**ORIGINAL RESEARCH ARTICLE**

# Cervical Cancer and Human Papilloma Virus Knowledge and Acceptance of Vaccination among Medical Students in Southwest Nigeria

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## Abstract

Human papillomavirus (HPV) is the commonest viral sexually transmitted infection in the world and the leading cause of cervical cancer. Medical students as future healthcare providers will play a role in influencing patients' decision to receive HPV vaccination. This study was aimed at determining the knowledge of cervical cancer and HPV as well as the acceptance of HPV vaccination among medical students of the University of Lagos. A descriptive cross-sectional study was carried out among 280 medical students sampled using stratified sampling technique. Self-administered questionnaires were used to collect relevant data. Most respondents were aware of cervical cancer (95.4%), HPV (85.4%) and HPV vaccination (69.3%) and the most common source of information was school teaching. Good knowledge of cervical cancer, HPV and HPV vaccination was demonstrated by 51.8%, 67.1% and 21.1% respectively; only 39.6% fully accepted HPV vaccination. Inadequate information and high costs were the obstacles identified to receiving vaccine and recommending it to others. Older age and higher levels of study were significantly associated with good knowledge of HPV. Good knowledge of HPV and HPV vaccination respectively were significantly associated with full acceptance of vaccination. There is need for more education on cervical cancer, HPV infection and HPV vaccination for the medical students via school teaching and other media, and inclusion of the HPV vaccine in the National Program on Immunization to improve access. *(Afr J Reprod Health 2015; 19[1]: 140-148).*

**Keywords**: Human papillomavirus, medical students, knowledge, Nigeria

## Résumé

Le virus du papillome humain (VPH) est la plus fréquente infection virale sexuellement transmissible dans le monde et la principale cause du cancer du col utérin. Les étudiants en médecine en tant que futurs professionnels de la santé joueront un rôle en influençant la décision des patientes de se faire vacciner contre le VPH. Cette étude visait à déterminer la connaissance sur le cancer du col utérin et sur le VPH ainsi que l'acceptation de la vaccination contre le VPH chez les étudiants en médecine de l'Université de Lagos. Une étude descriptive transversale a été menée auprès de 280 étudiants en médecine à l'aide de la technique d'échantillonnage stratifié. Des questionnaires auto-administrés ont été utilisés pour recueillir des données pertinentes. La plupart des interviewées étaient au courant de cancer du col utérin (95,4%), le VPH (85,4%) et la vaccination contre le VPH (69,3%) et la source la plus commune d'information était l'enseignement scolaire. Une bonne connaissance du cancer du col utérin, du VPH et de la vaccination contre le VPH a été démontrée par 51,8%, 67,1% et 21,1% respectivement; seulement 39,6% ont pleinement accepté la vaccination contre le VPH. Une information insuffisante et les coûts élevés ont été les obstacles identifiés à la réception du vaccin et à sa recommandation aux autres. L'âge avancé et des niveaux plus élevés de l'étude ont été associés de façon significative à une bonne connaissance du VPH. Une bonne connaissance du VPH et de la vaccination contre le VPH respectivement étaient significativement associés à la pleine acceptation de la vaccination. Il faut encore de renseignement sur le cancer du col utérin, l'infection au VPH et la vaccination contre le VPH pour les étudiants en médecine par l'enseignement de l'école et d'autres médias, et l'inclusion du vaccin contre le VPH dans le Programme national de l'immunisation pour améliorer l'accès. *(Afr J Reprod Health 2015; 19[1]: 140-148).*

**Mots-clés:** virus du papillome humain, étudiants en médecine, connaissances, Nigeria

## Introduction

Human papillomavirus (HPV) is the commonest viral sexually transmitted infection in the world and the leading cause of cervical cancer, which has a very high mortality rate[1,2]. Cancer of the cervix is a global public health issue as it is the second most common cancer in women and the most

common gynaecological cancer world wide[2-4]. Cervical cancer is estimated to affect approximately 500,000 women annually and 80% of these cases occur in developing countries[5,6]. It is known that about 80% of sexually active females worldwide would have been infected with HPV by the time they get to the age of 50 years or at some point in their lives[7,8]. HPV is most prevalent in the younger population with the highest rate in the age range of 20 to 30 years which include many college-aged students[5,9]. About 23.7% of women and 73% of men in the general population in Nigeria carry an HPV genital infection[10].

