Original Article

Knowledge, attitude and uptake of human papillomavirus vaccination among female undergraduates in Lagos State, Nigeria

Esther O. Oluwole[1], Oluwaseun M. Idowu[1], Adebola A. Adejimi[1], Mobolanle R. Balogun[1], Gbemisola E. Osanyin[2]

Departments of [1]Community Health and Primary Care and [2]Obstetrics and Gynecology, College of Medicine University of Lagos, Idi-Araba, Lagos, Nigeria

Abstract

Background and Aims: Human papillomavirus (HPV) is a known cause of cervical cancer which is the second-most common cancer among women worldwide. HPV vaccination is a primary prevention to reduce the occurrence of cervical cancer. This study assessed knowledge, attitude and uptake of HPV vaccine among female undergraduates in Lagos State Polytechnic (LASPOTECH). **Methods:** A descriptive cross-sectional survey was conducted among 400 female undergraduates of LASPOTECH in August 2018. Participants were selected using a multi-stage sampling technique and data was collected with a pretested, self-administered, semi-structured questionnaire. Univariate and bivariate analyses were conducted using IBM SPSS version 20. Statistically significant level was set at $P \leq 0.05$. **Results:** Mean age of respondents was 21.3 ± 2 years. Only 11 (3%) of the respondents had good knowledge of HPV and the vaccine. However, majority of the respondents 356 (92.7%) had positive attitude towards uptake of HPV vaccine. Only 10 (2.6%) of the respondents had received a single dose of HPV vaccine. Age, level of study and number of sexual partners of the respondents were statistically significantly associated with knowledge and attitude towards the HPV vaccine ($P \leq 0.05$). The most common reason stated by the respondents for none uptake of HPV vaccine was lack of information. **Conclusion:** Knowledge and uptake of HPV vaccination among the respondents were poor. However, majority had positive attitude towards uptake of the vaccine. It is recommended that information on HPV and the vaccine should be made available to increase the knowledge and the uptake among female undergraduates in Lagos State.

Keywords: Attitude, female undergraduates, human papillomavirus vaccine, knowledge, uptake

Introduction

The high prevalence, mode of transmission, association with cervical cancer and availability of effective vaccines all have made Human Papillomavirus (HPV) a significant virus and of public health importance.[1] Cervical cancer is the second most common type of cancer occurring in women worldwide, it has caused the death of about 275,000 women with about 529,000 new cases yearly. More than 80% of these deaths occur in developing countries, where cervical cancer is the leading cause of death in adult females.[2,3]

In Nigeria, cervical cancer is the most common genital tract malignancy among women. Most of which are caused by HPV. The cancer is usually preceded by a premalignant stage which can be prevented by HPV immunization when appropriate and can be cured if detected early by regular screening. Follow up of abnormal test results have also been recommended.[4,5] An

Address for correspondence: Dr. Esther O. Oluwole, Department of Community Health and Primary Care, College of Medicine, University of Lagos, P.M.B. 12003, Surulere, Lagos, Nigeria.
E-mail: oluester2005@yahoo.com

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estimate of 40.43 million women are at risk of developing cervical cancer and the number of women estimated to harbor cervical Human Papillomavirus (HPV) infection is about 23.7% with over 90% of invasive cervical cancer attributed to HPV subtypes 16 or 18, current estimates also indicates that 14,089 women are diagnosed and 8,240 die from cervical cancer.[6,7]

HPV 16 and HPV 18 are responsible for 70% of cervical cancer and most non-cervical HPV associated cancers. While HPV infection is the most important risk factor for cervical cancer, other predisposing factors include: early age of sexual activities, early marriage (below 20 years of age), multiple sexual partners, unprotected sex, long term use of hormonal contraceptives, increased number of pregnancies, smoking, and unhygienic practices.[8-10]

HPV is one of the common sexually transmitted infections implicated in 5% of cancers globally including most cervical cancer cases. In UK, HPV vaccine has been offered routinely to girls aged 11-13 years and cervical cancer screening to women aged 25-64 years since 2008.[11] HPV vaccination offers a unique opportunity for primary prevention of cervical cancer. Two HPV vaccines (Gardasil and Cervarix) protect against the two strains of HPV types 16 and 18, the vaccine is approved and recommended for use in females between 9-26 years of age, and the Advisory Committee on Immunization Practices (ACIP) recommends 'catch up vaccination' for females between 13-26 years of age.[12]

