



## Knowledge and attitude of professional health workers toward human papilloma virus (hpv) infection and vaccines.

### Attitude to HPV vaccine in Zaria

Oluwafumbi M Olajide<sup>1</sup>, Abimbola O. Kolawole<sup>1</sup>, Adekunle O. Oguntayo<sup>1</sup>, Sunday A. Adewuyi<sup>2</sup>

<sup>1</sup>Department of Obstetrics & Gynaecology, Gynae-Oncology Unit, Ahmadu Bello University Teaching Hospital (ABUTH), Zaria

<sup>2</sup>Radio-Oncology Department, ABUTH, Zaria

#### ABSTRACT

**Objective:** This study assessed the knowledge of professional health workers about HPV infection and vaccines, and their attitude towards the vaccines.

**Methodology:** Pretested, anonymous questionnaires were administered to 420 health workers in Ahmadu Bello University Teaching Hospital (ABUTH), Zaria, Nigeria. Information about knowledge of HPV infection and vaccines, and attitude towards the vaccines were elicited among respondents which included doctors, nurses, pharmacists and laboratory scientists.

**Results:** Among participants, 94% had heard of HPV infection, the highest percentage being among doctors (98.5%). Those that were aware of HPV transmission through sexual intercourse and scroto-labial contact were 87% and 10% respectively. Among respondents, 81.9% were aware of an association between HPV infection and cervical cancer. Over two-thirds (77.9%) were aware of HPV vaccines. Only 32.9% knew of its benefit to both boys and girls while 17% knew recommended age of vaccination. Participants reported higher intention to recommend HPV vaccine to girls (75.7%) versus boys (58.6%). However, 4.7% and 5.7% wouldn't allow their daughters and sons respectively to receive the vaccine.

**Conclusion:** The general awareness of HPV infection and vaccines among the health workers was high, though the in-depth knowledge was poor. Most participants would recommend the vaccine more for girls than for boys. The main reason given for non-recommendation was that it would encourage risky sexual behavior. Particularly for the boys, respondents felt they wouldn't benefit from the vaccine and were less at risk of acquiring HPV infection. There is need for more information dissemination on HPV vaccination and its benefits.

**Keywords:** Knowledge, Attitude, Human Papilloma Virus, Vaccine, professional, Health Workers.

#### SOMMARIO

**Obiettivo:** Questo studio ha valutato la conoscenza degli operatori sanitari professionali circa l'infezione da HPV e relativi vaccini, e il loro atteggiamento nei confronti dei vaccini.

**Metodologia:** Pre-Test; questionari anonimi sono stati somministrati a 420 operatori sanitari dell'ospedale Universitario Ahmadu Bello (ABUTH), Zaria, Nigeria. Informazioni su conoscenze di infezione da HPV e vaccini, e l'atteggiamento verso i vaccini sono stati ricavati tra gli intervistati che comprendevano medici, infermieri, farmacisti e analisti di laboratorio.

**Risultati:** Tra i partecipanti, il 94% aveva sentito parlare di infezione da HPV, la percentuale più alta risultava tra i medici (98,5%). Quelli che erano a conoscenza della trasmissione di HPV attraverso i rapporti sessuali e dal contatto scroto-labiale erano rispettivamente 87% e 10%. Tra gli intervistati, 81,9% era a conoscenza di un'associazione tra infezione da HPV e il cancro cervicale. Oltre due terzi (77,9%) erano a conoscenza di vaccini HPV. Solo il 32,9% era a conoscenza del suo beneficio sia per i ragazzi che le ragazze, mentre il 17% era a conoscenza dell'età raccomandata per la vaccinazione. I partecipanti hanno riferito maggiore intenzione di raccomandare il vaccino HPV per le ragazze (75,7%) rispetto ai maschi (58,6%). Tuttavia, il 4,7% e il 5,7% non avrebbe permesso alle loro figlie e ai loro figli, rispettivamente, di ricevere il vaccino.

