

Parental perception of human papillomavirus vaccination of prepubertal girls in Ilorin, Nigeria

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ABSTRACT

Context: Human papillomavirus (HPV) vaccination of young girls is yet to be a routine practice in Nigeria and parents' acceptance may influence immunization of their children. **Aims:** The aim of this study is to determine beliefs and concerns of parents about HPV vaccination of girls. **Subjects and Methods :** A cross-sectional survey of parents of girls between 10 and 15 years in 12 selected secondary schools of Ilorin using a self-administered questionnaire designed by researchers was conducted. **Statistical Analysis Used:** Data analysis involved univariate and bivariate analyses with SPSS version 20. The level of significance for all tests was set at 5%. **Results:** The respondents were 470 mothers between 31 and 50 years, 58.1% had at least secondary school education, 70.2% were employed, and 22.8% belonged to the upper social class. Of the study participants, 35.1% were aware of HPV vaccine and 33.8% knew that the vaccine was available in Nigeria. While 55.8% of mothers believed that all girls should be vaccinated, 19.5% responded that only sexually active girls should have it. Among all respondents, full protection, need for repeated doses, and age of the girls were significantly related to willingness to vaccinate statistically ($P < 0.05$). These concerns were not significant among mothers that were aware of HPV vaccines. **Conclusions:** There is low awareness of HPV vaccine among mothers in Ilorin despite the high prevalence of cervical cancer in our environment. Parental perception of HPV vaccines in terms of concerns and beliefs was significantly related to willingness of mothers to vaccinate their daughters.

Key words: Cervical cancer, human papillomavirus vaccine, parental perception

INTRODUCTION

Prepubertal vaccination of young girls for human papillomavirus (HPV) infection is yet to be a routine practice in Nigeria unlike some other countries such as Australia and United States of America. Controversies still surround prepubertal HPV vaccination despite its established role in the prevention of cervical cancer. Concerns bother on political efforts on ensuring adequate coverage, ethics, cost, and parental perspectives on the modalities of prevention that are not in conflicts with personal and religious beliefs. The promotion of HPV vaccine as an anticancer agent even though HPV is a sexually transmitted infection raises moral

concerns among some parents. As at 2006, the vaccine had been approved in 49 countries worldwide with varying national policies on the immunization program.^[1] The quadrivalent vaccine gives 100% protection against infection from HPV types 16 and 18, which are responsible for around 70% of all cervical cancers. It also protects against HPV types 6 and 11 that cause genital warts. Currently, the Advisory Committee on Immunization Practices recommended 9-valent HPV vaccine (Gardasil 9, Merck and Co., Inc.) as one of the three HPV vaccines that can be used for routine vaccination.^[2]

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In Nigeria, HPV vaccines (Cervarix and Gardasil) are available but are yet to be part of national immunization programs. This is rather unacceptable because of the high prevalence and risk of cervical cancer among Nigerian women. Nigeria has the highest mortality from cervical cancer in Africa, the incidence of cervical cancer is estimated to be 29/100,000 by age-standardized rate, and about 3.28 newborn girls per 100 are expected to develop cervical cancer in Nigeria.^[3] In addition, cervical cancer is the leading cause of cancer mortality in Sub-Saharan Africa.^[4,5]

Several factors have negatively influenced immunization programs for childhood diseases in Nigeria. There is misperception of routine immunization by populace as well as lack of public confidence and trust in health services provided by the government. This stems from the poor state of health facilities and low standards of delivery service.^[6] For instance, immunization for Polio eradication was impeded by rumors and misconceptions and this had global implications.^[7] Most routine immunization programs in Nigeria are initiated during childhood for preventable childhood diseases and not for late-onset disorders such as cancers which may elicit different responses from parents and others.

Reports on parents' concerns and acceptance of HPV vaccines are from developed world where HPV vaccines are already part of immunization programs available, and there are organized screening programs for cervical cancer. As HPV vaccines become available in developing countries, acceptability studies can help to better understand the potential barriers and facilitators of HPV vaccination and guide immunization programs.^[8] Parental preferences and perceptions of the HPV vaccine are crucial, and if not assessed accurately, may threaten the successful implementation of a widely encompassing vaccination program.^[9] The aim of this study is to describe perspectives of parents in regions of high prevalence of cervical cancer on HPV vaccination of their daughters. It also described how parental concerns and beliefs affect willingness to vaccinate prepubertal girls.