A significant impact has been made on the health and well-being of the world through the different types of life-saving vaccines. There is however the need for a robust public health and primary care partnership in order to continuously achieve national immunization coverage targets and low incidence of vaccine-preventable diseases. Primary care providers detect infectious disease among patients and report same to state or local health departments. This information usually drives public health response. Public health usually works with primary care providers to ensure adequate access to vaccines and provision of healthcare services to individuals, families and the community as a whole. This collaboration and integration of public health and primary care influences and reinforces the capabilities of each entity to deliver critical services. Primary care benefits from public health's role in policy, population health, health equity and education, while public health benefits from primary care's ability to provide individual patient assessment, disease management, care coordination, and quality improvement. Most parents follow the advice of their primary health care providers and conform to the national immunization requirements.[13]

HPV has remained prevalent in the United States even with the presence of a safe and effective vaccine with highest risk period in the late adolescence and early adulthood. Therefore, college students have been the target for HPV prevention and vaccination promotion particularly in regions with low vaccination rates.[14] This study assessed the knowledge, attitude, uptake of Human Papillomavirus vaccine and factors influencing uptake among female undergraduates in Lagos State Polytechnic, South west Nigeria.

Subjects and Methods

Study setting

The study setting was Lagos state College of Science and Technology (LASPOTECH), Nigeria which has both part and full-time students. The Polytechnic operates on three Campuses namely; Isolo, Surulere and Ikorodu which run programs in National diploma (ND) and in Higher National diploma (HND).[15]

Study population, study design, sample size determination and selection of participants

The study population used were female part-time students of the LASPOTECH Isolo and Surulere, Lagos, Nigeria. This was a descriptive, cross-sectional study design. The minimum sample size was determined using Cochran's formula ($n = z^2 \times p \times q/d^2$), with a standard normal deviation at 95% confidence interval (1.96), a prevalence rate of 31.2% (proportion of female students that had a correct knowledge of HPV vaccine from a previous study),[16] and the error of precision at ± 5% (0.05). The minimum sample size was 330, to adjust for none response an additional 20% was added to the minimum sample and a sample size of 396 was calculated, however a total of 400 participants were recruited for this study.

A multistage sampling method was employed to select female undergraduates (aged 15–24 years) who were students of LASPOTECH. A simple random sampling method by ballot was used to select respondents' departments in stage one as well as respondents' level at stage two. A systematic random sampling method based on sitting arrangements of the students was used to select the eligible participants at stage three.

Study instrument and data collection

The survey questionnaire (semi-structured, self-administered) which was used for this study was adapted from a review of relevant literatures.[17-19] The questionnaire was divided into four sections: "Section A" elicited the socio-demographic data of the respondents, "Section B" analyzed the knowledge of HPV and its vaccine while, "Section C" obtained the attitude of female undergraduates towards HPV vaccine. Furthermore, "Section D" derived the Uptake of HPV vaccine as well as the possible factors influencing uptake of the vaccine.

Statistical analyses

Data collected was entered into and analyzed using IBM SPSS version 20 statistical package. The results were summarized into the socio-demographic characteristics, knowledge and attitude scores of study participants. Chi-square was used to determine the statistical significance of observed differences for categorical and continuous variables respectively. The statistical significance was set at $P \leq 0.05$.

Ethical considerations

Ethical approval for this study was obtained from the Health Research and Ethics Committee (HREC) of the Lagos University Teaching Hospital (LUTH) (Health Research Committee assigned Number: ADM/DCST/HREC/APP/267, Date of approval was 10th October, 2018). A written informed consent was obtained from respondents before enrollment into the study. They were informed on the scope and objectives of the study. For confidentiality, all questionnaires were made anonymous and participation was voluntary.

Results

Socio-demographic characteristics

The mean age of respondents was 21.3 ± 2.0 years. Most (58.3%) of the respondents were in National Diploma level two. More than half of the respondents (56.8%) have had a previous sexual experience and 71.8% had their first sexual experience within the ages of 17-20 years. Majority (94.9%) of those who were sexually active had less than three sexual partners, 75.2% of them used condoms during sexual intercourse, while 36.4% used other forms of contraceptives [Table 1].

