Knowledge of Cervical Cancer and Vaccine among sexually active Women in FMC, Keffi Nigeria
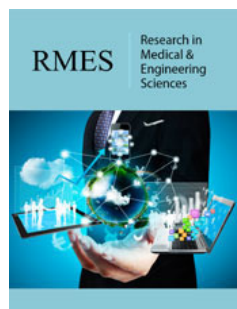
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Abstract

Background: Human papilloma virus vaccine uptake is influenced by a number of factors, such as limited awareness, cultural, and religious misconceptions about the vaccine. There is also increasing concerns about the vaccine safety as well as logistics issues associated to the vaccine distribution. This study aimed to evaluate the knowledge about cervical cancer and the uptake of the HPV vaccine among women attending FMC Keffi, Nigeria.

Methodology: This is a cross-sectional study conducted on 250 sexually active females using a structured questionnaire-base method from September to December, 2024. Statistical Package for the Social Sciences (SPSS) version 27 was used for analysis.

Results: The average age of the participants (250) was 25.92 years with a standard deviation of 7.31 years. Our data showed that 76.9% had never been screened for cervical cancer. Majority of those that are willing (60.2%) do not know when and where to be screened. Most (93.8%) participants have a higher education certificate but lack a clear understanding of the risk factors and the HPV vaccine. The most frequently reported symptom of the disease among respondents is foul-smelling vaginal discharge (9.3%), pelvic pain (9%), bleeding after sex (4.1%), and abnormal vaginal bleeding (2.2%). Majority of participants (75.4%) reported not experiencing any of these symptoms.

Conclusion: There is a lack of clear understanding of the risk factors associated with cervical cancer among the study participants which contributed to the low uptake of HPV vaccine. We advocated for awareness campaigns, access and affordable cervical cancer screening services vaccine uptake.

Keywords: Risk factors; Human papilloma virus; Human papilloma virus vaccine; Cervical cancer

Introduction

Cervical cancer continues to be a significant public health concern globally, especially in low- and middle-income countries. According to the World Health Organization (WHO), it is the fourth most common cancer among women globally, with approximately 604,000 new cases and over 31 million deaths yearly [1]. South-East Asia, Central America, and sub-Saharan Africa have the highest incidence and mortality rates and these areas are also known for having little access to screening and immunization services [2]. In Nigeria, cervical cancer is the second most common cancer among women between the ages of 15 and 44, accounting for about 12,075 new diagnoses and 7,968 deaths each year [3]. The age-standardized incidence rate is approximately 18.4 out of every 100,000 women, indicating a serious public health concern [4]. At least 70% of cases of cervical cancer are caused by persistent infection with high-risk human papillomavirus (HPV) types, particularly HPV 16 and 18 [5]. Early sexual debut, having several sexual partners, smoking, using oral contraceptives for a long period of time, and immunosuppression are additional risk factors for cervical cancer. Socioeconomic

factors, such as limited access to healthcare services and low educational levels, also increases the risk [6]. Nigeria has one of the highest rates of human papillomavirus (HPV)-related diseases in Sub-Saharan Africa and several studies suggest that HPV is highly prevalent among Nigerian women [7]. The disease significantly affects women's health, resulting in considerable morbidity and mortality. In addition to physical health consequences, cervical cancer causes considerable psychological and economic burdens on affected women and their families [8].

The introduction of the human papillomavirus (HPV) vaccine has been an important breakthrough in preventing cervical cancer. This has significantly reduced the incidence of HPV infections and related cervical abnormalities. It serves as a primary prevention strategy. WHO recommends vaccinating girls aged 9-14 years before they become sexually active. The vaccines are highly effective against infections caused by HPV types 16 and 18 [9]. Clinical studies have proved the vaccine's efficacy in preventing infections caused by high-risk HPV strains. For instance, a study published in the *New England Journal of Medicine* found that among Swedish females aged 10 to 30, quadrivalent HPV vaccination was associated with a substantially reduced risk of invasive cervical cancer at the population level [10]. In low- and middle-income countries (LMICs), modeling studies predict that girls-only HPV vaccination with 90% coverage could reduce the median age-standardized cervical cancer incidence from 19.8 to 2.1 cases per 100,000 women-years over the next century, representing an 89.4% reduction [11]. These findings underscore the critical role HPV vaccination plays in reducing cervical cancer incidence and mortality worldwide.