SUBJECTS AND METHODS

This cross-sectional descriptive survey was conducted in Ilorin, the capital of Kwara State in Nigeria. Ilorin is in the north-central geopolitical zone of the country, and the main ethnic groups in the city are Yoruba, Fulani, and Hausa.

The eligible participants were the parents of girls between 10 and 15 years who were randomly sampled from 12 selected secondary schools within Ilorin. The selection was done by multistage sampling of both private and public secondary schools in the state capital. A minimum of 40 girls were randomly sampled from each school. Their parents were invited to participate voluntarily in the study during open/visiting days for the boarding students while invitations were sent through the day students to their parents. The invitation included an

information sheet, consent form, and a questionnaire. The completed questionnaires were collected after 2 weeks. The sample size was calculated with Fischer's formula using a prevalence rate of 14%,^[10] and 20% of the calculated sample size was added to cater for incomplete and nonresponses.

The instrument for this study was designed by researchers based on similar surveys in the literature. The questionnaire was pretested in a similar population for validity and reliability using 20% of the calculated size. Permission for the study was obtained from the State Ministry of Education and ethical approval from the Ethical Review Board of the University of Ilorin Teaching Hospital. The self-administered questionnaire has multiple responses. It has two main parts; the first part determined the sociodemographic information of the parents and the other part collected data on their awareness, beliefs, and concerns about HPV vaccination of their daughters. The study respondents were assured of anonymity and confidentiality. Those who were aware of HPV vaccination answered questions on beliefs and concerns and responses. Their beliefs and concerns were compared with willingness to vaccinate and knowledge. In addition, respondents without prior knowledge of HPV vaccines also answered the questions related to concerns and willingness to vaccinate to determine and compare the effect of knowledge of HPV vaccine on vaccination by parents.

Quantitative data were cleaned and data analysis was done using SPSS version 20. Univariate analysis was done by the use of frequency distributions and proportions for categorical variables and descriptive statistics for continuous variables.

Bivariate analysis to test associations was done using Chi-square or Fisher's exact test for categorical variables and *t*-test for continuous variables. The level of significance for all tests was set at 5%.

RESULTS

Six hundred questionnaires were distributed to mothers of female students from selected secondary schools, but 470 questionnaires were returned for analysis, giving a response rate of 78.3%. The respondents were mothers between 31 and 50 years of age and were either Christians or Muslims (1:1.5). The percentage of those who had at least secondary school education was 58.1%, 70.2% were employed, and 22.8% belonged to the upper social class [Table 1].

Of the study participants, only 35.1% were aware of HPV vaccine while more than half (58.7%) have not heard of it. Sources of information about the vaccine included mass media, hospital/health personnel, journals, magazines, health talks, and peer groups. Other minor sources of information were internet (3.8%), social media (2.1%), and from relatives (0.4%). Regarding its availability, 33.8% knew that the vaccine was available in Nigeria, 14.7% said that

it was not available while 32.1% had no information on its availability. There was a nonresponse of 19.4%.

In all, 113 mothers satisfactorily responded to questions related to beliefs and concerns about HPV vaccines. Half of the respondents (55.8%) believed that all girls should be vaccinated, while 19.5% responded that it should be given to only sexually active girls. A proportion (23%) of the mothers indicated that their daughters were too young for the vaccine [Table 2].

Approximately, one-third (37.2%) of the 113 respondents thought that the vaccine will give full protection against cervical cancer, and 1.8% thought otherwise. Half of the respondents aware of HPV vaccine expressed their knowledge of the benefits/risks of the vaccine to their children. Some respondents, 27.4%, were concerned that the vaccine had adverse effects and the need for repeated doses was another concern in 7.1%.