**Conclusioni:** la conoscenza generale di infezione da HPV e vaccini tra gli operatori sanitari era alta, anche se la conoscenza approfondita era scarsa. La maggior parte dei partecipanti consiglierebbe il vaccino più per le ragazze che per i ragazzi. La ragione principale per non raccomandare i vaccini era che si sarebbero incoraggiati comportamenti sessuali a rischio. In particolare, i ragazzi intervistati ritenevano di non trarre beneficio dal vaccino ed erano meno a rischio di contrarre l'infezione da HPV. Sono quindi necessarie ulteriori informazioni sulla diffusione della vaccinazione HPV e dei suoi benefici.

## INTRODUCTION

Genital Human Papillomavirus infection (HPV) is one of the most common sexually transmitted infections, responsible for significant morbidity and mortality<sup>(1)</sup>. Although an estimated three fourths of sexually active adults will be infected with HPV at least once in their lifetime, it is sexually active women between 20-24 years that consistently have the highest rates of infection<sup>(2)</sup>. At least 80% of women will acquire an HPV infection by age 50<sup>(5)</sup>. Common risk factors for HPV infection and its clinical sequelae besides youth and gender include high number of sexual partners, lack of condom use and co-infection with Chlamydia trachomatis or herpes simplex virus. It has been estimated that high risk HPV infection accounts for approximately 5% of all cancers worldwide, including those of the cervix, vulva, vagina, oropharynx, mouth, anus, penis and scrotum<sup>(6)</sup>. HPV prevalence varies widely worldwide with about 20-fold difference between some regions, from 1.4% age standardized prevalence in Spain to 25.6% in Nigeria, which is more than twice the worldwide rate of 10.5%<sup>7</sup>. About 23.7% of women of the Nigerian population were estimated to harbor cervical HPV infection at a given time<sup>(8)</sup>. A pooled analysis of the International Agency for Research on Cancer (IARC) HPV Prevalence Surveys in 13 populations worldwide in 2005 revealed not only the highest HPV prevalence in Nigeria, but also the highest HPV 16 prevalence<sup>(7, 9)</sup>. A recent study done in Ibadan (2010) revealed an HPV prevalence of 26.3% in the general population. HPV is found to be prevalently high across all age groups in Nigeria<sup>(10)</sup>.

Persistent infection of the cervix with specific high risk types of HPV (mainly types 16, 18, 31, 33, 35, 45, 51, 56) is a prerequisite for the development of cervical intraepithelial neoplasia and cervical cancer in 99.7% of cases over a 10-20 year latent period<sup>(3)</sup>. HPV types 16 and 18 are implicated in 70% of cases globally<sup>(11)</sup>. Cancer of the cervix is the most common gynaecologic malignancy worldwide and the 2<sup>nd</sup> most common cancer in women<sup>(4)</sup>. It is the leading cause of death from cancer among women in developing countries<sup>(12)</sup>, causing about 190,000 deaths each year<sup>(13)</sup>.

In Nigeria, it is the commonest gynaecological cancer and a leading cause of death in women<sup>14</sup>, with 40.43 million women of age 15 years and above at risk of developing the cancer. It is estimated that 14,550 women are diagnosed with cervical cancer and 9,659 die from the disease annually<sup>(8)</sup>. In Southwestern Nigeria, it is 2<sup>nd</sup> to breast cancer<sup>(14)</sup>, accounting for 12.7%

of all cancers affecting women in that region<sup>(15)</sup>. In Northern Nigeria, it is the commonest cancer among females<sup>(16)</sup>, constituting 77% of all female genital tract tumours<sup>(17)</sup> and 15.5% of total cancers in ABUTH, Zaria<sup>(18)</sup>.

The establishment of HPV infection as the necessary cause of cervical pre-cancers and cancers provides a tremendous opportunity for cervical cancer prevention through vaccination. Two types of highly immunogenic HPV vaccine have been approved for this purpose. There is the bivalent Cervarix developed against high risk HPV types 16 and 18, and the quadrivalent Gardasil developed not only against types 16 and 18, but also against low risk type 6 and 11. They are best administered prior to exposure to the virus, ideally during preadolescence between 9-13 years of age, when response is optimal<sup>(19)</sup>. Both vaccines require a series of three injections over a 6-month period. Side effects are usually mild, the most common of which are short-term redness, swelling and soreness at the injection site<sup>(20)</sup>. Nonetheless, the most effective preventive approach when resources are available is combination of HPV vaccination of pre-adolescents, sex education and cervical screening of women<sup>(21)</sup>. HPV vaccines have been made available in many high income countries, however, due to their cost, they are not readily available to the public in low income countries like Nigeria. The vaccines were launched in Nigeria in September 2008<sup>(31)</sup>, while the bivalent vaccine, Cervarix was licensed in Nigeria in 2009<sup>(8)</sup>.