If the current mortality trend of cervical cancer continues, the proportion of death is expected to increase from 80% to 90% by 2020. Therefore, there is a need for immunization against HPV prior to first sexual experience as a form of primary prevention[11,12]. The existing HPV vaccines (Gardasil® and Cervarix®) are designed to be prophylactic i.e. to prevent infection and consequent disease[7,13,14]. Data from studies support the fact that effective vaccination against two oncogenic types, 16 and 18, which have been noted in about 70% of all cervical cancer cases worldwide will reduce the incidence of cervical cancer[15-17]. Nigeria licensed the two HPV vaccines in 2008 and the protocol was tailored towards the World Health Organization (WHO) recommendation but there is no concrete national implementation plan in the country and neither has she adopted a national cervical cancer prevention policy nor included HPV vaccination in its immunization program[17].

College of Medicine students are young male and female students within the most vulnerable age bracket for HPV infection, and by virtue of their discipline as medical students are expected to have good knowledge of HPV vaccine as well as HPV infection and its relation to cervical cancer. Some previous studies have shown that there is a gap in knowledge of HPV infection and its vaccination among doctors[2,18]. Good knowledge of HPV infection and attitude towards HPV vaccine among medical students, healthcare providers and the general population will greatly influence the success of immunization program against cervical cancer as studies have shown that the acceptance of HPV vaccination by healthcare providers plays a major role in influencing patients/clients decision in receiving HPV vaccination[5]. This study was aimed at determining the knowledge of cervical cancer and HPV as well as the acceptance of HPV vaccination among medical students of the University of Lagos.

## Methods

This descriptive cross-sectional study was carried out at the College of Medicine, University of Lagos located at Idi Araba, one of the nineteen wards in Mushin Local Government Area of Lagos State, southwest Nigeria. The medical and dental students in the College go through five levels during their training after one year in the main campus of the University. The study population was the 200 to 600 level medical students of the College of Medicine who numbered 1040 as at the time of the study. A minimum sample size of 245 was calculated using the formula for descriptive studies, $n = z^2pq/ d^2$ and assuming a proportion (p) of respondents with acceptance of HPV vaccination of 0.8[5]. This was increased to 280 to make up for non-response.

Stratified sampling technique was used to select respondents. A proportional allocation of the sample size was given to each study level using the sampling ratio 280/1040 followed by simple random sampling to select respondents. The selected students were met in their various lecture rooms. If the selected student was unavailable, another student was sampled within the stratum.

Quantitative data was collected using a pre-tested, structured, self-administered questionnaire that was developed from literature[2,4,5]. The 48-item questionnaire collected information on socio-demographic characteristics; knowledge of cervical cancer; knowledge of HPV; knowledge of HPV vaccination and acceptance of HPV vaccination. Data was collected over a period of ten days in the month of February, 2014. Participation in the study was voluntary and written informed consent was obtained from respondents prior to their participation. Ethical approval was obtained from the Health Research and Ethics Committee of Lagos University Teaching Hospital before proceeding with the study.

The data collected was entered and analysed using Epi Info statistical software version 7. There were 17 knowledge questions for cervical cancer, 14 for HPV and 7 for HPV vaccination; one point was awarded for every correct response. These points were graded such that respondents who scored less than 60% was graded poor and score above 60% was graded good. Four questions were asked to assess acceptance; if all the questions were answered "yes" (4/4), it was graded as full acceptance; 1 – 3 "yes" responses were graded as partial acceptance while all "no" responses were graded as no acceptance. Chi-square was used to test the associations between categorical variables. The level of significance was set at 0.05.

## Results

The respondents ranged in age from 15 to 40 years with a mean age of 20.8 ± 2.8 years. There were more females (60.4%) than males (39.6%). Majority (77.1%) of the respondents had never had sex before (Table 1).

**Table 1:** Socio demographic characteristics and sexual history of respondents

| Variables | Frequency (%) n=280 |
|---|---|
| **Sex** | |
| Male | 111(39.6) |
| Female | 169(60.4) |
| **Age group (years)** | |
| 15-19 | 102(36.4) |
| 20-24 | 156(55.7) |
| 25-29 | 14(5.0) |
| ≥ 30 | 8(2.9) |
| **Marital Status** | |
| Never Married | 260(92.9) |
| Married/Divorced | 20(7.1) |
| **Level** | |
| 200 | 71(25.4) |
| 300 | 77(27.5) |
| 400 | 33(11.8) |
| 500 | 61(21.8) |
| 600 | 38(13.6) |
| **Religion** | |
| Christianity | 233(83.2) |
| Islam | 45(16.1) |
| Others | 2 (0.7) |
| **Ever had sex** | |
| Yes | 64(22.9) |
| No | 216(77.1) |
| **Lifetime sexual partners(n = 64)** | |
| 1 – 5 | 51(81.0) |
| 6 – 10 | 7(11.1) |
| 11 – 15 | 3(4.8) |
| 16 – 20 | 2(3.2) |

