

# Knowledge of and attitude toward human papillomavirus infection and vaccines among female nurses at a tertiary hospital in Nigeria

Christian Chigozie Makwe  
Rose Ihuoma Anorlu

Department of Obstetrics and  
Gynaecology, College of Medicine,  
University of Lagos, Lagos, Nigeria

**Background:** Persistent infection with high-risk types of human papillomavirus (HPV) is a prerequisite for the development of cervical cancer. Highly immunogenic HPV vaccines have been developed and licensed for the primary prevention of cervical cancer in some developed and developing countries. This calls for assessment of the knowledge of the HPV infection and the acceptability of the HPV vaccines among health care providers.

**Objective:** The aim of this study was to assess awareness and knowledge of HPV infection and vaccines and to assess attitude toward these vaccines among female nurses at Lagos University Teaching Hospital, Lagos, Nigeria.

**Study design:** The study was a cross-sectional, descriptive study using a pretested, structured, anonymous, self-administered, 19-item questionnaire.

**Results:** A total of 178 female nurses were interviewed during a 4-week period. The mean age of respondents was  $37.1 \pm 3.1$  years. Almost all (99.4%) of the respondents had heard of cervical cancer, while about 85% of them had heard of HPV infection. Only a quarter (25.3%) of respondents had heard of the HPV vaccines, and of those only 26.7% knew the vaccines were for the prevention of cervical cancer. Most (70.2%) of the nurses expressed a desire to be vaccinated and 120 (67.4%) supported the vaccination of preadolescent girls. Those who expressed a willingness to be vaccinated were more likely to recommend HPV vaccination for preadolescent girls.

**Conclusion:** Overall, there was a poor knowledge of the HPV vaccines among female nurses at Lagos University Teaching Hospital. Despite this poor knowledge, most of the nurses expressed a strong desire to be vaccinated and their intention to recommend it for preadolescent girls. The main reason given overall for not recommending the vaccines was lack of information. There is an urgent need to bridge this information gap.

**Keywords:** HPV, immunization, cervical cancer

## Introduction

Human papillomavirus (HPV) is one of the most common sexually transmitted infections.<sup>1,2</sup> Over 50% of sexually active women are exposed to at least one HPV type during their lifetime.<sup>2</sup> HPV infection occurs in women of all age groups and the highest rates of HPV infection are seen in women 20–24 years old.<sup>3</sup> Most genital HPV infections are asymptomatic, transient, and resolve spontaneously without causing any disease. Genital HPV types have been classified as either high risk (mainly types 16 and 18) or low risk (mainly types 6 and 11), reflecting their potential risk of causing malignant lesions. Persistent infection of the cervix uteri with specific high-risk types of HPV is a prerequisite for the development of cervical intraepithelial neoplasia and cervical cancer.<sup>4</sup> HPV types 16 and 18 cause approximately 70% of cervical cancers.

Correspondence: Christian Chigozie Makwe  
Department of Obstetrics and  
Gynaecology, College of Medicine,  
University of Lagos/Lagos University  
Teaching Hospital, PMB 12003, Idi-Araba,  
Lagos, Nigeria  
Tel +234 803 335 8021  
Email makwe285@yahoo.com;  
ccmakwe@unilag.edu.ng

Cancer of the cervix uteri is the second most common cancer in women and is the most common gynecologic malignancy worldwide.<sup>5</sup> There were about 530,232 new cases in 2008 alone, and 85.5% of these occurred in developing countries.<sup>5</sup> Cervical cancer is a major public health problem and it is the leading cause of cancer-related deaths among women in developing countries.<sup>6</sup> It is hoped that the available HPV vaccines will markedly reduce the burden of cervical cancer and other HPV-related diseases in developing countries.