Table 1: Socio-demographic characteristics and sexual history of the respondents

Variables	Frequency *n*=384	Percentage (%)
Age (years)		
17-19	79	20.6
20-22	182	47.4
23-25	123	32.0
Mean±SD=21.3±2.0 years		
Religion		
Christian	230	59.9
Islam	149	38.8
Others	5	1.3
Ethnicity		
Yoruba	269	70.1
Hausa	23	6.0
Igbo	68	17.7
Others	24	6.3
Level of study		
National Diploma (ND)	294	76.5
Higher National Diploma (HND)	90	23.5
Course of study		
Accountancy	99	9.4
Banking and finance	36	25.8
Business administration	123	32.1
Computer science	29	7.6
Marketing	31	8.1
Mass communication	66	17.2
Previous sexual experience		
Yes	218	56.8
No	166	43.2
Age at first sexual intercourse (years)	*n*=218	
<16	28	13.1
17-20	153	71.8
21-24	37	15.1
Number of sexual partners		
<3	206	94.9
4-6	8	3.7
7-9	3	1.4
Use of condoms for sexual intercourse		
Yes	161	75.2
No	56	26.1
Use of other contraceptives		
Yes	78	36.4
No	136	63.6

Respondents' knowledge of HPV and its vaccine

Table 2 shows that about two-third (65.6%) of the respondents did not know the symptoms of HPV infection while 63.2% did not know the risk factors for HPV infection. More than half did not know the diseases caused by HPV (54.4%) as well as the mode of transmission (57.6%).

Majority (72.9%) of the respondents did not know the required number of doses of HPV vaccine neither the route of vaccination (70.1%). Similarly, more than half (58.9%) of the respondents did not know the diseases prevented by HPV vaccine while about two-third (63.8%) did not know the time of vaccination. A substantial proportion (40.4%) did not know who should be vaccinated against HPV. Overall, the majority (97.0%) of the respondents had very poor knowledge of HPV and the vaccine.

Attitude of respondents towards uptake of HPV vaccine HPV vaccine

In general, majority (92.7%) of the respondents had positive attitude towards uptake of HPV vaccine. Over two-third (69.8%) of the respondents agreed to the statement: "HPV vaccination should be included in the "National Program on Immunization", while less than a third (27.4%) agreed to the statement "HPV vaccine may have long negative effects on me" [Table 3].

Uptake of HPV vaccine

Only ten (2.6%) of the respondents have received HPV vaccine, out of which 60% completed the vaccine doses. However, more than half (54.8%) of the respondents were willing to be vaccinated. The three most common barriers to non-uptake of HPV vaccine mentioned include 'the need for more information' (33.4%), safety concerns (21.1%) and cost of the vaccine (17.6%) among others [Table 4].

Factors associated with knowledge and attitude towards HPV vaccination

Statistically significant associations were found between respondent's age, level of study, course of study and knowledge of HPV vaccine. Similarly, previous sexual experience and use of condom were statistically significant with knowledge of HPV and vaccine. Also, previous sexual history, number of sexual partners and use of condom were statistically significant with respondents' attitude towards HPV vaccine ($P \leq 0.05$) [Table 5].

