

Knowledge of HPV, HPV-induced cancers, and HPV vaccine among university students in medical laboratory science disciplines: Nigerian study

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Abstract

Introduction: Human papillomavirus (HPV) is a leading cause of notorious diseases affecting humans. Students in medical laboratory science disciplines are a population group at high risk of being infected with HPV.

Aim: To assess the knowledge of HPV, HPV-induced cancers, and HPV vaccine among university students in laboratory science disciplines, studying at the Federal University, Birnin Kebbi, Nigeria.

Material and methods: A cross-sectional survey of 150 students in laboratory science disciplines at the Federal University, Birnin Kebbi was conducted using a self-administered questionnaire obtaining information on their socio-demographic characteristics and knowledge of HPV, HPV-induced cancers, and HPV vaccine. Collected data was analysed using SPSS version 20 software.

Results: The majority (52.7%) of the respondents were females. Only 45.3% of them had ever heard of HPV, of whom 26.5% ($n = 68$) found out about it from internet sources. No significant relationship ($p > 0.05$) exists between the socio-demographic attributes of the respondents and their awareness of HPV, except for their course of study ($p = 0.009$). Furthermore, an in-depth assessment of knowledge of these respondents ($n = 68$) shows that they have huge knowledge gaps on HPV, HPV-induced cancers, and HPV vaccine. Furthermore, there exists statistically significant associations between gender of respondents and their knowledge of: “transmissibility of HPV through sexual intercourse”, “magnitude of risk of having multiple sexual partners”, “extent of protection offered by HPV vaccination”, and “clearance of HPV infections” ($p < 0.05$).

Conclusions: There is a need for school-based education programs targeted at educating students on the prevention strategies that are needed to be HPV free.

Key words: human papillomavirus, vaccine, cancer, medical, students, knowledge, Nigeria,

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Introduction

Human papillomavirus (HPV) infection continues to be the leading cause of notorious diseases affecting humans: HPV-induced cervical cancer (CC), HPV-induced head and neck cancer (HNC), genital warts, etc. [1–6]. Amongst these diseases, the most devastating of all are CC and HNC [1–6]. These HPV-induced cancers are highly notorious, affecting the mucosal lining of the cervix (CC) and upper aero-digestive tract (HNC) [1–6].

Globally, about 510,000 women are newly diagnosed with invasive HPV-induced CC every year [7]. Also, about 30,000 men and women are newly diagnosed with HPV-induced HNC yearly [8]. Over 100 serotypes of HPV exist, including types 6, 11, 16, 18, 31, 33, 35, and 39 [1, 9]. However, not all HPV types are responsible for HPV-induced cancers; the types that causes HPV-induced cancers are called oncogenic HPVs, and they include types 16 and 18 [3, 4].

HPV transmission routes from person to person have been well documented in scientific literature, and they include: sexual intercourse (e.g. oral sex, anal sex, and vaginal sex), skin-to-skin contact, and parturition [10–14]. The prevalence of lifetime risk of HPV infection is as high as 80% [15]. Based on the aforementioned, it can be asserted that almost everybody will be infected with HPV infection at some point in their lifetime.

Despite the high virulence of HPV [1–15], it is unfortunate that many people in Nigeria are not aware of the virus. To make it worse, the vaccine that can prevent people from getting HPV-induced diseases is yet to be introduced into the Nigerian routine immunisation schedule, unlike in other developed countries like the USA, Australia, and Germany [16–18]. Without mincing words, the best way suggested to prevent HPV-induced diseases in Nigeria, due to the problem of nonexistence of HPV vaccination in Nigeria's routine immunisation program, is to educate the public about HPV and its risk factors.

After a view into the virulence and risk factors of HPV, the authors found that university students in laboratory science disciplines are at high risk of getting infected by HPV. This conclusion was arrived at based on logical reasoning: 1) these students are adults and they are of childbearing age; hence, some of them may be sexually active; 2) they often come into contact with bio specimens, some of which may be infected with HPV. Hence, it will be of significance to conduct a scientific study to assess their knowledge of HPV, HPV-induced cancers, and HPV vaccine. However, after an extensive literature search on HPV-related studies conducted in Nigeria, it was found that there is a paucity of literature on HPV knowledge among this high-risk group.

Aim

Hence, this study was conducted with the aim of assessing the knowledge of HPV, HPV-induced cancers, and HPV vaccine among university students in laboratory science disciplines, studying at the Federal University, Birnin Kebbi – a new university in Nigeria.

