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# KNOWLEDGE, PERCEPTION AND UPTAKE OF HUMAN PAPILLOMAVIRUS VACCINE AMONG PARENTS OF FEMALE STUDENTS IN SELECTED SECONDARY SCHOOLS IN EFFURUN-WARRI CITY OF DELTA STATE, NIGERIA

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## ABSTRACT

Cervical Cancer is one of the few malignancies that have been known to be microbe-related and caused by the Human Papilloma Virus (HPV) with increasing mortality in developing countries. Although HPV vaccines is available, the level of HPV uptake is low among adolescents. Vaccination can only be effective in adolescents if the major stakeholders are well informed and highly knowledgeable on the diseases to be prevented. The study aimed at assessing the knowledge, perception of parents of female secondary school students about the HPV vaccine, and willingness to have them vaccinated. The cross-sectional study was conducted among 114 parents of female students aged 9 years and above, in randomly selected secondary schools located within Effurun/Warri Axis in Delta state with a validated questionnaire. Respondents' were selected randomly by availability to attend scheduled health seminars. The intervention was a 30-minutes educational presentation on HPV. The data were analyzed with Statistical Package for Social Sciences version 21. Most 102 (90%) of the respondents were female. Only 61 (54%) knew that HPV is the Human Papilloma Virus before the intervention and the source of information of HPV was mostly workplace (66%). Parents' perception and knowledge about HPV, cervical cancer, and HPV vaccine were poor; only 14 parents (12%) knew before the intervention that HPV could be transmitted sexually and by skin-to-skin contact. Only 4 (3.5%) of the respondents had vaccinated their children against HPV. The educational intervention significantly affected knowledge, perception, and parents' willingness to have their children vaccinated against HPV ($p=<0.0001$).

**KEYWORDS:** Perception, Parents, Parental consent, Female, Secondary School, Human Papilloma Virus, Use, Vaccine, Willingness, Uptake, Nigeria, South.

## INTRODUCTION

Human papillomavirus (HPV) is a group of viruses that are extremely common worldwide. It is transmitted majorly by sexual contact; being the most common Sexually Transmitted Infection. Cervical cancer is caused by sexually acquired infections with certain types of HPV. It is, however, the only cancer known to be prevented by a vaccine. HPV vaccination uptake in Nigeria is very low at present and this may be due to the following reasons; Vaccines are paid out of pocket by patients who are financially empowered to afford. More so, these vaccines are sold in pharmacies and some private health facilities as they are not commonly held in public health institutions. Furthermore, the Nigerian national routine immunization schedule does not include HPV vaccines., even though it has been recommended for girls between 09-14 years of age. For better efficacy, the vaccine should be administered to the patient before they become sexually active.[1]

The World Health Organization recommends that girls within the age range of 9 or 10 years through to 13 years are the primary end users of HPV vaccine. This is in line with ensuring that vaccination takes place before they become sexually active. The dosing schedule for females younger than 15 years is 2 doses given 6 months apart. The anti-HPV immune responses for all nine types in girls and boys 9–14 years of age who received two doses are the same as in young women 16–26 years of age who received three doses schedule.[1]

World Health Organization (WHO) recommends routine HPV vaccination for girls when the cost-effectiveness of vaccination strategies in the country or region has been given due considerations. Unfortunately, the immunization strategy in Nigeria for adolescents is next to non-existence.

In order to ensure effective global vaccination coverage by improving access and reducing the cost, the Global

Alliance for Vaccine Immunization (GAVI) helps the course of delivering HPV vaccine to at risk population.[2] Several countries in Africa have tried to adopt different methods of ensuring that patients are vaccinated while factoring in what would be the most effective method in each country.[3] these methods and their success rates have been well documented.[4] However, quite a number of countries do not benefit from the GAVI-supported immunization programs because of their low level of immunization coverage on national level.[5]

As with other vaccines, the end-user's mindset cannot be isolated as their perceptions have been known to influence overall HPV vaccine uptake. Studies have clearly shown the relationship between patient's opinions (women particularly) and the level of HPV vaccine uptake in these women in various places. This invariably indicates that they determine what obtains with regards to health, in their homes.[6] With HPV vaccination, women have generally shown a commendable level of willingness. From factors such as education, ethnicity and even occupation, to others such as age and religious beliefs, these determinants have been known to affect the acceptance and uptake of HPV vaccines among adolescents.[7]

Parents 'willingness to have their adolescents vaccinated also comes with some concerns. These concerns if not properly channeled and addressed may go on to override parents' willingness.