Table 2: Respondents' knowledge of HPV infection and vaccination

Variables	Frequency (*n*=384)	Percentage (%)
Diseases caused by HPV		
Genital warts	45	11.7
HIV	22	5.7
Oral cancer	24	6.3
Cervical cancer	143	37.2
I don't know	209	54.4
Symptoms of HPV infection		
Vaginal bleeding	52	13.5
Severe headache	20	5.2
Blood stained vaginal discharge	59	15.4
Pain during sexual intercourse	59	15.4
I don't know	252	65.6
Mode of transmission of HPV		
Faeco-oral	12	3.1
Physical	11	2.9
Sexual intercourse	144	37.5
Kissing	21	5.5
I don't know	221	57.6
Risk factors for HPV infection		
Early sexual debut	65	16.9
Obesity	5	1.3
Smoking	22	5.7
Multiple sexual partner	99	25.8
I don't know	239	63.2
Methods of preventing HPV		
HPV Vaccination	98	25.5
Condom use	66	17.2
Regular HPV screening	55	14.3
Abstinence	72	18.8
I don't know	307	53.9
What HPV vaccine prevent against		
Cancer of cervix, vagina and vulva	146	38.0
Cancer of the breast	17	4.4
Cancer of the anus, tongue and throat	16	4.2
Cancer of the Penis in men	13	3.4
I don't know	226	58.9
Route of HPV vaccine administration		
Through oral drops	15	3.9
Tablets	30	7.8
Through injections	66	17.2
Through skin patches	19	4.9
I don't know	269	70.1
Recommended Doses of HPV		
1 dose	27	7.0
2-3 doses	63	16.4
>3 doses	10	2.6
I don't know	280	72.9
Recommended age of vaccination with HPV vaccine		
Before first sexual intercourse	85	22.1
After first sexual intercourse	28	7.3
If you have more than one sexual partner	51	13.3
I don't know	245	63.8
Who should be vaccinated against HPV		
Females	130	33.9
Males	7	1.8
Both	90	23.4
I don't know	155	40.4

*-Multiple responses allowed

Table 3: Respondent's attitude towards uptake of HPV vaccination (*n*=384)

Statements	Disagree *n* (%)	Undecided *n* (%)	Agree *n* (%)
HPV vaccine is effective in preventing cervical cancer	19 (5.0)	100 (26.0)	265 (69.1)
I will take the vaccine because I feel at risk of getting HPV	72 (18.8)	122 (31.8)	190 (49.5)
I feel the vaccine will keep me safe from cervical cancer	23 (6.0)	105 (27.3)	256 (66.7)
I feel it is better to be vaccinated before becoming sexually active	48 (12.5)	110 (28.6)	226 (58.9)
The cost of the vaccine the vaccine discourages me from getting	99 (25.8)	113 (29.4)	172 (44.8)
I will use the vaccine if it is available in the clinic to students at a subsidized price	48 (12.5)	86 (22.4)	250 (65.1)
I feel only sexually active ladies should get the vaccine	149 (38.8)	113 (29.4)	122 (31.8)
HPV vaccine may have long negative effects on me	127 (33.1)	152 (39.6)	105 (27.4)
More information on HPV and its vaccine will be needed before I take the vaccine	34 (8.8)	101 (26.3)	249 (64.8)
HPV vaccination should be included on the National Program on immunization	33 (8.6)	83 (21.6)	268 (69.8)

*Price of one dose of HPV vaccine is about ₦8,000; three complete doses become ₦24,000. Minimum wage in Nigeria is ₦18,000

Discussion

About half (47.4%) of the respondents were between the ages of 21.3 ± 2.0 years with a mean age of 21.3 ± 2.0. Majority (70%) were from Yoruba ethnic group, and about 60% were Christians. This can be attributed to the fact that this study was conducted in Lagos state which is one of the six Yoruba speaking states of south west Nigeria. Over 98% of them own a mobile phone while about 95% have access to the use of internet. This shows the students are functioning within the current global trends.

Respondent's knowledge about HPV in this study was very low. About 97.0% had poor knowledge regarding HPV and HPV vaccine. This finding is similar to that of a study conducted among female adolescents in Ibadan South west, Nigeria, which reported that knowledge of HPV vaccine was generally poor and that only 11.8% of the respondents had good knowledge.[17] This result is lower compared to that of a study conducted among medical and dental students in a tertiary institution in Benin, Nigeria, which reported that 31.2% had good knowledge about HPV infection and vaccination.[16] The reason for a relatively higher knowledge among medical students may be attributed to the fact that the respondents were medical students who might have had lectures on HPV.

