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Awareness and knowledge of human papillomavirus, cervical cancer and human papillomavirus vaccines, and acceptance of human papillomavirus vaccination among female undergraduate students on a University Campus

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Abstract
Background: The awareness and knowledge of HPV, cervical cancer and HPV vaccines are essential for the acceptance of HPV vaccination.
Objective: To determine the awareness and knowledge of HPV, cervical cancer and HPV vaccines and acceptance of HPV vaccination among a cohort of female undergraduate students at the Benue State University
Methods and Materials: This was a questionnaire-based cross-sectional study involving 400 female undergraduate students of Benue State University from June 1, 2017 to September 30, 2017. Data was analysed using SPSS (Version 20.0) and the level of significance set at ≤0.05.
Results: The awareness of HPV was 31.0%. The knowledge of HPV, cervical cancer and HPV vaccines was 21.8%, 22.5% and 6.8% respectively. The acceptance of HPV vaccines was 96.0%. Age (20 – 29 years; $P = 0.003$), being single ($P = 0.019$) and being sexually active (P = 0.000) were positive correlates of knowledge of HPV, cervical cancer and HPV vaccines.
Conclusion: There was poor awareness of HPV and poor knowledge of HPV, cervical cancer and HPV vaccines among the respondents. However, the acceptance of HPV vaccination was quite high. There is a need for the incorporation of HPV vaccination into the national immunization programme in Nigeria.

Keywords: Awareness, knowledge, human papillomavirus (HPV), cervical cancer, HPV vaccines, GAVI.

Introduction
Cervical cancer, caused by oncogenic genotypes of Human Papilloma Virus (HPV) is the leading cause of cancer mortality among women in Sub-Saharan Africa [1-3]. Unlike other reproductive organ cancers, cervical cancer is potentially preventable. Prophylactic vaccinations against HPV infection can lead to significant reduction in the mortality and morbidity associated with the cancer and have proven to be cost-effective when offered to women before sexual debut or shortly thereafter to achieve optimal vaccine efficacy. The US Advisory Committee on Immunization Practices (ACIP) recommended routine HPV vaccination of girls at age 9 – 12 years and catch-up vaccination for female aged 13-26 years who have not been previously vaccinated or who have not completed the full immunization series [4-7]. Currently, there are three HPV vaccines that are safe and efficacious in preventing HPV infection: bivalent (Cervarix, Glaxo Smith Kline); quadrivalent (Gardasil, Merck), and nanovalent (Gardasil 9, Merck) HPV vaccines which protect against HPV 16 and 18; HPV 6, 11, 16 and 18; and HPV 6, 11, 16, 18, 31, 33, 45, 52 and 58 respectively. HPV 16 and 18 are the primary cause of 70% of all cervical cancers worldwide. HPV 6 and 11 are present in over 90% of all anogenital warts [8-10].
The success and benefit of primary prevention of cervical cancer depend on the level of awareness and knowledge of different aspects of the disease and acceptance of the HPV vaccines. Besides, cost has been previously cited as the biggest impediment to rolling out HPV vaccination on a national scale in Sub-Saharan Africa. In 2012, Global Alliance on Vaccine and Immunization (GAVI) announced a price of USD 4.50 per dose for all eligible GAVI alliance countries down from USD 120 per dose. The aim was to support the introduction of HPV vaccines into the national immunization programme of eligible countries in Sub-Saharan Africa with demonstrable ability or to co-fund demonstration projects for two years to guide planning and implementation of nationwide HPV vaccination programmes in countries, like Nigeria with DPT3 coverage of less than 70% [11-13].

The study is aimed at determining the awareness and knowledge of HPV, cervical cancer, HPV vaccines, and acceptance of HPV vaccination by undergraduate female students on the campus of the Benue State University, Makurdi, North-Central Nigeria.

Materials and Methods

This was a questionnaire-based cross-sectional study conducted among four hundred female undergraduate students on the campus of the Benue State University, Makurdi from June 1, 2017 to September 30, 2017. Participation was voluntary and only students who gave a written consent were recruited for the study.