Several studies, mostly in developed countries have shown that the knowledge of HPV infection and vaccines and the acceptability of these vaccines among health care providers and the general public vary from low to high<sup>(23-26)</sup>. A similar study in Lagos, Nigeria revealed a poor knowledge of HPV vaccines and its relevance in the prevention of cervical cancer, among nurses<sup>(22)</sup>. Health workers in Nigeria play an important role in immunization programs and provide health education to the public. Therefore, the awareness and knowledge of HPV infection and attitude toward HPV vaccines amongst them will greatly influence the success of an immunization program against cervical cancer. The aim of this study is to assess the knowledge and attitude of professional health workers toward HPV infection and vaccines in the primary prevention of cervical cancer.

## AIM

The aim of the study is to assess the knowledge and attitude of professional health workers

toward HPV infection and vaccines in the primary prevention of cervical cancer.

The specific objectives were:

1. To determine the level of awareness and knowledge of HPV infection
2. To determine the level of awareness and knowledge of HPV vaccines
3. To assess the attitude towards HPV vaccines

## MATERIALS AND METHODS

**Study Area:** Zaria is a heterogenous city in Kaduna state inhabited by about 1,490,000 people. Zaria occupies a portion of the high plains of Northern Nigeria, 652.6 meters above sea level and some 950 Kilometers from coast, at 11o031N, 7o42E. Seventy percent of the population is constituted by Hausa-Fulani ethnic group, and is predominantly comprised of peasant farmers of the Islamic faith. There are several tertiary level institutions of learning and research in the city, including Ahmadu Bello University and a polytechnic. The Ahmadu Bello University Teaching Hospital (ABUTH) is the only tertiary health institution in Zaria and serves as a referral health facility for Zaria and its environs.

**Study Population:** Consenting professional health workers of ABUTH, Zaria. These included doctors, nurses, pharmacists and laboratory scientists.

**Study Design:** A descriptive and cross-sectional survey. Pre-tested, structured, anonymous questionnaire with open and close-ended questions were administered to respondents.

**Study Period:** Between December 2012 and February 2013.

**Method:** ABUTH has several cadres of professional health workers including doctors, nurses, laboratory scientists and pharmacists. The subjects for the study were recruited from these personnel by convenience, non-probability sampling technique, in the form of consecutive personnel who meet the inclusion criteria. Each respondent was duly counseled, and consent sought before the questionnaires were administered.

**Sample Size:** was determined using the Fischer statistical formula:  $n = z^2pq/d^2$

where 'n' = minimum sample size

z = standard normal deviate of 95% confidence interval usually set as 1.96

p = proportion or prevalence of the condition. The knowledge of HPV vaccine among Lagos nurses = 25.3%, d = degree of precision which is taken as 0.05 (precision limit).

Taking a non response rate of 10%, f = % of non response. Minimum sample size

$N = n/1-f$ ;  $290/1-0.1 = 322$ . A sample size of 420 was taken.

**Statistical Analysis:** Data was analyzed with SPSS version 20, using simple statistical ratios and percentages.

**Inclusion Criteria:** All consenting professional health workers.

**Exclusion Criteria:**

1. Non-consenting professional health workers
2. Non professional staff

## RESULTS

Of the 420 questionnaires issued, 414 were returned correctly filled, giving a response rate of 98.6%. Sociodemographic characteristics of the respondents are outlined in **Table 1**. Majority of the respondents (49%) were between the ages of 31-40 years and 60.5% of them were males. Majority of the respondents (53.1%) had two or more children. Two hundred and sixty (61.9%) of the respondents were doctors, 100 (23.8%) were nurses, while pharmacists and laboratory scientists were 30 (7.1%) each. Majority of the participant (31.2%) had practiced for 2-5 years.

