

Evaluation of Awareness of Human Papillomavirus and Cervical Cancer among Female Undergraduates of a Private Mission University in Southwestern Nigeria

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Abstract

Background: Human papillomavirus infection is most prevalent in the younger population and causes cervical cancer, which is the leading cause of cancer death worldwide. In 2018, cervical cancer was estimated to be 570,000 cases and 311,000 deaths; it ranked as the fourth most commonly diagnosed cancer and the fourth leading cause of cancer death in women. Cervical cancer can be prevented through health education and vaccination against HPV. This study aimed at evaluating the level of awareness of human papillomavirus and cervical cancer among female undergraduate students of Babcock University, Ogun state of Nigeria. **Methodology:** This was a cross-sectional, questionnaire-based study conducted among 310 female undergraduates of Babcock University in Nigeria from January to April 2019. The selection technique was a multistage random sampling method. The data collection was done using structured and self-administered questionnaires. Data collected were analyzed using IBM Statistical Package for Social Sciences (SPSS) statistics for windows version 25 and were presented in summary charts and frequency tables. P-values less than or equal to 0.05 were considered statistically significant. **Results:** Of 310 female students, 296 (95.5%) were aware of HPV infections. The majority, 215 (69.4%) of the students knew that HPV is sex-

ually transmitted. There was poor knowledge of the risk factors of HPV infection. Only, 65 (21.0%) were aware that HPV infection causes cervical cancer. A few proportions of students 79 (25.4%) were aware of the HPV vaccine. Consequently, only 44 (14.2%) have received HPV vaccination and some complained about the cost as a significant reason for not being vaccinated against HPV infection. **Conclusion:** The level of awareness of HPV infection, cervical cancer, and HPV vaccine uptake was very low in this study. There is a need to improve health education and awareness campaigns among students about HPV infection, cervical cancer, and HPV vaccine uptake.

Keywords

Human Papillomavirus, Cervical Cancer, HPV Vaccine, Undergraduates, Babcock University

1. Introduction

Human papillomavirus (HPV) is the most predominant viral infection of the reproductive tract, especially in females [1]. It is one of the sexually transmitted viral infections of public health concern. Most sexually active males and females will acquire the infection at some point in their lives with several cases having repeated infections. The most likely period to acquire HPV infection is around adolescence after becoming sexually active [1]. Human papillomavirus (HPV) is responsible for cervical cancer. HPV also causes other cancers such as anal, vulva, vagina, penis, and head-and-neck cancers [1] [2] [3]. Human papillomavirus is a DNA virus with a non-enveloped icosahedral structure (50 - 60 nm diameter). Their genomes comprise double-stranded circles (episomes) of approximately 8000 base pairs, which contain eight or nine open reading frames (ORFs) [4]. There are over 100 types of HPV, and are classified as low-risk and high-risk groups [1] [4] [5]. Prolonged infections with high-risk HPV types 16 and 18 have been associated with about 70% of all cervical cancer cases globally [1] [5] [6]. Among the HPV types responsible for the cutaneous disease are HPV types 2, 3, 10, 27, and 57 from the Alpha Genus, HPV types 4, 60, and 65 from the Gamma Genus, and HPV types 1 and 63 from the Mu Genus [4]. Such benign lesions are relatively common in the general population, particularly in children (33% positive) who may be encountering HPV types for the first time and in immunosuppressed individuals (45% positive) [4].

Human papillomavirus infection is most prevalent in the younger population with the highest rate in the age range of 18 to 30 years which include many undergraduate university students [5] [7]. In Nigeria, over 20% of women and 70% of men have an HPV genital infection and within the first three years of coitarche (first sexual intercourse), 50% of women have evidence of an HPV infection [5] [6].

In women, cervical cancer is one of the leading causes of cancer death worldwide [1] [8] [9]. In 2018, cervical cancer was estimated at 570,000 cases and

311,000 deaths, it ranked the fourth most commonly diagnosed cancer and the fourth leading cause of cancer death in women [9] [10]. Nonetheless, about 85% of the global mortality from cervical cancer occurs in developing countries, and the death rate is 18 times higher in low-income countries [9]. The highest regional incidence and death rates are reported in Africa [9] [11]. Cervical cancer is classified as the 2nd most predominant cancer among women in Nigeria and the 2nd most frequent cancer among women between 15 and 44 years of age with associated high mortality rates [12].

