



# FACTORS INFLUENCING THE UPTAKE OF HUMAN PAPILLOMAVIRUS VACCINE AMONG FEMALE UNDERGRADUATE STUDENTS AT THE UNIVERSITY OF CALABAR, CROSS RIVER STATE, NIGERIA.

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(Received 4 November 2024 Revision Accepted 5 February 2025)

## ABSTRACT

**Background:** Human Papillomavirus (HPV) infection is the most prevalent viral infection affecting the reproductive tract, and it is a leading cause of cervical cancer—the fourth most common cancer among women globally. Vaccination against HPV serves as an effective preventive measure, particularly among young adults, who are at increased risk.

**Objective:** This study examined factors influencing HPV vaccine uptake among female undergraduate students at the University of Calabar, Nigeria

**Methods:** A non-experimental quantitative approach utilizing a descriptive cross-sectional survey design was adopted. The study included 213 female undergraduate students selected through a multi-staged sampling technique. Data were collected using a structured questionnaire administered face-to-face, ensuring ethical considerations such as informed consent and confidentiality. Data analysis was performed with SPSS version 23, and results were presented using percentages and Chi-Square test to explore associations.

**Results:** Findings revealed a low rate of HPV vaccine uptake among participants, with only 2.3% of the 213 students reporting they had received the vaccine. Lack of awareness emerged as a major barrier to uptake, with 58.2% of students indicating they had not heard of the HPV vaccine prior to the study. Additionally, fears of vaccine side effects (mean=3.17), religious beliefs (mean=2.95), and misconceptions associating vaccination with promiscuity (mean=1.73) contributed to hesitancy. Notably, students who were married (13.1% of participants) or had higher monthly incomes (10.8% earning above ₦100,000) showed higher uptake rates. Furthermore, students with higher knowledge levels about HPV demonstrated significantly higher rates of vaccine acceptance, as indicated by the significant association between knowledge levels and vaccine uptake ( $p=0.003$ ). **Conclusion:** This study highlights the urgent need for tailored educational interventions to improve HPV vaccine awareness and address misconceptions among female undergraduates.

**KEYWORDS:** Factors, Female HPV vaccine, Uptake, undergraduate students

## INTRODUCTION

Human papillomavirus (HPV) is a significant global health concern due to its strong association with cervical cancer, responsible for approximately 91% of cases worldwide [1].

HPV is a sexually transmitted infection affecting the reproductive tract, with the World Health Organization (WHO) noting that most sexually active individuals will encounter it at some point in their lives. While more than 90% of infections clear naturally due to the body's

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immune response, persistent infection with high-risk strains, particularly HPV-16 and HPV-18, can lead to cervical cell abnormalities and, ultimately, cervical cancer over time [2]. This gradual progression underscores the critical role of preventive measures such as vaccination and early screening. Cervical cancer is the fourth most common cancer among women globally [3] and typically affects women in midlife, with over 15% of cases occurring in those over 65 years of age [4]. Preventive strategies include promoting safe sexual practices, educating about delayed sexual debut, and administering the HPV vaccine, which significantly reduces the prevalence of high-risk HPV types. Coupled with early detection methods, such as Pap smears, these interventions can reduce cervical cancer incidence and improve outcomes [4].

In Nigeria, however, the uptake of HPV vaccination remains low. Studies [5,6] indicate that this low uptake is due to inadequate awareness programs, cultural and religious misconceptions, and limited access to vaccination services. Despite government efforts, the HPV vaccine is still not widely integrated into the national immunization schedule, and access is primarily through private healthcare, making it financially inaccessible to many [10]. Young university students, particularly those living independently, are especially vulnerable due to their exposure to potential risk factors without sufficient preventive education or vaccination [4]. This study is guided by the Health Belief Model (HBM), which provides a framework for understanding health behaviors like vaccine uptake. The model's constructs—perceived susceptibility, perceived severity, perceived benefits, and perceived barriers—help explain why students may choose to accept or decline the HPV vaccine. For instance, students' perceived susceptibility to HPV, along with their understanding of the potential severity of cervical cancer, can lead to their motivation to be vaccinated. Additionally, beliefs about the vaccine's benefits, weighed against perceived barriers (such as costs or social stigma), play a key role in decision-making. By examining these factors, this study aims to assess the factors influencing uptake of HPV vaccination among female undergraduate students at the University of Calabar, with the goal of identifying knowledge and socioeconomic gaps that hinder uptake and contributing to broader cervical cancer prevention efforts in Nigeria.