**Table 1.**  
biosocial characteristics of respondents

Age (years)	Number	Percentage (%)
21-30	79	18.8
31-40	206	49
41-50	94	22.4
51-60	39	9.3
<b>Sex</b>		
Male	254	60.5
Female	161	38.3
<b>Marital status</b>		
Married	309	73.6
Single	98	23.3
Divorced	2	0.5
Engaged	4	1
Widowed	4	1
<b>Number of children</b>		
None	128	30.5
1	63	15
2 or more	223	53.1
<b>Profession</b>		
Doctor	260	61.9
Nurse	100	23.8
Pharmacist	30	7.1
Laboratory Scientist	30	7.1
<b>Years of Practice</b>		
<1	63	15
2-5	131	31.2
6-10	104	24.8
11-15	25	6
16-20	32	7.6
21-25	29	6.9
26-30	25	6
31-35	9	2.1

Abbreviation 'n' = number

The sources of information for many of the respondents were from lectures and textbooks (50.8%), hospital and other health workers (25.7%), internet (13.3%), TV/magazine/radio (8.2%) and family/friends (1%).

Majority (86.9%) of participants knew that HPV infection was transmitted via sexual intercourse. However, only 10% were aware of transmission of HPV via scroto-labial contact (Table 2). Sixteen percent of respondents mentioned body fluids as a mode of transmission while 5% didn't know the mode of transmission. However, 1.4% and 8.6% of the respondents had a misconception that it could be transmitted as air borne and through hugging respectively.

Only 182 (43.3%) of the respondents knew the risk factors associated with the transmission of HPV. The various risk factors mentioned included: multiple sexual partners, unprotected sexual intercourse, early age at first sexual debut, immunosuppression, presence of other sexually transmitted infections STIs, male uncircumcision (2.3% of doctors), low socioeconomic status (1.5% of doctors and 1% of nurses), multiparity (1.2% of doctors), blood transfusion (1.2% of doctors and 1% of nurses), cigarette smoking (1.2% of doctors and 1% of nurses), drug abuse (0.8% of doctors), alcoholism (0.4% of doctors) and vertical transmission (0.4% of doctors)(Table 2).

Questions	Yes (n)	Yes (%)
<b>Ever heard of HPV infection?</b>		
General	397	94.5
Doctor	256	98.5
Nurse	91	91
Pharmacist	26	86.7
Laboratory scientist	24	80
<b>How is HPV infection transmitted?</b>	<b>Correct Response (n)</b>	<b>(%)</b>
<b>Sexual intercourse</b>		
General	365	86.9
Doctor	246	94.6
Nurse	72	72
Pharmacist	25	83.3
Laboratory scientist	22	73.3
<b>Scroto-labial contact</b>		
General	420	10
Doctor	29	11.2
Nurse	8	8
Pharmacist	4	13.3
Laboratory scientist	1	3.3
<b>What are the risks factors for acquiring HPV infection?</b>	<b>Correct Response (n)</b>	<b>(%)</b>
<b>Multiple sexual partners</b>		
Doctor	147	56.5
Nurse	23	23
Pharmacist	9	30
Laboratory scientist	3	10
<b>Unprotected sexual intercourse</b>		
Doctor	41	15.8
Nurse	7	7
Pharmacist	5	30
Laboratory scientist	2	6.7
<b>Early age of 1<sup>st</sup> sexual activity</b>		
Doctor	44	16.9
Nurse	3	3
Pharmacist	3	10
Laboratory scientist	0	0
<b>Immunosuppression</b>		
Doctor	33	12.7
Nurse	2	2
Pharmacist	3	10
Laboratory scientist	1	3.3
<b>Presence of other STIs</b>		
Doctor	6	2.3
Nurse	3	3
Pharmacist	1	3.3
Laboratory scientist	1	3.3
<b>Can HPV infection be prevented?</b>	<b>Yes (n)</b>	<b>Yes (%)</b>
General	366	87.1
Doctor	249	95.8
Nurse	76	76
Pharmacist	21	70
Laboratory scientist	20	66.7

