inspection with Lugol's iodine	4	1.7
Visual inspection with Acetic acid (VIA)	4	1.7
Don't know	168	71.2
Who to screen		
Sexually active women	73	30.9
Elderly women	16	6.8
Prostitutes	4	1.7
Don't know	143	60.6
Yes	23	9.7
No	213	90.3

Table 4 shows that more than half of the respondents (60.6%) were not aware of any method of cervical cancer

screening, while only 9.7% had ever had any form of cervical cancer screening in the past.

Table 5: Association of sociodemographic factors and cervical cancer screening

Variable	Ever screened	%	Never screened	%	Total	%	χ^2	p value	OR 95% CI
Age group									
25-34	4	1.7	70	29.8	74	31.0	2.661	0.447	1
35-44	11	4.6	84	35.1	95	39.7			2.29 (0.70-7.51)
45-54	5	2.1	32	13.4	37	15.5			2.73 (0.69-10.87)
55 and above	4	1.7	29	12.1	33	13.8			2.41 (0.57-10.31)
Marital status									
Married	21	8.6	192	79.0	213	88.7	0.001	0.981	1
Not currently married	3	1.2	24	11.1	27	11.3			1.02 (0.28-3.64)
Level of education									
No formal education	0	0	3	1.3	3	1.3	4.191	0.242	1.00 (0.05-20.07)
Primary	1	0.4	21	8.8	22	9.2			0.34 (0.04-2.67)
Secondary	2	0.8	49 (20.5)	20.5	51	21.3			0.29 (0.07-1.29)
Tertiary	20	8.4	143	59.8	163	68.2			1
Socioeconomic status									
Lower class	6	2.5	113	47.1	119	49.6	9.302	0.010	1
Middle class	12	5.0	95	39.6	107	44.6			2.38 (0.86-6.58)
Upper class	4	1.7	10	4.2	14	5.8			7.53 (1.82-31.19)
Are you still menstruating									
Yes	18	7.5	145	60.1	163	68.2	0.335	0.563	1.33 (0.51-3.49)
No	6	2.5	70	29.3	76	31.8			1

Individuals from the upper social class were about 7.5 times more likely to have undergone cervical cancer screening compared to those from the lower social class (OR 7.53, 95% CI: 1.82-3.49). In contrast, no significant difference in

cervical cancer screening rates was observed between the lower and middle social classes (OR 2.38, 95% CI: 0.86-6.58).

Table 6: Sociodemographic predictors of awareness of cervical screening

Variable	Aware of screening		Unaware of screening		Total		χ^2	P-Value	OR 95% CI	a OR 95% CI
	N	%	N	%	N	%				
Age group										
25-34	29	12.1	45	18.8	74	31.0	2.101	0.552	1	-
35-44	40	16.7	55	23.0	95	39.7			1.13 (0.61-2.10)	
45-54	11	4.6	26	10.9	37	15.5			0.66 (0.28-1.53)	
55 and above	11	4.6	22	9.2	33	13.8			0.78 (0.33-1.84)	
Marital status										
Married	84	34.6	129	53.8	213	88.8	0.003	0.953	1	-
Not currently married	12	5.0	15	6.2	27	11.2			1.02 (0.47-2.23)	
Level of education										
No formal education	0	0	3	1.3	3	1.3	25.309	<0.001	0.15 (0.01-2.91)	0.00 (0.00-NA)
Primary	2	0.8	20	8.4	22	9.2			0.10 (0.02-0.46)	0.15 (0.03-0.68)
Secondary	10	4.2	41	17.2	51	21.3			0.25 (0.12-0.54)	0.30 (0.13-0.66)
Tertiary	80	33.5	83	34.7	163	68.2			1	1
Socioeconomic status										
Lower class	31	12.9	88	36.7	119	49.6	19.769	<0.001	1	1
Middle class	49	20.4	58	24.2	107	44.6			2.40 (1.37-4.19)	1.70 (0.93-3.09)
Upper class	11	4.6	3	1.3	14	5.8			10.41 (2.72-39.78)	6.02 (1.54-23.55)
Are you still menstruating										
Yes	60	25.1	103	43.1	163	68.2	1.645	0.200	1.45 (0.82-2.54)	-
No	25	10.5	51	21.3	76	31.8			1	

