Perception and acceptance of Human Papilloma Virus Vaccine by Mothers in Owerri, Nigeria: A cross-sectional study

Abstract

Introduction: Human papillomavirus (HPV) vaccination among female children 9-14 years is critical to reducing the burden of HPV-related cancers in Nigeria. We assessed caregivers' perception and acceptance of HPV vaccination for their wards; using a structured, pretested, self-administered questionnaire in a face-to-face interview among caregivers attending a well-child/immunization clinic in Owerri, Nigeria.

Methodology: Participants were recruited by convenience sampling method between August and October 2023.We analysed the cross-sectional data from 267 caregivers of caregivers aged 20–57years in a Nigerian Teaching hospital. Statistical analysis included descriptive statistics and bivariate analysis to investigate the factors associated with HPV vaccination uptake.

Among the respondents, 132 (49.4%) of them had heard about HPV, and 52 (19.5%) stated that it could prevent cervical cancer. Bivariate analysis, demonstrated that tertiary education in the mother (OR 2.25, 95%CI 1.27 to 4.02) and father (OR 2.25, 95%CI 1.28 to 3.85) were significantly associated with their knowledge of HPV vaccine and their wards' probability of taking the HPV vaccine. Participants' intention to give HPV vaccination to their children was 77.5%. Our findings suggest that interventions tailored to enhance education and support of caregivers would significantly increase HPV vaccination among females in Nigeria.

Conclusion: Being well-educated appears to guarantee good knowledge of the HPV vaccine, but not HPV prevention of cervical cancer role. Our respondents' intention to have the HPV vaccine administered to their children was high. Concerted efforts need to be made by government and health workers to create awareness about HPV infection, HPV vaccine amongst caregivers to enhance HPV vaccine uptake.

Keywords: Knowledge, Attitude, Human Papilloma Virus, Vaccination.

INTRODUCTION:

Persistent Human Papilloma Virus (HPV) infection causes nearly all cases of cancer of the cervix; it is also responsible for a number of anogenital and oropharyngeal cancers.[1] The HPV is mainly transmitted sexually, with most infections acquired soon after becoming sexually active;[2] however, mother to child transmission can occur during childbirth.[3] Over 100 HPV serotypes exist; persistent infection with high-risk HPV serotypes 16 and 18 have been found to be responsible for approximately 70% of all cases of cancer of the cervix worldwide.[4]

Cervical cancer is the fourth most common cancer type in women worldwide, accounting for 604,127 cases in 2020, while it is also the fourth cause of cancer death in women globally with 341,831 deaths[5]. In Nigeria, it is the second most common type of cancer amongst 15 to 44-year-old females, with about 14,943 new cases diagnosed annually,[4] 8000 documented deaths [6] and is the second most frequent cause of cancer deaths.[7] Cancer of the cervix and diseases associated with HPV,[8] can be prevented by HPV vaccination programs. Vaccination against HPV is alluded to be one of the most valuable practices against HPV infection [9,10]with available data confirming the vaccines safety profile.[11, 12] Unfortunately, HPV vaccination and cervical screening services are still rudimentary in Nigeria.[13]

Nigeria, among other countries, has added HPV vaccination – particularly, the bivalent HPV vaccine (Gardasil) for subtypes 16 and 18 – to its National Program of Immunization (NPI) for children 9–14 years old, and has made it free for its citizens.[6] It is not yet available for boys in the NPI schedule, although it is available in private health facilities for girls, boys, and women, but at a largely unaffordable cost to the majority of Nigerians.[14]

To achieve optimum cost-effectiveness of HPV vaccination, more than 70% of the female population must be vaccinated.[15] Unfortunately, the knowledge of HPV as a cause of cervical cancer and HPV vaccination as prevention against cervical cancer, including the vaccination by the target population of young people, is still abysmally low[2]. These low rates could be attributed to inequitable access, socioeconomic, cultural, and religious factors.[16-18] Studies have shown that parents and caregivers of young children have poor knowledge of cervical cancer prevention and screening for their wards in Nigeria.[19, 20] To reverse this trend of low rates of vaccine acceptance and uptake, parents need to key into the concept of vaccination against HPV as acceptance by

parents with appropriate knowledge is the main driver towards increasing vaccination coverage rates.

Therefore, to advance awareness and knowledge of HPV infection and HPV vaccination among caregivers of children (parents), we sought to assess the knowledge of human papilloma virus and the attitude of mothers towards HPV vaccination for their children.

