

Knowledge and Attitude towards Human Papilloma Virus Vaccine among Female Undergraduate Students in Kano, Nigeria

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Abstract

Human papillomavirus (HPV) is associated with the huge burden of cervical cancer in sub-Saharan Africa. This study aimed to assess the knowledge and attitude of female undergraduate students towards HPV infection and the HPV vaccine. A descriptive cross-sectional study was used to study 204 female undergraduate students selected using a multistage sampling technique. Data were analyzed using IBM SPSS version 22.0 with a statistical significance set at $P \leq 0.05$. The minimum and maximum ages of respondents were 17 and 40 years with a mean \pm SD of 22.4 ± 3.4 years. About two-thirds of the students had a monthly income of $< \#18,000$. Only 38% of the students had good knowledge while more than half of the students (55.0%) had negative attitudes towards HPV and HPV vaccines. The majority (94.5%) had the attitude attributable to lack of awareness, (18.0%) due to the number of doses required, (26.5%) due to perceived reason for increased sexual promiscuity, and having one or no sexual partner (25.5%) respectively. A significantly higher proportion (69.2%, $p=0.01$) of students from other ethnic groups had good knowledge of HPV and HPV infection. Similarly, a significantly higher proportion of students with good knowledge (50.5%, $p=0.001$) were from science-based faculty. However, a significantly higher proportion of students having a positive attitude towards HPV and HPV vaccine were in their final college year (68.8%, $p=0.02$). The knowledge and attitude of the undergraduate students towards HPV infection and vaccine were suboptimal. The government and relevant stakeholders should intensify social mobilization activities on the importance and benefits of the HPV vaccine and the prevention of HPV infection.

Keywords: Attitude, Human Papilloma Virus, Infection, Kano, Knowledge, Students.

Introduction

Cervical cancer is one of the most common cancers in women with significant mortality linked to the Human Papillomavirus (HPV) [1]. It forms the third most common cancer burden of women globally with an estimated 569,847

new cases, contributing to 6.6% of all female cancers [1]. Up to 311,000 women died from cervical cancer, 85% of whom occurred in low- and middle-income countries [1]. There are over 140 serotypes of HPV, out of which 40 are transmitted through sexual routes [1, 2]. While most are benign, with infection resolving

spontaneously, high-risk HPV serotypes can persist resulting in precancerous lesions, and the consequent development of various forms of cancers [2]. The HPV serotypes 16 and 18 have the highest risk, while serotypes 6, and 11 have the lowest risk [3].

A significant proportion of HPV-associated cancers affect the cervix [4] and is also etiologically linked to 90 -93% of cases of cancer of the anus, 12-63% of cases of cancer of the oropharynx, 36 -40% of cases of cancer of the penis, 40 -64% of cases of cancer of the vagina and 40 -51% of cases of cancer of the vulva respectively [5]. The common risk factors for infection and eventual development of cancers are early age of marriage, multiple sexual partners, poor genital hygiene and smoking [6]. There are three prophylactic HPV vaccines, including the tetravalent vaccine (Gardasil®), protective against 4 HPV serotypes for women aged 9 to 45 years and men aged 9 to 26 years [4]. The bivalent vaccine (Cervarix®), protective against two HPV serotypes for women aged 9 and above [4], and the Gardasil 9®, protective against nine HPV serotypes, with significant coverage of about 90% of vulvar, cervical, vagina, and anal cancers [4].

All the vaccines were proven to be safe and effective, with limited serious adverse effects (AE) [7]. The World Health Organization (WHO) recommended HPV vaccination for ages between 9 to 14 years, with young adolescent girls being the primary target [8]. With the use of vaccines and other preventive measures, In the United States, the incidence of cervical cancer has fallen by 75 per cent over the last 40 years in the United States (US), and cervical cancer-related mortality in the UK has reduced by 40% [9], unlike the picture in China, [10], India [11], Spain [12], Sudan [13], the Kingdom of Saudi Arabia (KSA), [14] and Namibia respectively [15].

In Nigeria, about 40.43 million women are at risk of cervical cancer, and 23.7% were infected with HPV, [16]. The HPV vaccines are among

the most effective vaccines available [17] and have been introduced in over 80 countries, but available evidence suggests a low level of knowledge and negative attitude towards HPV infection and the HPV vaccine among female adolescents, especially in developing countries including Nigeria [18]. This is particularly worrisome in developing countries contributing to the largest global burden of infection and cervical cancer. This study aimed to identify knowledge and attitudes towards HPV infection and vaccines among female undergraduate students in Kano, Nigeria. The findings could provide information on the social mobilization framework for cervical cancer prevention among the target population.

