

# Human Papillomavirus Vaccine Acceptability and Uptake among Medical and Paramedical Students of a Nigerian Tertiary Health Institution

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**Abstract Background:** Human Papillomavirus (HPV) vaccine is expected to reduce the burden of cervical cancer globally. However, acceptability and uptake of this highly effective vaccine is not well known in most Nigerian communities. **Objective:** The study assessed predictors of HPV vaccine uptake among medical and paramedical students in the study population. **Method:** A cross-sectional study design was employed and stratified sampling technique used to recruit 310 consenting students in Bowen University Teaching Hospital, Ogbomosho, Nigeria; a Christian health institution. A pre-tested self-administered, semi-structured questionnaire was used for data collection. Both descriptive and inferential statistics were carried out. **Results:** Respondents' mean age was 21 ( $\pm 3.5$ ) years, 24.2% were adolescents, 21.0% of them knew HPV vaccination prevents cervical cancer, 61.8% knew vaccination should commence before sexual debut. Meanwhile, 38.0% and 51.0% of them had good knowledge on and positive attitude to the vaccine. Only 14.0% of the respondents had been vaccinated against HPV. There was increased odds of HPV vaccination among female respondents (OR=1.56; CI=1.26-1.31), respondents with positive attitude (OR=1.16; CI=0.11-0.22) and those who had engaged in unprotected sex (OR=0.19, CI=0.45-0.85). Acceptability rate was 73.9% but ignorance of availability of the vaccine in Nigeria and its high cost were among the main reasons for reduced vaccination uptake. **Conclusion:** The knowledge and practice of most of our respondents on HPV vaccination were low but acceptability rate was high. Most respondents were happy to recommend the vaccine to their loved ones.

**Keywords:** human papillomavirus, vaccination, attitude, knowledge, students, Nigeria

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## 1. Background

Human papillomavirus (HPV) infection is currently one of the most common infectious diseases of human reproductive tract worldwide. [1] HPV 16 and 18 infections are documented to be responsible for at least 70% of cervical cancer cases with serotype 16 being the most prevalent globally. [2] HPV infection has been linked with occurrence of penile cancer and also causes other cancers such as oropharyngeal and anal cancers aside other conditions, such as genital warts, that are equally associated with it. [1]

According to the World Health Organization (WHO), the highest prevalence of HPV is found in Sub-Saharan Africa (SSA); Nigeria with a growth rate of 2.6% and a projected population of about 200 million people is a major country in this sub-region. [3] In fact, Olesan et al., in a systematic review of genital HPV among men in SSA,

revealed an estimated prevalence ranging from 19.1-100%. Also, age-specific HPV prevalence is currently highest among people who are less than 25 years of age. [4] Moreover, the burden of HPV is said to be alarming among high risk groups such as men having sex with men (MSM). [4]

Globocan 2018 report shows that cancer of the cervix was seventh most common cancer globally, accounting for 3.2% of all cancer cases and 3.2% of cancer deaths. Over 31,955 new cases and 23,529 deaths were reported in the year 2018 in West African sub-region. [5] Current analysis from various cancer registries indicate that cervical cancer ranks second most frequently diagnosed female cancer in Nigeria [6] but HPV vaccination has not been incorporated into the Nigerian immunization schedule and males are not currently among the target groups for vaccination despite the HPV prevention benefits this exercise carries.

Since introduction of HPV vaccine in 2009, awareness on, knowledge about and its uptake have been low among

Nigerians with many parents, adolescents and youths demonstrating unfavourable attitudes to the vaccine. [7,8] One of the main factor of low HPV vaccine uptake could be its high cost. In Nigeria, one dose of HPV vaccine costs about US\$103. [9] Given that a large proportion (about 44.2%) of Nigerians live below the poverty line (less than US \$1.9 per day) [10], most parents may not be able to afford the vaccine for their adolescent children.

Most of the previous Nigerian studies on HPV and its vaccination had focused on mothers and/or adolescents who were undergraduate students in general [9,11]; only a few had targeted medical and paramedical students who are key to disseminating HPV vaccine-related information. [12] Onowhakpor et al reported that only 31.2% of Nigerian medical and dental students had good knowledge of HPV vaccine and the vaccination rate was estimated to be 3.7%. [12] This study aimed at providing further information on HPV vaccination among this group of students and to provide baseline information which can shape HPV vaccination programme in Nigeria.

