

## PARENTAL KNOWLEDGE AND WILLINGNESS FOR HUMAN PAPILLOMAVIRUS VACCINATION OF ADOLESCENTS IN MAIDUGURI, BORNO STATE

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### ABSTRACT

**Background:** The World Health Organization (WHO) states that HPV infection, affecting 50-80% of sexually active women, is the most prevalent sexually transmitted infection globally. Worldwide, HPV infection prevalence is 11.7% in women and 21% in men, with peak rates in adolescents of both sexes. **Objectives:** The study aims to assess the knowledge and readiness of parents and guardians of adolescent boys and girls regarding the use of the human papillomavirus vaccine in Maiduguri, Borno State. **Methods:** The study employed a multi-stage sampling technique and distributed four hundred semi-structured questionnaires as part of a descriptive cross-sectional study. The data was analyzed using IBM SPSS version 25. **Results:** Most respondents, 34.3%, were between the ages of 30 and 39, with a mean age of  $46.4 \pm 6.9$ . Up to 88% of respondents demonstrated poor knowledge about HPV infection and vaccines, while 65% identified vaccination and 70.7% recognized abstinence as preventive measures. The majority of respondents who were knowledgeable about HPV infection (41.9%) reported that they sourced their knowledge from healthcare workers. The study found that religion, level of education, and occupational status were statistically significant with a  $p$ -value  $\leq 0.05$ . **Conclusion:** The study revealed that many caregivers had poor knowledge, and factors such as religion, education level, and occupational status were significantly associated with knowledge. The study findings support future efforts to implement public-level HPV education.

**Keywords:** Knowledge, Readiness, Human Papillomavirus, uptake of HPV vaccine, Adolescents

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## Introduction

Human papillomavirus (HPV) is a group of over 100 highly transmissible, common viruses primarily transmitted through sexual contact.<sup>1,2</sup> It is the main risk factor for cervical cancer. It can lead to a variety of other malignant tumours, including oropharyngeal (12–63%), vulva (40–50%), vaginal (40–64%), anus (90–93%), and penile (36–40%).<sup>2–5</sup> The genital human papillomavirus infection is the most prevalent sexually transmitted infection (STI) globally.<sup>6</sup> HPV genital infections are typically asymptomatic, with 80% of infected individuals experiencing spontaneous recovery within a year.<sup>7</sup> Persistent high-risk infection can lead to cancer in the genital tract, affecting both men and women.<sup>7,8</sup> HPV infection is primarily prevalent among young women under 25 years old.<sup>8</sup> The global prevalence of cervical cancer is 11.7% in women with normal cytology and 21.0% in men, with peak rates in adolescents of both sexes.<sup>9</sup> Type 16 is the most virulent of the twelve oncogenic HPV types that are categorized as high risk, which include types 16, 18, 31, 33, 35, 39, 45, 52, 56, 58, and 59<sup>7,8,10]</sup> and types 16 and 18 account for approximately 70% of cervical cancer cases.<sup>11</sup> Cervical cancer cases and deaths in developing countries are estimated to exceed 80,000 annually, with the proportion expected to rise to 90% by 2020.<sup>12</sup> About 70% of cervical cancer cases worldwide are caused by HPV strains 16 and 18, which are primarily preventable through vaccination. However, 30% of cases are caused by other HPV types.<sup>13</sup> The vaccine's success relies on parental knowledge, consent and uptake, as it targets Nigerian 'legal minors', ensuring their health and well-being.<sup>14</sup> Implementing effective screening programs in low-resource settings is challenging, contributing to higher cervical cancer mortality rates in the developing world.<sup>15</sup>

The HPV vaccine is an evidence-based intervention for preventing cervical cancer-related illnesses and mortality in resource-limited nations compared to cytology screening or DNA testing.<sup>16</sup>

In 2017, 68% of women in high-income nations, 28% of middle-income countries, and 7.5% of lower-middle-income countries among females aged 10–20 years had received the HPV vaccine, while the global coverage rate was 39.7%.<sup>17</sup> Low HPV vaccination uptake is influenced by factors like low vaccine knowledge, side effects, school attendance, and parental fears of promiscuity and unsafe sexual behaviour.<sup>18</sup> Parental knowledge and willingness towards HPV disease and vaccine, along with the convenience of receiving the vaccine, are additional barriers.<sup>19</sup> Most African cervical cancer researchers focus on secondary prevention, such as cervical screening, with only 23.4% of publications on primary prevention, particularly HPV vaccination, being published.<sup>20,21</sup> The study aimed to assess the parental knowledge and willingness for HPV vaccination of adolescents in Maiduguri, Borno State.