Expanded Programme on Immunization (EPI) is Nigeria's routine immunization programme structured to cater to the prevention of childhood diseases in Nigeria. Since the introduction of the two HPV vaccines in Nigeria in 2009, the Federal Government is yet to adopt a national HPV vaccination strategy that will provide adolescents protection from HPV infection. Besides low vaccination levels, other preventive measures such as pap-smear screening for HPV-related infections is only available to patients who can pay for healthcare and who are knowledgeable about the disease state.[8] Late presentation for treatment has also contributed to increasing mortality rate of HPV-related cancers because of poor prognosis.[9] Being a cancer that can be prevented, the importance of education, awareness, and immunization cannot be over-emphasized as the cost of cervical cancer treatment continues to pose a burden both in terms of financial implications as well as the quality of life to the patient.[10]

In Delta state, Nigeria, there is no documented information on the level of HPV awareness among parents and adolescents and their acceptance of HPV vaccine to prevent cervical cancer. Therefore, this study seeks to address questions of the level of knowledge, perception, and willingness to be vaccinated among parents of female adolescents in select secondary schools and the impact of educational intervention.

## METHODS

The study was a cross-sectional descriptive study conducted in the Effurun-Warri city of Delta State, Nigeria. Delta State is an oil and agricultural producing state in the South-south geopolitical zone in Nigeria. The state has a population of 4,112,445 and 25 local government areas, an estimate of 758 secondary schools span the whole state.

Warri is the economic hub of the state. Warri-Effurun axis compromises of four Local Government Areas-Uvwie, Warri South, and Warri South West with a population of about 536,023.

The study was conducted in six secondary schools randomly selected and spread across the axis. All six schools were evenly divided into two private, state, and federal government secondary schools respectively. All six schools were also mixed-gender schools. Respondents were parents of female secondary school students aged 9 years and above; of the six selected schools. Schools and students in the Warri North Local Government area, as well as male students, were excluded. The selected schools were Delta Careers College, (Population size of about 210), Alvina Model Secondary School (Population size of about 159), Ogbe Secondary School (Population size of about 590), Nana College, Federal government College, Warri (Population size-3020), Demonstration Secondary School, Warri (1390).

Sampling was done with a random selection of 114 parents. The respondents were selected based on availability to attend the Parents Teachers Forum on the given day of the meeting and to participate in the study.

The study was conducted using a structured self-administered questionnaire. The survey questionnaire was reviewed and was modified based on reviewer comments about readability and content. Internal content validity was not carried out using Cronbach alpha. The final questionnaire consisted of four sections; demographics, knowledge of immunization, cervical cancer, and HPV vaccination, respondents' perception of cervical cancer and HPV vaccination, and willingness to be vaccinated. Each questionnaire was administered to each student and collected. A 30-minutes educational intervention was carried out in form of a presentation and the same questionnaire was administered following the intervention.

Data obtained was coded and entered into Microsoft Excel 2016 and analyzed and digitally stored using Statistical Package for the Social Sciences (SPSS Inc., Chicago, IL) Version 21. The software was used to run a descriptive analysis and the frequency tables were generated to assess the respondents' level of knowledge and involvement. The Chi-squared test was used to determine the association between categorical variables and weighted means was used as a descriptive measure

as well. We set the level of significance at 5% (using 2-tailed tests) with a confidence interval of 95%, and the associated *P*-value was reported in 2 decimal places.

Ethical approval for the study was obtained from the Research Ethics Committee of the Faculty of Pharmacy, University of Benin, Nigeria with the number EC/FP/020/21. We also obtained informed consent from the study participants in each school before questionnaire administration and ensured confidentiality of data.

## RESULTS AND DISCUSSIONS

### Sociodemographics

In this study, 114 parent respondents were enrolled, who were predominantly Christian by religion; particularly because Delta state is a predominantly Southern state with Christianity and the backbone of cultural beliefs. Only a tenth of the parents' respondents were male. Previous studies also had mothers as major respondents. The modal age group for this set of respondents was between 31-40 years, 71.1% were married and only 20.2% were single. The fraction of foreigners in this class of respondents was rather insignificant. The median number of children falling within the age range of 9-17 was 0-2 years as with the result obtained by a study in Lagos Nigeria.[11]