## 2. Materials and Methods

### 2.1. Study Setting

This was made up of clinical students of Bowen University Teaching Hospital, Ogbomosho (BUTH). This is one of the few missionary and privately owned tertiary health institution in Nigeria. Students admitted into the institution are expected to demonstrate high moral values but the religious philosophy of the institution does not prevent them from adopting positive health behaviour such as receiving appropriate immunizations. Thus, students' activities are guided by Christian ideologies/principles and religiosity is expected to be a protective factor against different anti-social behaviour including engagement in risky sexual behaviour which could predispose them to HPV infection. About 350 students comprising those studying Medicine and Surgery, BSc Nursing Sciences, BSc Physiotherapy and Diploma in Nursing Sciences were on campus as at the time of the survey.

### 2.2. Sample Size Determination

Using Leslie-Kish formula for estimating single proportion in a population that is less than 10,000 people, a minimum sample size was estimated for the study. Considering the result of a similar study conducted among medical students of Lagos University Teaching Hospital by Adejuyigbe et al. [13], 21% of our study participants were assumed to have good knowledge of HPV vaccine. Tolerable margin of error was set at 5% and a non-response rate of 10% was envisaged among the respondents and corrected for. A cluster factor of 2 was used and a minimum sample size of 284 was estimated.

### 2.3. Sampling Method

Stratified sampling method was used to recruit study participants from April to May, 2018. Respondents were

placed into different strata based on their courses of study. Proportionate samples were taken from each of the course-strata by dividing the number of students in a particular course of study by the total number of students in the clinical wing of BUTH and multiplying the result by our estimated sample size. In each of the class visited, respondents were selected using the simple random sampling method (balloting) until our estimated quota for a class is reached. Both male and female students were interviewed.

### 2.4. Data Collection Instrument and Method

A pretested self-administered, semi-structured questionnaire was used for data collection. The questionnaire collected information on the socio-demographic characteristics of respondents, their awareness and knowledge of cervical cancer, awareness and knowledge of HPV infection, and its vaccines as well as the acceptability and uptake of HPV vaccination. The questionnaire was written in simple English language and needed no interpretation into local Nigerian languages since all our respondents were proficient in English language. Ten medical students were trained on questionnaire administration help in data collection. The instrument used for data collection was developed by the researchers based on review of literature. Face validity was done before pretesting among 30 medical students of Ladoke Akintola University Teaching Hospital, Ogbomosho, chosen by convenience sampling method. These students were not included in the main study. Ambiguous questions identified after the exercise were either re-phrased or removed completely in line with study objectives. The new version was pre tested again and was found to be accurate in eliciting needed responses. The test-retest coefficient for reliability was estimated and found to be 0.81

### 2.5. Data Analysis

Data collected were edited daily so as to ensure all the required items were appropriately answered. Data entry and analysis were done using Statistical Package for Social Sciences (SPSS) version 21.0. Descriptive statistics were carried out and Chi-square test was used to compare categorical variables. A stepwise binary logistic regression model was built at the multivariate level to identify significant predictors of HPV vaccine uptake among the respondents at 95% Confidence Interval and  $p < 0.05$ . Variables imputed into the logistic model were selected based on whether they were statistically significant at the bi-variate level or whether they had been reported in previous studies as significant factors associated with HPV vaccination.

### 2.6. Ethical Consideration

Ethical approval was obtained from the Ethical Review Committee of Bowen University Teaching Hospital, Ogbomosho. Written consents were obtained from the respondents at recruitment. Confidentiality was assured by making the questionnaires anonymous and by entering data collected in a passworded computer accessible only to the principal investigators.

## 2.6. Operational Definitions of Key Variables

**Practice of HPV vaccine:** This was defined as respondents who had received at least one dose of bivalent or quadrivalent HPV vaccine.