**Table 2.**  
*Awareness and Knowledge of human papillomavirus (HPV) infection*

Abbreviation 'n'= number

Majority (87.1%) of all of the respondents were aware that HPV infection could be prevented, 1.9% had a misconception that it couldn't be prevented while 6% had no idea (Table 2). The several ways of prevention mentioned included: safe sex practice (34.2% of doctors, 16% of nurses, 26.7% of pharmacists and 10% of laboratory scientists), HPV vaccination (24.6% of doctors, 4% of nurses and 6.7% of pharmacists), faithfulness to one partner (19.6% of doctors, 27% of nurses, 10% of pharmacists and 13.3% of laboratory scientists), abstinence (12.7% of doctors, 4% of nurses, 6.7% of pharmacists and 20% of laboratory scientists), delay of sexual debut/coitarche (2.7% of doctors and 2% of nurses), sex education (2.7% of doctors, 2% of nurses and 3.3% of laboratory scientists), good genital hygiene (1.2% of doctors and 5% of nurses), male circumcision (1.2% of doctors), prompt treatment of STIs (0.8% of doctors and 4% of nurses), and safe blood transfusion (0.8% of doctors and 2% of nurses). Some participants which included 7.3% of doctors, 10% of nurses, and 6.7% of pharmacists and laboratory scientists each, however had a misconception that pap smear screening could prevent the acquisition of HPV infection.

Eighty two percent of the respondents were aware of an association between HPV infection and cervical cancer, 11.1% were not while 2.1% said there was no association between HPV infection and cervical cancer. Among the respondents that said they knew of the association, only 75.6% of the doctors, 59.6% of nurses, 71.4% of pharmacists and 50% of laboratory scientists were actually aware that HPV infection could predispose one to cervical cancer.

Among the 77.9% of participants that were aware of HPV vaccine, the knowledge of its use among the various cadres of health workers is as documented in table 3. The sources of information were lectures/textbooks (34.5%), hospital/other health workers (28.1%), internet (20.9%), TV/magazines/radio (12.2%) and family/friends (3.4%).

Only 32.9% of participants (40% of doctors, 1.8% of nurses, 30% of pharmacists and 23.3% of laboratory scientists) were aware that HPV vaccine is of benefit to both male and female. However, 42.6% (47.7% of doctors, 37% of nurses, 36.7% of pharmacists and 23.3% of laboratory scientists) thought it could benefit only females, while 2.9% didn't know (Table 3).

Question	Yes (n)	Yes (%)
<b>Ever heard of HPV vaccine?</b>		
General	327	77.9
Doctor	230	88.5
Nurse	58	58
Pharmacist	23	76.7
Laboratory scientist	16	53.5
<b>What is HPV vaccine used for?</b>	<b>Correct response (n)</b>	<b>(%)</b>
<b>Prevention of HPV infection</b>		
Doctor	92	35.4
Nurse	20	20
Pharmacist	10	33.3
Laboratory scientist	9	30
<b>Prevention of cervical cancer</b>		
Doctor	44	16.9
Nurse	17	17
Pharmacist	2	6.7
Laboratory scientist	1	3.3
<b>Prevention of HPV infection &amp; cervical cancer</b>		
Doctor	25	9.6
Nurse	1	1
Pharmacist	2	6.7
Laboratory scientist	0	0
<b>Prevention of genital warts</b>		
Doctor	0	0
Nurse	0	0
Pharmacist	1	3.3
Laboratory scientist	0	0
<b>Who will benefit from the vaccine?</b>	<b>Correct response (n)</b>	<b>(%)</b>
Girls	179	42.6
Girls and boys	138	32.9
<b>Age group eligible for the vaccine</b>		
9-13 years	72	17.1
9-26 years	18	4.3
<b>Route of transmission of the vaccine</b>		
Intramuscular	93	22.1
<b>Doses of vaccine required</b>		
3	62	14.8

**Table 3.**  
Awareness and knowledge of human papillomavirus (HPV) vaccines

Abbreviation 'n' = number

Thirty one percent of respondents (35.8% of doctors, 29% of nurses, 16.7% of pharmacists and 20% of laboratory scientists) thought that the vaccine is recommended for all sexually active women. Only 17.1% (23.8% of doctors, 7% of nurses, 10% of pharmacists and 0% of laboratory scientists) knew that it is recommended between 9-13 years of age, while 4.3% (4.2% of doctors, 5% of nurses, 3.3% of pharmacists and laboratory scientists each) thought it is recommended between 9-26 years of age (Table 3).

