

## Research Article

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# Assessment of Infrastructural and Human Resource for Health Status and Readiness for HPV Vaccination in Rural Communities in Nigeria

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**Received:** 03 July 2019; **Accepted:** 16 July 2019; **Published:** 23 July 2019

## Abstract

**Introduction:** Human papillomavirus vaccination remains an important primary preventive measure for cervical cancer. Its inclusion in preventive messages and service provision by first-line health care workers in low- and middle-income countries needs to be routine. However, there is paucity of data on willingness by health care workers (HCWs) working in rural communities, to counsel and/or provide service to beneficiaries of HPV vaccination programs. This study evaluated available facilities for cervical cancer prevention and willingness to vaccinate daughters for HPV by these HCWs.

**Materials and Methods:** This was a descriptive, cross-sectional study among HCWs in all the primary and secondary health care facilities in the three local government areas of Ibarapa health zone of Oyo state, Nigeria. Descriptive statistics such as mean  $\pm$  SD, frequency and proportion were used for socio-demographic data, awareness and willingness to vaccinate daughters by the study population.

**Results:** We observed that despite good awareness about cervical cancer (79.1%), awareness about HPV vaccine (41.9%) and their availability in Nigeria (31.0%) were low. Also, the uptake of the vaccine was low (1.8%). However, the majority of the respondents (78.6%) were willing to vaccinate their daughters. This, we believe, can be leveraged on the opportunity of already existing structure for childhood immunization in 77.8% of the facilities where the respondents practise.

**Conclusion:** It is important that narrowing of an existing gap between awareness of cervical cancer and practice of cervical cancer prevention should be initiated. Provision of more cervical cancer prevention educational programs and HPV vaccination opportunities will be key to achieving this.

**Keywords:** Awareness; HPV vaccination; Community health care workers; Prevention

## 1. Introduction

Cervical cancer is the second most common cancer in women in sub-Saharan Africa after breast cancer [1]. Every year, about half a million new cases are diagnosed with over 270 000 women dying from this highly preventable disease, mostly in developing countries [2, 3]. There is strong epidemiologic evidence linking cervical cancer to the Human Papilloma Virus (HPV), a ubiquitous sexually transmitted virus. About 35 of the over 100 types of HPV that are known infect the genital tract of which 14 are high risk and oncogenic to the cervix [4, 5]. Early sexual debut, multiple sexual partners and compromised immunity are some of the factors associated with acquisition and persistence of HPV infection and subsequent development of cervical cancer [6-8]. HPV is highly prevalent in younger populations, with prevalence rates of approximately 50% in sexually active adolescent girls and young women [9].

HPV vaccination and cervical cancer screening are the most effective primary and secondary preventive measures for cervical cancer [10]. Developed countries with organized HPV vaccination and cervical cancer screening programs have substantially reduced cervical cancer incidence and mortality by utilising the associated advantages with these measures. Despite demonstration of these impactful preventive interventions in many developed countries, such have not been effectively replicated in most low- and middle-income countries (LMICs), home to about 88% of cases of cervical cancer. Women, therefore, continue to be at risk of this highly preventable cancer. To provide the greatest public health benefit of these interventions, especially in LMICs, the uptake and coverage must be high, and the HPV vaccines must be administered prior to young girls initiating sexual activity in early adolescence ages [11, 12].

Effective inclusion of the HPV vaccination to increasingly deployed cervical cancer screening efforts in LMICs will provide the opportunity to substantially reduce the burden associated with cervical cancer in these countries. However, there are hurdles to getting this done. These include the limited understanding by many people that HPV causes cervical cancer, the infrastructural and personnel difficulties of getting pre-teens and teens into health facilities to get vaccinated and the high cost of the vaccine [13-15]. Added to this is the need to ensure that the recommendation of HPV immunization by first-line health care workers that attend to significant number of the population in LMICs is routine. This will be an influential factor in the individual's willingness to receive the vaccine. However, infrastructural availability, knowledge and positive attitude towards the vaccine among HCWs are key determinant factors in ensuring this role [16, 17]. The primary health care workers and facilities represent a significant factor in the healthcare system which offered first contact, coordinate preventive care to the general public and are in a privileged position to prescribe HPV immunizations. Many studies showed that health care