Respondents were recruited through self-administered, pretested questionnaires consisting of questions on their socio-demographic characteristics, awareness and knowledge of HPV, cervical cancer, HPV vaccines, and acceptance of HPV vaccination, using convenience sampling technique. Assistance was offered to the respondents, when necessary, by trained residents from the Obstetrics and Gynaecology Department of the Benue State University Teaching Hospital Makurdi, North-Central Nigeria. Respondents were recruited until 400 properly filled questionnaires were obtained.

Data was analysed using SPSS (Version 20.0) and the level of significance was set at a *P*-value of < 0.05.

The study was conducted according to the revised Helsinki declaration guidelines of 2008 in Seoul, South Korea.

Results

The mean age of the four hundred respondents was 24.2 ±3.8 years with an age range of 15 and 39 years. Two hundred (50%) of them were in the age interval of 20-24 years. Two hundred and eight-two (70.5%) of them were Tivs, 60(15.0%) were Idomas, 26(6.5%) were Igedes and 32(8.0%) were from other ethnic groups such as Igbos, Fulanis, Hausas and Yorubas. All of the respondents were of the Christian faith. Three hundred and eighty-two (95.5%) of the respondents were single, 16(4.0%) were married and 2(0.5%) were divorced. Six (1.5%) of the respondents were medical students in their pre-clinical years of study, 142 (35.5%) were from the Faculty of Management Sciences, 20(5.0%) were from the Faculty of Law, 60(15.0%) were from the Faculty of Social Sciences, 126 (31.5%) were from the Faculty of Arts, 44(11.0%) were from the Faculty of Science and 2(0.5%) were from the Faculty of Education.

Three hundred and ten (77.5%) were sexually active whereas 90(22.5%) were yet to have sexual debut. The mean age at coitarche was 20.1 (±2.4) years, with a range of 13 – 27 years, for the sexually active. The mean number of life time partners was 2.0(±2.1) for the sexually active.

Seventy two (18.0%) of the sexually active had previous sexually transmissible infections and 174(43.5%) had used one method or another of contraception.

Awareness

One hundred and twenty-four (31.0%) were aware of HPV, fifty-two (42.0%) of those who were aware of HPV got their information from friends, 38(30.6%) got information through the mass media and 34(27.4%) got their information from the internet.

Knowledge of HPV

Eighty-eight (22.0%) of the respondents believed HPV was acquired through sexual intercourse, 2(0.5%) believed it was acquired through hand-shake, 10(2.5%) were of the opinion that it was acquired through kissing and 300(75.0%) did not know how it was acquired.

With regard to the disease caused by HPV, 2(0.5%) thought vulvovaginal candidiasis was caused by HPV, 22(5.5%) believed that breast cancer was caused by HPV, 80(20.0%) believed HPV was the causative agent of cervical cancer, 6(1.5%) believed that genital warts were caused by HPV whereas 290(72.5%) of the respondents did not know any disease condition caused by HPV.

Knowledge of Cervical Cancer

Ninety (22.5%) believed that cervical cancer was caused by factors that facilitated cervical exposure to HPV through sexual intercourse, 8(2.0%) believed that it was caused by factors transmitted by blood transfusion, 4(1.0%) believed that it was caused by genetic inheritance and 298 (74.5%) had no clue of the cause of cervical cancer.

Forty (10.0%) believed cervical cancer could be prevented by regular cervical screening (Pap smear), 36 (9.0%) believed it could be prevented through HPV vaccination, 14(3.5%) believed it could be prevented by the use of condoms, whereas 310 (77.5%) had no clue of how cervical cancer could be prevented.

Knowledge of HPV Vaccines

Fifty-six (14.0%) knew that HPV vaccine was used for the prevention of cervical cancer, 12(3.0%) believed it could be used for the treatment of cervical cancer, and 332(83.0%) did not know what it was meant for.