Only 22.1% of respondents (27.3% of doctors, 11% of nurses, 26.7% of pharmacists, and 10% of laboratory scientists) were aware of the route of administration of the vaccine as being intramuscular, while only 14.8% (15.8% of doctors, 17% of nurses, 10% of pharmacists and 3.3% of laboratory scientists) were aware that three doses of the vaccine are required (Table 3).

## ATTITUDE TOWARD HUMAN PAPILLOMAVIRUS (HPV) VACCINE (Table 4).

Seventy three percent, 50%, 70% and 43.3% of doctors, nurses, pharmacists and laboratory scientists respectively were willing to be vaccinated, among the 65.5% of all the respondents.

Majority of respondents (75.7%) were willing to recommend HPV vaccination of girls (Table 4). Eighty percent and 68.3% of male and female participants respectively were willing to recommend the vaccination of girls. However, the more the female children they had, the less willing they were to recommend (52.2% had no female child, 28.2% had one female child while 19.6% had two or more female children). The reasons for the unwillingness included fear that it would encourage risky sexual behavior (36.4%); insufficient information about its efficacy (36.4%); high cost (9%); unavailability (9%); and insufficient information about its safety (9%).

Seventy two percent of respondents would allow their daughters to be vaccinated while 7.1% wouldn't (Table 4). Among these, majority (53.5%) had no female children, 27.6% had one female child while 18.9% had two or more female children. The reasons given for declining vaccination of their daughters were similar to those mentioned above.

Fifty eight percent of all the respondents were willing to recommend HPV vaccines for boys while 24.8% wouldn't (Table 4). Among those that were willing, 47.7% had no male children, 29%

had one male child, while 23.2% had two or more male children. The reasons for the unwillingness included the misconception that males don't need the vaccine (60%); males don't get infected with HPV (26.7%); it would encourage risky sexual behavior (6.7%); insufficient information about its safety (2.7%); high cost (1%); insufficient information about its efficacy (1%); and fear of sterility (1%).

Among the 55.2% that were willing to allow their sons to receive the vaccines, 49.8% had no male child, 28.8% had one male child, while 21.4% had two or more male children. The reasons for declining vaccination of their sons were also similar to those mentioned above.

Majority of the participants (77.9%) expressed a desire to have more information on HPV vaccines (Table 4)

**Table 4.**  
*Attitude toward Human Papillomavirus (HPV) vaccine*

Question	Yes (n)	Yes (%)
<b>Willingness to be vaccinated</b>		
General	275	65.5
Male	169	66.5
Female	101	62.7
<b>Willingness to recommend for girls</b>		
General	318	75.7
Doctor	228	87.7
Nurse	54	54
Pharmacist	21	70
Laboratory scientist	15	50
<b>Willingness to vaccinate daughters</b>		
General	303	72.1
Doctor	221	85
Nurse	48	48
Pharmacist	19	63.3
Laboratory scientist	15	50
<b>Willingness to recommend for boys</b>		
General	246	58.6
Doctor	184	70.8
Nurse	34	34
Pharmacist	17	56.7
Laboratory scientist	11	36.7
<b>Willingness to vaccinate sons</b>		
General	232	55.2
Doctor	176	67.7
Nurse	30	30
Pharmacist	15	50
Laboratory scientist	11	36.7
<b>Desire for more information</b>		
General	327	77.9

Abbreviation 'n' = number

## DISCUSSION

The knowledge of HPV infection and vaccines among the health workers in this study was generally low, though highest among the doctors and lowest among the laboratory scientists. Despite the fact that 94.5% of participants were

aware of the infection, only 10% were aware of its transmission by scroto-labial contact. Although HPV infection is a common sexually transmitted disease, intercourse (penetrative) is not always the only way of sexual transmission of the disease. The virus is also transmitted through genital skin-to-skin contact and skin-to-mucosal contact. Condoms are not full proof in preventing HPV infection. This is comparable with the result from the study done amongst nurses in LUTH where 84.8% had heard of the infection while only 7.3% knew of the scroto-labial route of transmission<sup>(31)</sup>.