## Methods

### Study area

Borno State, situated in Nigeria's northeastern geopolitical zone, comprises 27 Local Government Areas and has a population of 4,151,193, according to the 2006 Census. Jere LGA has twelve wards with a population of 211,204, while Maiduguri Metropolitan Council (MMC), the capital and largest city in Borno State, has fifteen wards and an estimated population of 1,907,600.

### Study design

A cross-sectional study was conducted in the Maiduguri Metropolitan Council and Jere LGA from April 15 to July 30, 2023.

### Study population

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The study focused on parents of adolescent boys and girls in Maiduguri and Jere Local Government Areas of Borno State.

Parents/guardians of adolescent boys and girls aged 10-19 years and those residing in study areas for at least six months were included in our study, while parents and guardians of adolescent boys and girls who were severely sick or mentally ill were excluded.

### Sample size and sampling procedure

The sample size was determined using a single population proportion formula, considering a previous study's finding of 48.7% HPV vaccination readiness in Ethiopia, a 95% confidence level, and a 5% margin of error. Thus, the final sample size, after accounting for a 10% non-response rate, became 422. A multi-stage sampling technique was employed to select study participants, consisting of four stages: the selection of wards, settlements, houses/households, and respondents.

### Data collection procedure and techniques

The study employed a structured, interviewer-administered questionnaire, which was translated into Hausa and then back into English by language experts to ensure consistency. The study involved the recruitment of Community Health Extension Workers (CHEWs) and resident doctors who are fluent in local languages and customs as data collectors and supervisors. Two days of training were provided to data collectors and supervisors on data collection procedures, questionnaire content, and confidentiality of respondents' information.

### Data quality assurance

A pretest was conducted on 10% of the sample to ensure data quality, with on-site supervision by the principal investigator and supervisors, and daily review of questionnaires by the research team.

### Data analysis

The questionnaire data were statistically analyzed using SPSS software version 26, with descriptive analyses summarized and presented in frequency tables. The study employed Pearson's Chi-square test for categorical data to identify factors associated with knowledge and willingness to undergo HPV vaccination, with a p-value of  $\leq 0.05$  considered statistically significant. Each question on knowledge is scored 1 out of 14, with scores ranging from 0 to 7 indicating poor knowledge and from 8 to 14 indicating good knowledge.

### Ethical clearance

The Ministry of Health and Human Services' ethical review committee in Borno State granted ethical clearance for this study (SHREC approval No.31/2023). After informing the eligible respondents of the study's goal, the right to withdraw at any time during data collection, and the privacy and confidentiality of all data collected, their informed consent was obtained.

### Results

The study involved participants with a mean age of  $46.4 \pm 6.9$  years, comprising 53.8% females, and reflected the major tribes in the study areas: Kanuri (34.8%), Hausa (15.6%), Babur (10.8%), Marghi (10.5%), and Shuwa-Arabb (9.8%). The majority of respondents are Muslims (78.7%), with 86.5% being married, 35.2% having received Qur'anic education, and 39% being traders. 14.2% are civil servants, while the majority, 88.5%, have an adolescent number between 1 and 5 (Table 1).

HPV infection is known to only 15% of respondents, with 41.9% receiving information from healthcare workers. 23.3% believe it's exclusively female-related, while 53.3% don't. 41.7% of respondents believe HPV is symptomatic, 10% think antibiotics can treat it, and 41.7% believe vaccination can treat it (Table 2). The majority of respondents are aware of the potential

benefits of abstinence (70.7%) and condom (58.6%) use in preventing HPV. Still, only five per cent are aware of the HPV vaccine's existence, and 10% have received it. The majority of respondents, 88%, have a low understanding of HPV infection and vaccination. The study found that despite low awareness of HPV, 90% of respondents were willing and supportive of HPV vaccination for adolescent boys and girls. The majority, 78.3% of respondents, show a parental willingness to vaccinate their children, with 26.9% not knowing about vaccination centres, 34.6% vaccine not available, and

7.7% fearing risky sexual behaviour. Out of 60 respondents, 46.7% are unaware of the HPV vaccine's efficacy in preventing genital warts, 33.3% are unsure if it prevents HPV-induced cancers, 38.3% are uncertain if it treats genital warts, and 26.7% believe it's effective, with up to eighty-eight per cent (88%) of respondents having poor knowledge (Table 3). Additionally, the study found that religion, education level, and occupation were significant factors in understanding HPV knowledge, with all having a P-value of  $\leq 0.005$  (Table 4).