***Sources of information and knowledge of cervical cancer***

Majority of the respondents had heard of cervical cancer (95.4%), HPV (85.4%) and HPV vaccination (69.3%). Their sources of information were mostly from school teachings [Figure 1]. Most of the respondents knew that cervical cancer is the most common gynaecological cancer (59.3%) and less than half (44.3%) knew that it has the highest mortality among gynaecological cancers. The most common risk factors for cervical cancer known were infection of the cervix (75.4%), early age at first sexual intercourse (71.8%) and positive family history (59.6%). A little over half (51.8%) of the respondents had good knowledge of cervical cancer (Table 2).

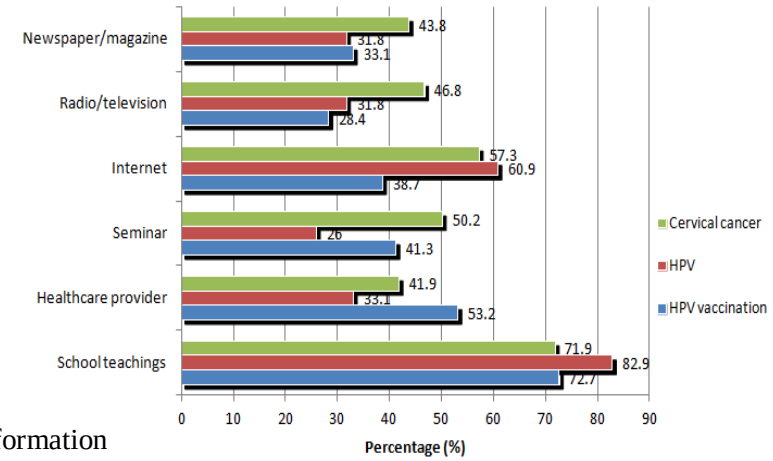


**Figure 1:** Sources of information

**Table 2:** Knowledge of Cervical Cancer

| Variables | Frequency (%) n=280 |
|---|---|
| **It is possible to have cervical cancer without knowing (Yes)** | 220 (78.6) |
| **It is the most common gynaecological cancer (Yes)** | 166 (59.3) |
| **Has the highest mortality among gynaecological cancers (Yes)** | 124 (44.3) |
| **Uterine cancer is the same as cervical cancer (No)** | 180 (64.3) |
| **Known risk factors for cervical cancer*** | |
| Infection of the cervix | 211 (75.4) |
| Family history | 167 (59.6) |
| Old age | 102 (35.4) |
| Early age at first intercourse | 201 (71.8) |
| Smoking | 127 (45.4) |
| Prolonged use of oral contraceptives | 132 (47.1) |
| **Known symptoms of cervical cancer*** | |
| Abnormal vaginal bleeding | 178 (63.6) |
| Foul smelling vaginal discharge | 150 (53.6) |
| Lower abdominal pain | 123 (43.9) |
| Post-coital bleeding | 109 (38.9) |
| Pain during sex | 166 (59.3) |
| Weight loss | 135 (48.2) |
| **Level of knowledge** | |
| Poor | 135(48.2) |
| Good | 145(51.8) |

***Multiple responses allowed

### *Knowledge of HPV and HPV vaccination*

Majority of the respondents knew that HPV is sexually transmitted (71.8%), is the primary cause of cervical cancer (73.9%) and that a person might be infected without knowing (71.1%). Less than a third of respondents (31.4%) knew that HPV can cause penile cancer. Most (67.1%) of them had good knowledge of HPV.

Most (66.4%) of the respondents knew HPV vaccine is used for prevention of HPV infection, Only 9.3% mentioned that it is used for prevention of cervical cancer. Overall, most (78.9%) of the respondents had poor knowledge of HPV vaccination (Table 3).