## **METHODOLOGY**

This study on the factors influencing uptake of HPV vaccination among female undergraduate students at

## **Results**

the University of Calabar employed a non-experimental quantitative design, specifically a descriptive cross-sectional survey. This approach enabled an in-depth examination of factors influencing uptake of HPV vaccine in a real-world setting, providing insights into the factors influencing student engagement with HPV vaccination (Polit & Beck, 2012). The study was conducted at the University of Calabar in Calabar Municipal, South-South Nigeria, a diverse institution with approximately 40,645 students, of whom 22,750 are female (9). The study sample comprised of 213 female undergraduate students. Inclusion criteria were current female students who consented to participate and were mentally stable. The sample size was determined using Cochran's formula, yielding a final sample size of 213 after accounting for possible non-compliance. A multi-stage sampling technique was applied to recruit participants across different faculties. Initially, one department was randomly selected from each of the 15 faculties, followed by a random selection of one academic level within these departments. Systematic random sampling was then used to select participants within each level, ensuring proportional representation of female students across faculties.

Data collection was conducted through a structured questionnaire with four sections: (1) demographic information, (2) knowledge about HPV vaccination, (3) factors influencing vaccine uptake, and (4) uptake details, with a total of 26 items. Content and face validity were ensured through review by experts in the field, incorporating suggested adjustments to improve clarity and relevance. The reliability of the instrument was verified using a test-retest method with a sample from the University of Cross River State, yielding a Pearson correlation coefficient of 0.5 or above, confirming acceptable reliability. Questionnaires were distributed during lecture breaks to maximize response rates and allow for clarification of the study's objectives. Data were analyzed using SPSS version 23, with findings presented in tables and percentages. Chi-square analysis tested the study's hypotheses, exploring associations between variables of interest. Ethical considerations were integral to the study.

Permissions were obtained from university authorities and respective Deans of Faculties, and participants provided written informed consent, emphasizing confidentiality and the voluntary nature of participation, with the right to withdraw at any time. This ensured adherence to ethical standards and prioritized participant well-being throughout the research process.

Table 1: Demographic data of respondents (n = 213)

S/N	Variable	Frequency	Percentage (%)
1.	<b>Age:</b>		
	16 – 19 years	47	22.1
	20 – 24 years	72	33.8
	25 – 29 years	94	44.1
	<b>Year of study</b>		
	100L	41	19.2
	200L	30	14.1
	300L	66	40.0
	400L	27	12.7
	500L	49	23.0
3.	<b>Department:</b>		
	Crop science	12	5.6
	English and Literary studies	17	8.0
	Genetics and Biotechnology	15	7.0
	Pure and applied chemistry	18	8.5
	Science education	24	11.3
	Law	15	7.0
	Mechanical Engineering	5	2.3
	Banking and finance	16	7.5
	Social works	15	7.0
	Nursing Science	28	13.1
	Medical Laboratory Sciences	10	4.7
	Human Nutrition and Dietetics	17	8.0
	Medicine and Surgery	12	5.6
	Dentistry and Pharmacy	9	4.2
4.	<b>Religion:</b>		
	Christianity	198	93.0
	Islam	15	7.0
	Traditional	-	0.0
	Others	-	0.0
5.	<b>Marital status:</b>		
	Single	185	86.9
	Married	28	13.1
6.	<b>Tribe:</b>		
	Igbo	56	26.3
	Yoruba	31	14.6
	Hausa	25	11.7
	Others	101	47.4
7.	<b>Place of residence</b>		
	Hostel	62	29.1
	Off campus	97	45.5
	Parent/guardian home	54	25.4
8.	<b>Monthly income</b>		
	Less than ₦30,000	59	27.7
	₦31,000- ₦100,000	131	61.5
	Above ₦100,000	23	10.8

Source: Fieldwork, 2022.

Table 1 presents the respondents' demographic characteristics. The Table shows that out of the 213 respondents, most 94 (44.1%) of them were between 25-29 years of age; a greater proportion 66 (40.0%) were in their 3<sup>rd</sup> year of study; a higher percentage (13.1%) of the respondents were from the Department of Nursing Science; nearly all 198

(93.0%) the respondents were Christians; majority 185 (86.9%) were single; almost half 101 (47.4%) of them were from others tribe including the Efiks, Ibibio, Ejagham etc.; while a greater part 97 (45.5%) of the participants reside off campus; and majority 131 (61.5%) earns between ₦31,000 – ₦100,000 per month.