Despite these efforts, the HPV vaccine uptake in Nigeria is influenced by a number of factors. They include limited awareness about cervical cancer and the vaccine, cultural and religious beliefs, misconceptions about cervical cancer and HPV vaccines, concerns about vaccine safety and logistics issues related to vaccine distribution and accessibility. Addressing these barriers is crucial to enhance vaccine acceptance and coverage [3]. Previous studies have indicated that all these contribute to the low uptake of HPV vaccine in Nigeria [12,13]. This study aims to evaluate the knowledge of cervical cancer and the uptake of the HPV vaccine among women attending FMC Keffi. By identifying the factors influencing awareness and vaccination rates, the findings of this research will provide insights into effective strategies for increasing HPV vaccine acceptance and, ultimately, reducing cervical cancer prevalence in Nigeria.

Materials and Methods

Ethical consideration

This study aims to evaluate the knowledge of cervical cancer and the uptake of the HPV vaccine among women attending FMC Keffi. A written informed consent approved by the Ethic Committee of the Federal Medical Centre Keffi, Nasarawa State, Nigeria, was obtained from all the study participants.

Study design

A descriptive cross-sectional survey study designed was carried out on 250 female's ages 18 to 50 years from September to December, 2024. The participants were informed about the study objectives after which information was collected using validated questionnaires on the knowledge on cervical cancer and vaccines were administered as well as demographics traits. By identifying the factors influencing awareness and vaccination rates, the findings of this research will provide insights into effective strategies for increasing HPV vaccine acceptance and, ultimately, reducing cervical cancer prevalence in Nigeria.

Participants

Inclusion criteria: Eligible participants were female's ages 18-50 years in the Federal Medical Centre Keffi whose informed consent to participate.

Exclusion criteria: Patients <18-years-old or older than 50 years of age, and those who did not consent were excluded from the study.

Sampling: A well-structured quantitative questionnaire was used to obtain data on the demographic factors such as age, educational level, marital status, parity, occupation, and income level. The questionnaire provided information on the knowledge on cervical cancer and vaccines among the participants. Partial entries and none responses were excluded.

Statistical analysis: Statistical analysis was performed using the Statistical Package for the Social Sciences (SPSS) version 27. Measures of central tendency (mean), variability (standard deviations), proportions (percentages), and occurrence (frequencies) were computed. The 10 items on the knowledge dimension, 5 items on the attitude and 5 items on the perception were assessed using a five-point Likert scale ranging from 1 to 5 (1=Strongly disagree, 2=disagree, 3= neutral, 4=agree, and 5=strongly agree. The mean scores were calculated by summing the items and dividing by the number of items. Higher mean scores represented better knowledge or attitude. Chi-square test was used to determine the influence of knowledge and sociodemographic characteristics on the utilization of cervical cancer screening services. A p-value less than 0.05 was considered statistically significant.

Result

A total of 250 individuals took part in the study. Table 1 presents the sociodemographic details of the respondents. The largest age group is 18-25 years, making up 60.8% of the participants, followed by those aged 26-35 years (29.6%), 36-45 years (6.8%), and 46 years and above (2.8%). The average age of the participants was 25.92 years with a standard deviation of 7.31 years. The majority (80%) are single, 16% are married, and 4% are widowed. Most participants (75.6%) have not experienced pregnancy, and a significant portion (92%) have attended tertiary education. Regarding occupation, 42% are students, 31.6% work in offices or formal jobs, 21.6% are involved in skilled trades or technical work, and 4.8% are unemployed. Additionally, 80.8% of the respondents live in urban areas, while 19.2% reside in rural areas.

Table 1: Socio-demographic characteristics.