Methods

Study Area

Kano is the most populous state located in North-Western Nigeria. The State has 44 local government Areas (LGAs). There are several public and private universities within the state training both medical and non-medical related courses. The Yusuf Maitama Sule University Kano, formerly named Northwest University Kano was established in 2012. It has 2 campuses, the city campus, and the main campus located along General Buhari Way Kofar Ruwa, Kano. The University has 6 faculties, and 14 academic departments, with 28 programmes approved by the National University Commission for both undergraduates and postgraduate students. There are over 16000 undergraduate students, 2000 administrative staff and 500 academic staff. The majority of students are indigenous Hausa-Fulani, although the Igbo, Yoruba and other ethnic groups are also well represented. The female students constituted about 9795 of the total students of the University. The majority of the students are inhabitants of Kano State with some from outside the State and the predominant languages are Hausa and Fulani.

Study Design and Population

A descriptive cross-sectional was conducted. All public universities in Kano were considered. Similarly, all full-time female undergraduate students were included, while part-time undergraduate, and postgraduate students and those temporarily away for any reason during data collection were excluded.

Sample Size Estimation

A minimum sample size (n) of 204 was calculated using, Z = the percentage point of the standard normal distribution curve, which the curve defines a 95% confidence interval as 1.96, P = the proportion of female students who were aware of HPV vaccine in University of Lagos [19], Nigeria of 14.4%=0.14, q = complementary probability i.e. $1-p$ ($1-0.14=0.86$), d = maximum sampling error allowed (precision) at 95% confidence limit i.e. 0.05, and 10% of the calculated sample size was added for possible non-response.

Sampling Method

A multi-stage sampling technique was used to recruit the participants for the study as follows:

Stage One: Selection Of University

The list of all the public universities in Kano was obtained from which YMU was randomly selected by simple balloting.

Stage Two: Selection of the Faculties

The list of all the faculties was obtained from which six were randomly selected by balloting.

Stage Three: Selection of the Departments

One department in each of the 6 selected faculties was selected by a simple random sampling technique.

Stage Four: Selection of Level

A simple random sampling technique was used to select one academic level of study in each of the selected departments. The lists of students were obtained from the heads of

respective selected departments and arranged serially in alphabetical order.

Stage Five: Selection of Students

The total number of students to be studied was proportionately allocated based on the total number of students in the selected levels. The sampling interval for each level selected across the department was calculated as the ratio of the sampling frame (total number of students in the selected levels) to the proportionately allocated sample size. The first respondents to be studied in each department and the selected level of that department were obtained by simple balloting within the calculated sampling interval of that department, thereafter, subsequent respondents were obtained by adding the calculated sampling interval of that department and selected levels until he equally allocated sample size was obtained.

Procedure for Data Collection

The data were collected using a semi-structured interviewer-administered questionnaire, adapted from previous studies [4-6, 13-16, 19]. The questionnaire consisted of three sections, section one asked about the socio-demographic characteristics of the respondent, and sections B and C sought information on Knowledge of HPV and HPV vaccines and the attitudes of female students towards the HPV vaccine respectively. Data were collected by six trained research assistants from February 2022 to May 2022. The research assistants were trained in the study objective, data quality and research ethics in dealing with human subjects. Twenty questionnaires were pre-tested in a tertiary institution outside the state.

Data Analysis and Measurement of Variables

Data collected from the field was entered into a Microsoft Excel spreadsheet and analyzed using IBM SPSS Statistics for Windows, version 22.0. Armonk, NY, USA: IBM Corporation. The quantitative data were