**Knowledge on HPV vaccine:** Ten questions were asked on HPV and HPV vaccine. Each correct answer attracted one point while incorrect answers attracted zero (0) point. Summation of scores obtained by each respondent was made and converted to percentages (ranging from 0 to 100%). Respondents who scored less than 50% were classified as having poor knowledge, those who scored 50-69.9% were categorized as having fair knowledge while those who scored at least 60% were categorized as having good knowledge.

**Attitude to HPV vaccination:** A five-point Likert Scale (ranging from strongly agree to strongly disagree) was used and eight questions were positively phrased for assessing respondents' attitude. Summation of scores was done for each of the respondents and converted to percentage (0 to 100%). Respondents who scored at least 50% were categorized as possessing positive attitude to HPV vaccination. Positive attitude indicated that respondents were either eager to be vaccinated or were willing to recommend the vaccine to others.

## 3. Results

A total of 320 questionnaires were administered to eligible respondents but 310 of them were returned satisfactorily completed (97% response rate). Almost one quarter (24.2%) of our respondents were adolescents. Other socio-demographic attributes and sexual behaviour of respondents are displayed in Table 1. Twenty-one percent of all the respondents knew HPV vaccination prevents cervical cancer while 55.5% of them stated the vaccine could prevent against genital warts. More than three-quarters (78.4%) believed that sexually active women were at risk of HPV infection but only 3.2% felt adolescents were at risk. While 70.6% agreed that all sexually active individuals need to be vaccinated, 18.6% agreed that only females need to be vaccinated. Although 61.8% knew that the ideal time to commence HPV vaccination is prior to first sexual experience, 4.2% agreed that vaccination is for individuals aged  $\geq 20$  years old. Also, 79.4% knew that the vaccine is available in the country but 53.2% did not know where to obtain it. In all, 38.0% had good knowledge of HPV vaccine while 51.0% had positive attitude to HPV vaccination (other findings are summarized in Table 2). Meanwhile, 46.0% of the respondents got information regarding HPV vaccine through didactic lectures (Figure 1). Only 14.0% of the respondents had received at least one dose of HPV vaccine before the survey. Almost three-quarters (73.9%) of the respondents indicated willingness to receive HPV vaccination in future. However, ignorance of availability of HPV vaccine in Nigeria and prohibitive vaccine cost were some of the main reasons for non-vaccination among respondents who were yet to be vaccinated (Figure 2).

The proportion of those who had been vaccinated against HPV was significantly higher among female respondents compared to their male counterparts (11.1%

vs. 5.3%,  $p=0.033$ ). The proportion was also significantly higher among those who had had sex without using condom (39.0% vs. 14.0%,  $p<0.001$ ) and among those with good attitude to HPV vaccination (17.8% vs. 9.8%,  $P=0.041$ ) (Table 3).

At the multivariate level (Table 4), the odds of getting vaccinated was significantly higher among female respondents compared to their male counterparts (OR=1.56; 95%CI=1.26-1.31). The odds of HPV vaccination was also significantly higher among those who demonstrated positive attitude compared to those with negative attitude (OR=1.16; 95%CI=0.11-0.22). Moreover, respondents who had had sex without using condom were significantly more likely to have been vaccinated against HPV compared to others (OR;0.19, 95%CI; 0.45-0.85).

**Table 1. SOCIODEMOGRAPHIC CHARACTERISTICS AND SEXUAL BEHAVIOUR OF STUDY PARTICIPANTS**

Variable	Frequency N=310	Percent (%)
<b>Age (years)</b>		
$\leq 19$	75	24.2
20-24	196	63.2
25-29	35	11.3
$\geq 30$	4	1.3
<b>Mean <math>\pm</math> SD (Range)</b>	21 $\pm$ 3.5	(16 – 33)
<b>Gender</b>		
Male	94	30.3
Female	216	69.7
<b>Religion</b>		
Christianity	290	93.5
Islam	15	4.8
Others	5	1.6
<b>Ethnicity</b>		
Yoruba	231	74.5
Igbo	37	11.9
Hausa	12	3.9
Others	30	9.7
<b>Course of study</b>		
Medicine and surgery	163	52.6
B.Sc Nursing	56	18.1
B.Sc Physiotherapy	32	10.3
Diploma in nursing Sciences	59	19.0
<b>Marital status</b>		
Single	295	95.2
Married	15	4.8
<b>Ever had sex</b>		
Yes	86	28.0
No	224	72.0
<b>Age at first sexual experience</b> n=86		
$\leq 12$	20	23.0
13 – 18	32	37.0
$> 18$	34	40.0
<b>Last sexual experience</b>		
Within the past one week	16	18.6
Within the past one month	13	15.1
Over a month ago	57	66.3
<b>Ever had sex without condom</b>		
Yes	13	15.1
No	73	84.9