**Table 1: Socio-demographic characteristics of respondents.**

Variables	Frequency (n=400)	Percentage (%)	Marital Status	
<b>Age (years)</b>				
20-29	5	1.3	Single	6
30-39	137	34.3	Married	346
40-49	115	28.7	Divorced	14
50-59	80	20.0	Widow/Widower	21
60-69	42	10.5	Separated	13
70-79	17	4.2		
80-89	4	1.0		
<b>Mean age</b>				
<b>46.4±6.9</b>				
<b>Gender</b>				
Male	185	46.2		
Female	215	53.8		
<b>Tribe</b>				
Kanuri	139	34.8		
Hausa/Fulani	63	15.6		
Babur	43	10.8		
Marghi	42	10.5		
Shuwa	39	9.8		
Others	74	18.5		
<b>Religion</b>				
Christianity	85	21.3		
Islam	315	78.7		
<b>Number of adolescents</b>				
1-5			354	88.5
6-10			41	10.3
$\geq 11$			5	1.2

**Table 2: Knowledge of HPV Infection among Parents/Guardians of Adolescent Boys and Girls.**

Variables	Frequency (n)	Percentage (%)		
<b>Heard of HPV Infection</b>				
Yes	60	15.0	Fingers	
No	340	85.0	I don't know	13 13.7
<b>Source of Information</b>			<b>A person with no symptoms cannot transmit HPV.</b>	
Health care worker	31	41.9	Yes	17 28.3
Social media	11	14.9	No	20 33.3
Television	10	13.5	I don't know	23 38.3
Radio	14	18.9	<b>Most sexually active people will get HPV at some point in their lives.</b>	
Family/Friends	8	10.8	Yes	29 48.3
<b>HPV infection is limited to females</b>			No	14 23.3
Yes	14	23.3	I don't know	17 28.3
No	32	53.3	<b>People who can be infected with HPV</b>	
I don't know	14	23.3	Only men can get infected	1 1.7
<b>HPV is symptomatic</b>			Only women can get infected	7 11.7
Always	25	41.7	Only young people can get infected	1 1.7
Not always	15	25.0	Anyone can get infected	37 61.7
I don't know	20	33.3	<b>I don't know</b>	14 23.3
<b>HPV infection can be treated</b>			<b>Circumcision reduces the risk of getting HPV infection.</b>	
Vaccination	25	41.7	Yes	28 46.7
Antibiotics	6	10.0	No	11 18.3
I don't know	29	48.3	I don't know	21 35.0
<b>Knows lesions related to HPV</b>			<b>Having multiple partners exposes one to a high risk of HPV infection.</b>	
Yes	16	26.7	Yes	48 80.0
No	18	30.0	No	2 3.3
I don't know	26	43.3	I don't know	10 16.7
<b>HPV can be transmitted through the following</b>				
Skin to Skin	23	24.2		
Unprotected sex	43	45.3		
	16	16.8		

**Table 3: Knowledge and Willingness to uptake of HPV vaccination respondents.**

Variables	Frequency(n)	Percentage (%)	Do you have a personal history of HPV infection?
<b>HPV can be prevented by</b>			
Vaccination	38	26.2	Yes 2 10.0
Use of Condom	34	23.5	No 49 81.7
Abstinence	41	28.3	I don't know 9 15.0
Avoid direct contact	23	15.8	
I don't know	9	6.2	
<b>You need more than one dose to complete the HPV vaccination.</b>			
Yes	28	46.7	
No	12	20.0	
I don't know	20	33.3	
<b>HPV Vaccination offers protection against all sexually transmitted infections</b>			
Yes	23	38.3	
No	19	31.7	
I don't know	18	30.0	
<b>You can cure HPV by getting the HPV vaccine.</b>			
Yes	30	50.0	
No	21	35.0	
I don't know	9	15.0	
<b>The HPV vaccine is most effective if given to people who are not exposed.</b>			
Yes	39	65.0	
No	7	11.7	
I don't know	14	23.3	
<b>Have you received the HPV vaccine?</b>			
Yes	6	10.0	
No	51	85.0	
I don't know	3	5.0	
<b>Do you have a personal history of HPV infection?</b>			
Yes	2	10.0	
No	49	81.7	
I don't know	9	15.0	
<b>Knowledge Score</b>			
Poor	352	88.0	
Good	48	12.0	
<b>Willing my son/daughter to get vaccinated</b>			
Yes	54	90.0	
No	6	10.0	
<b>Willing to pay for the vaccine if it is not free</b>			
Yes	47	78.3	
No	13	21.7	
<b>Is your daughter/son vaccinated against HPV?</b>			
Yes	0	0.0	
No	60	100.0	
<b>Reasons for not vaccinating my children</b>			
I don't know the vaccination centre for the HPV vaccine.	21	26.9	
Vaccine not available.	27	34.6	
May expose adolescents to risky sexual behavior.	6	7.6	
I don't have sufficient information about the vaccine.	18	23.1	
HPV vaccination is expensive.	2	2.6	
The HPV vaccine could have side effects.	3	3.9	
No reason.	1	1.3	