**Table 2: Knowledge of HPV-vaccine among the respondents (n = 213)**

S/No	Variable	Frequency	Percentage (%)
1.	Have you ever heard of HPV vaccine?		
	Yes	89	41.8
	No	124	58.2
2.	How did you hear about the vaccine?		
	Internet/social media	19	8.9
	Friend	11	5.2
	Parent and/or guardian	8	3.7
	Health worker	14	6.6
	Others	37	17.4
3.	Does HPV vaccine prevent cervical cancer?		
	Yes	78	36.6
	No	6	2.8
	I don't know	129	60.6
4.	Does the vaccine prevent against genital warts?		
	Yes	80	37.6
	No	7	3.2
	I don't know	126	59.2
5.	Who is eligible to get the vaccine?		
	Only females	88	41.3
	Only males	-	0.0
	Both males and females	1	0.5
	I don't know	124	58.2
6.	How many doses are recommended to be fully vaccinated?		
	1	26	12.2
	2	17	8.0
	3	41	19.2
	4	2	0.9
	I don't know	127	59.6
7.	Is the vaccine available in your town/city?		
	Yes		
	No	82	38.5
	I don't know	5	2.3
		126	59.2
8.	Where can you get the vaccine?		
	Within the school environment	2	0.9
	In the health facility	86	40.4
	Others	1	0.5
	I don't know	124	58.2

Table 2 shows that more than half 124 (58.2%) of the 213 respondents have not heard of HPV vaccine prior to the study. Among those respondents 89 (41.8%) who have heard of it, many 37 (17.4%) had their information from sources other than internet/social media, friends, parent and/or guardian, and healthcare workers; majority 78 (36.6%) of these participants responded 'yes' that HPV vaccine prevent cervical cancer; majority 80

(37.6) also affirmed that the vaccine prevent against genital warts; while nearly all 88 (41.3%) responded that the vaccine is meant only for females; majority 82 (38.5%) said 'yes' that HPV vaccine is available in their town/city; majority 86 (40.4%) answered that the vaccine is available in health facility; however, many 41 (19.2%) of these respondents responded that the recommended doses for full vaccination with HPV vaccine is 4 doses.

**Table 3: Uptake of HPV vaccine among the respondents (n = 213)**

S/No	Variable	Frequency	Percentage (%)
1.	Have you received HPV vaccine?		
	Yes	5	2.3
	No	208	97.7
2.	If yes, how many doses have you received?		
	1	4	1.8
	2	-	0.0
	3	1	0.5
	None	208	97.7

**Source: Fieldwork, 2022.**

Table 3 above presents the respondents uptake of HPV vaccine. According to the Table, only 5 (2.3%) out of the 213 respondents have been vaccinated with HPV vaccine prior to the study, while the remaining proportion 208 (97.7%) have not been

vaccinated. Among those vaccinated, only 1 (0.5) have received the recommended 3 doses of the vaccine, while the remaining part 4 (1.8%) received only once dose of the vaccine.

**Table 4: Factors influencing uptake of HPV vaccine among the respondents**

S/No.	Factors	Weighted mean	Standard deviation	Decision
1.	Vaccine too expensive	1.07	0.22	Insignificant
2.	Religious belief	2.95	0.17	Significant
3.	Cultural belief	1.49	0.54	Insignificant
4.	Encourages promiscuity	1.73	0.18	Insignificant
5.	Lack of information about the vaccine	3.82	0.11	Significant
6.	Interval between the doses is too long	1.22	0.16	Insignificant
7.	Vaccine side effects	3.17	0.63	Significant
8.	Distance to health facility	1.06	0.72	InSignificant

**Decision Rule:  $\bar{x} > 1.50 = \text{Significant}$   $\bar{x} \leq 1.50 = \text{Insignificant}$**

Table 4 presents the factors influencing uptake of HPV vaccine among the respondents. Data obtained under this research question was summarized using the weighted mean score. Based on the decision rule stated below the Table, the significant factors influencing uptake of HPV vaccine among the students include; lack of information about HPV vaccine (3.82±0.11), fear of vaccine side effects

(3.17±0.63), religious belief (2.95±0.22), and the perception that being vaccinated encourages promiscuity (1.735±0.18). Findings underscore the role of misinformation and cultural beliefs in vaccine hesitancy and suggest that addressing these misconceptions through comprehensive educational programs could improve uptake