presented using mean and standard deviation for normally distributed data or median and interquartile range (IQR) for skewed data, while qualitative variables were presented using frequency and percentage. The knowledge of HPV was assessed using 16 questions which covered awareness of HPV infection, mode of transmission and prevention of HPV, whether HPV can cause cervical cancer and how HPV infection can be prevented. A correct answer to each question was given a score of “1” while an incorrect answer was scored zero. The total score was converted to percentage and classified as poor knowledge for a score of less than 50.0%, fair knowledge for a score of 50.0% to 69.9%, and good knowledge for a score of 70% and above [5]. A 5-point Likert scale ranging from “strongly disagree” to “strongly agree” was used in scoring attitudes toward the HPV and HPV vaccination. The scale consisted of 10 questions around “safety concerns”, “perception of needs”, “the importance of prevention” and “intentions to receive vaccination”. One point was allocated to correct responses while a zero point was allocated to wrong responses. The total attitude score was classified as a positive attitude with a score of 5 to 10 represented while less than 5 was classified as a negative attitude [5]. The outcome variables were knowledge of HPV and HPV vaccine (good, poor and fair) and attitude towards HPV and HPV vaccine (positive and negative) while the independent variables were the socio-demographic characteristics. The Person’s Chi-squared test was used to

determine the factors associated with knowledge and attitude at a 5% α level of significance.

Ethics

Ethical approval for the study was obtained from the Health Research Ethics Committee of the Kano State Ministry of Health with approval number NHREC/17/03/2018 dated 10th February 2022. All the principles of research ethics in dealing with human subjects were respected throughout the process of data collection

Results

Socio-Demographic Characteristics

A total of 204 female students were involved in the study out of which 200 of the questionnaires were retrieved and analysed giving a response rate of 98%. The minimum and maximum ages of respondents were 17 and 40 years with a mean \pm SD of 22.4 \pm 3.4 years. The majority (75.0%) were between 16 to 24 years of age. About two-thirds (66.0%) were of Hausa ethnic background, while more than two-thirds (70.5%) were residents in urban areas, and being sponsored (72.0%) by their parents. The minimum and maximum monthly income were #2000, and #100,000 with a median monthly income of #12,000 (interquartile range = 100,000–200,000) Naira. About two-thirds of the students had a monthly income of <#18,000, and the father's level of education (67.0%) was tertiary. Less than a quarter (24.0%) were married (Table 1).

Table 1. Socio-Demographic Characteristics of Students

Variable (s)	Frequency, (n=200)	Percentage, (%)
Age(years)		
16-24	150	75.0
>24	50	25.0
Ethnicity		
Hausa	132	66.0
Fulani	39	19.5
Yoruba	10	5.0

Igbo	6	3.0
Others	13	6.5
Religion		
Islam	181	90.5
Christianity	19	9.5
Place of residence		
Rural	59	29.5
Urban	141	70.5
Faculty		
Science-based	103	51.5
Non-science-based	97	48.5
Level of Study		
100	56	28.0
200	70	35.0
300	42	21.0
400	32	16.0
Sponsorship		
Self	13	6.5
Parent	144	72.0
Scholarship	24	12.0
Husband	16	8.0
Others	3	1.5
Monthly income (naira)		
<18,000	122	61.0
>18,000	78	39.0
Fathers' level of education		
Primary	7	3.5
Secondary	56	28.0
Tertiary	134	67.0
Quranic	3	1.5
Mothers level of education		
Primary	31	15.5
Secondary	86	43.0
Tertiary	73	36.5
Quranic	8	4.0
None	2	1.0
Marital status		
Single	147	73.5
Married	48	24.0
Divorced	5	2.5
Sexual activity		
Ever had	57	28.5
Never had	143	71.5

Knowledge of HPV and HPV Vaccine

The minimum knowledge score was 0, and the maximum was 17 with a median knowledge score of 9 (interquartile range = 0-13.0). Only 38% of the students had good knowledge, while 46% and 16% had a poor and fair knowledge of HPV and HPV vaccine respectively (Figure 1). More than half (59.0%) reported having heard

of HPV infection, while only 38.5% knew that multiple sexual partners are a risk factor for HPV infection. Less than half (35.5%) knew that using condoms could protect from HPV infection. Further, only 10% correctly provided the age range for HPV vaccination while less than half knew that the initial stage of HPV infection was asymptomatic (Table 2).