**Table 1: Socio-demographic data of parents' respondents.**

| Socio-demographic variables | Frequency (n=114) | Percentage (%) | Socio-demographic variables | Frequency (n=114) | Percentage (%) |
|---|---|---|---|---|---|
| Gender | | | **No of female children >9 years old** | | |
| Male | 12 | 10.5 | | | |
| Female | 102 | 89.5 | 0-2 | 50 | 43.9 |
| **Age** | | | 3-5 | 43 | 37.7 |
| 25-30 | 4 | 3.5 | >6 | 21 | 18.4 |
| 31-40 | 43 | 37.7 | | | |
| 41-50 | 238 | 33.3 | **Highest educational degree** | | |
| 51-60 | 25 | 21.9 | Primary education | 4 | 3.5 |
| >61 | 4 | 3.5 | WAEC | 2 | 1.8 |
| **Religion** | | | OND/HND | 32 | 28.1 |
| Christianity | 111 | 97.4 | BSc | 57 | 50 |
| Islam | 3 | 2.6 | Masters | 19 | 16.7 |
| **Marital Status** | | | | | |
| Single | 20.2 | 23 | **Occupation** | | |
| Married | 71.1 | 81 | Public service | 45 | 45 |
| Divorced/Separated | 5.3 | 6 | Private service | 48 | 48 |
| Widowed | 3.5 | 4 | Trading/Business | 21 | 21 |
| **Nationality** | | | | | |
| Nigerian | 113 | 99.1 | **Estimated monthly income in USD** | | |
| Foreigner | 1 | 0.9 | $ 50.00-138.89 | 30 | 26.3 |
| | | | $ 139.17-194.44 | 28 | 24.6 |
| | | | $ 194.72-277.78 | 26 | 22.8 |
| | | | $ 278.06- 416.67 | 19 | 16.7 |
| | | | $ 416.94-694.44 | 9 | 7.9 |

As at the time of this study $1USD was equivalent to 360.00NGN (Nigerian naira).

### Parents respondents' knowledge of HPV vaccination and cervical cancer

The knowledge of cancer among the respondents was good. More so, is their knowledge of vaccination. This may be because most of the parents are educated. However, this did not translate into their knowledge of HPV as only about 53% of the total respondents knew that HPV is human papillomavirus. This study also showed that the level of education is not necessarily directly proportional to being empowered with knowledge about human papillomavirus. Reports from various studies in Nigeria have shown that awareness of HPV infection and vaccines and the acceptability of these vaccines among the general public are very low even among health care providers.[12]

**Table 2: Knowledge of HPV vaccination and cervical cancer.**

| Variables | Pre-intervention | | | Post-intervention | | | P-value |
|---|---|---|---|---|---|---|---|
| | Yes n(%) | No n(%) | IDK n(%) | Yes n(%) | No n(%) | IDK n(%) | |
| Have you heard about vaccination before? | 106 (93) | 4 (3.5) | 4 (3.5) | 108 (94.7) | 6 (5.3) | 0 | 0.110 |
| Vaccination is a proven way to prevent infections and the spread of several communicable diseases | 104 (91.2) | 2 (1.8) | 8 (7) | 111 (97.4) | 3 (2.6) | 0 | 0.015 |
| Vaccination has helped to reduce the rate of communicable diseases worldwide. | 111 (97.4) | 2 (1.8) | 1 (0.9) | 114 (100) | - | - | 0.219 |
| Cancer is one of the leading causes of death | 108 (94.7) | 0 | 6 (5.3) | 111 (97.4) | 3 (2.6) | 0 | 0.011 |
| Cancer can affect different tissues in the body | 105 (92.1) | 2 (1.8) | 7 (6.1) | 107 (93.9) | 0 | 7 (6.1) | 0.362 |
| HPV is human papilloma virus | 61 (53.5) | 4 (3.5) | 59 (43) | 108 (94.7) | 0 | 6 (5.3) | 0.0001 |
| HPV infection cannot be prevented | 30 (26.3) | 28 (24.6) | 56 (49.1) | 18 (15.8) | 84 (73.7) | 12 (10.5) | 0.0001 |
| Having more than one sexual partner increases the risk of HPV Infection. | 264(49.5) | 64 (12) | 205 (38.5) | 483 (90.6) | 32 (6.0) | 18 (3.4) | 0.0000 |
| There are strains of HPV that can lead to genital warts, anal cancer or cervical cancer | 191 (35.8) | 12 (2.3) | 330 (61.9) | 480 (90.1) | 19 (3.6) | 34 (6.4) | 0.0000 |

IDK= I do not know.

Parents learned about HPV from the following sources: Church & Hospital- 8%, Internet 16%, Pamphlets, newspapers, TV and adverts- 10%, Workplace – 66%.