Table 1: Awareness and knowledge of parents about cervical cancer and human papillomavirus vaccines (n=470)

Variable	Frequency (%)
Cervical cancer commoner in developing than developed countries	
Yes	175 (37.2)
No	37 (7.9)
Don't know	221 (47.0)
NR	37 (7.9)
Cervical cancer is caused by HPV	
Yes	190 (40.4)
No	30 (6.4)
Don't know	224 (47.7)
NR	26 (5.5)
Heard about HPV vaccine	
Yes	165 (35.1)
No	276 (58.7)
NR	29 (6.2)
Is HPV vaccine available in Nigeria?	
Yes	159 (33.8)
No	69 (14.7)
Don't know	151 (32.1)
NR	91 (19.4)

HPV: Human papillomavirus, NR: No response

Table 2: Parental beliefs about human papilloma virus vaccines among respondents (n=113)

Parental beliefs	Frequency (%)
HPV vaccine should be given to all girls	63 (55.8)
HPV vaccine should be given to sexually active girls only	22 (19.5)
My child is too young for HPV vaccine	26 (23.0)
HPV vaccination is dependent on my child's sexual activity	20 (17.7)

HPV: Human papillomavirus

Almost half of the respondents (49.6%) expressed that the vaccine would be safe if supplied by the Government, while fewer (6.2%) disagreed. Other concerns such as availability and accessibility were considered by 1.3%.

Thirty-one percent (31%) of the respondents would have regrets in the future if the child was not vaccinated. One hundred and fifty-seven (33.4%) women were well motivated to allow their children to be vaccinated. Perception, concerns, and beliefs of the mothers were found to be significantly related to willingness to vaccinate their girls ($P < 0.001$) in the general population but less so among respondents with some knowledge of HPV vaccines [Tables 3-5].

DISCUSSION

Most mothers of selected prepubertal girls were not aware of HPV vaccines, and very few knew of its availability in Nigeria. Half of the mothers want all girls vaccinated, those who do not think prepubertal girls were too young, and vaccination should be for the sexually active. Concerns identified about HPV vaccination are full protection, adverse effects, and availability and are related to parental willingness to vaccinate their daughters.

This survey has demonstrated the poor awareness of HPV vaccines among mothers in Ilorin. The low awareness of the vaccine among parents is comparable to the findings from similar studies within Nigeria and some developing countries.^[8-14] In a survey conducted in Southeastern Nigeria, women had no knowledge of HPV vaccine as a modality of preventing cervical cancer.^[11] In a qualitative study in Tanzania, no parent was aware of either HPV or HPV vaccine,^[8] and in Ghana, there was low awareness of the vaccine among women aged 18–65 years.^[12] Surveys and focus group studies from South Africa concluded that women were not familiar with HPV or its vaccines and thus had limited knowledge of its role in cervical cancer prevention,^[13,14] while in Cameroon, there was high level of awareness of HPV vaccine among parents after community sensitization.^[15] Low awareness among the study population most probably reflects their poor knowledge of causes and preventive measures of cancer of the cervix despite its high prevalence. This is also reflected in the low percentage of women that knew that HPV vaccines are available in the country. Thus, for the HPV immunization program to succeed, parents need to be properly educated on cervical cancer and the role of HPV in its etiology.

Concerns and beliefs of the mothers about HPV vaccines were found to be significantly related to willingness to vaccinate their daughters in this study. More respondents, 32%, wanted all girls to be vaccinated while 11.3% believed that only sexually active girls should be vaccinated. The proportion of those who believed that all girls should be immunized was approximately similar to those that were aware of HPV vaccine (32 vs. 35%) and also that knew it was

Table 3: Parental views about vaccines among respondents with human papillomavirus knowledge (n=113)

Parental concerns	Frequency (%)
Vaccine gives full protection	
Yes	42 (37.2)
No	2 (1.8)
I don't know	42 (37.2)
NR	27 (23.9)
The vaccine has adverse effects	
Yes	31 (27.4)
No	4 (3.5)
I don't know	70 (61.9)
NR	8 (7.1)
Vaccination has to be repeated?	
Yes	8 (7.1)
No	4 (3.5)
I don't know	69 (61.1)
NR	32 (28.3)
The vaccine is safe if offered by the government	
Yes	56 (49.6)
No	7 (6.2)
I don't know	41 (36.3)
NR	9 (8.0)
Other concerns	
Protection	6 (1.3)
Understand the risk/benefit of HPV to my child	
Yes	59 (52.2)
No	7 (6.2)
I don't know	35 (31.0)
NR	12 (10.6)
I will regret my refusal to vaccinate my daughter in future	
Yes	36 (31.9)
No	11 (9.7)
I don't know	45 (39.8)
NR	21 (18.6)