More than half (54.4%) of the respondents in this study did not know that HPV vaccine prevents cervical cancer, genital

Table 4: Uptake of HPV vaccine among the respondents

Variables	Frequency (*n*=384)	Percentage (%)
Ever received HPV vaccine? (*n*=384)		
Yes	10	2.6
No	374	97.4
Completed the vaccine (*n*=10)		
Yes	6	60
No	4	40
Willingness to be vaccinated (*n*=374)		
YES	205	54.8
NO	169	45.2
Reasons for none uptake of HPV vaccine		
Reasons	**Frequency (*n*=169)**	**Percentage (%)**
Not sexually active	65	17.4
Too expensive	66	17.6
Too old for the vaccine	8	2.1
Already infected with HPV	5	1.3
Not sure about the safety of the vaccine	81	21.1
Don't know where to get the vaccine from	66	17.6
Need more information about the vaccine	125	33.4
The vaccine is against my cultural belief	27	7.2

*Multiple responses allowed

warts and oral cancers. The finding is similar to that of a study conducted among female students in the university of Lagos Nigeria, where about 62% of the respondents did not know that HPV infection can cause cervical cancer.[20] More than half (58%) of the respondents in our study did not know that HPV can be transmitted through sexual contact while about two-third (63%) did not know that having multiple partners increases the risk of HPV infection which causes cervical cancer. The low level of knowledge found in this study may be related to the little coverage that is given to HPV and sex education programs in Nigeria. It has been observed from literatures that students studying in programs unrelated to medical/health care have less knowledge compared to those in medical related disciplines.[16,21,22]

Despite the poor knowledge of HPV and its vaccine among the respondents, majority of them (93%) had positive attitude towards uptake of HPV vaccine. This finding is similar to studies among mothers of adolescent in Nigeria, where 73.5% had positive attitude towards the uptake of HPV vaccine for their daughters and another study conducted among Ghanaian women which reported that 94% of the respondents were willing to vaccinate themselves or their daughters.[23,24] High acceptance of HPV vaccination or high interest in obtaining HPV vaccines has been reported in recent studies in Italy and Honduras with >70% willingness of the majority of the adolescents and young women to recommend the vaccine to others or to accept it for themselves.[25,26] A study done among students in Berlin, Germany reported that 79% of the respondents had positive attitude to the uptake of HPV vaccine.[27] A systematic review in developing countries of South-East Asia Region reported the percentage of knowledge of availability of HPV vaccine to be varied from 7.8-97.5%, while the positive attitude ranged from 36.1-92.1%.[28]

Table 5: Associated factors of knowledge and attitude towards HPV vaccination

Knowledge of HPV vaccine			
Variables	**Good *n* (%)**	**Poor *n* (%)**	**Statistical tests**
Age group (years)			
17-19	2 (2.5)	77 (97.4)	X^2=12.746
20-22	3 (1.6)	179 (98.3)	*P*=0.013
23-24	6 (4.9)	117 (95.1)	
Total	11 (2.9)	373 (97.1)	
Level of study			
ND	4 (1.4)	290 (98.6)	X^2=22.428
HND	7 (7.8)	83 (92.2)	*P*=<0.001
Total	11 (2.9)	373 (97.1)	
Course of study			
Accountancy	4 (4.0)	95 (96.0)	X^2=38.672
Banking and Finance	0 (0.0)	36 (100.0)	*P*=0.003
Business Administration	1 (0.5)	122 (99.5)	
Computer Science	0 (0.0)	29 (100.0)	
Marketing	4 (12.9)	27 (87.1)	
Mass Communication	2 (3.3)	64 (96.7)	
Total	11 (2.9)	373 (97.1)	
Previous sexual experience			
Yes	9 (4.1)	137 (95.9)	X^2=7.830
No	2 (1.2)	164 (98.8)	*P*=0.020
Total	11 (2.9)	373 (97.1)	
Use of condom			
Yes	6 (3.7)	155 (96.2)	X^2=8.639
No	5 (2.2)	218 (97.7)	*P*=0.013
Total	11 (2.9)	373 (97.1)	
Attitude towards HPV vaccination			
	Positive *n* (%)	**Negative *n* (%)**	**Statistical tests**
Previous sexual experience			
Yes	210 (96.3)	8 (3.7)	X^2=9.786
No	146 (88.0)	20 (12.0)	*P*=0.002
Total	356 (92.7)	28 (7.3)	
Number of sexual partners			
<3	342 (93.4)	24 (6.6)	X^2=9.627
4-6	6 (66.7)	3 (33.3)	*P*=0.008
7-9	2 (100.0)	0 (0.0)	
Total	356 (92.7)	28 (7.3)	
Use of condom			
Yes	158 (98.1)	3 (1.9)	X^2=12.085
No	198 (88.8)	25 (11.2)	*P*=0.001
Total	356 (92.7)	28 (7.3)	