Age	Frequency	Percent
- 18-25 Years	152	60.8
- 26- 5 Years	74	29.6
- 36-45 Years	17	6.8
- 46 and above	7	2.8
Total	250	100
Mean Age	25.92 (±7.31)	
Marital Status		
- Single	200	80
- Married	40	16
- Widowed	10	4
Total	250	100
Parity		
- 0	189	75.6
- 1	21	8.4
- 2	16	6.4
- 3	10	4
- 4	6	2.4
- 5	4	1.6
- 6	4	1.6
Total	250	100
Level of Education		
- No formal education	6	2.4
- Secondary school	14	5.6
- Tertiary education	230	92
Total	250	100
Occupation		
- Formal worker	79	31.6
- Skilled trades and technical workers	54	21.6
- Student	105	42
- Unemployed	12	4.8
Total	250	100
Residential Area		
- Rural	48	19.2
- Urban	202	80.8
Total	250	100

Table 2 reveals that the majority of participants (96.8%) have not experienced menopause. Only 7.6% have ever undergone cervical cancer screening, with 36.8% of those having been screened over 5 years ago. A large portion (82%) reported no family history of cervical cancer, 3.6% confirmed a family history, and 14.4% were unsure. Regarding viral infections, 10% of participants have been diagnosed, with the most common being HBV (61.5%), followed by HIV (23.1%), and HCV (15.4%). Additionally, 1.2% of the participants reported have been diagnosed with cervical cancer in the past.

Table 2: Respondents' history.

		Frequency	Percent
Have you undergone menopause	No	242	96.8
	Yes	8	3.2
	Total	250	100.0

Have you ever been screened for cervical cancer	No	231	92.4
	Yes	19	7.6
	Total	250	100.0
Last screening	Less than 1 year ago	6	31.6
	1-2 years ago	3	15.8
	2-5 years ago	3	15.8
	More than 5 years ago	7	36.8
	Total	19	100.0
Do you have a family history of cervical cancer	No	205	82
	Yes	9	3.6
	Not sure	36	14.4
	Total	250	100.0
Have you ever been diagnosed with any Viral infections	No	224	89.6
	Yes	26	10.4
	Total	250	100.0
If yes, which?	Hepatitis B	16	61.5
	Hepatitis C	4	15.4
	HIV	6	23.1
	Total	26	100.0
Have you ever been diagnosed with cervical cancer	No	247	98.8
	Yes	3	1.2
	Total	250	100.0

Table 3 indicates that the most frequently reported symptom among respondents is foul-smelling vaginal discharge (9.3%), followed by pelvic pain (9%), bleeding after sex (4.1%), and abnormal vaginal bleeding (2.2%). The majority of participants (75.4%) reported not experiencing any of these symptoms.

Table 3: Knowledge of respondents on cervical cancer.

Items	SD	D	N	A	SA	Mean (S.D)
Cervical cancer is primarily caused by human papilloma virus HPV.	3 (1.2%)	3 (1.2%)	44 (17.6%)	123 (49.2%)	77 (30.8%)	4.07* (±0.79)
Cervical cancer is a preventable disease through vaccination and screening.	6 (2.4%)	9 (3.6%)	32 (12.8%)	120 (48%)	83 (33.2%)	4.06* (±0.90)
Pap smear is one of the tests for detecting cervical cancer.	-	-	51 (20.4%)	93 (37.2%)	106 (42.4%)	4.22* (±0.76)
Smoking increases the risk of developing cervical cancer.	3 (1.2%)	21 (8.4%)	56 (22.4%)	94 (37.6%)	76 (30.4%)	3.88* (±0.98)
Cervical cancer is more common in women who have multiple sexual partners.	3 (1.2%)	28 (11.2%)	43 (17.2%)	93 (37.2%)	83 (33.2%)	3.90* (±1.02)
Vaginal bleeding is one of the signs of cervical cancer.	-	12 (4.8%)	53 (21.2%)	119 (47.6%)	66 (26.4%)	3.96* (±0.81)
Itching in the vaginal is one of the signs of cervical cancer.	3 (1.2%)	25 (10%)	57 (22.8%)	116 (46.4%)	49 (19.6%)	3.73* (±0.92)
Pain during urination is one of the signs of cervical cancer.	3 (1.2%)	12 (4.8%)	53 (21.2%)	118 (47.2%)	64 (25.6%)	3.91* (±0.87)
Pain in the abdomen is one of the signs of cervical cancer.	-	15 (6%)	82 (32.8%)	93 (37.2%)	60 (24%)	3.79* (±0.87)
HIV positive individuals have a higher risk of cervical cancer.	3 (1.2%)	15 (6%)	78 (31.2%)	98 (39.2%)	56 (22.4%)	3.76* (±0.91)
Overall, Knowledge	Frequency (Percent)					
- Poor	6 (2.4%)					