HPV: Human papillomavirus, NR: No response

available (33%). Hence, 33%–35% of the study population had the correct knowledge of HPV which reflected in their belief. Knowledge contributes significantly to human belief system, and it is an important determinant of health-seeking behavior such as immunization.^[16]

Although the percentage of women who believed that the HPV vaccination was independent of their child's sexuality was higher than those who perceived the opposite, the recommendations and observations from countries with established immunization programs are important for offering counseling to parents to increase their acceptability of HPV vaccines. The recommendation by the Centers for Disease Control (CDC) is that routine HPV vaccination should be offered to girls at 11 or 12 years before sexual activity and exposure to the virus. Vaccination is also recommended for females aged 13–26 years;^[2,17] evidence has shown a decrease

in the incidence of premalignant cervical lesions in countries with HPV immunization programs.^[18,19]

Only one-quarter of the participants believed that the vaccine would give full protection against cervical cancer; this may translate to a negative attitude toward the vaccination program. Although this may be related to the low level of awareness and knowledge of the vaccine among these respondents, it may be that some are aware of other preventive measures of cervical cancer such as sexual abstinence, screening programs for precancerous lesions, and treatment as part of interventions even after vaccination. Vaccines are not effective if administered after infection has occurred. Therefore, vaccination against HPV does not obviate the need for cervical cancer screening.^[1,2] Currently available bivalent and quadrivalent HPV vaccines which cover two oncogenic HPV serotypes (HPV 16 and 18) prevent about 70% of cervical cancer cases, and a nonvalent vaccine which covers five additional oncogenic HPV genotypes (HPV 31, 33, 45, 52, and 58) prevents up to 90% of all cervical cancer.^[18,19]

This study suggests that there were important concerns and beliefs that may negatively affect the successful implementation of the program in this region despite the lack of national guidelines for implementation. The issue of public trust in terms of safety of the vaccine as expressed by some parents is like concerns observed in countries such as Rwanda, Japan, and India.^[16,20-23]

Similar to the findings in a Tanzanian study,^[8] a good percentage of parents thought that the vaccine would be safe if provided by the government. It was not surprising that some respondents were concerned about adverse effects of the vaccine as repeated doses was a minor concern in this study, but it was a factor that decreased acceptability of the vaccine in a survey in Kenya.^[24] Antibody levels usually rise after vaccination and then decline after; repeated doses are needed to augment titer rise in antibody levels.^[2] However, authors have suggested innovative delivery strategies and vaccine design to create heat-stable, single-dose HPV vaccines as solution to this concern.^[25]

An organized national program on HPV vaccine will go a long way in allaying fears surrounding safety, accessibility, and availability. This will require sound political will and technical know-how to ensure maintenance of standard transportation, supply, cold chain, and storage. Although it would have been more acceptable to assess beliefs and concerns after a thorough health education on the subject, identified concerns among this small proportion actually represent current barriers that need to be addressed among the so-called elites if success is anticipated.

Clinicians should strive to educate more women and women groups either in the clinics or through organized campaigns,

Table 4: Relationship between parental beliefs and concerns about human papillomavirus vaccination and their willingness to vaccinate child among respondents with some knowledge of virus and vaccine