Methodology

We conducted a descriptive, cross-sectional, health institution-based survey involving 267 female caregivers at the Well-Child and Immunization clinic of the Federal Teaching Hospital (FTH), Owerri, between August and October 2023. The FTH is a 624-bed tertiary hospital that offers maternal and child health services and serves as a referral centre for general hospitals, maternity facilities, and private hospitals within Owerri and its adjoining states. A convenience sampling technique was utilized in obtaining data from all consecutive parents who attended the well-child clinic, using a questionnaire that covered baseline characteristics, knowledge, and attitude about HPV and the HPV vaccine. Questionnaires were administered after obtaining informed consent from the parents, who were encouraged to ask for an explanation on any of the questions from the researchers, but conversation amongst them was discouraged while completing the questionnaires. Questions were interpreted into the local language on participant's requests, without further explanations to remove bias. Ethical approval was obtained from the Ethical Committee of the institution. The SPSS version 26.0 (IBM Corp., USA) statistical software was used for data entry, validation, and analysis. Pearson's Chi-square (χ^2) statistic was used to examine the associations between categorical variables and effect estimates were presented as odds ratios along with their 95% confidence intervals. Relationships were said to be statistically significant when $p<0.05$.

Results:

Questionnaires were administered to 302 respondents and 35 out of the 302 questionnaires were incompletely filled and not analyzed further. Only 267 questionnaires were analyzed, giving an effective response rate of 88.4%.

The key characteristics of the respondents are presented in Table 1. The mean age of the 267 participants was 31.0 ± 5.7 years; with a range of 20 – 52 years. One hundred and twenty-three

(46.1%) respondents were aged 29 – 36 years and made up the modal age group. Most of the respondents had received a university education (198, 74.2%) and a majority of them belonged to social classes II or III (180, 67.4%).

Analysis of the 267 caregivers revealed that 132 (49.4%) had heard about the HPV vaccine while 135 (50.6%) had not. The major source of information about the vaccine was from health workers in the hospital (79, 46.5%), the internet/social media (39, 23.0%), and the radio/TV 16(9.4%) Table 2. A significant proportion of the mothers, 52 (39.4%) stated that HPV vaccination prevents cervical cancer, 118 (89.2%) opined that it was given to prevent infection/disease and 96 (36.0%) did not know why it was administered. One (0.4%) respondent declined comment.

When the respondents were asked about being vaccinated, only twenty-three (9.6%) mothers had received the HPV vaccine while less than one-tenth 22 (8.2%) affirmed that their children had received the HPV vaccine. Fourteen (53.8%) subjects stated that the HPV vaccine was administered to their children at a cost in a government hospital, while 8(30.8%) received the HPV vaccine at a health centre while 4 (15.4%) admitted receiving it at a private health facility.

Of the respondents, 95 (35.6%) stated that boys could be vaccinated against HPV, 165 (61.8%) stated otherwise and 3 (1.1%) were undecided, four (1.5%) respondents declined comment. A majority of respondents 207 (77.5%) stated that they wanted their children to receive HPV vaccine, 55 (20.6%) did not wish their children to be vaccinated and 3 (1.1%) were undecided. Two (0.7%) respondents did not state their preference for HPV vaccination of their children. The reasons respondents proffered for not wanting their children vaccinated against HPV are shown in Figure 1 below.

Bivariate analysis demonstrated that age, occupation (father and mother), education (father and mother), religion, and state of domicile of the study participants were not found to be significantly associated with the mothers' intention to have their children vaccinated with the HPV vaccine (Table 3).

Educational class significantly affected knowledge of HPV/vaccinations; as respondents with a university degree or more were about 2.3 times more likely to know about HPV/vaccinations than their counterparts without a university degree; this was similar for both the mother's (OR

2.25, 95%CI: 1.27 to 4.02) and the father's (OR 2.25, 95%CI: 1.28 to 3.85) level of education. There was no significant difference in the knowledge of HPV/vaccine by age, state of domicile religion, or occupation of the respondents (Table 4).

DISCUSSION

In Nigeria and many sub-Saharan countries, HPV infection/cancer of the cervix is still a serious public health concern, despite the development of a safe and effective preventive vaccine. Broad acceptance of the vaccine by all and sundry is yet to be attained, even as HPV infection/cancer of the cervix remains a foremost cause of morbidity and mortality.

This study demonstrated that HPV knowledge is fairly common (49.4%) among the participants (mothers), with a 9.6% uptake of HPV vaccine among the mothers and an 8.2% uptake among their children. This finding, among literate women (74.2% of respondents) is a pointer to the fact that the state of affairs may be worse in the wider population. According to the analysis, only 19.5% were knowledgeable about HPV being the cause of cervical cancer, comparable to the 14.8%, 11.1% as documented in Benin[2]and Lagos,[21] Nigeria. This contrasts with the 43% knowledge of HPV among Greek adolescents[22] and 99.4% among mothers of adolescents.[23] The poor knowledge of HPV infection as a cause of cancer of the cervix displayed by the mothers could potentially jeopardize the HPV infection/ cervical cancer prevention endeavour, necessitating the need for early HPV /vaccine education to be initiated/ enhanced and made to be all-inclusive (children, adolescents, young people and adult males and females).