workers' experience and attitudes towards HPV vaccine were major motivators affecting women and adolescent girls to receive preventative cervical cancer services [18-20]. Contrastingly, most of the existing studies on the willingness to counsel and/or provide service to appropriate-ages beneficiaries of HPV vaccination program were conducted among health care workers in higher level of care and urban areas [21-29]. The differences in clinical practice among HCWs practicing in different cultural, infrastructural and clinical environments are well recognized and need to be explored. There are evidences of significant knowledge gaps in cervical cancer prevention and treatment among healthcare workers, including community health workers (CHWs) [30-32]. Community health workers and, less common, nurses often staff health centres in rural areas of many developing nations, including Nigeria, while physicians are found more frequently at secondary and tertiary centres of care [33, 34].

The objectives of this study were to evaluate the awareness of cervical cancer, HPV infection and prevention as well as the willingness of the HCWs working in public health facilities in rural local government of Nigeria to vaccinate their daughters against HPV.

## **2. Materials and Methods**

### **2.1 Study design**

This was a cross sectional study evaluating the awareness of HCWs in primary and secondary levels of health care facilities in rural communities about cervical cancer, causes and prevention as well as their practice and willingness to vaccinate their eligible daughter against HPV. This rural community level exploratory survey was part of grassroots interventional strategies involved in identifying and enhancing skills of HCWs in Primary health centers and General hospital in a rural Local Government Areas in Ibarapa zone of Oyo state, Nigeria to contribute to the national efforts in universal health coverage through prevention of cervical cancer.

### **2.2 Study participants**

The study involved the Community Extension Workers (CHEWs), Community Health Officers (CHOs), Nurses/Midwives and Medical Officers working in the Primary Health Care facilities and the General Hospitals in the Ibarapa Central (n=52), Ibarapa East (n=50) and Ibarapa North (n=40) Local Government areas of Oyo state. The LGA staff-specific response rates were 86.5% for Ibarapa Central, 92.6% for Ibarapa East, and 87.5% % for Ibarapa North.

### **2.3 Survey instrument**

The survey instrument was developed based on the principle that practice level factors impact a HCW's decision to provide a preventive service like HPV vaccination [35] and that medical encounter serves as an important teachable experience for patients to initiate preventive services [36]. Participants' knowledge of cervical precancer and cancerous lesions, causes, prevention as well as the intention to vaccinate their daughters were evaluated using a self-administered questionnaire. The questionnaire was designed by the study team based on review of previous similar studies [22, 23, 27, 28]. It was piloted during similar training for a non-governmental organization in a town

about 200 km from this local government area a year prior to this study followed by refinement of ambiguous or deletion of redundant questions before preparation of the final version of the questionnaire [37]. Items in the survey instrument included sociodemographic variables such as age, gender, marital status, professional category, as well as questions evaluating awareness of cervical precancer and cancer lesions, the cause, risk factors and prevention [37]. The participants practice of HPV vaccination education and utilization was, also, assessed. The variables of interest were as follows: (a) Sociodemographic like age, gender, religion, years of professional practice, marital status, number of living children (b) HPV and its vaccine, cervical cancer and its prevention awareness of cervical cancer, HPV as cause of cervical cancer, availability of HPV vaccine, HPV vaccine prevention of cervical cancer and HPV availability in Nigeria (c) HPV vaccination attitude and practice like discussion of HPV vaccination with patients, ever vaccinated their eligible daughter, willingness to vaccinate eligible daughter(s) against HPV and barriers to vaccination of such eligible girls. HPV awareness was assessed using items designed to ascertain participants' responses regarding HPV infection and HPV vaccination. Response options included "yes," "no," or "not sure." HPV vaccine willingness for their female children was assessed using the following question: "In the past 12 months, have you vaccinated your daughter? Participants reported their response as either "yes" or "no". Those that responded "no" were asked follow-up question of their willingness to vaccinate their daughters with "yes", "no" or "I am not sure" response options. The participants with "no" or "I am not sure" responses to this follow-up question were asked the reasons for their responses using items pertaining to concerns about: vaccine safety and efficacy, challenges with discussing sexuality, fear of vaccinated teenagers practicing riskier sexual behaviours, cost, and facility visit requirements linked to HPV vaccination. The response were expressed in frequencies and percentages.