Table 4: Factors Associated with Knowledge of HPV Infection and Vaccination Among Respondents.

Variables	Poor Knowledge	Good Knowledge	Test Statistics	P-value
<b>Age (Years)</b>				
20-59	294	43	1.169	0.280
60-89	58	5		
<b>Gender</b>				
Male	160	25	0.747	0.388
Female	192	23		
<b>Tribe</b>				
Kanuri	128	11	3.369	0.066
Others	224	37		
<b>Religion</b>				
Christianity	63	22	19.698	$\leq 0.001^*$
Islam	289	26		
<b>Marital Status</b>				
Married	304	42	0.047	0.829
Others	48	6		
<b>Current level of education</b>				
Informal	180	8	20.148	$\leq 0.001^*$
Formal	172	40		
<b>Occupation</b>				
Trading	151	5	18.732	$\leq 0.001^*$
Others	201	43		

\*Statistically significant

## Discussion

The study found that parents in Maiduguri, Borno State, Nigeria, who participated in a survey, exhibited poor knowledge about HPV infection and vaccination. Comparable research indicated a low level of awareness of the HPV vaccine and its relation to the development of cervical cancer among parents. However, researchers found a high level of knowledge about the HPV vaccine and infection.<sup>9,11,12,23</sup> Studies that are not similar to this study were conducted in Nigeria,<sup>21</sup> Uganda,<sup>14</sup> and Mali.<sup>16</sup>

Parents showed a significant willingness to vaccinate their adolescent boys and girls, similar to a study conducted in Nigeria,<sup>23</sup> the Kingdom of Bahrain,<sup>11</sup> Uganda,<sup>14</sup> and Mali.<sup>16</sup> A study reported willingness among parents towards the HPV vaccine, while a contrary report was also found in a study in Oyo state, Nigeria.<sup>21</sup> Respondents' negative willingness towards HPV vaccine uptake is likely due to their religious beliefs, as Nigeria has diverse religions that prohibit drugs, vaccines, and healthcare procedures. The

study revealed mixed opinions on sexually transmitted infection prevention messages, particularly at young ages, and highlighted the ongoing conversation between adolescents and healthcare providers about sexual health.

Strengthening vaccination channels for adolescents and their parents is crucial due to factors such as education, religion, and occupation influencing their knowledge and willingness to take up HPV vaccines. Studies have shown that the level of knowledge about the HPV vaccine significantly impacts its uptake.<sup>21</sup> Despite Ibadan South-West parents' good knowledge of the HPV vaccine, several factors have been identified that hinder parents and their children's participation. The increase in cervical cancer incidence in Ibadan may be attributed to this.<sup>22</sup> The issue requires effective communication, subsidization of vaccination, and increased availability of vaccines.

The generalization of our results is greatly enhanced by the questionnaire's validity, high response rate, and sampling technique. The

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study's limitations include its cross-sectional nature, making it difficult to infer causal relationships between adolescent parents and guardians' knowledge of HPV infection and vaccination and their willingness to use HPV vaccination. The study provides baseline data on HPV vaccination, which will guide further research on knowledge, attitudes, perceived barriers, and associated factors.

### Conclusion

The majority of respondents had poor knowledge about HPV infection and vaccines, and the study found that religion, education status, and occupation were statistically significant. Knowing the advantages of HPV vaccination, the Nigerian government should make these vaccines widely available and reasonably priced, as it has been integrated into the National Program on Immunization (NPI) in Nigeria, and also the study findings support future efforts to implement public-level HPV education.

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