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Attitude And Uptake Of Human Papilloma Virus Vaccine Among Adolescents Attending University Of Benin Teaching Hospital, Benin City, Nigeria.

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Abstract
This study examined the attitude and uptake of Human papilloma virus (HPV) vaccine among adolescents who received care at the General practice clinic of the University of Benin Teaching Hospital, Nigeria. Also, the study investigated factors that influence uptake of HPV vaccine by adolescents. The sample size for the study was 302 and was collected using systematic sampling method. Structured-questionnaire was used in collecting information from the sampled parents. Simple proportion and frequencies were used to describe the characteristics of adolescents included in the study, and also attitude of adolescent on HPV vaccine. Chi-square test was conducted to examine factors that were significantly associated with uptake of HPV vaccine by adolescents at 5% level of significance. The binary logistic regression was used to explore the determinants of uptake of HPV among adolescents. The analyses were undertaken using SPSS version 20.0. All statistical analyses were set at 5% level of significance. The result showed that 18.5 % of the adolescents have taken the vaccine and 75.2% of their parents reported having heard of the vaccine. The results from the logistic regression showed that adolescents with older parents, those whose parents were female, those whose parents were employed were more likely to take the vaccine of HPV. Among other things, the study recommends that education opportunities should be expanded for adolescents in study areas, create job opportunities for parents, deploy multi-pronged approach to increase household income and create awareness on the benefits of HPV vaccine among male parents.

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I. Introduction

Human papillomavirus (HPV) infection is an exceptionally common viral sexually-transmitted infection globally, as up to 80% of sexually-active individuals will acquire an HPV infection of some type at one point in their lives (World Health Organization, 2009; Markowitz et al., 2016). HPV infection accounts for a significant share of disease burden globally (National Population Census, 2006; Bosch et al., 2003; Garland et al., 2009; Dunne et al., 2007; Ferlay et al., 2012; You et al., 2020). It is etiologically associated with 12 to 63 % of cancers of the oropharynx, 40 to 51% of cancers of the vulva, 40 to 64 % of cancers of the vagina, 70 % of cervical cancers, 36 to 40 % of penile cancers, and 90 to 93% of cases of anal cancers (Ola et al., 2009; Markowitz et al., 2014; Smith et al., 2007). HPV vaccination has been recognized as an effective primary intervention in preventing cervical, vaginal and vulvar precancerous lesions in women and is highly effective in preventing penile precancerous lesions and for reducing the burden of HPV-related diseases in men (Ferlay et al., 2012; Munagala et al., 2009; Pedroza-Torres et al., 2014; Marklund et al., 2011).The global awareness of HPV and uptake of its vaccine among adolescents and parents have been low, as its uptake is yet to achieve relevance among adolescents especially among developing countries (Bosch et al., 2003; Syrjanen et al., 2002; Marra et al., 2009; Markowitz et al., 2020; Gillison et al., 2008). Only a handful of studies have examined the knowledge of parents of HPV, which can influence the uptake of the vaccine by adolescents. Majority of the studies were conducted in developed countries with fewer studies conducted in Asia and Africa (Ola et al., 2009). A high proportion of these studies focused on female gender while only few had males as their subject matter, hence limiting comparison between male and female. Prior to this time, numerous studies have assessed knowledge and attitude towards HPV vaccine uptake across the world ever since the first vaccine was introduced (Markowitz et al., 2014; Smith et al., 2007).

HPV infection is an infection caused by HPV (Bosch et al., 2003). HPV is a deoxyribonucleic acid (DNA) virus from the papilloma family, of which over 30 types of the 170 types known are sexually transmitted (Bosch et al., 2003; Smith et al., 2007). Majority of these infections resolve spontaneously without symptoms but some persist and cause warts or precancerous lesions with increased risk of cancer of the mouth, throat, vulva, vagina,

cervix, penis, and anus. The highest rate of HPV infection is seen in sexually-active ages between 17 and 26 due to high rate of sexually-risky behaviours (Caroll et al., 2012; Lin et al., 2019; Schulein et al., 2016).

Optimal vaccination coverage for the enormous number of young persons would yield immense public health benefit which includes reduced disease transmission and a healthier population at a later age in life (Markowitz et al., 2020; Henry et al., 2018; Feiring et al., 2015). To have better access to adolescents, it is suggested that HPV vaccines be administered through a school-based approach (Gillison et al., 2008). From a public health perspective, HPV vaccination is a worthwhile prophylactic measure for a government to subsidize in order to prevent HPV-associated infections and severe illnesses and invariably curb the surge of HPV-implicated diseases. The cost of vaccination will certainly be more than compensated for by the future savings in medical costs, as well as by improvements in the health of the public in the long-run (Markowitz et al., 2009; Saqer et al., 2017). However, reports on the evaluation of perceptions of adolescents about HPV infection and the uptake of its vaccine are limited. In the light of the few studies conducted among developing countries, this study examined the attitude and acceptance of HPV vaccine among adolescents in Benin City, Southern Nigeria.