## 2.4 Data collection

The participants had the survey instruments administered in Ibarapa Central LGA followed by on-job training, technical and infrastructural supports and participatory supervisions<sup>37</sup> while trained research assistants distributed and collected the questionnaire in the other 2 LGAs of Ibarapa East and Ibarapa North. Data collection took place between December 2015 and January 2016.

## 2.5 Data analysis

All categorical data were presented as frequencies with percentages and continuous data as means. The primary response variable, HCWs willingness to vaccinate daughter, was dichotomized into "yes" or "no." All analyses were performed using the SPSS version 22 statistical software package (SPSS, Chicago, IL).

## 3. Results

### 3.1 Characteristics of the study sample

The mean age of the study respondents was  $40.7 \pm 8.1$  years (IC =  $41.9 \pm 6.9$ ; IN =  $39.1 \pm 9.1$ ; IE =  $41.4 \pm 7.9$ ). Of the 129 respondents, 97.6% were of Yoruba tribe with the only one Hausa and the 2 Igbo respondents working in Ibarapa North of the zone, 72.1% were Christian, 90.0% were married and 71.3% had between 2 and 4 children. About 69.0% of the available human resource for health in these Local Government areas were of CHEW/CHO cadre and 24.0% and 7.0%, respectively, were Nurses/Midwives and Physicians. Fifty-five percent of the workforce

have spent between 1- 5 years at their job, 27.9% have spent 6-9 years and 17.1% have spent  $\geq 10$  years as health care worker (Table 1).

<b>Sociodemographic and Professional Characteristics</b>				
<b>Characteristics</b>	<b>Total</b>	<b>Ibarapa Central</b>	<b>Ibarapa North</b>	<b>Ibarapa East</b>
	<b>N=129</b>	<b>n=45</b>	<b>n=49</b>	<b>n=35</b>
<b>Sex</b>				
Male	29(22.4)	8(17.8)	13(26.5)	8(22.9)
Female	100(77.5)	37(82.2)	36(73.5)	27(77.1)
Age (mean) Years	40.7 $\pm$ 8.1	41.9 $\pm$ 6.9	39.1 $\pm$ 9.1	41.4 $\pm$ 7.9
<b>Tribe</b>				
Hausa	1(0.8)	0(0.0)	1(2.0)	0(0.0)
Igbo	2 (1.6)	0(0.0)	2(4.1)	0(0.0)
Yoruba	126 (97.6)	45(100.0)	46(93.9)	35(100.0)
<b>Religion</b>				
Christianity	93(72.1)	25(55.6)	40(81.6)	28(80.0)
Islam	35(27.1)	20(44.4)	8(16.3)	7(20.0)
Traditional	1(0.8)	0(0.0)	1(2.0)	0(0.0)
<b>Marital status</b>				
Single	9(7.0)	2(4.4)	5(10.2)	2(5.7)
Divorced	2(1.5)	2(4.4)	0(0.0)	0(0.0)
Widowed	2(1.5)	2(4.4)	0(0.0)	0(0.0)
Married	116(90.0)	39(86.7)	44(89.8)	33(94.3)
<b>Parity</b>				
$\leq 1$	28(21.7)	5(11.1) 37(82.2)	17(34.7)	7(20.0)
4-Feb	92(71.3)		30(61.2)	25(71.4)
$\geq 5$	8(6.2)	3(2.3)	2(4.1)	3(8.6)
<b>Professional category</b>				
CHEW/CHO	89(69.0)	31(68.9)	34(69.4)	24(68.6)
Nurse/Midwife	31(24.0)	12(26.7)	11(22.4)	8(22.9)
Physician	9(7.0)	2(4.4)	4(8.2)	3(8.6)
<b>Years of service</b>				
1-5 years	71(55.0)	31(68.9)	17(34.7)	23(65.7)
6-10 years	36(27.9)	12(26.7)	18(36.7)	6(17.1)
$\geq 10$ years	22(17.1)	2(4.4)	14(28.6)	6(17.1)