Material and methods

This study was a descriptive cross-sectional study conducted among students of Microbiology and Biochemistry degree programs at the Federal University, Birnin Kebbi, Kebbi State, Nigeria. Permission to conduct this survey was obtained from the Heads of the surveyed departments. The study tool was a questionnaire obtained from a similar study on HPV awareness conducted among Nigerian monotechnic freshmen [19].

A total of 273 and 257 students (from 1st year to final (4th) year) were enrolled in the Departments of Microbiology and Biochemistry, respectively, during the time of data collection (i.e. December 2018 to January 2019). Out of a total of 530 students eligible for the study, a sample of 150 students was used as the minimum sample size for the study; the sample size was determined based on the authors' convenience.

Table 1. Socio-demographic variables of the respondents

Variables	Frequency (<i>N</i> = 150)	Percentage
Gender:		
Male	71	47.3
Female	79	52.7
Age [years]:		
15–19	25	16.7
20–24	99	66.0
25–29	21	14.0
30 and above	5	3.3
Level of study:		
1 st year	40	26.7
2 nd year	3	2.0
3 rd year	31	20.7
4 th year	76	50.7
Ethnicity:		
Yoruba	21	14.0
Hausa	99	66.0
Igbo	6	4.0
Others	24	16.0
Religion:		
Christianity	26	17.3
Islam	123	82.0
Traditional	1	0.7
Course of study:		
Biochemistry	32	21.3
Microbiology	118	78.7
Family background:		
Monogamous	87	58.0
Polygamous	57	38.0
Polyandry	1	0.7
Single parent	5	3.3

Table II. Awareness and sources of information on HPV

Variable	Frequency	Percentage
Heard of HPV? (<i>n</i> = 150):		
Yes	68	45.3
No	82	54.7
Source of information on HPV* (<i>n</i> = 68):		
Friends	6	8.8
Parents	1	1.5
TV/radio	15	22.1
Internet	18	26.5
Doctor/nurse	7	10.3
Clinic/hospital	12	17.7
Others	24	35.3

*Multiple responses provided.

These students were visited in their classrooms, they were informed about the aims and objectives of the study; they were also informed that their participation in the study was strictly voluntary. Only those (*n* = 157) who were willing to participate in the study were issued a self-administered questionnaire after giving verbal informed consent.

Statistical analysis

All issued questionnaires were returned to the investigators. During the data cleaning process, seven questionnaires were discarded because they were not completely/appropriately filled. Hence, we used the data of 150 participants for the study. Data were computed using the SPSS version 20 software for analysis. The frequency distributions of all variables were determined; tests of associations between relevant variables were also done, using the χ^2 test. A *p*-value < 0.05 was used as the yardstick to determine the level of statistical

Table III. Association between socio-demographic characteristics of respondents and awareness of HPV

Variable	Aware of HPV <i>n</i> (%)	Not aware of HPV <i>n</i> (%)	Chi-square value (χ^2)	<i>P</i> -value
Gender:			0.355	0.551
Male	34 (47.9)	37 (52.1)		
Female	34 (43.0)	45 (57.0)		
Age [years]:			1.385	0.709
15–19	9 (36.0)	16 (64.0)		
20–24	48 (48.5)	51 (51.5)		
25–29	9 (42.9)	12 (57.1)		
30 and above	2 (40.0)	3 (60.0)		
Level of study:			16.764	0.001
100	13 (32.5)	27 (67.5)		
200	2 (66.7)	1 (33.3)		
300	7 (22.6)	24 (77.4)		
400	46 (60.5)	30 (39.5)		
Ethnicity:			3.974	0.264
Yoruba	8 (38.1)	13 (61.9)		
Hausa	44 (44.4)	55 (55.6)		
Igbo	5 (83.3)	1 (16.7)		
Others	11 (45.8)	13 (54.2)		
Religion:			1.077	0.584
Christianity	13 (50.0)	13 (50.0)		
Islam	55 (44.7)	68 (55.3)		
Traditional	0 (0.0)	1 (100.0)		
Course of study:			6.786	0.009
Biochemistry	8 (25.0)	24 (75.0)		
Microbiology	60 (50.8)	58 (49.2)		
Family background:			0.991	0.803
Monogamous	39 (44.80)	48 (55.2)		
Polygamous	27 (47.4)	30 (52.6)		
Polyandry	0 (0.0)	1 (100.0)		
Single parent	2 (40.0)	3 (60.0)		

significance in the χ^2 test. Results generated were presented as descriptions and as tables.

Results

More than half (66%) of the respondents were within the age range of 20–24 years; their gender distribution was fairly even: 52.7% were females. Roughly half (50.7%)

were in their 4th year of study, 66.0% were Hausas, 82.0% were Muslims, 78.7% were in a Microbiology discipline, and 58.0% had monogamous family background (Table I).