In this present study, only ten (2.6%) of the respondents have been vaccinated with HPV vaccine which corroborates a similar finding from a study conducted among female students in Benin, Nigeria, where about 3.7% of the respondents have received HPV vaccine, and another study done among female adolescents in Ibadan, where only about 4.1% had received the vaccine.[16,17] Likewise, a study conducted among female medical students in a tertiary institute in India reported that only 6.8% of the respondents had received HPV vaccination.[22] The reason for low uptake found in this study may be due to the fact that Nigerian government is yet to organize a subsidized vaccination program for HPV. On the contrary, similar studies conducted in some developed countries like Germany and the United states

reported a considerable high uptake of HPV vaccines of 53% and 62.4% respectively.[29,30] The higher uptake of HPV vaccine seen in developed countries could be attributed to vaccination subsidy in such countries. In order to increase the HPV vaccination rate in Nigeria, the government may need to consider subsidizing the cost.

The four most common reasons or barriers for non-vaccination with HPV vaccine as reported by the respondents were as follows: insufficient information about the vaccine, safety concerns, expensive cost, and the fact that they don't know where to get the vaccine. The reasons for none uptake of the vaccine (safety concerns and high cost) is similar to that reported by a study conducted among HIV positive women in Nigeria who stated safety concerns (24.4%) and expensive cost of the vaccine (19.5%) as the reasons for failure of uptake of HPV vaccine.[31] Another study among adolescents in Nigeria reported that 62% of the respondents stated expensive cost for non-uptake of HPV vaccine.[23] Similarly, a study among mothers of adolescents in Lagos state found that most (96.5%) of the respondents reported that they would want more information on HPV and its vaccine which corroborates a similar barrier in this study which reported respondents need for more information.[32] More so, a study done among female Iranian nurses reported that inadequate knowledge of HPV vaccine (26.2%) and safety concerns (41.4%) were the major reasons for unwillingness to be vaccinated,[33] which is consistent with findings in this study where respondents stated the need for more information before becoming vaccinated and safety concerns as barriers to vaccination. Generally, studies have reported the most common barriers to uptake of HPV vaccination were mostly insufficient information about and high cost of the vaccine.[23,31-33] These barriers can be overcome by target interventions aimed at increasing knowledge of HPV vaccine among young persons and vaccination subsidization in Nigeria.

Statistically significant associations were found between age, level of study, course of study of the respondents and knowledge of HPV and its vaccine ($P \leq 0.05$). This finding is similar to that of a study conducted among female Medical and Dental students in a tertiary institution in Benin-city, Nigeria where age ($P = 0.001$), faculty ($P = 0.014$), level of study ($P = 0.001$) were significantly associated with knowledge of HPV.[16] Another study conducted among medical and para-medical students in India showed a statistically significant association between level of study of respondents and knowledge of HPV vaccine ($P < 0.001$), with increasing seniority in classes, the odds of good knowledge about HPV vaccination increased.[22] This implies that the higher the level, the better the knowledge of HPV and vaccine. In this study, there was a statistically significant association between age of the respondents ($P = 0.034$), previous sexual experience ($P = 0.002$), number of sexual partners ($P = 0.008$) and respondents' attitude towards HPV vaccine. This finding however is contrary to that of some other studies which showed no significant association between sociodemographic variables and attitude of respondents towards HPV vaccine.[16,17,23,32] This study also found a significant association between respondent's knowledge of HPV vaccine and the willingness to be vaccinated ($P = 0.002$), which is in accordance with other studies conducted in India and Ibadan, ($P < 0.001$) and ($P = 0.007$) respectively.[17,22] This implies that respondents with good knowledge of HPV and its vaccine were more willing and ready to be vaccinated compared to those with poor knowledge.