<b>Health Care Facilities' Characteristics</b>				
<b>Characteristics</b>	<b>Total</b>	<b>Ibarapa Central</b>	<b>Ibarapa North</b>	<b>Ibarapa East</b>
	<b>N=36</b>	<b>n=12</b>	<b>n=13</b>	<b>n=11</b>
<i>Type of Facility</i>				
General hospital	3(8.3)	1(8.3)	1(8.3)	1(9.1)
PHCs	33(91.7)	11(91.7)	12(91.7)	10(90.9)
Room for Cervical Cancer Screening	23(63.9)	7(58.3)	8(61.5)	8(72.7)
Examination couch with Stirrup	12(33.3)	3(25.0)	5(38.5)	4(36.4)
Specula for examination	20(55.6)	7(58.3)	6(46.2)	7(63.6)
Acetic Acid	2(5.6)	1(8.3)	1(7.7)	0(0.0)
Cryotherapy Machine	0(0.0)	0(0.0)	0(0.0)	0(0.0)
Provision of Immunization Service	28 (77.8)	11	9	8

**Table 1:** Characteristics of the Respondents and Health Facilities.

### 3.2 Health care facilities characteristics

The assessment of the characteristics of the health facilities in readiness for cervical cancer prevention activities showed that 63.9% of the 3 General Hospitals and 33 Primary Health Care centres have examination rooms structurally design to serve the purpose of cervical cancer screening (58.3% in Ibarapa Central, 61.5% in Ibarapa North and 72.7% in Ibarapa East), only 33.3% had examination couch with stirrup that can be used for cervical cancer screening, 55.6% had appropriate specula for pelvic examination, 5.6% have ever had Acetic acid and none with cryotherapy equipment. About 77.8% of the health facilities offer immunization services to pregnant women and children (Table 1) and none has ever provided HPV immunization service in any of the 3 LGAs.

### 3.3 Awareness of cervical cancer and its prevention practices

Most of the respondents (79.1%) were aware of cervical cancer, 70.5% were aware of HPV, with 64.3% aware that the virus causes cervical cancer and 51.9% aware that the virus can be prevented. Only 41.9% of the respondents were aware of availability of the HPV vaccine and 31.0% aware of the availability of the vaccines in Nigeria. These levels of awareness varied among the cadre of the HCW with the lowest levels of awareness among the CHEWs/CHOs (Table 2) that formed 69.0% of the health workforce in these rural communities generally and 98.9% (89/90) of the workforce in the PHCs. Suggested ways of preventing cervical cancer by the health care workers included abstinence from sexual intercourse until adulthood in 31.7% of respondents, keeping to one sexual partner by 21.3%, HPV vaccination by 18.2%, prevention of sexually transmitted infection in 16.2% and screening for cervical cancer by 12.6% (Table 4).