Among the entire 150 respondents that were included in this study, only 45.3% of them had ever heard of HPV, of whom 26.5% ($n = 68$) found out about it from internet sources (Table II). Bivariate analysis showed no significant relationship ($p > 0.05$) between the cross-tabulated so-

Table IV. Assessment of knowledge of respondents on HPV and HPV vaccine

Items	True ($n = 68$) n (%)	False ($n = 68$) n (%)	Not sure ($n = 68$) n (%)	Correct answer [Ref.]
Men cannot develop HPV Infection	10 (14.7)	25 (36.8)	33 (48.5)	False [8]
HPV is very rare	26 (38.2)	6 (8.8)	36 (52.9)	False [7, 8, 15]
There are many types of HPV	29 (42.6)	7 (10.3)	32 (47.1)	True [1, 9]
HPV can be found in the mouth	17 (25.0)	9 (13.2)	42 (61.8)	True [8]
HPV can cause HIV/AIDS	12 (17.6)	17 (25.0)	39 (57.4)	False [20]
HPV can be transmitted through sexual intercourse	32 (47.1)	6 (8.8)	30 (44.1)	True [10]
HPV can be passed on during oral sex	28 (41.2)	6 (8.8)	34 (50.0)	True [8, 10]
Persons infected with HPV usually has symptoms	37 (54.4)	4 (5.9)	27 (39.7)	False [1]
Chances of getting HPV increases with number of sexual partners	26 (38.2)	7 (10.3)	35 (51.5)	True [8, 10, 11]
Most types of HPV cannot clear up on their own	21 (30.9)	8 (11.8)	39 (57.3)	False [15]
HPV can be cured by antibiotics	24 (35.3)	11 (16.2)	33 (48.5)	False [1, 5, 14, 20]
Most sexually active persons will get HPV at some point	19 (27.9)	10 (14.7)	39 (57.4)	True [8, 10, 11, 15]
Having sex at an early age increases risk of getting HPV	17 (25.0)	13 (19.1)	38 (55.9)	True [8, 10, 11, 15, 21]
HPV causes cervical cancer	34 (50.0)	2 (2.9)	32 (47.1)	True [7]
HPV causes head and neck cancer	14 (20.6)	9 (13.2)	45 (66.2)	True [8]
HPV is the same as HIV	3 (4.4)	39 (57.4)	26 (38.2)	False [20]
HPV test can tell how long you have been infected with HPV	14 (20.6)	13 (19.1)	41 (60.3)	True [23, 24]
If a person tests positive for HPV, he/she will definitely get HNC	7 (10.3)	14 (20.6)	47 (69.1)	False [1, 3, 4, 9]
There is an HPV vaccine that can prevent cancer in men and women	23 (33.8)	7 (10.3)	38 (55.9)	True [7]
HPV vaccine requires 3 doses	11 (16.2)	4 (5.9)	53 (77.9)	True [22]
HPV vaccine offers protection against all STIs	16 (23.5)	12 (17.6)	40 (58.8)	False [7]
HPV vaccine is most effective for those who have never had sex	8 (11.8)	12 (17.6)	48 (70.6)	True [1]
Someone who has had HPV vaccine cannot get HNC	6 (8.8)	13 (19.1)	49 (72.1)	False [1]
Recommended age for getting HPV vaccine is 11 to 26 years	11 (16.2)	9 (13.2)	48 (70.6)	True [1]

[Ref.] – Reference.

cio-demographic attributes of the respondents and their awareness of HPV, except for their course of study ($p = 0.009$) (Table III).

An assessment of the knowledge of those respondents ($n = 68$) that were aware of HPV shows that they have huge knowledge gaps on HPV, HPV-induced cancers, and HPV vaccine (Table IV) [20–24]. For instance, only one-quarter (25.0%) of them knew that HPV can be found in the mouth,

while less than half (47.1%) knew that HPV can be transmitted through sexual intercourse. Furthermore, there exists statistically significant associations between the gender of respondents and their knowledge of: “transmissibility of HPV through sexual intercourse”, “magnitude of risk of having multiple sexual partners”, “extent of protection offered by HPV vaccination”, and “clearance of HPV infections” ($p < 0.05$) (Table V).