The major risk factors for cervical cancer are linked to exposure to HPV [9]. Likewise, there are other risk factors associated with cervical cancers which include early coitarche, multiple sexual partners, smoking, high parity, and low socioeconomic level [9] [13].

Cervical cancer can be prevented through health education and vaccination against HPV. Vaccination is recommended as a primary preventive strategy for cervical cancer by the World Health Organization (WHO) [14]. Early diagnosis of the premalignant lesion and screening with proper medical intervention can guarantee a complete cure for cervical cancer. Regrettably, both preventive measures (health education and vaccination) and cervical screening services are still very low in Nigeria [5] [15]. Several studies have revealed poor knowledge and awareness of HPV, cervical cancer, and vaccination among undergraduate students in Nigeria [5] [16]. University undergraduate students are among the high-risk group not only based on their age, but also the tendency of having risky sexual behaviors such as having multiple sexual partners, and early age of sexual debut [16]. The awareness of HPV and cervical cancer becomes pertinent as a tool to increase knowledge, and acceptability of the HPV vaccine which will as well reduce the burden of cervical cancer. This study aimed at evaluating the level of awareness of human papillomavirus and cervical cancer among female undergraduate students of Babcock University, Ogun Nigeria.

2. Materials and Method

2.1. Study Design and Population

This was a questionnaire-based descriptive cross-sectional study carried out among 310 female undergraduate students of Babcock University between January and April 2019. The university comprises nine schools and one College of Health and Medical sciences. It has over 12,000 undergraduate students and also postgraduate students. The target population was female undergraduate students between age 15 and 30 years.

2.2. Ethical Issues

Approval for the study was obtained from the Institutional review board, Babcock University Health Research Ethics Committee (BUHREC) before the commencement of the study. Consent was also sought and obtained from each participant.

2.3. Sample Size Determination

The sample size for the study was determined using the formula: $n = z^2 pq / d^2$. Where: n = desired sample size when population > 10,000, z = level of significance at 95% CI (=1.96), p = proportion of the study population who are aware of HPV infection and of Cervical Cancer among the participants from similar previous study = 0.669, $q = 1 - p = 0.331$ and d = degree of accuracy desired, usually set at 0.05. The minimum sample size required for this study was 310. Participants were recruited using a multistage sampling technique.

2.4. Data Collection

A semi-structured and pre-tested questionnaire containing sections on demography, Knowledge of HPV infection, Knowledge of Cervical Cancer and HPV Vaccine and its uptake. The structured self-administered questionnaire contains 34 questions, 23 were related to the Human Papillomavirus and its vaccine and the remaining 11 are attitude-based questions.

2.5. Data Analysis

The data generated were entered on an excel sheet, examined for completeness, and analyzed using IBM SPSS version 25.0 (IBM Corp, Armonk, NY, USA). A Chi-square test was used to assess the association between qualitative variables. P-values less than or equal to 0.05 were considered statistically significant.

3. Results

3.1. Socio-Demographic and Baseline Characteristics of the Participants

A total of 310 female students were enrolled in the study. Their ages ranged from 15 to 30 years with a mean age of 23 ± 2 years. Most of the 180 students (58.1%) are single and others are dating. A higher proportion of the students 129 (41.6%) were in the 300 level of study, followed by 126 (40.6%) at the 400 level and 39 (12.6%) students at the 200 level. The participants were recruited from various departments which include Public Health 50 (16.1%), Medical Laboratory sciences 50 (16.1%), Computer Science 26 (8.4%), Economics 23 (7.4%), Computer Technology 22 (7.1%), Medicine 21 (6.8%), Information Technology 19 (6.1%), Mass Communication 18 (5.8%), Nursing Science 18 (5.8%) and others (**Table 1**).