Items	Total N=129	CHEW/CHO n=89	Nurses n=31	Physicians n=9
<b>Aware of Cervical Cancer</b>				
Yes	102(79.1)	75(84.3)	27(87.1)	9(100.0)
No	20 (15.5)	8(9.0)	3(9.7)	0(0.0)
Not sure	7(5.4)	6(6.7)	1(3.2)	0(0.0)
<b>Aware of HPV</b>				
Yes	91(70.5)	57(64.0)	26(83.9)	8(88.9)
No	10(7.8)	6(6.7)	3(9.7)	1(11.1)
Not sure	28(21.7)	26(29.2)	2(6.5)	0(0.0)
<b>HPV causes Cervical Cancer</b>				
Yes	83(64.3)	48(53.9)	28(90.3)	7(77.8)
No	4(3.1)	2(2.2)	0(0.0)	2(22.2)
Not sure	42(32.6)	39(43.8)	3(9.7)	0(0.0)
<b>HPV can be prevented</b>				
Yes	67(51.9)	36(40.4)	24(68.6)	7(77.8)
No	58(45.0)	50(56.2)	7(22.6)	1(11.1)
Not sure	4(3.1)	3(3.4)	0(0.0)	1(11.1)
<b>There is vaccine for HPV</b>				
Yes	54(41.9)	32(36.0)	15(48.4)	7(77.8)
No	15(11.6)	9(10.1)	4(12.9)	2(22.2)
Not sure	60(46.5)	48(53.9)	12(38.7)	0(0.0)
<b>HPV vaccine is available in Nigeria</b>				
Yes	40(31.0)	22(24.7)	11(35.5)	7(77.8)
No	27(20.9)	17(19.1)	8(25.8)	2(22.2)
Not sure	62(48.1)	50(56.2)	12(38.7)	0(0.0)

**Table 2:** Awareness of Cervical Cancer and its Prevention Practices.

**3.4 Practices and intentions of respondents on HPV vaccination**

Regarding the most suitable time for when their daughters should undergo the HPV vaccination among the 54 respondents who were aware of availability of HPV vaccine, 29.6 % of the HCW considered the HPV vaccination to be necessary prior to onset of first sexual intercourse, 33.3 % considered it necessary in adulthood after onset of sexual intercourse, 14.8 % considered it necessary after their daughters are married, about 13.0 % considered it to be decision for their daughters to make at the appropriate time and 9.3% were not sure of the best time for the vaccine to be given (Table 3). Only 24.1% of the respondents aware of vaccine for HPV have ever discussed HPV vaccination with mothers and/or their daughters in the past with only 1.8% (a Physician) has ever vaccinated his

daughter. However, 78.6% of the HCW were willing to vaccinate their eligible daughters if the opportunity is available.

Items	Total	CHEW/CHO	Nurses	Physicians
<b>Have discussed HPV vaccination with patient (54)</b>	<b>N=54</b>	<b>N=32</b>	<b>n=15</b>	<b>n=7</b>
Yes	13(24.1)	7(21.9)	4(26.7)	2(28.6)
No	41(75.9)	25(78.1)	11(73.3)	5(71.4)
<b>Ideal time for HPV vaccination for girls (15)</b>	<b>N=15</b>	<b>n=9</b>	<b>n=4</b>	<b>n=2</b>
Before onset of first sexual intercourse	4(29.6)	1(12.5)	1(46.7)	2(71.4)
After onset of sexual intercourse	5(33.3)	4(40.6)	1(33.3)	0(0.0)
After their daughters are married	3 (14.8)	1 (18.7)	2 (6.7)	0 (0.0)
Decision for their daughters	2 (13.0)	2 (21.9)	0 (0.0)	0 (0.0)
Not sure	1(9.3)	1(46.9)	0(0.0)	0(0.0)
<b>Have vaccinated daughter (54)</b>	<b>N=54</b>	<b>n=32</b>	<b>n=15</b>	<b>n=7</b>
Yes	1(1.8)	0(0.0)	0(0.0)	1(14.3)
No	53(94.6)	32(100.0)	15(100.0)	6(85.7)
<b>Willing to vaccinate daughter</b>				
Yes	44(78.6)	23(71.9)	14(93.3)	7(100.0)
No	3(5.4)	3(9.4)	0(0.0)	0(0.0)
Not sure	7(12.5)	6(18.8)	1(6.7)	0(0.0)

**Table 3:** HPV Vaccination Practices and Intentions.

### 3.5 Barriers to HPV vaccination discussion and uptake

Forty-one (75.9%) of the respondents that were aware of availability of vaccine for HPV had never discussed HPV vaccination with any patient in their career. The reasons included lack of awareness of availability of the vaccine in Nigeria (43.9%), not familiar with the topics to be discussed on HPV vaccine (26.8%), not familiar with available types (14.6%), I have never seen any patient that met the criteria (7.3%) and that it was not part of their job (7.3%) (Table 4).