Limitation of the study

There was a possibility for recall bias since data since this was a cross-sectional survey design. Another potential limitation that should be considered when interpreting this study is that the information obtained was collected using a self-administered questionnaire and so the possibility exists that some of the respondents may not have answered some of the questions correctly.

Conclusion

The respondent's knowledge of HPV and its vaccine was generally poor and the uptake of HPV vaccine was very low. However, there was a predominantly positive attitude towards uptake of HPV vaccine. Therefore, health education programs focused on increasing awareness and knowledge of HPV vaccine among female undergraduates in Lagos State Institutions is highly recommended. Also, the government should endeavor to include HPV vaccine in the National Program on Immunization (NPI) schedule for easy accessibility.

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Conflicts of interest

There are no conflicts of interest.

References

1. Oluwasola TA, Bello OO, Odukogbe AA. Awareness and attitude of female undergraduates toward human papillomavirus vaccine in Ibadan. Trop J Obstet Gynaecol 2019;36:33-8.
2. Ferlay J, Shin HR, Bray F, Forman D, Mathers C, Parkin DM. Estimates of worldwide burden of cancer in 2008: GLOBOCAN 2008. Int J Cancer 2010;127:2893-917.
3. Harries J, Moodley J, Barone MA, Mall S, Sinanovic E. Preparing for HPV vaccination in South Africa: Key challenges and opinions. Vaccine 2009;27:38-44.
4. Olubodun T, Odukoya OO, Balogun MR. Knowledge, attitude and practice of cervical cancer prevention, among women residing in an urban slum in Lagos, South West, Nigeria.

Pan Afr Med J 2019;32:130.