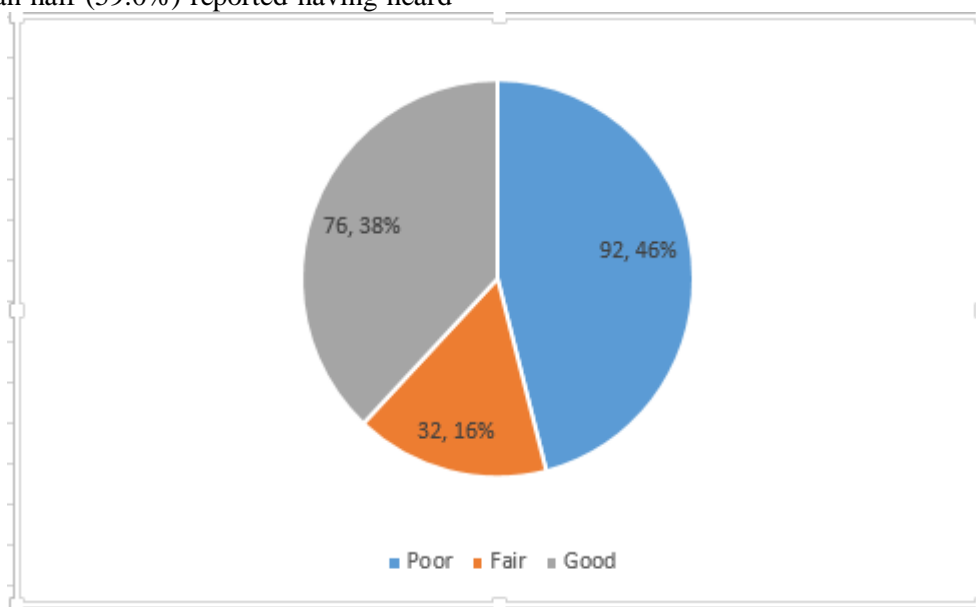


Figure 1. Knowledge of the Human Papilloma Virus Vaccine

Table 2. Correct Responses to Questions Assessing Knowledge of HPV and HPV Vaccine

Items assessing the knowledge of respondents	Frequency (n=200)	Percentage (%)
Have heard of HPV Infection	118	59.0
HPV is a sexually transmitted infection	104	52.0
HPV Infection is mostly asymptomatic	82	41.0
HPV related to cervical cancer	107	53.5
HPV occurs worldwide	94	47.0
HPV is a viral infection	103	51.5
HPV can cause genital warts	88	44.0
HPV can cause penile cancer	81	40.5
Weak immune system predisposes to HPV infection	94	47.0
Multiple sexual partners predispose to HPV infection	77	38.5
HPV infection can be prevented by the use of a condom	71	35.5

HPV infection can be prevented by vaccination	110	55.0
Information on the HPV vaccine	103	51.5
The vaccine is for both sexes	69	34.5
Eligible age group for the vaccine	20	10.0
Number of vaccine doses	71	35.5

Attitude Towards HPV and HPV Vaccine

The minimum attitude score was 0, and the maximum was 10, with a median attitude score of 4 (interquartile range = 3.0-6.0). More than half of the students (55.0%) had negative attitudes, while 45.0% had positive attitudes towards HPV and HPV vaccines (Figure 2). The majority (94.5%) had the attitude

attributable to lack of awareness of the infection and the vaccine, less than a quarter (18.0%) due to number of doses required, more than a quarter (26.5%) due to perceived reason for increase sexual promiscuity, and having one or no sexual partner (25.5%), while more than a half (56.5%) were willing to recommend the vaccine to others (Table 3).