Another striking finding relating to knowledge of HPV vaccination is that a significant association between a higher level of education and knowledge of HPV was demonstrated, as was reported by Makweet al.[24] In this study, parents with at least a university degree were about 2.3 times more likely to know about HPV/vaccine than their counterparts without a university degree.

It is not amazing that 46.5% of the parents mentioned health workers in hospitals/health centres as their source of information about HPV vaccines. This is akin to the findings by Naoum P et al.[24] This finding accentuates the need for health workers in the hospital while providing health

education need to be armed with current information, considering their role in the fight against HPV infection and cervical cancer.

Also noteworthy was the low HPV vaccination rate amongst parents (9.6%) and their children (8.2%). Several workers had reported similar low uptake values ranging from 2.5 – 6.9%.[20, 24–26] This low uptake rate (9.6% and 8.2%), contrasts with high uptake rates of up to 47% reported from America.[27] Cost, availability of vaccines and inequity are some of the factors that may militate against HPV vaccination uptake in Nigeria[28] and may account for the documented rate in our study. Majority of mothers, 77.5% were willing to have the HPV vaccine administered to their children; this aligns with other studies by several workers.[20,21] However, parents who were hesitant to have the HPV vaccine administered to their children cited a lack of knowledge (63%) as their main reason, contrasting with safety concerns/side effects documented in another study as the main reason for hesitancy[29]; while a fear of side effects(13%) was the second most common reason for the vaccine hesitancy identified in this survey. Other reasons adduced for vaccine hesitancy in this study were the fathers' decision (5%) and a belief of not having any need for it (4%). Accordingly, the largely optimistic outlook (77.5%) willing to have HPV vaccine administered to their wards exhibited by the study participants is quite encouraging and should be taken advantage of, to improve HPV vaccination uptake. Furthermore, a lack of knowledge of the vaccine shown by 50.6% of the participants provides an opening for healthcare workers and policymakers to exploit and accentuate advocacy and education of the populace for improved HPV vaccination uptake. This is so, because physicians/health workers' recommendation has been found to be the factor with the highest positive association with the decision of parents to vaccinate children with the HPV vaccine.[23]

Pertaining mothers' intention to have their children vaccinated with the HPV vaccine, parents' age, occupation, education, religion, and state of domicile were not found to be significantly associated with mother's intention to have HPV vaccine administered to their children. However, other workers had documented a positive correlation between gender(sex) and vaccination intentions.[30] Despite not demonstrating any significant association between intention to receive HPV vaccine and other variables, its(i.e. intention to vaccinate their children) high value amongst mothers suggests that free HPV vaccination/inclusion in the national program on

immunization, if implemented, holds promise of a huge success in aiding effort(s) aimed at reducing the burden of cervical carcinoma amongst in Nigeria.

Conclusion

Given that HPV vaccination considerably reduces cervical cancer and death resulting there from, special consideration should be given to process(s) that would enhance provision of valid information to parents/caregivers. This information; should be conveyed in a straightforward exhaustive and easy-to-understand manner to parents and general populace regarding recommendation for the HPV vaccine and justification based on research. Instruction on HPV infection and cervical cancer should be encouraged at all levels of education in Nigeria to boost awareness while serving as an underpinning for better knowledge of HPV/vaccine, cervical cancer, and preventing deaths from cervical cancer. This will facilitate reduction in the enormous resources from the health budget that would have been spent in the management of cancer of the cervix.

Limitations

Recall bias may not be excluded as some of the questions required recall of past events, while social desirability bias cannot be excluded because of the urge to be seen to flow with the trend.