3.2. Knowledge of HPV among Participants

The knowledge of HPV infection was evaluated and the majority of the students, 296 (95.5%) have heard of HPV infections. Most of them, 112 (37.8%) heard of HPV infection from television, 89 (30.1%) from family and friends, 75 (25.3%) from doctors, 7 (2.4%) from nurses or other healthcare professionals, and 13 (4.4%) heard of HPV from other sources. A higher proportion of the students, 215 (69.4%) knew that HPV is transmitted through sexual intercourse, and others

Table 1. Socio-demographics and baseline characteristics of the respondents.

Characteristics	Frequency (f)	Percentage (%)
AGE		
15 - 20	114	36.8
21 - 25	135	43.5
26 - 30	61	19.7
Total	310	100
MARITAL STATUS		
Married	0	0
Single	180	58.1
Dating	130	41.9
Total	310	100
LEVEL OF EDUCATION		
100	7	2.3
200	39	12.6
300	129	41.6
400	126	40.6
500	4	1.3
600	5	1.6
Total	310	100
COURSE OF STUDY		
Accounting	6	1.9
Information system	7	2.3
Computer Science	26	8.4
Computer Technology	22	7.1
Economics	23	7.4
History	13	4.2
ILD*	13	4.2
Information Technology	19	6.1
Law	15	4.8
Mass communication	18	5.8
Medical laboratory	50	16.1
Medicine	21	6.8
Nursing	18	5.8
Public health	50	16.1
Others	9	2.9
Total	310	100

*International Languages Department.

answered that the mode of transmission was through physical contact 45 (14.5%), kissing 19 (6.1%), and blood transfusion 31 (10.0%) (Table 2). The associated

Table 2. Knowledge of HPV infection among participants.

Questions	Frequency (f)	Percentage (%)
HAVE YOU EVER HEARD OF HPV[†]		
Yes	296	95.5
No	14	4.5
Don't know	0	0
Total	310	100
IF YES, FROM WHERE		
Doctor	75	25.3
Nurse or other health care professional	7	2.4
Family and friends	89	30.1
Television	112	37.8
Other	13	4.4
Total	310	100
MODE OF TRANSMISSION		
Physical contact	45	14.5
Sexual intercourse	215	69.4
Kissing	19	6.1
Blood transfusion	31	10.0
Total	310	100
MULTIPLE SEXUAL PARTNERS IS A RISK FACTOR		
Yes	236	76.1
No	30	9.7
I don't know	44	14.2
Total	310	100
EARLY EXPOSURE TO SEX IS A RISK FACTOR HPV		
Yes	123	39.7
No	46	14.8
I don't know	141	45.5
Total	310	100
HPV INFECTION CAN GO SPONTANEOUSLY WITHOUT ANY TREATMENT		
Yes	47	15.2
No	43	13.9
I don't know	220	71.0
Total	310	100
AGE AT FIRST INTERCOURSE		
≤14	0	0
15 - 16	73	23.5
≥17	27	8.7
Not yet	210	67.7
Total	310	100

[†]Human papillomavirus.

risk factors for HPV infection among female undergraduates were also assessed. Most of the participants, 236 (76.1%) knew that multiple sexual partners are a major risk factor for HPV infection, while 30 (9.7%) of students answered that multiple sexual partners is not a risk factor and a worrisome proportion of students, 44 (14.2%) were not aware that multiple sexual partners is a risk factor to HPV infection. One hundred and twenty-three (39.7%) were aware that early sexual intercourse leads to HPV infection, 46 (14.8%) of the students do not believe that early coitarche leads to HPV infection and 141 (45.5%) students do not know that early coitarche is a risk factor to HPV infection. None of the students had their first sexual intercourse below the age of 15 years, 73 (23.5%) had their first sexual intercourse between the age of 15 - 16 years, 27 (8.7%) had their first sexual intercourse at the age of 17 years and above, while a greater number of the participants 210 (67.7%) were yet to have their first sexual intercourse. Most students do not know that HPV infection can resolve spontaneously, while 43 (13.9%) answered that HPV infection cannot resolve spontaneously and 47 (15.2%) students were aware that there is a spontaneous resolution of some HPV infection (**Table 2**).