II. Materials and Method

Study Site

The study is a cross-sectional health facility survey conducted at the University of Benin Teaching Hospital (UBTH). As a Federal Teaching Hospital, it provides specialist care services to patients. It is located at Ugbowo very close to the University of Benin. The General Practice Clinic (GPC) of the UBTH was selected because it is the unit where a high number of adolescents could be found.

Study Population

The population of this study comprises all adolescents and their parents who were brought to receive care at the GPC of UBTH during the time of the study.

Sample Size Calculation

The data analyzed in this study was gotten from 302 parents whose children received care at the GPC during the time of the study. The sample size for the study was obtained using the Cochrane's[19] sample size formula ($n = \frac{z^2pq}{d^2}$). Assuming a critical value of 1.96 for 95% confidence interval, an error margin of 5% and 50% prevalence of HPV by parents due to a dearth of studies reporting the prevalence, a sample size of 272 was worked out. Adopting a 10% non-response rate, the sample size was increased to 302.

The data was collected at the GPC unit of UBTH. The GPC is selected because it is the unit that has good number of adolescents in the hospital. Systematic sampling technique was used to select respondents for the study. A preliminary record of the patterns of attendance at the GPC shows that on average, 30 adolescents were attended to in the clinic daily, hence an average of 150 adolescents were attended to in the facility per week. The first adolescent that registered in the clinic on the first day of the study was selected, after then every fourth adolescent from the first selected adolescent was selected. If any adolescent picked did not meet inclusion criteria, the next adolescent who met the inclusion criteria was selected for the study. Adolescent in this study was defined as those within the age of 10 to 19 years (Caroll et al., 2012). Information on parent who brought the adolescent to the hospital was also collected and parents' knowledge and perception of HPV and vaccine were extracted using separate questionnaire.

Variables and Measures

The outcome indicator for this study is acceptance of HPV vaccination by adolescent. HPV vaccination acceptance was binary and it was coded as 1 for adolescents who reported having taken the vaccine and 0 otherwise.

Independent Variables

Drawing from past studies, the following independent variables were explored as determinants of HPV acceptance among adolescents; child age (10-13years/14-16years/17-19years); gender of child (male/female); occupation of parent (employed/ not employed), parent's age (31-40years/41-50years/51-60years/ ≥60years) and family monthly income ₦ (30,000/31,000-45,000/46,000-60,000/61,000-90,000/≥91,000), employment status (employed/unemployed), and adolescent's education (non-formal/primary/secondary/higher).

Data Collection Procedure

Structured questionnaire was used in collecting data from respondents. The questionnaire was structured into four sections comprising socio-demographic characteristics of parents and adolescents, HPV infection, vaccine uptake, and access to health information. The questionnaire was piloted by administering it to 5 other

parents who brought their children to receive care at GPC, and Central Hospital in Benin City. Minor adjustments were made after the pilot test. The questions were principally closed-ended and respondents were provided with options. The questionnaire was administered through the aid of research assistants, who were given two days' training on the field content of the questionnaire, ethics of the research, and general administration of the questionnaire. The questionnaire was administered through face-to-face contact.

Statistical analysis

The data obtained through the questionnaire were cleaned, re-coded where necessary, and then entered into an excel spreadsheet, then analyzed with SPSS version 22.0. Simple proportions and frequencies were used to describe the characteristics of the respondents. Chi-square test was used to assess the factors associated with parents' acceptance of HPV. The test was conducted at 5 % significant level. Binary logistic regression was used to examine factors that were significant predictors of acceptance of HPV among parents of adolescents. Only variables that were statistically significant at 5% at the bivariate level were accommodated in the logistic regression model. All statistical analyses were set at 5% level of significance.

Ethical considerations and consent to participate

Approval to conduct the study was obtained from the Research Ethics Committee of the UBTH. Approval to conduct the study in UBTH was gotten from the hospital authority. Informed consent was obtained from the respondents. Respondents were given the free will to participate or not. No withdrawal penalty for any respondents who desired to withdraw from the study. In this study, confidentiality and privacy of personal information shared by the study respondents with the researcher were maintained during the entire study period. After each interview, the completed questionnaires were separated from the consent forms and safely kept to avoid unauthorized access to the information that was obtained. However, all the data collected were processed without names or other kinds of information that are recognizable.

III. Results

In Table 1, the demographic characteristics of the respondents are presented.

Table 1: Socio-demographic characteristics of adolescents

Socio-demographic Characteristics	Frequency(n = 302)	Percent(%)
Age(years)		
10-13	135	44.7
14-16	93	30.8
17-19	74	24.5
Gender		
Male	116	38.4
Female	186	61.6
Marital status		
Single	272	90.1
Cohabiting	30	9.9
Married	0	0.0
Religious orientation		
Christianity	266	88.1
Islam	36	11.9
ATR	0	0.0
Educational status		
No formal education	0	0.0
Primary	153	50.7
Secondary	127	42.1
Tertiary	22	7.3
Occupation		
Unemployed	242	80.1
Employed	60	19.9
Ethnic group		
Bini	133	44.0
Esan	38	12.6
Afemai	32	10.6
Akoko-Edo	21	7.0
Yoruba	16	5.3
Igbo	15	5.0
Hausa	34	11.3
Others	13	4.3