**Table 3: Parents respondents' perception of HPV vaccination and cervical cancer.**

| Perception about HPV vaccination & cervical cancer | Pre intervention Weighted mean | Post intervention Weighted mean |
|---|---|---|
| The effect of HPV infection can be very serious | 3.72 | 4.48 |
| I am predisposed to having HPV infection | 1.41 | 3.08 |
| Vaccination can be very harmful to the body | 2.13 | 1.90 |
| Vaccination is irrelevant if I stand a chance of being infected. | 2.32 | 1.96 |
| Vaccination is against what my religion believes | 1.73 | 1.23 |
| HPV vaccination should be paid for by the Government like other vaccines such as BCG, measles, etc. | 4.03 | 4.60 |
| HPV vaccination is not necessary for every female child | 2.32 | 1.71 |

This study did not emphasize routine screening like Pap smear because the focus of the study was on the parents' willingness to have their children vaccinated rather than on themselves. Pap smear as a routine screening for cervical cancer was however emphasized during the educational intervention for both parents and students. It is therefore of utmost importance educational interventions, programs, or campaigns are set up not just to merely raise awareness of HPV but its association with cancer and the need to elaborate on prevention.

Also, religion did not affect the parent's perception of vaccination even though Delta state is a predominantly religious state whose activities have religious undertones. Almost all respondents agree that the government should include the HPV vaccine in the Nigerian EPI schedule so that they would not have to pay for it. Furthermore, even though parents had quite low knowledge about HPV and its association with cervical cancer, almost 100% of the respondents were willing to have their female children take the HPV vaccine once they knew that the HPV vaccine can protect against HPV infection. The reason for this high willingness may be the rising incidence of cancer globally. As with other studies, the willingness to take the HPV vaccine did not depend on educational background or family annual income.

**Table 4: Parent respondents' willingness to vaccinate their children against HPV.**

| Variables | Pre-intervention | | | Post-intervention | | | P-value |
|---|---|---|---|---|---|---|---|
| | Yes N (%) | No N (%) | IDK N (%) | Yes N (%) | No N (%) | IDK N (%) | |
| Have you ever vaccinated your child against HPV? | 4(3.5) | 75 (65.8) | 35 (30.7) | 25 (21.9) | 86 (75.4) | 3 (2.6) | <0.0001 |
| Will you be willing to be vaccinated if it was recommended? | 74 (64.9) | 4 (3.5) | 36 (31.6) | 111 (97.4) | - | 3 (2.6) | <0.0001 |
| HPV Infection is not very common | 20 (17.5) | 41 (36) | 53 (46.6) | 28 (24.6) | 70 (61.4) | 16 (14) | 0.0001 |
| The need to take more than one dose is discouraging. | 22(19.3) | 34 (29.8) | 58 (50.9) | 22 (19.3) | 68 (59.6) | 24 (21.1) | 0.0001 |
| HPV vaccination is too expensive for me to afford for my female children. | 22 (19.3) | 26 (22.8) | 66 (57.9) | 24 (21.1) | 63 (55.3) | 27 (23.7) | <0.0001 |
| HPV vaccination can make my daughter(s) sexually active knowing that they are protected against HPV infection. | 8 (7) | 38 (33.3) | 68 (59.6) | 12 (10.5) | 81 (71.1) | 21 (18.1) | <0.0001 |

The impact of educational intervention was highly significant on the willingness of parents to vaccinate their children. 97.4% of the parent respondents were more willing (P<0.0001). This study also established that some demographic factors did not influence or affect the willingness to get their children vaccinated. This corroborates the results of a 2015 study showing that college education level is not correlated with having good intention levels.[13]

**Association between variables**

Another finding in this study is the fact that there is a relationship between the number of female children and the perception that taking more than one dose can be discouraging. (p=0.032). This is a relationship to be explored because parents who aren't necessarily discouraged by the cost but can be lost to follow up since HPV vaccine doses are >1. Centre for Disease Prevention and Control recommends 2 doses within the space of 0 and 6-12 months for persons initiating vaccination at ages 9 through 14 years, except immunocompromised persons; and 3 doses within the space of 0,1-2,6-12 months for persons initiating vaccination at ages 15 through 26 years, and immunocompromised persons initiating vaccination at ages 9 through 26 years. [14] An earlier study by Walling et al, [15] showed the 3-dose requirement as a known barrier to successful vaccination. Ways to mitigate discouragement might be to institute follow-up through primary health centers, use of cards to ensure tracking of dose completion. More methods should also be explored particularly in girls >15 years as there might be moves away from home to tertiary institutions. The need for an awareness campaign in this age bracket and for their parents would therefore, aid completion of vaccine dose.