There are two types of HPV vaccine that have received regulatory approval for use in cervical cancer prevention programs worldwide. These vaccines are prepared with recombinant technology, using purified L1 structural proteins that self-assemble to form HPV type-specific empty shells or virus-like particles (VLPs). There is a bivalent HPV-16/18 VLP vaccine and a quadrivalent HPV-6/11/16/18 VLP vaccine. The vaccines are best administered prior to exposure to the virus, ideally during preadolescence (ie, 9–13 years of age).<sup>7</sup>

Several studies, mostly from 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>8–17</sup> Nurses in developing countries play an important role in immunization programs, particularly those for vaccine-preventable childhood diseases. Nurses administer these vaccines and provide health education to the public. Therefore, the awareness and knowledge of HPV infection and the attitude toward HPV vaccines among nurses will greatly influence the success of an immunization program against cervical cancer. The aim of this study was to assess awareness and knowledge of HPV infection and vaccines and to assess attitude toward these vaccines among female nurses at Lagos University Teaching Hospital, Lagos, Nigeria.

## Materials and methods

This prospective, cross-sectional, descriptive study was performed in the outpatient clinics, wards, theater, and the Accident and Emergency Unit of Lagos University Teaching Hospital, from January 21, 2008, to February 15, 2008. There were 415 female nurses in employment at the time of the study. The hospital is a 750-bed tertiary health care facility, which serves as a referral center for Lagos and its environs (Lagos has a population of about 15 million people).

The sample size was calculated using a formula for finite population. Assuming that 50% of the female nurses had sufficient knowledge of genital HPV infection, a minimum sample of 215 female nurses was calculated with 95%

confidence and 5% reliability. The entire population of female nurses in the hospital was selected for the study. The questionnaire was delivered by hand during working hours and was collected after completion. The objectives of the study were explained to the nurses and their verbal consent was obtained before they were given a pretested, structured, anonymous, self-administered, 19-item questionnaire with both closed and open-ended questions. The questions sought information on sociodemographic characteristics, on awareness and knowledge of cervical cancer, HPV infections, and HPV vaccines, and on acceptance of these vaccines.

Data entry and analysis was performed using Epi Info™ (v 3.2.2; Centers for Disease Control and Prevention, Atlanta, GA) statistical software. Descriptive statistics were generated and data presented as a mean (standard deviation) or median (range) for continuous variables and as a percentage for categorical variables. Comparisons of categorical responses were evaluated using  $\chi^2$ -test or Fisher's exact test. A *P*-value of <0.05 was considered to be statistically significant. Ethical approval was obtained from the Health Research Ethics Committee of Lagos University Teaching Hospital.

## Results

### Sociodemographic characteristics

Two hundred and thirty questionnaires were distributed and 178 female nurses completed and returned their questionnaires. The response rate was 75.7% and the data were complete for all 178 respondents. Sociodemographic characteristics of the respondents are outlined in Table 1. The mean age was  $37.1 \pm 3.1$  years. One hundred and sixteen (65.2%) of the respondents were married, 56 (31.5%) were single, three (1.7%) were separated/divorced, and three (1.7%) were widowed. One hundred and sixty-five (92.7%) were Christians and 13 (7.3%) were Muslims. Most (38.8%) respondents were staff nurse midwives.

### Awareness and knowledge of HPV infection and vaccines

One hundred and seventy-seven of the nurses (99.4%) had heard of cervical cancer and 151 (84.8%) had heard of HPV infection (see Table 2). The majority (70.1%) of them were aware of the association between cervical cancer and HPV infection. Most (72.9%) of the nurses who had heard of cervical cancer knew it could be prevented by Pap smear, while only 13% of them knew it could be prevented through vaccination.