3.3. Knowledge of HPV Infection as a Cause of Cervical Cancer

Only 65 (21.0%) were aware that HPV infection leads to cervical cancer. Sixty-two (20.0%) of the students are aware that irregular menstruation is one of the symptoms of cervical cancer, while most participants 153 (49.4%) were aware that foul-smelling vaginal discharge is also one of the symptoms of cervical cancer and 33 (10.6%) were aware that bleeding after sexual intercourse is also a symptom of cervical cancer. The majority of the students 247 (79.7%) do not know that cervical cancer is a leading cause of cancer-related deaths among women in Nigeria. A higher proportion 246 (79.4%) of the students were aware of the Pap smear test but only a very few 28 (10.6%) knew that it is a screening test for cervical cancer (**Table 3**).

Table 3. Knowledge of cervical cancer among the participants.

Questions	Frequency (f)	Percentage (%)
*HPV INFECTION MAY LEAD TO CERVICAL CANCER		
True	65	21.0
False	54	17.4
I don't know	191	61.6
Total	310	100
MAJOR SYMPTOMS OF CERVICAL CANCER		
Lack of symptoms from genital area	40	12.9
Irregular menstruation	62	20.0
Smelly vaginal discharge	153	49.4
Itching in the genital area	16	5.2

Continued

Bleeding after sexual intercourse	33	10.6
High fever	6	1.9
Total	310	100
CERVICAL CANCER IS A LEADING CAUSE OF CANCER DEATHS IN WOMEN IN NIGERIA		
True	63	20.3
False	0	0
I don't know	247	79.7
Total	310	100
HAVE YOU EVER HEARD ABOUT PAP SMEAR TEST		
Yes	246	79.4
No	64	20.6
I don't know	0	0
Total	310	100
USE OF PAP SMEAR TEST		
Testing sexually transmitted diseases (STDs)	218	82.9
Treating cervical cancer	17	6.5
Cervical cancer screening	28	10.6
Total	310	100
NO NEED FOR PAP SMEAR SCREENING AFTER RECEIVING HPV VACCINATION		
Yes	51	16.5
No	41	13.2
I don't know	218	70.3
Total	310	100

[†]Human papillomavirus.

3.4. Knowledge of the HPV Vaccine and Its Uptake

Seventy-nine (25.4%) of the students answered that they were aware of the HPV vaccine. One hundred and ninety (61.3%) were not aware of the HPV vaccine. Of a few of the students, 44 (14.2%) had received the HPV vaccine, some received only one dose, 3 (1.0%), others received two doses, 13 (4.2%) and 28 (9.0%) had completed 3 doses. Twenty-seven (8.7%) students had cost as their major reason for not receiving the HPV vaccine. A few students 66 (21.3%) expressed readiness to take the vaccine if the cost of the vaccine is reduced (**Table 4**).

4. Discussion

Overall, the study showed that students had little or poor knowledge regarding

Table 4. HPV Vaccine and its uptake.

Questions	Frequency (f)	Percentage (%)
DISEASE PROTECTED BY †HPV VACCINE		
Yes	79	25.4
No	190	61.3
I don't know	41	13.2
Total	310	100
DISEASE PROTECTED BY HPV VACCINE		
Cervical cancer	18	5.8
Anal cancer	43	13.9
Vulvar cancer	109	35.2
Wart	89	28.7
Breast cancer	51	16.5
Total	310	100
HAVE YOU EVER RECEIVED A HPV SHOT OR VACCINE		
Yes	44	14.2
No	53	17.1
I don't know	213	68.7
Total	310	100
IF YES, HOW MANY DOSES HAVE YOU RECEIVED		
1 dose	3	1.0
2 doses	13	4.2
3 doses	28	9.0
IF HPV VACCINE AT MUCH LOWER COST, WOULD YOU GET IT		
Yes	66	21.3
No	51	16.5
I don't know	193	62.3
Total	310	100

†Human papillomavirus.