The 10 HCW with knowledge of HPV vaccine, but not willing or unsure of readiness to vaccinate their daughters gave reasons of wanting the vaccination process to be fully established (10.0%), their daughters not sexually active (10%), scared of side effects of the vaccine (20%), HPV vaccine as risk factor for exposure to risk of promiscuity among the young girls (30%), and the vaccine being expensive (30%) (Table 4).



Condition	Frequency (%)
<b>Reasons for not discussing HPV vaccination (n=41)</b>	
I have never seen any patient that met the requirements	3 (7.3)
I am not familiar with the topic on HIV vaccine	11(26.8)
I am not familiar with HPV vaccine	6(14.6)
It is not part of my job	3(7.3)
I am not aware of availability of HPV vaccine in Nigeria	18(43.9)
<b>Reasons for not allowing HPV vaccination (N=10)</b>	
Want the vaccination process to be fully established	1(10.0)
HPV vaccine exposes to risk of promiscuity	3(30.0)
She is not sexually active	1(10.0)
Scared of the side effects of the vaccine	2(20.0)
It is expensive	3(30.0)

**Table 4:** Reasons for not discussing and not allowing HPV Vaccination for daughters.

**4. Discussion**

Cervical cancer, a largely preventable disease, remains a public health problem especially in low- and middle-income counties (LMICs) [38, 39]. An important strategy towards the reduction of its burden is prevention of its known causative agent, HPV, through vaccination This will be, particularly, more effective if the rural, underserved eligible population are deliberately included in efforts to ensure universal coverage. In this study, the infrastructural availability, human resource for health and the practices of cervical cancer prevention of health care workers in the rural communities of Ibarapa reflected typical situation in many similar communities and, to some extent, the whole of Nigeria.

**4.1 The health infrastructure and personnel in Ibarapa**

The role of health\_system on provision and uptake of preventive health services has been challenging regarding cervical cancer prevention activities in Nigeria contributing its low coverage. Our findings showed that in Ibarapa health zone of Oyo state, like most rural settings in Nigeria, there were no programs or public educational campaigns for cervical cancer and its prevention at the time of this study. The readiness of the health facilities for cervical cancer prevention activities was low. While 63.9% of the health facilities had examination rooms structurally design to serve the purpose of cervical cancer screening, only 33.3% had an examination couch with stirrup that can be used for cervical cancer screening, 55.6% had appropriate specula for pelvic examination and 5.6% ever had acetic acid and none with cryotherapy equipment. It was shown in this study that about 69.0% of the available human resources for health in these rural local government areas were of CHEW/CHO cadre and none had undergone formal training to offer cervical cancer prevention services, a situation that was applicable to all the

nurses and physicians in these 3 LGAs. The challenges of health workforce cannot be over emphasized, especially in low- and middle-income countries (LMICs) like Nigeria, where cervical cancer prevention can be hampered by a lack of medical infrastructure [40]. The community health workers (CHWs) are focus of many governments in developing countries as an effective service delivery option to increase access to health care [37, 41, 42]. Nigeria should join the league of nations, especially in LMICs where there are ongoing efforts to rapidly upscale formal training of health care workers to offer cervical cancer prevention services [43]. Adequate and even distribution of infrastructural and human resource for health play significant role in encouraging women to participate in cervical cancer prevention [44-46].