About 90% of the nurses who had heard of HPV infection knew that it could be transmitted through sexual intercourse,

**Table 1** Sociodemographic characteristics (n = 178)

Age distribution (years)	Respondents (n)	Respondents (%)
20–29	56	31.4
30–39	50	28.1
40–49	50	28.1
≥50	22	12.4
<b>Marital status</b>		
Single	56	31.5
Married	116	65.2
Divorced/separated	3	1.7
Widowed	3	1.7
<b>Religion</b>		
Christian	165	92.7
Muslim	13	7.3
<b>Tribe</b>		
Yoruba	96	53.9
Ibo	42	23.6
Other	40	22.5
<b>Position/Designation</b>		
CNO	25	14.0
Assistant CNO	15	8.4
Principal NO	33	18.5
Senior NO	14	7.9
NO	22	12.4
Staff nurse midwife	69	38.8

**Abbreviations:** CNO, chief nursing officer; NO, nursing officer; n, number.

while only eleven (7.3%) knew it could be transmitted by skin-to-skin contact. Less than half of the respondents who had heard of genital HPV infection knew that it could be prevented by vaccination (31.8%) and condom use (33.1%).

Most (74.7%) of the respondents had never heard of the HPV vaccines. Among the 45 nurses who had heard of the vaccines, only twelve (26.7%) knew they were for the prevention of cervical cancer, while 30 (66.7%) respondents thought they were for the prevention of HPV infection.

## HPV vaccine acceptability

As Table 2 shows, 125 (70.2%) of the nurses stated they would want to be vaccinated, while 53 (29.8%) were unwilling to be vaccinated; the main reason given for unwillingness was insufficient knowledge about the HPV vaccines.

The majority (67.4%) of respondents supported vaccination of preadolescent girls, while 58 (32.6%) did not. The reasons given for not recommending HPV vaccination for preadolescent girls included (1) they are too young; (2) they are not yet sexually active; (3) they are not at risk for HPV infection; (4) vaccination will encourage premarital sex; and (5) the respondent had insufficient knowledge about the vaccines and its complications. Almost all the participants (99.4%) expressed a desire to have more information on HPV vaccines.

**Table 2** Awareness and knowledge of cervical cancer, human papillomavirus (HPV) infection, and HPV vaccines, and acceptability of these vaccines (n = 178)

Question	Yes (n)	Yes (%)
Ever heard of cervical cancer?	177	99.4
Ever heard of HPV infection?	151	84.8
Ever heard of HPV vaccine?	45	25.3
Would you want to receive a vaccine that can prevent cervical cancer?	125	70.2
Would you support vaccination of preadolescent girls?	120	67.4
<b>Knowledge of cervical cancer<sup>a</sup></b>		
	<b>Correct response</b>	
	<b>(n)</b>	<b>(%)</b>
Cervical cancer is the commonest gynecological cancer in Nigeria	171	96.6
Cervical cancer is caused by HPV infection	124	70.1
Cervical cancer is preventable	164	92.7
How can cervical cancer be prevented?		
Pap smear	129	72.9
Vaccination	23	13.0
<b>Knowledge of HPV infection<sup>b</sup></b>		
HPV infection is associated with genital warts	117	77.5
How is HPV infection transmitted?		
Sexual contact	135	89.4
Skin-to-skin contact	11	7.3
How can genital HPV infection be prevented?		
Sexual abstinence	63	41.7
Condom use	50	33.1
Vaccination	48	31.8
<b>Knowledge of HPV vaccine<sup>c</sup></b>		
What is the HPV vaccine used for?		
Prevention of HPV infection	30	66.7
Prevention of cervical cancer	12	26.7
Prevention of genital warts	5	11.1
Age group eligible for the HPV vaccine		
9–26 years	11	24.4

**Notes:** <sup>a</sup>Only respondents who had heard of cervical cancer; <sup>b</sup>only respondents who had heard of HPV infection; <sup>c</sup>only respondents who had heard of HPV vaccine.

**Abbreviation:** n, number.

The awareness of HPV infection, cervical cancer, and the vaccines had no significant association with the willingness to be vaccinated or the intention to recommend the vaccine for preadolescent girls. The nurses who were willing to be vaccinated were more likely to recommend the vaccines for preadolescent girls ( $P < 0.001$ ) (Table 3).