Table 2. KNOWLEDGE, ATTITUDE AND PRACTICE OF RESPONDENTS ON HPV AND HPV VACCINATION

VARIABLE	FREQUENCY N=310	PERCENTAGE
<b>Diseases that could be prevented using HPV vaccine</b>		
Do not know	14	4.5
Cervical cancer	65	21.0
Genital warts	172	55.5
Genital herpes	46	14.8
Endometrial cancer	13	4.2
<b>People at higher risk of acquiring HPV</b>		
Do not know	10	3.2
Adolescents	23	7.4
Married women only	24	11.0
Sexually active women	243	78.4
<b>Gender of people who should be vaccinated</b>		
Do not know	9	2.9
Males only	26	8.4
Females only	56	18.6
Sexually active individuals	219	70.6
<b>Ideal time to commence vaccination</b>		
Do not know	23	7.4
Before first sexual activity	191	61.8
Age 20 and above	83	4.2
<b>Do you know where to obtain HPV vaccine in your environment?</b>		
Yes	132	42.9
No	166	53.2
Don't know	12	3.9
<b>Overall knowledge score on HPV vaccine</b>		
Good	117	38.0
Fair	93	30.0
Poor	100	32.0
<b>Attitude to HPV vaccination</b>		
Positive	157	51.0
Negative	143	49.0
<b>Ever received HPV vaccine</b>		
Yes	43	14.0
No	267	86.0
<b>Willing to receive HPV vaccine in future?</b>		
Yes	229	73.9
No	26	26.1

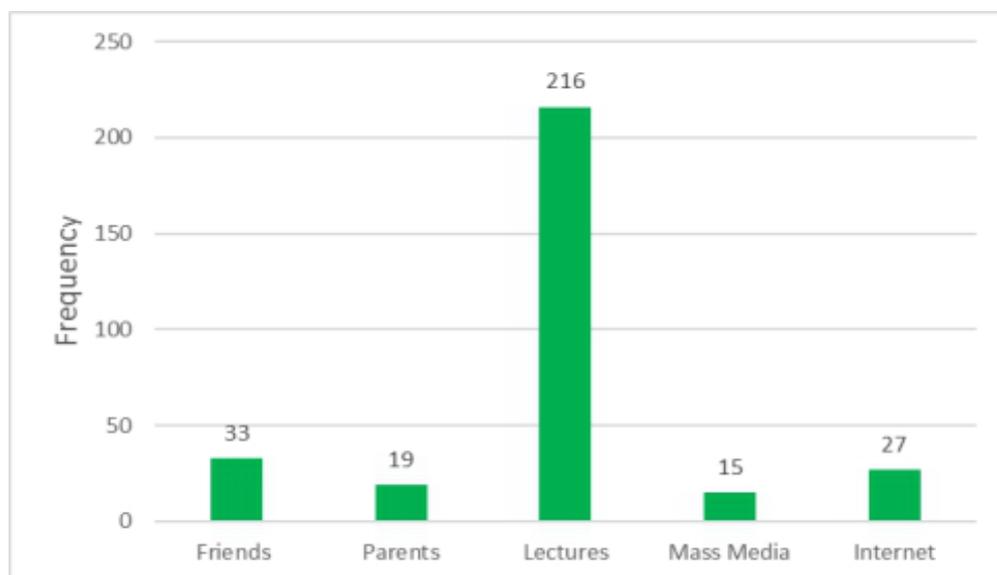


Figure 1. Sources of information about HPV vaccine (N=310)