Table 5: Contingency Chi-square analysis showing the association between the respondents' demographic characteristics and uptake of HPV vaccine (n = 213)

Demographic characteristics	Uptake of HPV vaccine			X <sup>2</sup>	P-value	Decision
	Received	Did not received	Row Total			
<b>Age</b>						
16 – 19 year	1	46	47	1.725	>0.05	Not Significant
20 – 24 years	3	69	72			
25 – 29 years	1	93	94			
<b>Column Total</b>	<b>5</b>	<b>208</b>	<b>213</b>			
<b>Year of study:</b>						
100L	0	41	41	0.951	>0.05	Not Significant
200L	1	29	30			
300L	4	62	66			
400L	0	27	27			
500L	0	49	49			
<b>Column Total</b>	<b>5</b>	<b>208</b>	<b>213</b>			
<b>Department:</b>						
Crop science	0	12	12	0.970	>0.05	Not significant
English and Literary Stud.	0	17	17			
Genetics & Biotechnology	0	15	15			
Pure & Applied Chemistry	1	17	18			
Science Education	0	24	24			
Law	0	15	15			
Mechanical Engineering	0	5	5			
Banking & Finance	0	16	16			
Social works	0	15	15			
Nursing Science	1	27	28			
Medical Lab. Sci.	1	9	10			
Human Nutrition & Diet.	0	17	17			
Medicine & Surgery	2	10	12			
Dentistry & Pharmacy	0	9	9			
<b>Column Total</b>	<b>5</b>	<b>208</b>	<b>213</b>			
<b>Religion</b>						
Christianity	5	193	198	0.388	>0.05	Not Significant
Islam	0	15	15			
Traditional	0	0	0			
Others	0	0	0			
<b>Column Total</b>	<b>5</b>	<b>208</b>	<b>213</b>			
<b>Marital status</b>						
Single	2	183	185	9.845	<0.05*	Significant
Married	3	25	28			
Others	0	0	0			
<b>Column Total</b>	<b>5</b>	<b>208</b>	<b>213</b>			
<b>Tribe:</b>						
Igbo	1	55	56	2.570	>0.05	Not Significant
Yoruba	0	31	31			
Hausa	0	25	25			
Others	4	97	101			
<b>ColumnTotal</b>	<b>5</b>	<b>208</b>	<b>213</b>			
<b>Place of residence:</b>						
Hostel	1	61	62	0.439	>0.05	Not Significant
Off Campus	3	94	97			
Parent/Guardian Home	1	53	54			
<b>Column Total</b>	<b>5</b>	<b>208</b>	<b>213</b>			
<b>Monthly Income:</b>						
Less than ₦30,000	0	59	59	13.282	<0.05*	Significant
₦31,000- ₦100,000	2	129	131			
Above ₦100,000	3	20	23			
<b>Column Total</b>	<b>5</b>	<b>208</b>	<b>213</b>			

\*p&lt;0.05

Table 5's Chi-square analysis identifies a significant association between vaccine uptake and marital status ( $p < 0.05$ ) and monthly income ( $p < 0.05$ ), indicating that single and higher-income respondents may be more inclined towards vaccination. Other

demographic factors, including age, year of study, and religion, show no statistically significant association with vaccine uptake, suggesting that income and marital status are more influential factors for this population.

**Table 6: Contingency chi-square ( $\chi^2$ ) analysis for the association between knowledge and uptake of HPV vaccine among the respondents (n = 213)**

Knowledge	Uptake of HPV vaccine		Row total	df	Cal $\chi^2$	p-value
	Vaccinated	Unvaccinated				
Good	5	73	78	1	8.862	.003*
Poor	0	135	135			
<b>Column total</b>	<b>5</b>	<b>208</b>	<b>213</b>			

\* $p < 0.05$

#### DECISION:

Since the p-value (.003) associated with the computed Chi-square value (8.862) is less than the stipulated level of significance (.05), the null hypothesis is rejected with a conclusion that there is a statistically significant association between knowledge and uptake of HPV vaccine among female undergraduate students in University of Calabar, Calabar.