**Table 3:** Knowledge of HPV and HPV vaccination

| Variables | Frequency (%) n=280 |
|---|---|
| **HPV is sexually transmitted (Yes)** | 201 (71.8) |
| **HPV is the primary cause of cervical cancer (Yes)** | 207 (73.9) |
| **HPV can cause genital warts (Yes)** | 173 (61.8) |
| **HPV can cause penile cancer (Yes)** | 88 (31.4) |
| **Men can carry or contract HPV (Yes)** | 169 (60.4) |
| **Pills protect against HPV (No)** | 123 (43.9) |
| **Condoms can protect against HPV(Yes)** | 131 (46.8) |
| **A person might be infected without knowing (Yes)** | 199 (71.1) |
| **HPV is preventable with vaccine (Yes)** | 189 (67.5) |
| **Known risks of HPV infection*** | |
| Multiple sexual partners | 216 (77.1) |
| Early age at first intercourse | 177 (63.2) |
| Unprotected sex | 185 (66.1) |
| **Level of knowledge of HPV** | |
| Poor | 92 (32.9) |
| Good | 188(67.1) |
| **Use of HPV vaccine*** | |
| Prevention of HPV infection | 186 (66.4) |
| Prevention of cervical cancer | 26 (9.3) |
| Prevention of genital warts | 90 (32.1) |
| **Doses for vaccine (Three)** | 35 (12.5) |
| **Duration to complete doses (Six months)** | 27 (9.6) |
| **Approved age for vaccine is 9-26yrs (Yes)** | 75 (26.8) |
| **Number of brands of HPV vaccine available (Two)** | 31 (11.1) |
| **Level of knowledge of HPV vaccine** | |
| Poor | 221 (78.9) |
| Good | 59 (21.1) |

***Multiple responses allowed

**Table 4:** Acceptance of vaccination

| Variables | Frequency (%) n=280 |
|---|---|
| **Supports HPV vaccination of adolescent girls** | |
| Yes | 184 (65.7) |
| No | 23 (8.2) |
| Not sure | 73 (26.1) |
| **Supports HPV vaccination of males** | |
| Yes | 150 (53.6) |
| No | 25 (8.9) |
| Not sure | 105 (37.5) |
| **Would recommend it to colleagues/friends** | |
| Yes | 230 (82.1) |
| Not sure | 50 (17.9) |
| **Would recommend it to future clients** | |
| Yes | 224 (80.0) |
| No | 3(1.07) |
| Not sure | 53 (18.9) |
| **Graded acceptance** | |
| Full acceptance | 111 (39.6) |
| Partial acceptance | 169 (60.4) |

### *Acceptance of HPV vaccination*

Most of the respondents supported vaccination of adolescent girls (65.7%) and were willing to

recommend vaccination to colleagues/friends (82.1%) and to future clients (80.0%). Most (53.6%) of them accepted that males should be offered the vaccine. Less than half (39.6%) of respondents fully accepted HPV vaccination (Table 4).

Out of the 169 female students in this study, 162 (95.9%) had never received HPV vaccine while 7 (4.1%) had received at least one dose and 2 (1.2%) had completed the three doses. Most 128 (75.7%) of them were willing to be vaccinated if the vaccine is free, 6 (3.6%) were not willing and 35(20.7%) were not sure. The obstacles to receiving HPV vaccination among the female respondents included inadequate information (60.9%), high cost of vaccine (56.2%), poor access to vaccine (55.6%), worry about efficacy (38.5%), worry about safety (36.1%) and religious barriers (17.7%). The obstacles to not recommending HPV vaccination to others included inadequate information (50.8%), high cost (41.4%), poor access (40.8%), worry about safety (32.5%), worry about efficacy (27.8%) and religious barriers (23.6%).

If HPV vaccination were to be approved for use among males in Nigeria, 69 (62.2%) of the 111 male respondents would accept to be vaccinated, 8 (7.2%) would not while 34 (30.6%) were not sure. Seventy-one (64%) males would recommend it to other male colleagues, 5 (4.5%) would not and 35 (31.5%) were not sure. Sixty-nine (62.2%) would recommend it to future male clients, 6 (5.4%) would not while 36 (32.4%) were not sure.

### *Factors associated with knowledge and acceptance of vaccination*

Higher proportions of students in the older age group and those in higher class levels than 200 level had good knowledge of HPV ($p < 0.001$). Also, higher proportions of students in the age group 25-29 years and in 600 level had good knowledge of HPV vaccination ($p < 0.01$). A lower proportion of students in 200 level (18.3%) fully accepted HPV vaccination than higher levels ($p < 0.001$). Similarly, good knowledge of HPV and HPV vaccination respectively were significantly associated with full acceptance of vaccination ($p<0.01$) [Table 5].