**Table 5: Association between variables.**

| **HPV Vaccination is too expensive for my female children** | | | | | | |
|---|---|---|---|---|---|---|
| | Yes | No | I don't know | | X2 | P-value |
| Primary education | 2 | 2 | 0 | 4 | 6.950 | 0.542 |
| WAEC | 2 | 1 | 2 | 5 | | |
| OND/HND | 5 | 15 | 5 | 25 | | |
| BSc. | 13 | 33 | 14 | 60 | | |
| Masters | 2 | 12 | 6 | 20 | | |
| **HPV Vaccination can make my daughter sexually active** | | | | | | |

| | Yes | No | I don't know | n=114 | X2 | P-value |
|---|---|---|---|---|---|---|
| Primary education | 0 | 3 | 1 | 4 | 8.098 | 0.424 |
| WAEC | 1 | 1 | 3 | 5 | | |
| OND/HND | 2 | 18 | 5 | 25 | | |
| BSc. | 7 | 43 | 10 | 60 | | |
| Masters | 2 | 16 | 2 | 20 | | |
| **The need to take more than one dose is discouraging.** | | | | | | |
| Number of female children with 9-17 years | Yes | No | I don't know | n=112 | X2 | P-value |
| 0-2 | 4 | 35 | 10 | 49 | 10.571 | 0.032 |
| 3-5 | 12 | 17 | 11 | 40 | | |
| >6 | 6 | 14 | 3 | 23 | | |
| **Vaccinating my daughters against HPV can make them sexually active knowing they are immunized.** | | | | | | |
| | Yes | No | I don't know | n=112 | X2 | P-value |
| 0-2 | 5 | 38 | 6 | 49 | 2.526 | 0.640 |
| 3-5 | 5 | 27 | 8 | 40 | | |
| >6 | 2 | 15 | 6 | 23 | | |
| **HPV Vaccination is too expensive for my female children** | | | | | | |
| | Yes | No | I don't know | n=112 | X2 | P-value |
| 0-2 | 8 | 30 | 11 | 49 | 1.286 | 0.864 |
| 3-5 | 9 | 20 | 1 | 40 | | |
| >6 | 5 | 13 | 5 | 23 | | |

**Estimated Monthly Income and Willingness to be Vaccinated.**

| **The need to take more than one dose is discouraging** | | | | | | |
|---|---|---|---|---|---|---|
| **Monthly income USD** | **Yes** | **No** | **I don't know** | | **X2** | **P-value** |
| $50.00-138.89 | 11 | 16 | 2 | 29 | 22.063 | 0.015 |
| $139.17-194.44 | 4 | 6 | 12 | 22 | | |
| $194.72-277.78 | 3 | 11 | 10 | 24 | | |
| $278.06- 416.67 | 3 | 9 | 4 | 16 | | |
| $416.94-694.44 | 1 | 19 | 2 | 22 | | |

There was also a significant relationship between the estimated monthly income and the need to take more than one dose. (p=0.015) The higher the income, the less important taking more than one dose became. As earlier said, even though almost all parents' respondents were willing to have their children vaccinated, they need to consider such factors as multiple doses of the vaccine is important to ensure that the children get vaccinated as required. When vaccination against HPV infection began, 3 doses were advocated for all ages before it was changed to 2 doses for aged 9-15 years without immunosuppression. The administration of the first dose, and a booster second dose is advantageous over 3 doses as it will ultimately serve to reduce unit cost of vaccinating each child. More so, stakeholders are motivated following up with two doses rather than with three. It also serves to minimize the drawbacks that affect vaccination coverage, including adherence and logistics. Prospective considerations in achieving better immunization rates may be directed at developing and ensuring the use of single dose HPV vaccines.

## CONCLUSION

Findings of this study show that parents of young female adolescents will be willing to get their children vaccinated against HPV infection with the right knowledge and awareness campaigns put in place. Forums like the Parent-Teacher Forums, workplace, marketplaces and other important places of engagement will sure increase knowledge about these diseases. Demographic factors have also been seen to have very little significance in affecting their willingness to get vaccinated. The importance of educational interventions on both parents and students within this age bracket can therefore not be over emphasized. Government involvement and reassessment of immunization schedule to include HPV vaccine will also improve the uptake of the vaccination on a much larger scale.

## LIMITATION TO STUDY

Only 114 consenting parents were participants in this study. Caution must be taken in extrapolating certain demographic characteristics to the entire population of parents of female children within the specified age limit.

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