Beliefs and concerns	Willingness to vaccinate child			χ^2	P	OR (95% CI)
	Yes n (%)	No n (%)	Total n (%)			
Vaccine gives full protection						
Yes	33 (94.3)	4 (100.0)	37 (94.9)	0.241	1.000 ^F	0.892 (0.797-0.998)
No	2 (5.7)	0	2 (5.1)			
The vaccine has any adverse effect						
Yes	29 (87.9)	2 (100.0)	31 (88.6)	0.274	1.000 ^F	0.935 (0.853-1.026)
No	4 (12.1)	0	4 (11.4)			
Vaccine has to be repeated						
Yes	8 (66.7)	0	0	6.833 ^Y	0.077	-
No	4 (33.3)	0	0			
My child is too young for HPV vaccination						
Yes	8 (66.7)	0	0	3.829	0.093 ^F	0.200 (0.035-1.133)
No	18 (33.3)	5 (71.4)	23 (37.7)			
HPV vaccination is dependent on my child's sexual activity						
Yes	36 (66.7)	2 (28.6)	38 (62.3)	0.838	0.389 ^F	0.457 (0.083-2.518)
No	16 (31.4)	3 (50.0)	19 (33.3)			
The vaccine is safe if offered by the government						
Yes	35 (68.6)	3 (50.0)	38 (66.7)	3.037	0.140	4.900 (0.711-33.784)
No	49 (90.7)	4 (66.7)	53 (88.3)			
	5 (9.3)	2 (33.3)	7 (11.7)			

NB: No responses and "don't know" were not included in the analysis. F: Fisher's exact P value, Y: Yates' corrected χ^2 , OR: Odds ratio, CI: Confidence interval, HPV: Human papillomavirus

Table 5: Relationship between beliefs and concerns about human papillomavirus vaccination and willingness to vaccinate among all respondents

Beliefs and concerns	Willingness to vaccinate child			χ^2	P	OR (95% CI)
	Yes n (%)	No n (%)	Total n (%)			
My child will be fully protected after HPV vaccination						
Yes	142 (92.2)	18 (69.2)	160 (88.9)	11.89	0.002*	5.26 (1.69-16.32)
No	12 (7.8)	8 (30.8)	20 (11.1)			
The vaccine has any adverse effect						
Yes	69 (88.5)	11 (100.0)	80 (89.9)	1.41	0.594	0.00 (0.00-3.73)
No	9 (11.5)	0	9 (10.1)			
Vaccine has to be repeated						
Yes	28 (82.4)	0	28 (77.8)	7.41	0.044*	-
No	6 (17.6)	2 (100.0)	8 (22.2)			
My child is too young for HPV vaccination						
Yes	34 (27.2)	21 (67.7)	55 (35.3)	17.89	<0.001*	0.18 (0.07-0.45)
No	91 (72.8)	10 (32.3)	101 (64.7)			
HPV vaccination is dependent on my child's sexual activity						
Yes	36 (32.7)	14 (50.0)	50 (36.2)	2.88	0.090	0.49 (0.19-1.22)
No	74 (67.3)	14 (50.0)	88 (63.8)			
The vaccine is safe if offered by the government						
Yes	113 (85.6)	27 (81.8)	140 (84.8)	0.29	0.587	1.32 (0.42-3.96)
No	19 (14.4)	6 (18.2)	25 (15.2)			

*Statistically significant (i.e., $P < 0.05$). OR: Odds ratio, CI: Confidence interval, HPV: Human papillomavirus

on the role of HPV vaccines in the prevention of cervical cancer. This should stress the role of HPV infection in the pathogenesis of cancer.

Larger studies on other barriers to HPV vaccination and methodology for implementation that will be more

acceptable need to be determined – either as school program or as part of NIPS. Future studies that are of both quantitative and qualitative methods may be useful in identifying other indigenous barriers with suggested solutions for the population at risk. Interventional studies would go a long way in addressing knowledge related health issues like this one.

More education on sexuality and prevention of STDs and adolescent health in general is important to secure future health of womenfolk. HPV vaccines can be used as the entry point for developing programs for adolescents or schoolchildren in the near future, and other vaccination programs, as well as interventions such as nutritional supplements, health promotion, and provision of sexual education and reproductive health information for adolescents.^[26] Hopefully, these may be pivotal stage for potential future addition of new vaccines against HIV or TB and specific needs of communities.^[27] Beliefs and concerns expressed by parents in this study should constitute the basis of any awareness program on cervical cancer prevention in our environment.

CONCLUSION

This study has shown low awareness of HPV vaccines among parents in Ilorin, Nigeria. Concerns and beliefs of the mothers about HPV vaccines were found to be significantly related to willingness to vaccinate their daughters. For HPV immunization program to succeed, parents need to be educated on cervical cancer and the role of HPV vaccination as a primary preventive strategy.

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Conflicts of interest

There are no conflicts of interest.

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