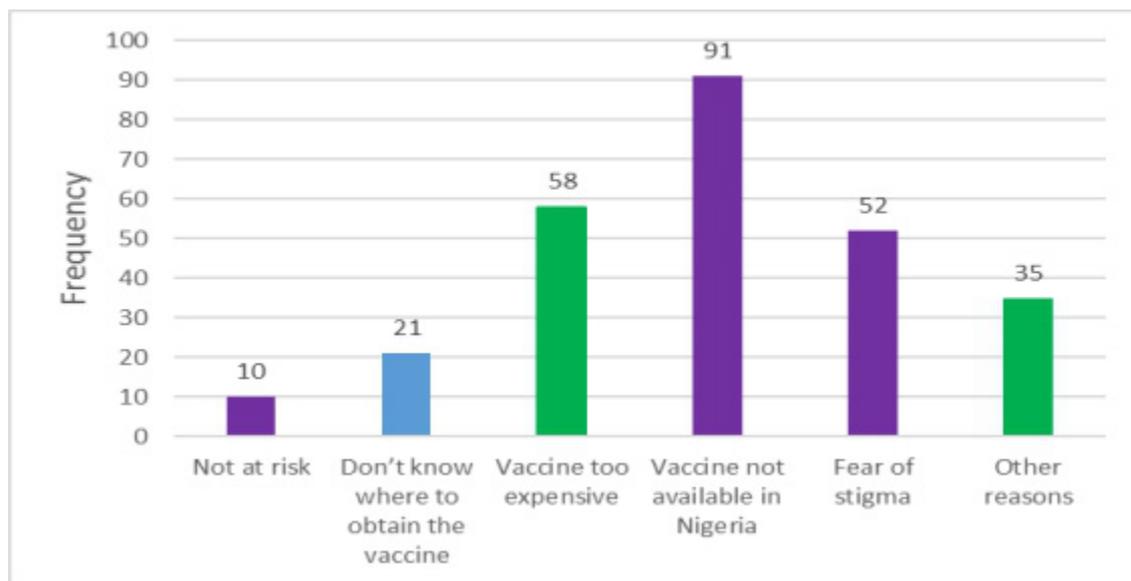


Figure 2. Reasons for non HPV vaccination among respondents (N=267)

Table 3. FACTORS INFLUENCING HPV VACCINATION AMONG RESPONDENTS

Variable	Had HPV vaccine		$\chi^2$	p-value
	Yes (%) N=43 (14.0)	No (%) N=267 (86.0)		
<b>Age Groups</b>			3.5129	0.318
≤19	7 (9.3)	68 (90.7)		
20-24	32 (16.3)	164 (83.7)		
25-29	3 (8.6)	32 (91.4)		
≥30	1 (25.0)	3 (75.0)		
<b>Gender</b>			4.524	<b>0.033*</b>
Male	5 (5.3)	89 (94.7)		
Female	24 (11.1)	192 (88.9)		
<b>Religion</b>			2.904	0.234
Christianity	39 (13.4)	251 (86.6)		
Islam	2 (13.3)	13 (86.7)		
Traditional	2 (40.0)	3 (60.0)		
<b>Course of study</b>			1.006	0.785
Medicine and surgery	24 (14.7)	139 (85.3)		
B.Sc Nursing	9 (16.1)	47 (83.9)		
Physiotherapy	3 (9.4)	29 (90.6)		
Diploma in nursing	7 (11.9)	52 (88.1)		
<b>Marital status</b>			0.004	0.951
Single	41 (13.9)	254 (86.1)		
Married	2 (13.3)	13 (86.7)		
<b>Ever had sex</b>			0.578	0.447
Yes	14 (16.3)	72 (83.7)		
No	29 (12.9)	195 (87.1)		
<b>Age at first sexual experience</b>			1.032	0.597
≤12	3 (15.0)	17 (85.0)		
13 – 18	7 (21.2)	26 (78.8)		
> 18	4 (12.1)	29 (87.9)		
<b>Ever had sex without condom</b>			18.592	<b>&lt; 0.001*</b>
Yes	5 (39.0)	8 (61.0)		
No	10 (14.0)	63 (86.0)		
<b>Knowledge of HPV and vaccination</b>			3.142	0.076
Good	11 (9.4)	106 (90.6)		
Poor	32 (16.6)	161 (83.4)		
<b>Attitude towards HPV</b>			4.183	<b>0.041*</b>
Good	28 (17.8)	129 (82.2)		
Poor	15 (9.8)	138 (90.2)		

\* Statistically significant at a p value<0.05.