5. Zhang S, Batur P. Human papillomavirus in 2019: An update on cervical cancer prevention and screening guidelines. Cleve Clin J Med 2019;86:173-8.
6. WHO/ICO Information Centre on HPV and Cervical Cancer (HPV Information Centre): Human Papilloma virus and Related Cancers in Nigeria. Summary Report 2010. Geneva: World Health Organization; 2010. Available from: www.hpvcentre.net>reports>NGA. [Last accessed on 2018 May 20].
7. Ferlay J, Soerjomataram I, Ervik M, Dikshit R, Eser S, Mathers C, *et al.* GLOBOCAN 2012 v1.0, Cancer Incidence and Mortality Worldwide: IARC Cancer Base No. 11 [Internet]. Lyon, France: International Agency for Research on Cancer; 2013. Available from: http://globocan.iarc.fr. [Last accessed on 2018 May 20].
8. Gillison ML, Chaturvedi AK, Lowy DR. HPV prophylactic vaccines and the potential prevention of noncervical cancers in both men and women. Cancer 2008;113(Suppl):3036-46.
9. Kumar V, Abbas AK, Fausto N, Mitchel RN. Robbins Basic Pathology. 8th ed. London: WB Saunders Elsevier; 2007. p. 718-21.
10. Castellsague X, Munoz N. Chapter 3: Cofactors in human papillomavirus carcinogenesis-role of parity, oral contraceptives, and tobacco smoking. J Natl Cancer Inst Monogr 2003;31:20-8.
11. Sherman SM, Cohen CR, Denison HJ, Bromhead C, Patel H. A survey of knowledge, attitudes and awareness of the human papillomavirus among health care professionals across the UK. Eur J Public Health 2019. pii: ckz113. doi: 10.1093/eurpub/ckz113. [Epub ahead of print].
12. Markowitz LE, Dunne EF, Saraiya M, Lawson HW, Chesson H, Unger ER. Quadrivalent human papillomavirus vaccine: Recommendations of the advisory committee on immunization practices (ACIP). Morb Mortal Wkly Rep 2007;56:1-24.
13. Astho. Available from: www.astho.org>immunization. [Last accessed on 2019 Aug 22].
14. Kasymova S, Harrison SE, Pascal C. Knowledge and awareness of human papillomavirus among college students in South Carolina. Infect Dis (Auckl) 2019;12:1178633718825077.
15. Lagos State Polytechnic. Available from- https://www.mylaspotech.edu.ng [Last accessed on 2019 Jun 25].
16. Onowhakpor AO, Omuemu VO, Osagie OL, Odili CG. Human papilloma virus vaccination: Knowledge, attitude and uptake among female medical and dental students in a tertiary institution in Benin-City, Nigeria. J Community Med Primary Health Care 2016;18;101-8.
17. Ndikom C, Oboh P. Perception, acceptance and uptake of human papillomavirus vaccine among female adolescents in selected secondary schools in Ibadan, Nigeria. Afr J Biomed Res 2017;20:237-44.
18. National health interview survey (NHIS). Survey with questions on adults and HPV. Available from: www.cervicalcancerfreecoalition.org. [Last accessed on 2018 Jun 8].
19. Masika MM, Ogembo JG, Chabeda SV, Wamai RG, Mugo N. Knowledge on HPV vaccine and cervical cancer facilitates vaccine acceptability among school teachers in Kitui county, Kenya. PLoS ONE 2015;10: e0135563.
20. Makwe CC, Anorlu RI, Odeyemi KA. Human papillomavirus (HPV) infection and vaccines: Knowledge, attitude and perception among female students at the University of Lagos, Lagos, Nigeria. J Epidemiol Glob Health 2012;2:199-206.
21. Donadiki EM, Jiménez-García R, Hernández-Barrera V, Carrasco-Garrido P, López de Andrés A, Jimenez-Trujillo I, *et al.* Knowledge of the HPV vaccine and its association with vaccine uptake among female higher-education students in Greece. Human Vaccines and Immunotherapeutics 2012;9:1-6.
22. Swarnapriya K, Kavitha D, Mohan R. Knowledge, attitude and practices regarding HPV vaccination among medical and para medical in students, India a cross sectional study. Asian Pac J Cancer Prev 2015;16:8473-7.
23. Ogochukwu TN, Akabueze J, Ezeome IV, Aniebue UU, Oranu EO. Vaccination against Human Papilloma Virus in Adolescent Girls: Mother's Knowledge, Attitude, Desire and Practice in Nigeria. J Infect Dis Preve Med 2017;5:1.
24. Coleman MA, Levison J, Sangi-Haghpeykar H. HPV vaccine acceptability in Ghana, West Africa. Vaccine 2011;29:3945-50.
25. Di Giuseppe G, Abbate R, Liguori G, Albano L, Angelillo IF. Human papillomavirus and vaccination: Knowledge, attitudes, and behavioural intention in adolescents and young women in Italy. Br J Cancer 2008;99:225-9.
26. Perkins RB, Langrish SM, Cotton DJ, Simon CJ. Maternal support for human papillomavirus vaccination in Honduras. J Womens Health (Larchmt) 2011;20:85-90.
27. Stöcker P, Dehnert M, Schuster M, Wichmann O, Deleré Y. Human papillomavirus vaccine uptake, knowledge and attitude among 10th grade students in Berlin, Germany. Hum Vaccin Immunother 2013;9:74-82.
28. Kristina SU, Permitasari NAL. Knowledge, attitude and barriers towards human papillomavirus (HPV) vaccination in developing economies countries of South-East Asia Region: A systemmatic review. Sys Rev Pharm 2019;10:81-6.
29. Remschmidt C, Walter D, Schmich P, Wetzstein M, Deleré Y, Wichmann O. Knowledge, attitude, and uptake related to human papillomavirus vaccination among young women in Germany recruited via a social media site. Hum Vaccin Immunother 2014;10:2527-35.
30. Guodong L, Lan K, Ping D. HPV vaccine completion and dose adherence among commercially insured females, aged 9 through 26 years in the US. Papilloma Research 2016;2:1-8.
31. Nyengidiki TK, Durugbo IK, Oranu E. Human papilloma virus awareness and uptake of HPV vaccination among human immunodeficiency virus positive women in Nigeria. Int J Trop Dis Health 2016;15:1-7.
32. Ezenwa BN, Balogun MR, Okafor IP. Mothers' human papilloma virus knowledge and willingness to vaccinate their adolescent daughters in Lagos, Nigeria. Int J Womens Health 2013;5:371-7.
33. Mojahed S, KariMi M, BoKaie M, SaliMi T. Attitude and knowledge of Iranian female nurses about human papillomavirus infection and cervical cancer: A cross sectional survey. J Prev Med Hyg 2013;54:187-90.