## Discussion

The knowledge of HPV infection and vaccines among nurses in this study was relatively low. Despite the fact that many were aware of cervical cancer and HPV infection, a relatively

**Table 3** Relationship between awareness of human papillomavirus (HPV) infection, cervical cancer, and HPV vaccines and acceptance of these vaccines

Awareness	Willingness to receive HPV vaccine			
	Yes (n = 125)	No (n = 53)	$\chi^2$ -Test	P-value
Ever heard of HPV infection?				
Yes	104	47	0.87	0.351
No	21	6		
Ever heard of cervical cancer?				
Yes	124	53	NA	1.000*
No	1	0		
Ever heard of HPV vaccine?				
Yes	32	13	0.02	0.880
No	93	40		
	Intention to recommend HPV vaccine to preadolescent girls			
	Yes (n = 120)	No (n = 58)	$\chi^2$ -Test	P-value
Ever heard of HPV infection?				
Yes	104	47	0.96	0.326
No	16	11		
Ever heard of cervical cancer?				
Yes	119	58	NA	1.000*
No	1	0		
Ever heard of HPV vaccine?				
Yes	31	14	0.06	0.807
No	89	44		
Willing to receive vaccine?				
Yes	97	28	19.82	<0.001
No	23	30		

**Note:** \*Fisher's exact test.

**Abbreviations:** NA, not available; n, number.

low proportion (70.1%) knew about the association between HPV infection and cervical cancer. In similar studies in Greece, New Zealand and Thailand the proportions of nurses who knew about this association were 78.5%, 71%, and 81.8% respectively.<sup>18–20</sup>

Several studies have shown that knowledge of HPV infection is high in countries with existing national HPV education programs. These programs have led to an improved awareness and knowledge of HPV infection and related diseases among health care providers and the general public.

In this Nigerian study, only a quarter of the nurses who had heard about the vaccines knew they were for the prevention of cervical cancer. This is relatively low compared with 39.1% in the Thailand.<sup>20</sup> The poor knowledge of the HPV vaccines among the nurses in this Nigerian study may be due to the lack of HPV and cervical cancer education programs in Nigeria. The vaccines were launched in Nigeria in September 2008, long after the study was conducted.

Over two-thirds of the female nurses were willing to be vaccinated. This is a similar result to that obtained from nurses in the Thai study.<sup>20</sup> Most (67.4%) of the nurses were also willing to recommend the HPV vaccines for preadolescent girls.

This finding is consistent with what has been reported in other recent studies.<sup>9,10,15,17,21</sup> These studies found there was a high level of public interest in HPV vaccination, despite an overall low knowledge about HPV infection and related diseases. Studies have also shown that the main predictors of providers' intention to recommend HPV vaccination are endorsement by professional organizations and provider knowledge of and attitude toward HPV vaccination.<sup>19,21,22</sup> Likewise, the authors found that the nurses who were willing to be vaccinated were more likely to recommend the vaccine for preadolescent girls.

The main reason given by many of the nurses for not accepting the HPV vaccines or recommending them for preadolescent girls was insufficient information about the efficacy and safety of the vaccines. Another reason given was that preadolescent girls were not at risk for HPV infection or cervical cancer and therefore had no need for the vaccines. Other studies have also identified these factors as barriers to effective HPV immunization.<sup>10,23–25</sup> Almost all of the nurses expressed their desire to receive more information about the vaccines.

The potential limitations of this study include the relatively small sample size and the fact that, as a self-administered

questionnaire was used to collect data, it is possible that some respondents might have given incorrect information.

## Conclusion

The knowledge of the HPV infection and vaccines among female nurses in this study was poor. Despite their poor knowledge, most of the nurses were willing to be vaccinated and would recommend the vaccines for preadolescent girls. The main reason given overall for not recommending the vaccines was lack of information. There is an urgent need to bridge this information gap through a well-designed HPV education program integrated into a national cervical cancer prevention and control program.

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## Disclosure

The authors report no conflicts of interest in this work.

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