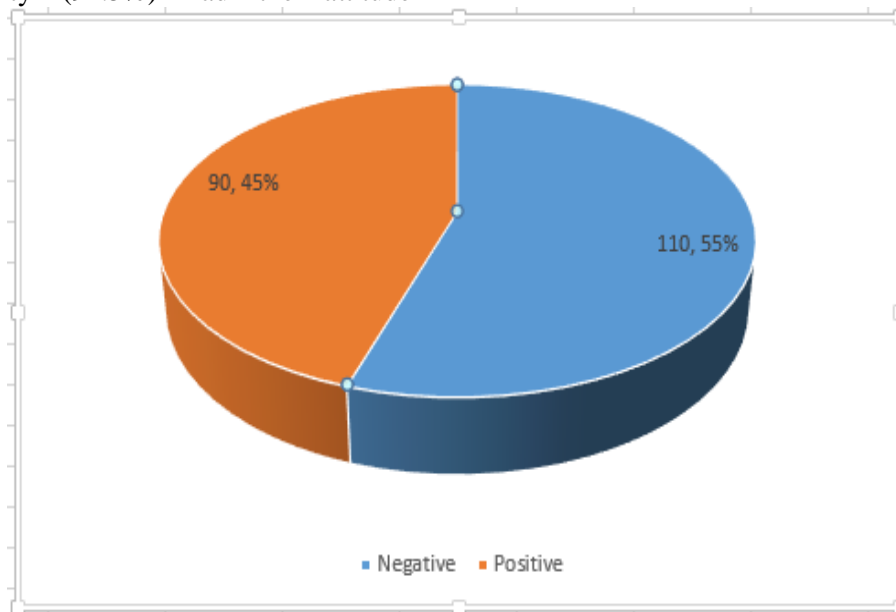


Figure 2. Attitude Towards Human Papilloma Virus Vaccine

Table 3. Correct Responses to Questions Assessing Attitude Towards HPV Vaccine

Items Assessing Attitude of HPV	Frequency(n=200)	Percentage (%)
A lack of awareness of the HPV Vaccine will prevent me from receiving the vaccine	189	94.5
Availability of vaccine	153	76.5
Cost of vaccine	112	56.0
Multiple doses of Vaccine are my reason for not accepting the HPV vaccine	36	18.0

Not being at risk of the disease can prevent me from receiving the vaccine	32	16.0
I am willing to recommend the HPV Vaccine to someone	113	56.5
Am ready to receive an HPV Vaccine or any other preventive intervention	127	63.5
Fear of side effects is critical in accepting the HPV vaccine	17	8.5
HPV Vaccine Increases Promiscuity	53	26.5
Having no or a single sexual partner is enough reason not to receive the vaccine	51	25.5

Factors Associated with Knowledge and Attitude towards HPV and HPV Vaccine

A significantly higher proportion (69.2%, $p=0.01$) of students from other ethnic groups had good knowledge of HPV and HPV infection. Similarly, a significantly higher

proportion of students with good knowledge (50.5%, $p=0.001$) were from science-based faculty (Table 4). However, a significantly higher proportion of students having a positive attitude towards HPV and HPV vaccine were in level 400, their final college year (68.8%, $p=0.02$) (Table 5).

Table 4. Factors Associated with Knowledge of Human Papilloma Virus Vaccine

Variable(S)	Knowledge of Respondents			χ^2	P value
	Poor	Fair	Good		
Age					
16-24	74(49.3)	21(14.0)	55(36.7)	3.2	0.2
>24	18(36.0)	11(22.0)	21(42.0)		
Ethnicity					
Hausa	63(47.7)	19(14.4)	50(37.9)	16.7	0.03*
Fulani	18(46.2)	9(23.1)	12(30.8)		
Yoruba	2(20.0)	4(40.0)	4(40.0)		
Igbo	59(83.3)	0(0.0)	1(16.7)		
Others	4(30.8)	0(0.0)	9 (69.2)		
Religion					
Islam	84(46.4)	29(16.0)	68(37.6)	0.2	0.947
Christianity	8(42.1)	3(15.8)	8(42.1)		
Faculty					
Science-based	38(36.9)	13(12.6)	52(50.5)	14.1	0.001*
Non-science-based	54(55.7)	19(19.6)	24(24.7)		
Level					
				9.0	0.176

100	31(55.4)	7(12.5)	18(32.1)		
200	32(45.7)	11(15.7)	27(38.6)		
300	21(50.0)	8(19.0)	13(31.0)		
400	8(25.0)	6(18.8)	18(56.3)		

**Statistically significant*

Table 5. Factors Associated with Attitude Towards Human Papilloma Virus Vaccine

Variable(s)	Attitude towards HPV Vaccine			
	Negative	Positive	χ^2	P value
Age groups				
16-24	85(56.7)	65(43.3)	0.7	0.4
>24	25(50.0)	25(50.0)		
Ethnicity				
Hausa	74(56.1)	58(43.9)	5.4	0.3
Fulani	25(64.1)	14(35.9)		
Yoruba	4(40.0)	6(60.0)		
Igbo	3(50.0)	3(50.0)		
Others	4(30.8)	9(69.2)		
Religion			1.4	0.3
Islam	102(56.4)	79(43.6)		
Christianity	8(42.1)	11(57.9)		
Faculty			2.6	0.1
Science base	51(49.5)	52(50.5)		
Non-science-based	59(60.8)	38(39.2)		
Level			10.4	0.02*
100	34(60.7)	22(39.3)		
200	38(54.3)	32(45.7)		
300	28(66.7)	14(33.0)		
400	10(31.3)	22(68.8)		

**Statistically significant*

Discussion

There are over 200 serotypes of HPV which can have an impact on human health and well-being [20-29]. Its genome encodes proteins that

make up the viral capsid [21]. Mucosal forms are sexually transmitted, predominantly through skin-to-skin contact [21], and it takes many years to develop the consequences of HPV infection [22, 23]. Several risk factors like

age, immunosuppression, multiparity, early age at first delivery, smoking, and long-term use of hormonal contraceptive agents are associated with increased risk of cervical cancers [24]. Preventive strategies for cervical cancer have resulted in a decrease in cancer-related mortality by 60% [25].