**Table 5:** Factors associated with knowledge of HPV, knowledge of HPV vaccination and acceptance of HPV vaccination

| **Variables** | **Knowledge of HPV** | | **$X^2$** | **p value** |
|---|---|---|---|---|
| | **Good** | **Poor** | | |
| | **Freq (%)** | **Freq (%)** | | |
| **Age group (years)** | | | 54.04 | **<0.001** |
| 15 – 19 | 41 (40.2) | 61 (59.8) | | |
| 20 – 24 | 127 (81.4) | 29 (18.6) | | |
| 25 – 29 | 12 (85.7) | 2 (14.3) | | |
| > 30 | 8 (100) | 0 (0.0) | | |
| **Level** | | | 114.94 | **<0.001** |
| 200 | 12 | 59 | | |
| 300 | 69 | 8 | | |
| 400 | 22 | 11 | | |
| 500 | 51 | 10 | | |
| 600 | 34 | 4 | | |
| | **Knowledge of HPV vaccination** | | | |
| | **Good** | **Poor** | | |
| | **Freq (%)** | **Freq (%)** | | |
| **Age group (years)** | | | 17.81 | **0.001** |
| 15 – 19 | 8(7.8) | 94(92.2) | | |
| 20 – 24 | 44(28.2) | 112(71.8) | | |
| 25 – 29 | 5(35.7) | 9(64.3) | | |
| > 30 | 2(25.0) | 6(75.0) | | |
| **Level** | | | 40.43 | **<0.001** |
| 200 | 2(2.8) | 69(97.2) | | |
| 300 | 14(18.2) | 63(81.8) | | |

| | | | | |
|---|---|---|---|---|
| 400 | 11(33.3) | 22(66.7) | | |
| 500 | 12(19.7) | 49(80.3) | | |
| 600 | 20(52.6) | 18(47.4) | | |
| | **Acceptance of HPV vaccine** | | | |
| | **Full** | **Partial** | | |
| | **Freq (%)** | **Freq (%)** | | |
| **Level** | | | 32.37 | **<0.001** |
| 200 | 13 (18.3) | 58 (81.7) | | |
| 300 | 29 (37.7) | 48(62.3) | | |
| 400 | 22(66.7) | 11(33.3) | | |
| 500 | 24(39.3) | 37(60.7) | | |
| 600 | 24(63.1) | 14(36.8) | | |
| **Knowledge of HPV** | | | 22.59 | **<0.001** |
| Good | 94(50.0) | 94(50.0) | | |
| Poor | 18(19.6) | 74(80.4) | | |
| **Knowledge of HPV vaccination** | | | 7.09 | **0.008** |
| Good | 33(55.9) | 26(44.1) | | |
| Poor | 79(35.7) | 142(64.3) | | |

## Discussion

It is imperative that medical students have adequate knowledge about cervical cancer and HPV because most of them fall within the age group reported to have high rates of HPV infection[9], and also because as health care providers in training, their counsel and recommendations would facilitate primary and secondary prevention of cervical cancer. In this study, just over half of the medical students had good knowledge of cervical cancer and about two-thirds had good knowledge of HPV. Although this is higher than the knowledge observed in previous studies in Nigeria; among the general population in Lagos[19], among women in an urban community in Kwara[20], among community members in rural Edo[21], and among market women in Kaduna State[22], it is still not satisfactory knowledge for medical students despite the fact that majority of them had heard of cervical cancer, HPV and HPV vaccination. Their knowledge was lower than that observed in a recent study among female health workers in a teaching hospital in northern Nigeria where 98.6% of female health workers had good knowledge about cervical cancer[23]. The inadequate knowledge among the students reflects a lack of relevant education and may compromise their awareness of personal risk of cervical cancer and HPV infection and the severity of its consequences. Also as future doctors, their knowledge will influence the care of the clients.

In the specific areas of knowledge, 59.3% and 44.3% of the respondents in this study knew that cervical cancer is the most common gynaecological cancer and has the highest mortality among gynaecological cancers respectively. Among female nurses in a tertiary hospital in Lagos, Nigeria a higher percentage (96.6%) knew that cervical cancer is the most common gynaecological cancer[4]. Lower figures were found in a study carried out among medical interns and nursing staffs of a tertiary hospital in Pakistan where 23.3% knew that cervical cancer is the most common of all gynaecological cancers and 26% indicated that it is not the highest cause of mortality among gynaecological cancers[24].