#### DISCUSSION OF FINDINGS

This study identified a significant lack of awareness regarding HPV vaccines among female undergraduate students at the University of Calabar, with more than half of the respondents unfamiliar with HPV vaccination. Such low awareness levels are indicative of an informational gap in public health education, especially on university campuses. Notably, students who were aware of the HPV vaccine had learned about it from a variety of sources—healthcare workers, family, friends, and, to a lesser extent, social media platforms. This diverse source base suggests that while conventional health communication channels exist, they may not sufficiently emphasize HPV education. Many students understood that the HPV vaccine prevents cervical cancer, yet there was limited awareness of the recommended dosage and schedule, hinting at a fragmented understanding of vaccination protocols. This gap mirrors findings from similar studies among students at Ambrose Ali University and Lagos State University, where poor knowledge about HPV vaccination prevailed [4] [5]. Such consistency across Nigerian universities indicates an urgent need for targeted, in-depth educational initiatives that go beyond basic awareness and cover specific information on dosage, timing, and vaccine accessibility to improve knowledge among students. The findings revealed an alarmingly low HPV vaccine uptake rate among students, with almost no participants reporting complete adherence to the recommended three-dose schedule.

Only one student had fully completed the vaccination course, indicating both a general lack of engagement with the HPV vaccine and a failure to adhere to the full protocol among those who initiate it. This low uptake reflects broader trends reported in other Nigerian regions. For example, uptake rates of 0.5% among female secondary school students in Benin City and 2.6% among female university students in Lagos indicate similar barriers that likely extend beyond local influences, suggesting systemic factors at play across the country [10] [5]. A range of practical barriers—such as lack of awareness about dosage requirements, fear of side effects, and cultural concerns—seem to impede young women from fully engaging with HPV preventive measures. Therefore, a critical implication is that addressing these barriers may require health campaigns and vaccination programs to emphasize the importance of completing the full course, particularly on university campuses where young women can access routine health information and services. Several barriers emerged as influential in preventing HPV vaccine uptake among the study participants. A predominant factor was the lack of information about the HPV vaccine itself. Many students expressed that they had never encountered information on its benefits, safety, or administration, suggesting an essential gap in public health outreach specific to this age group. Additionally, misconceptions about the vaccine's implications—such as beliefs that vaccination might encourage promiscuity—reflected societal stigmas and misinformation. Such views parallel findings from research on Nigerian parents, who identified similar concerns regarding promiscuity and adverse side effects as deterrents to their daughters' vaccination [12]. In contrast, a study on female civil servants in Delta State highlighted cost and accessibility as primary barriers [13]. This discrepancy suggests that university students, particularly those with low or irregular incomes, may have distinct concerns from older, employed adults, requiring tailored interventions.

Addressing these misconceptions directly and offering comprehensive information about the vaccine's health benefits may help mitigate the social and psychological barriers influencing young women's decisions.

The association between demographic variables such as marital status and monthly income and HPV vaccine uptake highlights socioeconomic and relational factors that shape health behaviors. Married students showed a higher likelihood of being vaccinated compared to their unmarried counterparts, possibly due to greater awareness of HPV's impact on reproductive health or a heightened sense of personal responsibility in protecting their health and that of potential partners. Similarly, students with higher monthly incomes were more inclined to receive the vaccine, reflecting how financial capacity facilitates access to health services. These findings are consistent with studies associating income and marital status with greater health engagement, suggesting that beyond awareness, financial assistance or subsidies could enhance vaccine uptake among financially constrained students. Additionally, there was a clear link between knowledge level and vaccination rates, indicating that informed students were more likely to participate in HPV prevention. This reinforces the importance of knowledge-based interventions, emphasizing how essential it is to provide students with detailed and accurate information to facilitate informed decision-making regarding HPV vaccination [4] [14] .

## CONCLUSION

The study revealed significant gaps in knowledge and uptake of the HPV vaccine among female undergraduate students at the University of Calabar. Over half of the participants lacked prior knowledge of the vaccine, highlighting a critical need for improved educational initiatives. Among those aware, diverse sources of information were identified, including healthcare workers and peers, though many still had limited understanding of the vaccine's dosage and administration. Alarming, nearly all participants reported not receiving the HPV vaccine, with only one student completing the full three-dose regimen, mirroring low uptake trends seen in other regions of Nigeria. Key barriers to vaccination included insufficient information, fears of side effects, cultural misconceptions, and socio-economic factors, such as marital status and income, which significantly influenced vaccination decisions. The findings emphasize the urgent need for targeted interventions that address these barriers and enhance awareness and accessibility of the HPV vaccine among university students.

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