#### **4.2 Respondents awareness**

Despite the no prior training on cervical cancer prevention, the respondents in our study demonstrated good levels of awareness of cervical cancer, HPV and its cervical cancer causative effect. This is not surprising considering the health profession of the respondents. They were expected to be more knowledgeable than non-health and other women in the communities. This is consistent with the previous studies, on secondary preventive strategy, on this subject [47, 48]. Most of the respondents would have acquired their knowledge about the disease from their training. Social media, self-study, and colleagues constituted other possible sources of information for these respondents. However, fewer knew of the HPV vaccine and its availability for use in Nigeria (41.9% and 31.0%, respectively). These levels of awareness, however, vary among the cadres of HCWs with the lowest levels among the CHEWs and CHOs. This finding might be attributed to the nature of trainings given to the, Nurses, CHEWs and CHOs which, comparatively, are less in-depth in discussing the pathology of diseases. Many of the CHEWs/CHOs (59.6%) in this study were not aware that HPV can be prevented (Table 2). This lower level of awareness among these lower cadres of health care personnel has been found in other studies in sub-Saharan Africa (SSA) [47, 49, 50].

#### **4.3 Practice of primary cervical cancer prevention**

Uptake of any national cervical cancer prevention to reduce the morbidity and mortality associated with this disease depends on, among other factors, request by health care workers [51, 52]. But many studies have documented poor utilization of this opportunity [53] in sub-Saharan Africa [54]. It was therefore not surprising that only about one quarter of the 54 respondents who were aware of HPV vaccines have ever discussed vaccination with their patients and only about a third correctly knew the prioritized timing for vaccination for girls. This low level of awareness of primary cervical cancer strategies calls for more enlightenment campaign on primary prevention modalities for cervical cancer along the rapidly expanding secondary prevention strategy of screening to expand the prevention opportunities of the disease [14].

The provision and utilization of HPV vaccination service in this study was very low as only 24.1% (15/54) and 1.8% (1/54) of the respondents that were aware of HPV vaccines ever discussed and vaccinated their daughters against HPV, respectively. Gladly, 78.6% of the respondents who were aware of the availability of the HPV vaccines were willing to vaccinate their eligible daughters. Also, of note is that 77.8% of the health facilities in these local government areas already have the infrastructure and personnel for provision of Immunization services (Table 1).

The commonest reason given for not discussing HPV vaccination included not aware of the availability of HPV vaccine in Nigeria. The vaccine being expensive was the commonest reason for not willing to vaccinate their daughters. Other reasons given included fear of side effects of the vaccines, vaccination likelihood of exposing their daughters to risk of promiscuity. Our findings on barriers to willingness to vaccinate children were in general similar with findings from previous studies [55, 56]. These reasons need to be addressed in an intervention program targeting this category of health workers, considering their number and the influence they have in the community. Targeted workshop and training on cervical cancer and its prevention strategies, provision of simple, effective and sustainable prevention services and integration of all cervical cancer preventive strategies and into other reproductive health preventive services likely family planning, MNCH, will be of enormous help in improving utilization of cervical cancer prevention programme.

The implications of this study for clinical practice include the need for deliberate effort to further implement the national policy on task shifting to allow the full utilization of the lower cadre of health care workers to be involved in cervical cancer prevention services. As shown in this study, they form the majority of the available human resource for health in our rural communities. More educational initiatives should be organised for health care workers in the lower levels of health care facilities to enhance their perceived importance of prescribing HPV vaccine and cervical cancer screening to their patients. This will improve their uptake of the services for their personal and family benefits as well. Also, since non-willingness was mainly on the vaccine's safety and the associated myth of exposure to promiscuity, these HCWs, as well as other parents, should be particularly reassured about its low rates of adverse effects in lieu of its many health benefits and consultations with prospective clients and patients eligible to receive HPV vaccine should be cautiously conducted with good communication skills taking into account the sensitive nature some of the discussions might be and possible embarrassment to girls and their parents.