Level of education and the social class of the respondents were significantly associated with awareness of cervical cancer screening. Compared to having a tertiary education, having a primary education was associated with 90% reduced odds (OR 0.10, 95% CI 0.02 to 0.46) and a secondary education was associated with 75% reduced odds (OR 0.25, 95%CI: 0.12 to 0.54) of cervical cancer screening awareness. Regarding the social class, belonging to the middle class was associated with almost two and a half times the odds of awareness of cervical cancer screening

when compared to the lower class (OR 2.40, 95%CI: 1.37 to 4.19); and belonging to the upper class was associated with about ten times the odds of awareness of cervical cancer screening when compared to the lower class (OR 10.41, 95%CI: 2.72 to 39.78). After adjusting for confounding, level of education and social class remained independent predictors of cervical cancer screening awareness amongst the respondents. Primary education was associated with 85% reduced odds (aOR 0.15, 95%CI: 0.03 to 0.68), and secondary education with 70% reduced odds (aOR 0.30,

95%CI: 0.13 to 0.66) of awareness of cervical cancer screening relative to tertiary education after adjusting for social class. Also, being in the upper social class compared to the lower class was associated with about 6 times the odds of awareness of cervical cancer screening among the respondents, after adjusting for level of education (aOR 6.02, 95%CI: 1.54 to 23.55).

Table 7: Factors affecting uptake of cervical cancer screening

Variable	Frequency (N=213)	Percentage
Reason for not screening		
Lack of awareness of screening services	125	58.7
Financial constraints	15	7
Unaware of where to get screening services	45	21.1
Don't have need for screening	8	3.8
Have other things to take care of	7	3.3
Mindset (I cannot have cancer)	1	0.4
Afraid of getting positive result	8	3.8
Feel shy about going for screening	4	1.9

Table 7 shows that lack of awareness of cervical cancer screening was the reason for not screening in 58.7% of the respondents while 21.1% of the respondents did not know where to go for cancer screening.

Discussion

This study investigated the challenges associated with cervical cancer screening among women in Enugu. The findings from this study revealed that majority of participants (39.8%) fell within the age range of 35-44 years, followed by those aged 25-34 years (31.0%), (Table 1). This contrasts with a previous study in Enugu, where most participants seeking cervical cancer screening were between the ages of 40-49 years (35.4%), and nearly 68% were referred from other clinics due to existing gynecological concerns [17]. This discrepancy may suggest that many women in the earlier study were more likely to seek cervical cancer screening as part of a broader diagnostic workup for other gynecological issues. In this study, however, the younger age group appears to be more engaged in seeking screening services independently.

Although most respondents (65.7%) had heard of cervical cancer (Table 2), only 9.3% were aware of its prevention through vaccination (Table 3). This highlights a significant gap in knowledge regarding preventive measures for cervical cancer, such as vaccination, which is crucial for primary prevention. Additionally, although 39.4% were aware of cervical cancer screening, only 9.7% had ever undergone screening in the past (Table 4). This low level of uptake is consistent with findings from other regions of Nigeria, such as Jos (10.2%) [13] and Owerri (7.1%) [18], further emphasizing the widespread challenges in cervical cancer screening across the country.

Level of education and the social class of the respondents were major predictors of awareness of cervical cancer screening from this study (Table 6). Also, respondents from the upper social class are 7.5 times more likely to get screened for cervical cancer when compared to those in the middle or lower class (Table 5). This highlights the significant influence of education and financial empowerment on the health seeking behaviours of women. Findings from a study in Bangladesh showed that socioeconomic status has a strong connection with women's

healthcare seeking behaviours in both rural and urban areas.¹⁹ In another review paper by O'Neil *et al.*, it was opined that improving socioeconomic position (SEP) and future employment opportunities is strongly linked to education, which includes both formal educational attainment and health literacy, particularly when implemented alongside other supportive interventions.²⁰ These reports are not different from findings from other studies in Nigeria. Hadizah and Ibrahim's research on women of reproductive age in North-west, Nigeria, highlighted the debilitating effects of poverty on women's lives, limiting their access to quality healthcare, and exposing them to numerous health risks, including malnutrition, disease, and environmental hazards [21].