The level of knowledge we identified is in keeping with what was reported by a study conducted in southern Nigeria, though our study population had a negative attitude compared to what was reported [5, 16]. Similarly, a study conducted in Spain, [12], India, [6], Sudan, [29] and Uganda [30], reported a similar pattern to our study. Though this could be linked to different regions of the country which could be linked to socio-cultural differences compared with our study area, however, the willingness and uptake of the HPV vaccine by a study conducted in our study area signify better willingness to receive the vaccine presumably due to good knowledge and positive attitude [18], this is likely due to the targeted study population who were medical and health-related students and are therefore more likely to be informed on HPV and its associated consequences.

Our study targeted only female undergraduate students unlike other studies that reported the male students to be less knowledgeable compared with female students [26, 27, and 28], this calls for a comparative study in our study area or a study among the two sexes could provide useful information that can facilitate the development of preventive intervention framework. This is particularly important in looking at the relationship between a lack of knowledge of the HPV vaccine and vaccine rejection [27]. Unlike what we reported in terms of poor knowledge and negative attitude, despite suboptimal levels of knowledge of the HPV vaccine among undergraduate students, a study conducted in Indonesia reported a good level of willingness to receive the vaccine [1], and in Sudan, Abdallah et al, reported a positive attitude

towards HPV vaccination with a high level of desire to recommend HPV vaccine to the families and other members of the communities by the students [29]. This was also in keeping with what was found in a study conducted In Uganda [30]. The difference in these findings compared with our study may be due to the nature of our study participants who were only female undergraduate students. More so, our study population had limited information on cervical cancer and preventive strategies.

We found a good level of knowledge among Hausa undergraduate students and among those studying science-based courses to be important factors associated with knowledge of HPV and HPV vaccine, while undergraduate female students in the final year of their degree program had a significantly better positive attitude similar to the finding by a study conducted in Spain [12]. However, a study reported a lack of awareness, vaccine availability/accessibility, cost, and concerns about acceptability as significant factors [18]. Similarly, it was reported that in the US, UK, and Australia, poor knowledge of HPV and HPV vaccines and fear of side effects were the significant factors reported [31]. Further, in China, factors associated with knowledge and attitude were poor knowledge of HPV, cost of vaccine, and fear of side effects [27]. Similarly, the barriers to the HPV vaccine program in India were vaccine costs, health prioritization, variable epidemiologic surveillance data on HPV-related cancer burden, lack of awareness of HPV, vaccine safety, and societal and cultural barriers [31, 32]. More so in Indonesia, the factor in addition to high cost was a lack of good information flow on HPV-related topics [12]. In Sudan, poor knowledge of cervical cancer prevention was reported as the key factor [29]. The variable factors are attributable to socio-economic status across different regions and countries, cost, availability and accessibility of the vaccines, and socio-cultural beliefs among others. This calls for the provision of adequate service packages

including correct and timely information on cervical cancer prevention especially in developing countries including Nigeria.

This study is limited by studying only female undergraduate students which was conceived to provide information because they are the important target for HPV vaccine introduction into routine immunization globally which could provide information for risk mitigation on potential barriers to the uptake upon introduction of HPV vaccine.

Conclusions

The knowledge and attitude of the undergraduate students towards HPV infection and vaccine were suboptimal. Students of Hausa background and those studying science-based courses were found to have significantly

better knowledge of HPV and HPV vaccines, while the undergraduate students in their final year of study had significantly better positive attitudes. The government and relevant stakeholders should intensify social mobilization activities on the importance and benefits of the HPV vaccine and the prevention of HPV infection.

Conflict of Interest

There are no conflicts of interest.

Author's contribution

The authors contributed equally.

Data availability

The data are available upon proper request for scientific purposes.

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