The findings from this study raised cost issue. To overcome this and enhance uptake for adolescent girls, at this early stage of HPV vaccine introduction in Nigeria, the Government should consider at least partial subsidy to eligible clients to overcome vaccine cost which is one of the important barriers. In light of the present findings, future research should evaluate interventions which could effectively enhance Nigeria HCWs', especially the lower cadres like CHEWs and CHOs, knowledge of HPV and its vaccination in a sustainable manner; remove the barriers of offering immunization, and optimize proper practice of HPV vaccines in suitable subjects.

To our knowledge this study is the first-ever evaluation among rural communities' health care practitioners on their practice of cervical cancer prevention and willingness to vaccinate their daughters, prescriptions of HPV vaccination. The high response rate and the sampling methodology enhanced the generalizability of the findings. However, several limitations should be addressed here. Firstly, this is a cross-sectional study and one could not establish causal relationships between the HCWs' awareness and their willingness to vaccinate their daughters. In addition, we had invited HCWs working in the public health facilities only, and the attitudes and barriers to cervical cancer prevention practice and willingness to vaccinate their daughters might differ to a certain extent with

physicians working in the private sector who form significant health service providers in Nigeria. Also, our respondents were heterogeneous with respect to their specialties and we have, essentially, adopted an aggregate analysis. This is a descriptive analysis and there could be potential confounders affecting clinical practice. Lastly, it is anticipated that the rapid promotion of cervical cancer prevention activities in Nigeria, especially among Non-Governmental organizations, in recent times will change these perceptual variables with time as more people and communities become more aware. A time series of cross-sectional surveys is needed to reflect the trends of changing knowledge, attitude, uptake and perceived barriers on this subject.

## **5. Conclusion**

It is evident from this study that despite the high level of awareness of cervical cancer, availability, provision and utilization of preventive services, especially primary prevention of HPV vaccination is almost non-existent in our rural, populous communities where such services are most needed. There is, therefore, still a lot of efforts needed to equip our HCWs knowledge on cervical cancer prevention strategies if we must join the league of nation with low burden of cervical cancer. There is a need for the widespread training and empowerment of our facilities and health care workers, particularly those in the rural, hard to reach communities to be actively involved in the cervical cancer prevention. Cervical cancer prevention education programs need to be carried out among health care professionals on a continuous basis, especially among the CHEWs and CHOs who are the most available HCWs in our rural communities. The continuing education-based program provides an opportunity for doing this, especially as HCWs constitute one of the most authoritative sources of information on health matters for the general populace, especially for women. As they become informed, they should be motivated to practice what they teach and lead by example. Public health education on safety and efficacy of the HPV vaccination is still needed. Recommendation by Government, including subsidy would be an important factor to enhance vaccination rates. The adoption of vaccination as part of pre-secondary education, exercise may also be considered.

## **Authors' Disclosures of Potential Conflicts of Interest**

The following represents disclosure information provided by authors of this manuscript. All relationships are considered compensated. Relationships are self-held unless noted. I = Immediate Family Member, Inst = My Institution. Relationships may not relate to the subject matter of this manuscript. For more information about ASCO's conflict of interest policy, please refer to [www.asco.org/rwc](http://www.asco.org/rwc) or [ascopubs.org/jco/site/ifc](http://ascopubs.org/jco/site/ifc).

## **Acknowledgment**

We acknowledge the support of the staff of the Oyo State Ministry of Health for allowing us access to the facilities and the members of staff for administration of the questionnaire. We thank the members of staff of the health facilities for their cooperation during the conduct of this study.

## **Support**

Supported by an ASCO/Conquer Cancer International Innovation grant to O.A.A.

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**Citation:** Olutosin Alaba Awolude, Sunday Oladimeji Oyerinde. Assessment of Infrastructural and Human Resource for Health Status and Readiness for HPV Vaccination in Rural Communities in Nigeria. *Journal of Cancer Science and Clinical Therapeutics* 3 (2019): 078-093.



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