Another research conducted by Akanbiemu *et al.*, in Nigeria, cited by Salifu *et al.* found a strong correlation between income level and prompt healthcare-seeking behaviour, with 81.87% of higher-income individuals seeking medical care in a timely manner, compared to those with lower incomes [22].

The barriers to cervical cancer screening identified in this study were comparable to those found in other studies, including lack of awareness about available screening services, financial constraints, limited knowledge of where to access screening, and beliefs that screening was unnecessary due to perceived lack of risk. Additionally, some respondents expressed concerns about the possibility of receiving a positive result, which deterred them from seeking screening (Table 7). These barriers reflect broader societal and infrastructural challenges in low-resource settings that hinder the uptake of preventive healthcare services, particularly for conditions like cervical cancer, which often do not present symptoms until advanced stages. These findings starkly contrast with the situation in developed countries, where over 75% of women undergo cervical cancer screening within a 5-year period [7]. The discrepancy in screening rates between developed and developing countries underscores the need for tailored interventions in low-resource settings like Enugu. In developed countries, effective public health campaigns, well-established screening programs, and the integration of cervical cancer screening into routine healthcare services have significantly reduced the incidence and mortality associated with cervical cancer.

There is an urgent need to address the low uptake of cervical cancer screening in Enugu and similar settings by implementing strategies that target the identified barriers. Echoing the suggestion by Dim *et al.*, it is crucial to introduce routine cervical cancer counselling and offer an opt-out option for screening to every eligible woman attending outpatient clinics, including gynaecological and general health clinics [15]. Such measures would not only raise awareness but also facilitate the early detection and treatment of precancerous lesions, thereby significantly reducing the incidence and burden of cervical cancer in this environment.

Moreover, integrating screening services into primary healthcare systems, where most women in rural areas seek care, could improve accessibility and increase participation. Offering free or subsidized screening services, coupled with educational campaigns, would address financial constraints and improve the knowledge base regarding cervical cancer and its prevention. Collaboration between government health agencies, non-governmental organizations, and the

private sector could further enhance the reach and sustainability of cervical cancer prevention programs in Enugu and similar regions.

Conclusion

This study highlights significant gaps in awareness, access, and utilization of cervical cancer screening services among women in Enugu, a setting with limited resources. Despite reasonable knowledge of cervical cancer itself, many women remain unaware of preventive measures, such as vaccination, and the availability of screening services. The low uptake of cervical cancer screening, coupled with socio-cultural and economic barriers, underscores the need for targeted interventions to improve awareness, accessibility, and acceptance of screening services.

To address these challenges, it is imperative to implement integrated public health strategies that promote routine cervical cancer counselling and offer screening services with an opt-out option at every point of contact with the healthcare system. Efforts should focus on reducing financial and logistical barriers, increasing educational outreach, and encouraging healthcare providers to actively engage women in preventive care.

By addressing these critical gaps, we can significantly improve early detection rates and reduce the burden of cervical cancer in low-resource settings like Enugu. Ultimately, with collaborative efforts between government, healthcare providers, and community organizations, cervical cancer screening can be effectively integrated into routine healthcare services, leading to better health outcomes for women in the region.

Conflict of Interest

Not available

Financial Support

Not available

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How to Cite This Article

Omeke CA, Enebe JT, Nevo CO. Challenges and opportunities in cervical cancer screening: Insights from Enugu, Southeast Nigeria. *International Journal of Obstetrics and Gynaecological Nursing*. 2025;7(1):167-174.

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