- Moderate	40 (16%)
- Good	204 (81.6%)

*Strongly Disagree (SD = 1-1.8), Disagree (D=1.81-2.60), Neutral (N=2.61-3.40), Agree (A=3.41-4.20), Strongly Agree (SA=4 .21).

Table 4 demonstrates that respondents possess a high level of knowledge about cervical cancer, with all item means exceeding 3.4. The most agreed statement is pap smear is one of the tests for detecting cervical cancer (4.22±0.76), followed by cervical cancer is primarily caused by human papilloma virus HPV (4.07±0.79), cervical cancer is a preventable disease through vaccination and screening (4.06±0.90), vaginal bleeding is one of the signs of cervical cancer (3.96±0.81), pain during urination is one of the signs of cervical cancer (3.91±0.87), cervical cancer is more common in women who have multiple sexual partners (3.90±1.02), smoking increases the risk of developing cervical cancer (3.88±0.98), pain in the abdomen is one of the signs of cervical cancer (3.79±0.87), HIV positive individuals have a higher risk of cervical cancer (3.76±0.91), and itching in the vaginal is one of the signs of cervical cancer (3.73±0.92). Overall, 81.6% of respondents have good knowledge of cervical cancer, 16% have moderate knowledge, and 2.4% have poor knowledge.

Table 4: Attitude of respondents on cervical cancer.

Items	SD	D	N	A	SA	Mean (S.D)
I believe that vaccines against HPV are effective in reducing the risk of cervical cancer.	-	3 (1.2%)	35 (14%)	140 (56%)	72 (28.8%)	4.12* (±0.68)
Fear of receiving a positive result from a cervical cancer screening test prevents me from getting tested.	26 (10.4%)	78 (31.2%)	57 (22.8%)	52 (20.81%)	37 (4.8%)	3.02 (±1.23)
I feel confident discussing cervical cancer and screening with my healthcare provider.	-	22 (8.8%)	62 (24.8%)	111 (44.4%)	55 (22%)	3.80* (±0.88)
Cervical cancer screening tests are too invasive and uncomfortable	3 (1.21%)	40 (16%)	70 (28%)	97 (38.8%)	40 (16%)	2.48 (±0.98)
I trust the accuracy of cervical cancer screening tests.	3 (1.2%)	-	87 (34.8%)	119 (47.6%)	41 (16.4%)	3.78* (±0.75)
Overall Attitude	Frequency (Percent)					
- Negative	10 (4%)					
- Moderate	127 (50.8%)					
- Positive	113 (45.2%)					

*Strongly Disagree (SD=1-1.8), Disagree (D=1.81-2.60), Neutral (N=2.61-3.40), Agree (A=3.41-4.20), Strongly Agree (SA=4.21-5). This is reversed for Negative statements.

Table 5 demonstrates that respondents' attitude on cervical cancer, The most agreed item is I believe that vaccines against HPV are effective in reducing the risk of cervical cancer (4.12±0.68), I feel confident discussing cervical cancer and screening with my healthcare provider (3.80±0.88), I trust the accuracy of cervical cancer screening tests (3.78±0.75), and Cervical cancer screening tests are too invasive and uncomfortable for women (3.52±0.98). Overall, 45.2% of respondents have positive attitude towards cervical cancer, 50.8% have moderate attitude, and 4% have negative attitude.

Table 5: Perception of respondents on cervical cancer.