Regarding risk factors for cervical cancer, majority (75.4%) of the respondents in this study knew that infection of the cervix, early sexual debut (71.8%) and positive family history (59.6%) increases the risk of having cervical cancer and these findings are consistent with those from studies among University of Ibadan students[25], in which 82.0% of them knew that early sexual exposure was a risk factor for cervical cancer. In Pakistan 78% knew that infection of the cervix is a risk factor for cervical cancer[24]. In South Africa, among 389 female university students, lower proportions than in our study realised that early onset of sexual debut (28.7%) and family history (24.6%) are risk factors for cervical cancer[26]; the difference is possibly because the South African university students did not have a medical.

The respondents obtained cervical cancer and HPV information mostly from school teaching similar to female health workers in Sokoto[23] and medical students in India[12] and China[27]. In contrast, respondents in community-based studies obtained their knowledge mostly from the media (television/radio)[19,28] and healthcare professionals[22,29]. The influence of formal education in obtaining cervical cancer and HPV information is obvious in this study and it is recommended that the gaps in knowledge experienced by medical students should be addressed through this same source.

Previous studies in Enugu (Nigeria)[11] and Turkey[30], found out that most (over 50%) of the medical students in the studies were aware of HPV. Their findings corroborate the findings of this study where majority of the respondents (85.4%) were aware of HPV and about two-thirds (67.1%) had good knowledge concerning HPV. Contrary to the findings of this study are several studies round the globe (Nigeria inclusive) where majority of the respondents had no or little awareness of HPV[14,19,31]. Majority of the respondents in this study knew of the sexual transmission of HPV, that it is the primary cause of cervical cancer and that a person might be infected without knowing. However, most (68.6%) of them did not know that HPV can cause penile cancer in men; possibly because more emphasis is placed on HPV as a cause of cervical cancer in women as evidenced by equally high knowledge of this fact among similar study groups[4,23,27]. In contrast, community-based studies revealed that HPV knowledge is poor among general population[7,19,21].

Most respondents in this study (78.9%) lacked good knowledge concerning HPV vaccination possibly because the vaccines were introduced into the country in recent years and its use is yet to be wide-reaching. Similarly, poor knowledge of the vaccine was reported in other studies in Enugu (Nigeria)[11] and India[12]. In contrast, nurses studied in Cameroon demonstrated moderately high level of knowledge about HPV vaccine[32]. Specifically, only few (9.3%) respondents in this study knew that HPV vaccine can prevent cervical cancer but about two-thirds knew that it can prevent HPV. This finding is surprising, as majority of the respondents knew HPV to be the primary cause of cervical cancer. Contrary to this finding are findings from a study carried out in India where 82% of the respondents knew HPV vaccine can prevent cervical cancer[12]. Also, majority of the respondents in this study didn't know the vaccine dose schedule and the approved age for vaccination similar to study findings in Turkey[30] and New Delhi respectively[18].

More respondents in higher class levels had good knowledge of HPV and vaccination. Since majority of them indicated school teaching as their source of information, more exposure to medical learning as they advance in school would have the effect of better knowledge as evident in this study. Several studies have identified significant association between levels of education and knowledge of cervical cancer, HPV infection and HPV vaccination in Nigeria[19,20,22] and South Africa[33].

Full acceptance of HPV vaccination among the respondents was poor. Less than 40% of the respondents fully accepted HPV vaccination, although most of them reported that they would recommend the vaccine to future clients (80%) and other colleagues and friends (82.1%). This finding shows the medical students might have some reservations about the vaccine possibly because of the obstacles they indicated to receiving HPV vaccination and recommending it to other people, such as inadequate information, high cost and lack of access to vaccine. We recommend further clarification possibly from qualitative studies in future research. Result from several studies conducted in Nigeria[4,11,19] and India[12], showed high acceptance of the HPV vaccination by the respondents. Systematic review of studies conducted on this subject in Sub-Saharan Africa revealed high levels of acceptability of HPV vaccine among all key demographics[34]. Accessibility, affordability and insufficient knowledge had also been identified as possible barriers to future utilization[4,11,19]. Specifically, removing the potential barrier of cost tends to improve acceptance of vaccine; majority (75.7%) of the female respondents were willing to be vaccinated if the vaccine is free as noted in previous studies in Lagos[4,19]. It is thus recommended that inclusion of the HPV vaccine in

the National Program on Immunization at no cost to the end-users should be given top priority. This study showed that HPV vaccination practice was very poor among the female college students possibly due to the identified obstacles to vaccination.

Result from this study showed that 53.6% of the respondents agreed that males should be offered HPV vaccine. This result is lower compared to a study carried out in Thailand among doctors and nurses[5], 91.3% of the doctors suggested males should be vaccinated and 88.8% of nurses agreed that male should be offered the vaccine. This could be because of the poor knowledge of the association between HPV infection and penile cancer demonstrated by the students since most of them did not know HPV can cause penile cancer.