Table 4. PREDICTORS OF HPV VACCINATION AMONG RESPONDENTS

Variable	Odd Ratio (OR)	95%CI (Lower-Upper)		P-value
		Lower	Upper	
<b>Gender</b>				
Male	1.56	1.26	1.31	0.02*
Female				
<b>Religion</b>				
Christianity	5.51	0.66	45.92	0.11
Islam	6.54	0.38	112.8	0.20
Traditional				
<b>Knowledge on HPV</b>				
<b>Course of study</b>				
Medicine and surgery	0.68	0.10	4.42	0.69
B.Sc Nursing	0.29	0.08	1.10	0.06
Physiotherapy	0.36	0.05	2.29	0.28
Diploma in nursing				
<b>Marital status</b>				
Single	1.32	0.22	7.98	0.76
Married				
<b>Ever had sex</b>				
Yes	0.76	0.38	1.53	0.45
No				
<b>Age at first sexual experience</b>				
≤12	0.81	0.14	4.50	0.81
13 – 18	0.43	0.10	1.80	0.25
> 18				
<b>Ever had sex without condom</b>				
No	0.19	0.45	0.85	0.03*
Yes				
<b>Knowledge on HPV vaccination</b>				
Good				
Poor	0.24	0.22	2.11	0.91
<b>Attitude to HPV vaccination</b>				
Positive				
Negative	1.16	0.11	0.22	0.01*

HPV=Human Papilloma Virus, CI=Confidence interval \* Statistically significant.

## 4. Discussion

The current examined knowledge, attitude and acceptability of medical and paramedical students on HPV vaccination. The study reveals that more than one-quarter (28.0%) of the respondents had experienced sexual activities before the survey. This finding is in agreement with the study conducted in 2010 by Daniyam et al. in which 38% of the medical students in Jos, Nigeria had had sex prior to the survey [28] The 28.0% sexual exposure rate in our study was however much lower than what was reported by Ojimah et al., in which 73.6% of university students in Southern Nigeria had initiated sex prior to their survey. [15] The disparity in figure in the two studies could have been due to differences in the structures of institutions used. Our study was conducted in a missionary medical institution where religiosity might have influenced students not to engage in risky sexual practices while on campus compared to their counterparts in public schools.

It is also revealed in the current study that a sizable proportion of the sexually active study participants had had sex without using condom. Even though this result agrees with the finding from the study conducted by Daniyam et al., [14] medical and paramedical students are expected to know the risk associated with practice of unprotected sexual activities.

Less than a quarter of our respondents knew that HPV vaccine could prevent against cervical cancer while 55.5% stated the vaccine could prevent against genital warts. This shows that knowledge of students regarding indications for HPV vaccination was quite low in the study population as Makwe et al. reported that 46.2% of students studied in the University of Lagos, Nigeria knew that HPV vaccine could prevent against cervical cancer. [16] Most of the students surveyed had poor overall knowledge of HPV vaccination. This is consistent with findings from previous studies. [12,17,18] It is also in consonance with systematic reviews by Petel et al. and Hendry et al [18,19]. A study by Mohd et al., among Malaysian medical students concluded that being a medical student does not guarantee good knowledge on HPV and its vaccination. [21] Meanwhile, more than half of the respondents with good knowledge in the current study knew that HPV vaccination should commence before the first sexual experience. This calls for proper education of medical related students so that they can be sufficiently informed to help in disseminating accurate HPV vaccine facts to other students on campus and their patients when they become qualified to practice.