Items	SD	D	N	A	SA	Mean (S.D)
There is stigma associated with discussing cervical cancer, which hinders open communication about the topic.	4 (1.6%)	31 (12.4%)	51 (20.4%)	115 (46%)	49 (19.6%)	3.70* (±0.97)
Cervical cancer is a serious health concern that should be prioritized in public health campaigns.	3 (1.2%)	4 (1.6%)	16 (6.4%)	102 (40.8%)	125 (50%)	4.37* (±0.77)
Religious or spiritual beliefs influence people views on cervical cancer and its prevention.	11 (4.4%)	18 (7.2%)	65 (26%)	108 (43.2%)	48 (19.2%)	3.66* (±1.01)
Cultural beliefs influence people view on cervical cancer and its prevention.	21 (8.4%)	24 (9.6%)	69 (27.6%)	101 (40.4%)	35 (14%)	3.42* (±1.10)
Cervical cancer affects not only the individual diagnosed but also their family and community.	21 (8.4%)	48 (19.2%)	50 (20%)	96 (38.4%)	35 (14%)	3.30 (±1.17)

*Strongly Disagree (SD=1-1.8), Disagree (D=1.81-2.60), Neutral (N=2.61-3.40), Agree (A=3.41-4.20), Strongly Agree (SA=4.21-5).

Table 6 presents respondents' perceptions of cervical cancer. The most strongly agreed-upon statement is that cervical cancer is a serious health issue that should be prioritized in public health campaigns (mean=4.37±0.77). This is followed by the belief that stigma surrounding discussions of cervical cancer hampers open communication about the subject (mean=3.70±0.97). Additionally, respondents agree that religious or spiritual beliefs (mean=3.66±1.01) and cultural beliefs (mean=3.42±1.10) influence people's views on cervical cancer and its prevention.

Table 6: Awareness of HPV vaccine.

Items		Frequency	Percent
Are you aware of the HPV vaccine?	No	80	32
	Not sure	18	7.2
	Yes	152	60.8
	Total	250	100
If yes, where?	Family or friends	26	17.1
	Healthcare provider	20	13.2
	Media (TV, radio, internet)	43	28.3
	School or educational institution	63	41.4
	Total	152	100
HPV vaccine prevents which of the following	HPV	174	43.10%
	Cervical	167	41.30%
	Others (anal, throat, penile)	63	15.60%
	Total	404	100.00%
What age range is recommended for the HPV Vaccine?	<9 years old	14	5.6
	9-14 years old	47	18.8
	Above 14 years old	94	37.6
	I don't know	95	38
	Total	250	100

Discussion

The study found that 60.8% of participants were between the ages of 18 and 25 years, with a mean age of 25.92±7.31 years. This age distribution correlates with the findings of Morounke et al. [14], demonstrating that younger women are largely the respondents in cervical cancer awareness studies. The considerable number of single participants (80%) and those possessing university education (92%) indicates that the study population is well educated, potentially affecting their understanding and perceptions of cervical cancer and its prevention. Comparable studies have shown that educational level is a major factor affecting cervical cancer awareness since women with higher degrees of education show better information on the disease, its risk factors, and preventative actions [15]. Despite the high awareness levels-82.5%-only 7.6% of respondents have undergone cervical cancer screening. Given the success of early diagnosis in lowering cervical cancer morbidity and death, the low acceptance is concerning. By helping to early detection of precancerous lesions, hence permitting quick care, research has demonstrated that cervical cancer screening drastically reduces both the incidence and death rates of the illness [16]. Still, low screening rates have been recorded in Nigeria and other sub-Saharan African countries for reasons including poor awareness, cultural attitudes, limited resources, and poor healthcare infrastructure [17]. The difference between awareness and screening emphasizes the need of interventions linking knowledge with behavior.