Also, among the male respondents, 62.2% were willing to receive the vaccine if it is approved for use in males in Nigeria and they were willing to recommend it to future male clients, colleagues and friends. This would encourage wider coverage of vaccination, which would in turn result to herd immunity and incidence of HPV infection and cervical cancer would be reduced significantly. This is contrary to the result of a study in a UK University where majority of the male students did not accept vaccination of males[35].

Higher class levels and good knowledge of HPV and HPV vaccination were significantly associated with acceptance of HPV vaccination. These findings are consistent with what other studies have shown, that there is an association between educational level and knowledge of HPV infection and the vaccine uptake or acceptance[19,22].

## Conclusion

There were gaps in the knowledge of cervical cancer, HPV and HPV vaccination among medical students in Southwest Nigeria. Full acceptability of HPV vaccine was also low and several obstacles to vaccination were identified. However, majority were willing to be vaccinated if the vaccine is free. There is need for more education on cervical cancer, HPV infection and HPV vaccination via school teaching and other media, and inclusion of the HPV vaccine in the National Program on Immunization.

## References


1. WHO. Report of the consultation on human papillomavirus vaccines. WHO Immunization, Vaccine and Biologicals, Geneva. Available at: www.who.int/vaccines-document/2005. Accessed on: 15th June 2013
2. McCusker SM, Macqueen I, Lough G, MacDonald AI, Campbell C, Graham SV. Gaps in detailed knowledge of human papillomavirus (HPV) and the HPV vaccine among medical students in Scotland. BMC Public Health 2013; 13: 264.
3. Bosch FX, de Sanjose S. Chapter 1: Human papillomavirus and cervical cancer – burden and assessment of causality. J Natl Cancer Inst Monogr 2003; 31: 3-13.
4. Makwe CC, Anorlu RI. Knowledge of and attitude toward human papillomavirus infection and vaccines among female nurses at a tertiary hospital in Nigeria. Int J Womens Health 2011; 3:313-7.
5. Songthap A, Pitisuttithum P, Kaewkungwal J, Fungladda W, Bussaratid V, Koonsaeng S. Knowledge, attitude and acceptability of a human papillomavirus vaccine among healthcare providers. Southeast Asian J Trop Med Public Health 2009; 40(5): 1048-56.
6. Cutts FT, Franceschi S, Goldie S, Castellsague X, de Sanjose S, Garnett G *et al* Human papillomavirus and HPV vaccines: a review. Bull World Health Organ 2007; 85: 719-26.
7. Holcomb B, Bailey JM, Crawford K, Ruffin MT. Adults' knowledge and behaviours related to human papillomavirus infection. J Am Board Fam Pract 2004;17(1): 26-31.
8. WHO. World Health Organization position paper on vaccines against human papillomavirus (HPV) - the abridged version. Geneva WHO 2012. Available at: www.who.int/immunization/documents/HPV_position_paper_summary.pdf?ua=1. Accessed on: 15th June 2013.
9. Licht AS, Murphy JM, Hyland AJ, Fix BV, Hawk LW, Mahoney MC. Is use of the human papillomavirus vaccine among female college students related to human papillomavirus knowledge and risk perception? Sex Transm Infect 2010; 86(1): 74-8.
10. WHO/ICO Information center on HPV and cervical cancer (HPV Information center). Human papillomavirus and related cancers in Nigeria. Summary report 2010. Available at: www.who .int/hpvcenter. Accessed on: 15th June 2013.
11. Ugwu EO, Obi SN, Ezechukwu PC, Okafor II, Ugwu AO. Acceptability of human papillomavirus vaccine and cervical cancer screening among female health-care workers in Enugu, Southeast Nigeria. Niger J Clin Pract 2013;16(2): 249-52.
12. Pandey D, Vanya V, Bhagat S, Vs B, Shetty J. Awareness and attitude towards human papillomavirus (HPV) vaccine among medical students in a premier medical school in India. PLoS ONE 2012; 7(7): e40619.
13. Marlow LA, Forster AS, Wardle J, Walker J. Mothers' and adolescents' beliefs about risk compensation