Twenty-two (5.5%) of the respondents mentioned cervarix as a HPV vaccine, 2(0.5%) mentioned Gardasil, 6(1.5%) mentioned Gardasil 9 and 370 (92.5%) could not mention any HPV vaccines.

Five (1.25%) of the respondents believed that 2 doses of the HPV vaccines were required, 2(0.5%) believed 3 doses were required, 3(0.75%) believed 4 doses were required, 10(2.5%) believed ≥ 5 doses were required and 380 (95.0%) had no idea how many doses were required.

Sixteen (4.0%) believed that the duration of HPV vaccination was 6 months, 10 (2.5%) believed the duration was 12months, 8(2.0%) believed the duration was 24 months, 6(1.5%) believed the duration was ≥ 36 months and 390(90.0%) had no clue of what the duration of HPV vaccination was.

Multivariate analysis showed that age (20 – 29 years; $P=0.003$), being single ($P = 0.019$) and being sexually active ($P = 0.000$) had positive correlation with knowledge of HPV, cervical cancer and HPV vaccines.

Acceptance of HPV Vaccines

Three hundred and eighty four (96.0%) would receive the HPV vaccine if it was available at an affordable prices and could prevent cervical cancer. However, 16(4.0%) of the respondents rejected the vaccine for fear of unforeseen safety concerns.

Table 1: Socio-demographic Characteristics of Respondents (n = 400)

Variable	Frequency	Percent
Age group (years)		
15 – 19	32	8.0
20 – 24	200	50.0
25 – 29	136	34.0
30 – 34	18	4.5
≥35	14	3.5
Ethnicity		
Tiv	282	70.5
Idoma	60	15.0
Igede	26	6.5
Others	32	8.0
Religion		
Christianity	400	100
Marital Status		
Single	382	95.5
Married	16	4.0
Divorced	2	0.5
Course of study/Faculty		
Medicine	6	1.5
Management Sciences	142	35.5
Law	20	5.0
Social Sciences	60	15.0
Arts	126	31.5
Sciences	44	11.0
Education	2	0.5

Table 2: Sexual History of Respondents (n = 400)

Variable	Frequency	Percent
Sexual activity		
Sexually active	310	77.5
Yet to commence sexual activity	90	22.5
Age at coitarche of the sexually active (n=310)		
13 – 16	14	3.5
17 – 20	186	46.5
21 – 24	96	24.0
≥25	14	3.5
Number of lifetime sexual partners of the respondents		
None	90	22.5
1 – 5	290	72.5
6 – 10	16	4.0
≥11	4	1.0
Number of respondents who had previous STIs -	72	18.0
Number of respondents who used contraception	174	43.5

Table 3: Knowledge of HPV (n = 400)

Variable	Frequency	Percent
How is HPV acquired?		
Through sexual intercourse	88	22.0
Through hand-shake	2	0.5
Through kissing	10	2.5
Don't know	300	75.0
What disease conditions can HPV cause?		
Vulvovaginal candidiasis	2	0.5
Breast cancer	22	5.5
Cervical cancer	80	20.0
Genital warts	6	1.5
Don't know	290	72.5
Mean Knowledge of HPV = 21.8%		
What are the causes of cervical cancer?		
Factors that facility cervical exposure to HPV through sexual intercourse	90	22.5
Through blood transfusion	8	2.0
Through genetic inheritance	4	1.0
Don't know	298	74.5
How can cervical cancer be prevented/controlled?		
Through regular cervical screening programme	40	10.0
Through HPV vaccination (Pap smear cytology)	36	9.0
Through the use of condoms	14	3.5
Don't know	310	77.5
Mean knowledge of cervical cancer = 22.5%		

Table 4: Knowledge of HPV Vaccine by the respondents (n = 400)