On a Likert scale, the study assessed participants' level of understanding. Most of the respondents (80%) correctly named human papillomavirus (HPV) as the main cause of cervical cancer; they also admitted the need of vaccination (81.2%), and the Pap smear as a detection tool (79.6%), Still, there are misunderstandings since 22.8% mistakenly believe that vaginal itching is a sign of cervical cancer. The results coincide with studies by Adegboyega et al. [18], showing that although many Nigerian women know about cervical cancer, common misconceptions on its symptoms and risk factors exist. This emphasizes the necessity of targeted health education campaigns to counteract false information and enhance the dissemination of factual knowledge in order to public health campaigns ought to give top priority to dispelling false ideas about cervical cancer and distributing accurate information via social media, community outreach initiatives, and medical professionals [19].

The main barriers to screening were lack of symptoms (75.4%) and inadequate knowledge of screening techniques. The results coincide with studies by Zenzano et al. [20], which highlighted the need of proactive healthcare policies encouraging regular screening, especially among younger women and pointed out similar obstacles. Moreover, healthcare workers represented a

small information source (5.6%), which emphasizes the need of improved patient-provider communication right away. Screening rates can be significantly changed by increasing the involvement of medical professionals in campaigns against cervical cancer. Studies show that women who follow advice from doctors are more likely than those who rely on other sources to be screened [21]. This emphasizes the need of teaching and arming medical practitioners to provide correct information and support screening during regular visits.

Other noted obstacles include financial restrictions and diagnosis anxiety. Many low- and middle-income nations have great difficulty in the cost of cervical cancer screening. [22] found that women's participation rates in Nigeria were much lowered by out-of-pocket screening costs. Reducing the cost of screening and including cervical cancer screening into main healthcare treatments could help to improve acceptance rates. Furthermore, deterring women from seeking screening services are psychological elements including fear of a cancer diagnosis, stigma, and fatalistic attitudes. To reduce anxiety and encourage involvement in screening programs, public health advertisements have to stress the benefits of early identification and the major treatability of precancerous lesions [23].

Though the study did not explicitly measure vaccination rates, awareness regarding cervical cancer prevention was rather strong. Still, accessibility and cost are important issues in Nigeria that restrict the general acceptance of HPV vaccinations. Makwe et al. [23] claim that low HPV vaccination coverage in Nigeria still results from high expenses, restricted availability, and ignorance. To boost coverage, policymakers should concentrate on helping HPV vaccines to be included into national immunization campaigns and subsidized. Countries that have effectively included HPV vaccination into their immunization programs have noted notable drop in cervical cancer incidence [24].

Over 90% of eligible girls in a study carried out in Rwanda, where the government runs a free HPV vaccination campaign, got the vaccination, so projecting a decline in cervical cancer cases over the next decades [25]. By working with international health organizations and pharmaceutical businesses to guarantee broad vaccination availability, Nigeria can implement such plans. Programs centered on communities can also serve to debunk false information and promote acceptance of vaccines.

Government actions aiming at cervical cancer prevention and screening acceptance should focus on strengthening healthcare systems, more financing for cancer control programs, and national screening rules application. Low screening rates discovered in Nigeria result from the absence of a well-organized national cervical cancer screening program. Because of their systematic screening campaigns, countries with organized screening systems-like the United Kingdom and Australia-have much lower cervical cancer incidence [26]. Early detection rates will be much improved by putting in place a thorough cervical cancer screening program combining regular Pap tests with HPV testing for qualified women.

Including cervical cancer screening into universal health coverage proposals helps to solve financial obstacles. Studies show that when insurance or government subsidies pay for the screening programs, women are more likely to participate. Mobile screening tools can also be used in rural areas to serve underprivileged groups who might not have access to medical facilities [26]. In conclusion, the burden of cervical cancer in the study area could be significantly reduced by awareness campaigns, access, and affordable screening services and vaccine uptake.

Conclusion

Based on our data, there is a lack of clear understanding of the risk factors associated with cervical cancer among the study participants which contributed to the low uptake of HPV vaccine. We advocated for awareness campaigns, access and affordable cervical cancer screening services vaccine uptake. Mobile screening tools can also be used in rural areas to serve underprivileged groups who might not have access to medical facilities.

Consent for Publication

Not applicable.

Availability of Data and Material

Data are available from the corresponding author upon request.

Competing Interests

The authors declare no conflict of interest.

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