following HPV vaccination. J Adolesc Health 2009; 44(5): 446-51.
14. Waller J, McCaffery KJ, Forrest S, Szarewski A, Cadman L, Wardle J. Awareness of human papillomavirus among women attending a well clinic. Sex Transm Infect 2003; 79(4): 320-22.
15. Castellsague X. Natural history and epidemiology of HPV infection and cervical cancer. Gynecol Oncol 2008; 110: S4-S7.
16. 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). MMWR 2007; 56(RR02): 1-24.
17. Morhason-Bello IO, Adesina OA, Adedokun BO, Awolude O, Okolo A, Amakhu CO. Knowledge of the human papillomavirus vaccines and opinion of gynaecologists on its implementation in Nigeria. Afr J Reprod Health 2013; 17: 150 – 6.
18. Mehta S, Rajaram S, Goel G, Goel N. Awareness about human papillomavirus and its vaccine among medical students. Indian J Community Med 2013; 38(2): 92-4
19. 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.
20. Durowade KA, Osagbemi GK, Salaudeen AG, Musa OI, Bolarinwa OA, Babatunde OA et al. Knowledge of cervical cancer and its socio-demographic determinants among women in an urban community of North-central Nigeria. Savannah J Med Res Pract 2013;2(2):46-54.
21. Igwilo AI, Igwilo UU, Hassan F, Idanwekhai M, Igbinomwaanhia O, Popoola AO. The knowledge, attitude and practice of the prevention of cancer of the cervix in Okada Community. Asian J Med Sci 2012; 4(3): 95-8.
22. Ahmed SA, Sabitu K, Idris SH, Ahmed R. Knowledge, attitude and practice of cervical cancer screening among market women in Zaria, Nigeria. Niger Med J 2013;54:316-9.
23. Oche MO ,Kaoje AU, Gana G and Ango J. T. Cancer of the cervix and cervical screening: Current knowledge, attitude and practices of female health workers in Sokoto, Nigeria. Int J Med Med Sci 2013; 5(4): 184-190.
24. Ali SF, Ayub S, Manzoor NF, Azim S, Afif M, Akhtar N *et al*. Knowledge and awareness about cervical cancer and its prevention amongst interns and nursing staff in tertiary care hospital in Karachi, Pakistan. PLOS ONE 2010; 5(6):e11059
25. Oladepo O, Rickelt OL, John-Akintola Y. Knowledge and utilization of cervical cancer screening services among Nigerian students. Int Q Comm Health Educ 2009; 29(3):293-304.
26. Hoque E, Hoque M. Knowledge of and attitude towards cervical cancer among female university students in South Africa. South Afr J Epidemiol Infect 2009; 24(1):21-4.
27. Ying W, Xiong-Fei P, Zhi-Mei Z, Feng C, Chin-Jing F, Si-Qi L et al. Knowledge of Human Papilloma virus(HPV) infection, cervical cancer and HPV vaccine and its correlates among medical students in Southwest China: a multi-centre cross-sectional survey. Asian Pac J Cancer Prev 2010;15(14):5773-9.
28. Frehiwot G, Fekadu M, Mulunesh A, Zelalem B. Comprehensive knowledge about cervical cancer is low among women in Northwest Ethiopia**.** BMC cancer 2013;13: 2.
29. Nnodu O, Erinosho L, Jamda M, Olaniyi O, Adelaiye R, Lawson L, et al. Knowledge and Attitudes towards cervical cancer and human papillomavirus: a Nigerian pilot study. Afr J Reprod Health. 2010;14(1):95–108.
30. Ozyer S, Uzunlar O, Ozler S, Kaymak O, Baser E, Gungor T *et al*. Awareness of Turkish female adolescents and young women about HPV and their attitude towards HPV vaccination. Asian Pac J Cancer prev 2013; 14(8): 4877-81.
31. 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(2):225-9.
32. Wamai RG, Ayissi CA, Oduwo GO, Perlman S, Welty E, Welty T et al. Awareness, knowledge and beliefs about HPV, cervical cancer and HPV vaccines among nurses in Cameroon: An exploratory study. Int J Nurs Stud 2013;50(10):1399– 406.
33. Hoque M, Hoque E, Kader SB. Evaluation of cervical cancer screening program at a rural community in South Africa. East Afr J Pub Health 2008;5(2):111-6.
34. Perlman S, Wamai RG, Bain PA, Welty T, Welty E, Ogembo JG. Knowledge and awareness of HPV vaccine and acceptability to vaccinate in Sub-Saharan Africa: systematic review. PLOS ONE 2014;9(3):e90912.
35. Gerend MA, Barley J Human papillomavirus vaccine acceptability among young adult men. Sex transm dis 2009; 36(1): 58-62.