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Table 1: Sociodemographic characteristics of respondents

Variables	Frequency *n* (%)
Age range (years)	
20 – 28	98 (36.7)
29 – 36	123 (46.1)
37 – 44	40 (15.0)
45 – 52	6 (2.3)
Age of child	
<6 months	185 (69.3)
6 to <12 months	306 (6.4)
≥12 months	65 (24.3)
Religion	
Christianity	263 (98.5)
Islam	1 (0.4)
No response	3 (1.1)
Education level	

Primary	1 (0.4)
Secondary	68 (25.4)
Tertiary	198 (74.2)
Social class	
I	8 (3.0)
II	54 (20.2)
III	126 (47.2)
IV	35 (13.1)
V	39 (14.6)

Table 2: Source of knowledge of HPV vaccine among respondents

Source of knowledge of vaccine	**n**	**% (n =170)**
Hospital	79	46.5%
Internet	38	22.4%
Radio/TV	16	9.4%
Family and friends	16	9.4%
School	16	9.4%
Billboard	3	1.8%
Social media	1	0.6%
Church	1	0.6%

Table 3: Association between intention for child to have HPV vaccination and sociodemographic characteristics of respondents

Variable		**Wants HPV vaccine for child/ward, yes N, %**	**Odds Ratio (95% CI)**	**p-value**
Age				
	≤30 years	112 (77.2)	1	
	>30 years	95 (79.2)	1.12 (0.62 – 2.01)	0.706
Religion				
	Christianity	203 (77.8)	1	
	Islam	1 (100.0)	4.62×10^{8} (0.0 – ∞)	1.000
Education of father				
	University education or more	153 (79.7)	1	
	Less than a university education	54 (74.0)	0.72 (0.39 – 1.36)	0.315

Education of mother			
University education or more	157 (80.1)	1	
Less than a university education	50 (72.5)	0.65 (0.35 – 1.23)	0.187
Occupation of father (in 2 categories)			
Class 4/5	24 (70.6)	1	
Class 1 – 3	183 (79.2)	1.59 (0.71 – 3.55)	0.256
Occupation of mother (in 2 categories)			
Class 4/5	56 (76.7)	1	
Class 1 – 3	147 (78.6)	1.12 (0.59 – 2.13)	0.740
State of domicile			
Imo	197 (79.4)	1	
Outside Imo	9 (69.2)	0.58 (0.17 – 1.97)	0.379

Table 4: Association between knowledge about HPV and baseline socio-demographic variables

Variable	Heard of HPV vaccine, yes N, %	Odds Ratio (95% CI)	p-value
Age			
≤30 years	72 (49.7)	1	
>30 years	60 (49.2)	0.98 (0.61 – 1.59)	0.938
Religion			
Christianity	130 (49.4)	1	
Islam	1 (100.0)	1.65×10^9 (0.0 – ∞)	1.000
Education of father			
University education or more	106 (54.9)	1	
Less than a university education	26 (35.1)	0.45 (0.26 – 0.78)	0.004
Education of mother			
University education or more	108 (54.5)	1	
Less than a university education	24 (34.8)	0.44 (0.25 – 0.79)	0.005
Occupation of father (in 2 categories)			
Class 4/5	15 (41.7)	1	
Class 1 – 3	117 (50.6)	0.70 (0.34 – 1.42)	0.316
Occupation of mother (in 2 categories)			
Class 4/5	32 (43.2)	1	
Class 1 – 3	97 (51.6)	0.72 (0.42 – 1.23)	0.223

State of domicile				
	Imo	122 (48.8)	1	0.062
	Outside Imo	10 (76.9)	3.50 (0.94 – 13.01)	

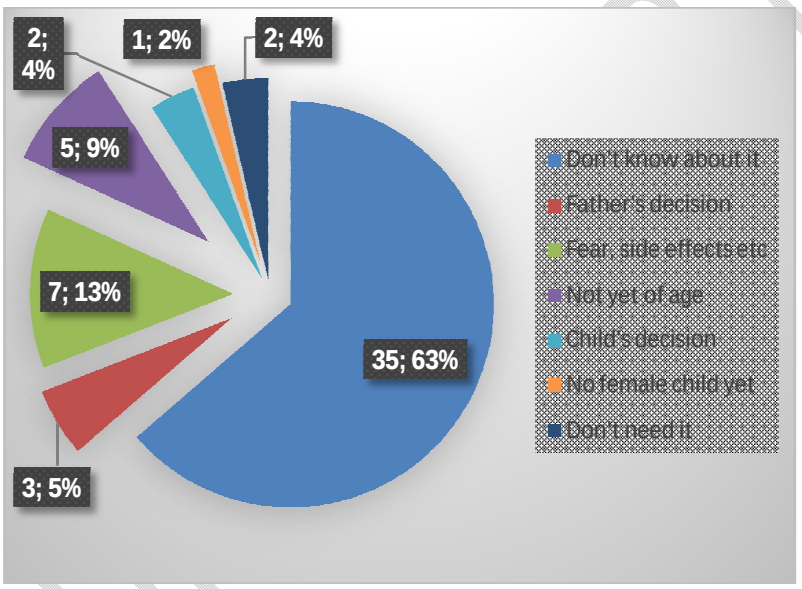

Figure 1: Reasons respondents did not want HPV vaccination given to their children