Variable	Frequency	Percent
What is HPV vaccine used for?		
Used for prevention of cervical cancer	56	14.0
Used for treatment of cervical cancer	12	3.0
Don't know	332	83.0
Knowledge of types of HPV vaccines		
Cervarix (divalent)	22	5.5
Gardasil (quadrivalent)	2	0.5
Gardasil 9 (nanovalent)	6	1.5
Don't know	370	92.5
Doses of Vaccine Required		
2 doses	5	1.25
3 doses	2	0.50
4 doses	3	0.75
≥5 doses	10	2.50
Don't know	380	95.0
Duration of Vaccination		
6months	16	4.0
12 months	10	2.5
24 months	8	2.0
≥36 months	6	1.5
Don't know	360	90.0
Mean knowledge of HPV Vaccine = 6.8%		

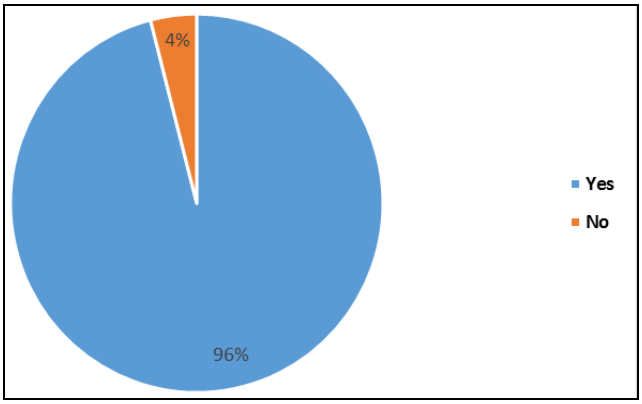

Fig 1: Acceptance/Willingness to receive HPV vaccine (n = 400)
Accept to be given HPV Vaccine

Discussion

The mean age of 24.2 years among the respondents was greater than the mean ages of 19.9 years reported from Brazil, 20.8 years from South-West Nigeria and 22.1 years reported from South-West Ethiopia [14-16]. However, it was less than the mean ages of 37.5 years and 40.0 years reported from Nigeria and Kenya respectively [17, 18].

The awareness of HPV was 31.0% among the respondents. This was less than the awareness of 37.0 [14] 36.5% [17] and 36.0 [19] reported by studies from Brazil, Nigeria and India respectively. The awareness of 31.0% in this study was higher than the awareness of 15.4%, 19.3% and 29.0% reported by similar studies from Nepal, China and the United Arab Emirate (UAE) respectively [20-22]

The mean knowledge of HPV was 21.8%. This was less than the knowledge of HPV of 45.61% among female college students in India. The knowledge of cervical cancer of 22.5% and of HPV vaccine of 6.8% in this study was less than the knowledge of cervical cancer of 82.42% and of HPV vaccine of 44.0% in the same study from India [23].

The acceptance of HPV vaccine among the respondents was 96.0% in spite of the poor awareness of HPV and the poor knowledge base among the respondents of HPV, cervical cancer and HPV vaccines. Similar high acceptance rates of 100.0%, 81.8% and 89.0% were reported by studies from Brazil, Nigeria and Kenya respectively [14, 17, 18].

The differences in awareness and knowledge of HPV, cervical cancer and HPV vaccine might be attributed to socio-demographic differences of the study population. Majority of the respondents in this study were studying non-health related courses which might have been responsible for their poor knowledge base of HPV, cervical cancer and HPV vaccines. Moreover, the few medical student respondents (1.5%) were in their preclinical years and had poor knowledge of the subject matter.

Another reason for the poor awareness and knowledge of HPV, cervical cancer and HPV vaccines among the respondents was the fact that Nigeria is yet to include HPV vaccination in her National Programme on Immunization.

A nationwide multicentre study on this subject matter and advocacy in favour of HPV vaccination will help to raise awareness and knowledge of HPV, cervical cancer and HPV vaccines. Besides, such a study may eventually persuade the policy makers to yield to the pressure to incorporate HPV vaccination into the national immunization programme.

Conclusion

There were poor awareness and knowledge of HPV, cervical cancer and HPV vaccines among the respondents. However, the acceptance of HPV vaccination by the respondents was high as long as it was readily available at an affordable price.

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Conflict of interest: nil

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