A relatively low proportion of the health workers knew of the association between HPV infection and cervical cancer. This is comparable to the results obtained from Lagos, Nigeria<sup>(31)</sup> and New Zealand<sup>(40)</sup> but relatively lower than the 78.5% of nurses in Greece and 81.8% in Thailand who knew about the association. Several studies have revealed that the knowledge of HPV infection among health care providers and the general population is better in countries that have established national HPV education programs which are absent in Nigeria.

In this study, the percentage of respondents that were aware of HPV vaccine is much lower than the 94% found among general practitioners and nurses in New Zealand<sup>(40)</sup> who were aware of the vaccines. The lowest level of awareness in this study were among the nurses and laboratory scientists but still higher than the 22.6% obtained among nurses in Tanzania<sup>41</sup> and 25.3% among nurses in LUTH, Lagos<sup>(31)</sup> who had heard of the vaccine.

Only two third of doctors, two fifth of nurses, about half of the pharmacists and two fifth of laboratory scientists who had heard about the vaccines knew that they were for the prevention of HPV infections and/or cervical cancer. This is comparable with 39.1% obtained in Thailand, and higher than 26.7% among nurses in Lagos<sup>(31)</sup>. The knowledge about whom will benefit from the vaccine, age group of recommendation, the route of administration, and number of doses of the vaccine required is very low among all the health workers in this study. This poor knowledge may be due to the lack of an HPV vaccine schedule, and the absence of HPV and cervical cancer education programs in Nigeria.

About two-thirds of the female health workers were willing to be vaccinated. This is similar to the result obtained from nurses in Lagos, Nigeria and in Thailand. Most of the respondents were also willing to recommend HPV vaccines for girls,

though lower than 95% of general practitioners and nurses in New Zealand<sup>(40)</sup>, but higher than 67.4% in Lagos. Doctors were however more likely than nurses to recommend it in this study, which is quite the opposite of what was obtained in New Zealand. Participants reported higher intention to recommend HPV vaccine to girls versus boys and more often indicated that boys didn't need the vaccine and were less at risk of HPV infection. This is similar to the report in the study among family physicians and pediatricians in the United States<sup>(44)</sup>.

The percentage of respondents who were willing to recommend the vaccines for girls and boys however dropped when it involved their own daughters and sons. For their daughters they indicated that it would encourage risky sexual behavior, similar to the concerns of Turkish mothers<sup>(35)</sup>. For their sons, most indicate that boys didn't need the vaccine and were less at risk of getting HPV infection. It was also noticed in this study that participants who had more sons and daughters were less willing to allow their sons and daughters to receive the vaccine. Other reasons given by the participants for not accepting the vaccine or recommending it for girls and boys include: insufficient information about the efficacy and safety of the vaccine, non-availability, high cost, and the fear of it causing sterility. Majority of respondents expressed a desire to receive more information about the vaccine. One of the limitations of the study is the relatively small size of each cadre of health worker.

## CONCLUSION

The general awareness of HPV infection and vaccine among health workers in Ahmadu Bello University Teaching Hospital, Zaria was high. However, the in-depth knowledge was poor especially among the laboratory scientists. Despite their poor knowledge, most of the participants were willing to be vaccinated and would recommend the vaccine more for girls than for boys. The main reason given for not recommending the vaccine was that it would encourage risky sexual behavior. However, particularly for the boys, respondents felt they would not benefit from the vaccine and were less at risk of acquiring HPV infection. There is therefore the need for HPV vaccination and cervical cancer prevention education programs to be established in Ahmadu Bello University Teaching Hospital and Zaria as a whole, in order to bridge the information gap.

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