HPV. The poor knowledge of HPV infection as a cause of cervical cancer demonstrated among female university undergraduates in this study can be extrapolated to mean that the level of awareness will be lower in the community where there are more illiterate women. Similar studies conducted previously in Nigeria reported that 14.8% and 11.1% of female students were aware that HPV infection leads to cervical cancer in Benin and Lagos respectively [5] [16]. This is lower than what was reported in similar studies in Pakistan (55%) [17] and Florida in the United States of America (78%) [18]. The efficient HPV awareness programs and campaigns in these countries may have resulted in higher levels of knowledge of HPV infection and cervical cancer knowledge.

In this study, a good proportion (79.4%) had heard of the pap smear test but 10.6% knew that Pap-smear is used for cervical cancer screening. This poor knowledge of the use of Pap-smear will negatively affect the acceptability of Pap-smear cervical cancer screening.

About 69.4% knew that HPV infection is a sexually transmitted infection. Among those who were sexually active 90/310 (29%), and about 73/90 (81.1%) had their first sexual intercourse at the age of 15 - 16 years. This finding is higher than 52.7% who were reported to have had their first sexual intercourse between the ages of 15 and 19 years in a similar study in Benin [5]. This early coitarche was a serious implication for HPV infection especially when Isara and colleague [5] reported in a previous study that 25% of female undergraduates never condoms during sexual intercourse. More so, 60.3% are not aware that early sexual exposure predisposes to HPV infection. Early coitarche and multiple sexual partners are major risk factors for HPV infection. Therefore, there is a need for female undergraduates with all these identified risk factors to be educated early in life about the risk of HPV infections and cervical cancer.

Prevention of HPV infections is very vital in the prevention and control of cervical cancer. The awareness of the existence of the HPV vaccine was very poor (25.4%) among young female undergraduates in this study. Less than 6% were aware that vaccination protects against cervical cancer, anal cancer (13.9%), vulvar cancer (35.2%), and wart (28.7%). The poor knowledge of HPV vaccination and its importance has a negative influence on acceptability as well as the uptake of the vaccine. It is not shocking that only 14.2% have received the HPV vaccine. This finding is similar to low vaccine uptake reported in previous studies in Nigeria such as Abakaliki (6.9%) [19] and Lagos (2.6%) [16] but much lower than HPV vaccine uptake that was reported in advanced countries such as Germany (67.0%) [20]. Some of the factors that reduce HPV vaccine uptake include the cost and availability of vaccines. In this study, 8.7% of the participants identified cost as their major reason for not getting vaccinated which is a similar finding to reports of previous studies in Nigeria [5] [16] [19]. Interestingly, this study revealed that a significant proportion of the participants were aware of HPV infection but had very poor knowledge of the association between HPV infection and cervical cancer. The awareness of the HPV vaccine and its acceptability was also very poor among students which highlighted the need to scale up health education on HPV infection, cervical cancer, and HPV vaccination.

The limitation of this study was the relatively low participation of female students in the study. A more expansive quantitative survey and qualitative interviews would be required to elucidate the initial findings in a more substantive manner.

5. Conclusions

The level of awareness of HPV and cervical cancer among female undergraduate students of Babcock University was generally poor. The result of this study re-

vealed poor knowledge among the participants about HPV, associated diseases, mode of transmission, risk factors, and prevention. Despite the significant proportion of students who may be at risk of HPV infection, there was a low uptake of the HPV vaccine by the students.

This underscores the need to increase awareness campaigns and health education among university undergraduates as well as young females in the community.

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Authors' Contributions

All authors participated in the meeting summarized by this article. CJE, TAA, OS, VN, BT, CCO conceptualized and wrote the initial draft of the article. ACO, BF, AJO, BG, EVO, OIM, OEO, UC, and EF anchored data collection and description. CJE, CI, OO, and BE reviewed the manuscript. All other authors contributed significantly to the revisions of the article. All authors approved this version of the article for publication.

Consent for Publication

The authors hereby transfer all copyright ownership exclusively to the journal, if this work is published by the journal.

Conflicts of Interest

The authors have declared no conflict of interest.

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