The proportion of our respondents who demonstrated unfavourable attitude to HPV vaccination was found to be high. This is in agreement with findings from previous

studies. [19,20] This observed trend of unfavourable attitude to HPV vaccination is not too different even in adult populations. A qualitative study conducted among African parents living in England revealed that HPV vaccination was generally unacceptable to them. [22] All these point to the fact that there are still many misconceptions and poor understanding of the populace about HPV vaccination and the range of diseases being targeted for prevention in Nigeria were less well understood in the study population. Thus, reproductive health-related agencies and the Nigerian governments need to improve on HPV awareness campaigns targeting medical and paramedical students in tertiary institutions. When these students are sufficiently equipped with necessary HPV vaccine information, they are more likely to be agents of information dissemination in various Nigerian institutions and communities.

Only a small proportion (14.0) of our respondents had received at least one dose of HPV vaccine before the survey. This is in congruence with similar studies. [11,12] Moreover, HPV vaccination rate was 13.3% among undergraduate students in Hong Kong as reported by Chiang et al in 2016. [23] In Ilorin, Nigeria, only 1.9% of mothers had vaccinated their adolescents prior to the survey conducted by Adesina et al. [24]

Female respondents had increased odds of vaccination compared to their male counterparts in the current study. This finding is not an unusual one because HPV vaccination programme was initially designed for females. Inclusion of males in the exercise is relatively nascent in most developing countries like Nigeria. Our study also revealed that the odds of HPV vaccination was significantly higher among those who had engaged in sexual activities without using condom. Those who had engaged in unprotected sex should be expected to be more anxious about their HPV status and would have been more willing to opt for HPV vaccination compared to other students since they knew they were at higher risk of HPV and other infections. Our respondents with good attitude were more likely to have been vaccinated. Favourable attitude to health-related matters has been established as an important determinant of practice.

Meanwhile, ignorance of where to obtain HPV vaccine in Nigeria, high vaccine cost, fear of being tagged as being promiscuous and low risk perception were the main reasons for lack of vaccination among the unvaccinated respondents. Our findings were in tandem with what previous researchers had documented. Fear of children promiscuity was among the main reasons why HPV vaccination was unaccepted to African parents in a city north of England [25], while high cost of vaccination was the reason why 48.5% of medical and paramedical students in India were unwilling to be vaccinated. [18] Yet, Ozyer et al. revealed lack of information regarding HPV vaccine as the main reason for lack of vaccination among Turkish adolescents. [26] Some of the most common reasons for lack of HPV vaccination acceptance by mothers in Ibadan, South-West Nigeria included high vaccine cost, the fear of making children promiscuous, and the fear of unknown side effects. [13] The study of Ezeanochie and Olagbuji also revealed that the fear of causing promiscuity was the main barrier to HPV acceptance among mothers in Nigeria. [27]

The proportion of students who were willing to receive HPV vaccination was high in the study population. Hogue et al. reported that 77.3% of female university students in South Africa were willing to accept HPV vaccination. [28] Nigerian government should ensure that health facilities at all levels have constant supply of HPV vaccines in their institutions as only a few Nigerian hospitals currently have the vaccine available in stock. This may hinder access to the timid population of Nigerian youths and adolescents who are willing to receive the vaccine.

There is a need for HPV vaccination to be integrated into the Nigerian national immunization schedule and should be highly subsidised (if not free) to improve its availability, coverage, uptake and to ensure adequate protection of Nigerians against HPV.

This was a single institutional study with a lesser proportion (30%) of male students; respondents were predominantly Christian students. Thus, it may be difficult to generalize its findings on all Nigerian medical and paramedical students (particularly on the male students). However, the fact that a probability (stratified) sampling method was utilised in recruiting study participants would have increased the external validity of the study. Authors call for similar researches among students in public tertiary health institutions.

## 5. Conclusion

Only a few proportion of our respondents were adjudged to have possessed good knowledge by scoring at least 50% of the questions asked to assess HPV vaccination knowledge. HPV vaccination uptake was equally low despite their chosen courses in medical sciences.

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## Conflict of Interest

Authors declared no conflict of interest in conducting this research

## Authors' Contributions

AI made substantial contribution to conceptualization, design and proof reading the manuscript. SAO reviewed the manuscript for critical intellectual contents while OKI analysed and interpreted the data. All authors approved the final version of the manuscript.

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