Table V. Associations between gender and knowledge of HPV, HPV-induced cancers, and HPV vaccine

Items	Correct answers, grouped by gender		P-value
	Male ($n = 34$) n (%)	Female ($n = 34$) n (%)	
Men cannot develop HPV Infection	16 (47.1)	9 (26.5)	0.090
HPV is very rare	4 (11.8)	2 (5.9)	0.590
There are many types of HPV	13 (38.2)	16 (47.1)	0.450
HPV can be found in the mouth	5 (14.7)	12 (35.3)	0.146
HPV can cause HIV/AIDS	12 (35.3)	5 (14.7)	0.108
HPV can be transmitted through sexual intercourse	11 (32.4)	21 (61.8)	0.030
HPV can be passed on during oral sex	10 (29.4)	17 (50.0)	0.200
Persons infected with HPV usually has symptoms	2 (5.9)	2 (5.9)	0.208
Chances of getting HPV increases with number of sexual partners	8 (23.5)	18 (52.9)	0.017
Most types of HPV cannot clear up on their own	6 (17.6)	2 (5.9)	0.039
HPV can be cured by antibiotics	6 (17.6)	4 (14.7)	0.597
Most sexually active persons will get HPV at some point	9 (26.5)	10 (29.4)	0.390
Having sex at an early age increases risk of getting HPV	5 (14.7)	12 (35.3)	0.036
HPV causes cervical cancer	16 (47.1)	18 (52.9)	0.270
HPV causes head and neck cancer	7 (20.6)	7 (20.6)	0.936
HPV is the same as HIV	21 (61.8)	18 (52.9)	0.698
HPV test can tell how long you have been infected with HPV	5 (14.7)	9 (26.5)	0.401
If a person tests positive for HPV He will definitely get HNC	5 (14.7)	9 (26.5)	0.478
There is an HPV vaccine that can prevent cancer in men and women	10 (29.4)	13 (38.2)	0.131
HPV vaccine requires 3 doses	4 (11.8)	7 (20.6)	0.610
HPV vaccine offers protection against all STIs	11 (32.1)	1 (2.9)	0.001
HPV vaccine is most effective for those who have never had sex	2 (5.9)	6 (17.6)	0.079
Someone who has had HPV vaccine cannot get HNC	7 (20.6)	6 (17.6)	0.952
Recommended age for getting HPV vaccine is 11 to 26 years	4 (11.8)	7 (20.6)	0.403

Discussion

The problem of HPV-induced cancers Nigeria is huge [25]. Unfortunately, lay public awareness of the virus, its risk factors, and its associated diseases is generally low in Nigeria [26]. The general low awareness rate among the lay public may be due to the weak efforts on public education on HPV in Nigeria. However, health professionals and trainees are supposed to be at least aware of HPV, its risk factors, and associated diseases, even if they lack in-depth knowledgeable about HPV. In this study, we surveyed university students in medical laboratory science disciplines on their knowledge of HPV. We found that the majority of them had never heard of HPV at all. By comparing the awareness rate recorded in this present study with that reported in other literature, we found that the awareness rate recorded in this study is higher than that reported in a similar study conducted among Nigerian freshmen in health science disciplines [19].

Also, it was observed that internet and TV/radio were the two most utilised specific sources of our respondents' information on HPV. However, this finding contradicts what was reported in a Nigerian study conducted by Kanmodi *et al.* [19], where media and health practitioners were the top two sources of information on HPV among their respondents. This shows that there are diverse sources of information on HPV among Nigerian students in health disciplines.

It is also noteworthy that there were some erroneous conceptions among our respondents as regards information pertaining to HPV infection, HPV risk factors, HPV-induced cancers, and HPV vaccines, because many of them had incorrect knowledge about vital information on these themes. For instance, not many of our respondents actually knew that HPV can be transmitted through sexual intercourse. However, by putting gender distribution into play, our data analysis showed that the surveyed females were found to be generally more knowledgeable than males on issues pertaining to HPV transmission, HPV risk factors, HPV-induced cancers, and HPV vaccines. This finding is similar to that reported in a similar Nigerian study [19].

By taking a look at the peculiarities of our study population, it can be said that is very important to educate them on HPV because they are high-risk groups. Pertinently, if students in medical disciplines could demonstrate a knowledge gap as huge as that reported in this study, then it can be concluded that students in non-medical academic disciplines will demonstrate more knowledge deficits on the surveyed themes. However, there are many benefits associated with educating university students on HPV disease prevention; a major benefit is that they will be able to educate others on HPV and also take all necessary precautions against getting infected with the disease.

However, this study has its limitations. First, this study was a single-centre study, and it only surveyed students in medical laboratory science disciplines; hence, it will be difficult to make unguided generalisations based on the study data.

Conclusions

This study shows that there is a need for school-based education programs targeted at public education on the risks of HPV infection and as well the prevention strategies that are needed to be HPV free.

Conflict of interest

The authors declare no conflict of interest.

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