Others include Urhobo 7 (2.3%), Tiv 3(1.0%), Ibibio 2 (0.7%), Igede 1 (0.3%)

Table 1 below showed that 135 (44.7%) of adolescent respondents were between ages 10 and13 years, 93 (30.8%) 14 and 16 years and 74 (24.5%) 17 and 19 years. Gender showed that 186 (61.6%) were females and 116 (38.4%) were males. Of all the respondents, 272 (90.1%) were single, 30 (9.9%) were cohabiting while none was married. Christians were 266 (88.1%) while Muslims were 36 (11.9%) but none indicated African Traditional Religion. Primary level of education was 127 (42.1%) among respondents, 22 (7.3%) secondary level, 153 (50.7%) tertiary level of education and none of the respondents had no formal education. Also, 242 (80.1%) of respondents were unemployed whereas 60 (19.9%) were employed. It showed that 133 (44.0%) were Benin; 38 (12.6%) Esan; 34 (11.3%) Hausa; 32 (10.6%) Anemias; 21 (7.0%) Akoko-Edo; 16 (5.3%) Yoruba; 15 (5.0%) Igbo and 13 (4.3%) of respondents indicated their ethnicity as 'others'.

Attitudes towards HPV Vaccine among adolescents

Table 2: Adolescents' attitudes towards HPV vaccine

Variables	Frequency	Per cent		
Have you heard of HPV Vaccination ?				
Yes	56	18.5		
No	246	81.5		
Do you think it is essential to get vaccinated?				
Yes	42	75		
No	14	25		
Do you think refraining to get vaccinated will expose you to more risks?				
Yes	199	65.9		
No	103	34.1		
Does your religion prohibits vaccination against HPV?				
Yes	91	30.1		
No	211	69.9		
Does your parents approve of the vaccine and ready to give their supports?				
Yes	149	49.3		
No	153	50.7		

Parental Perception and Knowledge About HPV Vaccine

In Table 3, the data for parents' knowledge and perception about HPV vaccine is presented.

Table 3: Parents' Perception and Knowledge about HPV Vaccine

Variables	Frequency (n=302)	Per cent	
Have you heard about HPV?:			
Yes	268	88.7	
No	34	11.3	
Source of the Information:			
Hospital	192	71.6	
Family and friends	57	21.3	
Media	11	4.1	
School	8	3	
Do you know that HPV causes cervical cancer?			
Yes	290	96	
No	12	4	
Do you know about HPV Vaccine?			
Yes	227	75.2	
No	75	24.8	
Do you know of anyone who has taken the vaccine?			
Yes	46	15.2	
No	256	84.8	
Do you think that HPV has side effects?			
Yes	184	60.9	
No	118	39.1	
Please state the side effects:			
Headache	62	33.7	
Body pain	18	9.8	

Bleeding	10	5.4	
Confusion	6	3.3	
Stomache ache	30	16.3	
Insomnia	18	9.8	
Itching	10	5.4	
Others	30	16.3	
Do you know the complete dosage a patient must take?			
Yes	161	53.3	
No	141	46.7	
How is HPV Vaccine administered?			
Intramuscular	190	62.9	
Intravenous	68	22.5	
Subcutaneous	19	6.3	
Oral	25	8.3	
Would you approve of HPV vaccination for your child/ward?			
Yes	149	49.3	
No	153	50.7	
What do you think is the vaccination rate ?			
High	20	6.6	
Moderate	80	26.5	
Low	202	66.9	

Table 3 showed that 268 (88.7%) of parents of adolescents have about HPV whereas 34 (11.3%) have not heard. Of the parents who have heard of HPV, 192 (71.6%) heard from hospitals, 57 (21.3%) from family and friends, 11 (4.1%) from media and 8 (3.0%) from school.

Two hundred and ninety (96.0%) respondents' parents said yes to if they know that HPV causes cervical cancer while 12 (4.0%) said no. Two hundred and twenty and twenty-seven (75.2%) said yes to knowing about HPV vaccine while 75 (24.8%) said no. Only 46 (15.2%) said yes to if they know anyone who has taken HPV vaccine while 256 (84.8%) said no.

One hundred and eight-four (60.9%) of respondents' parent knew that HPV has side effects while 118 (39.1%) did not know. Side effects recognised were headache 62 (33.7%), body Pain 18 (9.8%), bleeding 10 (5.4%), confusion 6 (3.3%), stomach ache 30 (16.3%), Insomnia 18 (9.8%), itching 10 (5.4%) and others 30 (16.3%).

Furthermore, the data showed that 161 (53.3%) said they know the complete dosage of HPV vaccine a patient must take while 141 (46.7%) did not know. When asked about the routine of administration of HPV vaccine, 190 (62.9%) said intramuscular; 68 (22.5%) intravenous; 19 (6.3%) subcutaneous and 25 (8.3%) oral. Two hundred and two (66.9%) of respondents' parents thought the vaccination rate is low, 80 (26.5%) moderate while 20 (6.6%) high.

Chi-Square Tests of Significance for factors associated with parents accepting their children to be vaccinated.

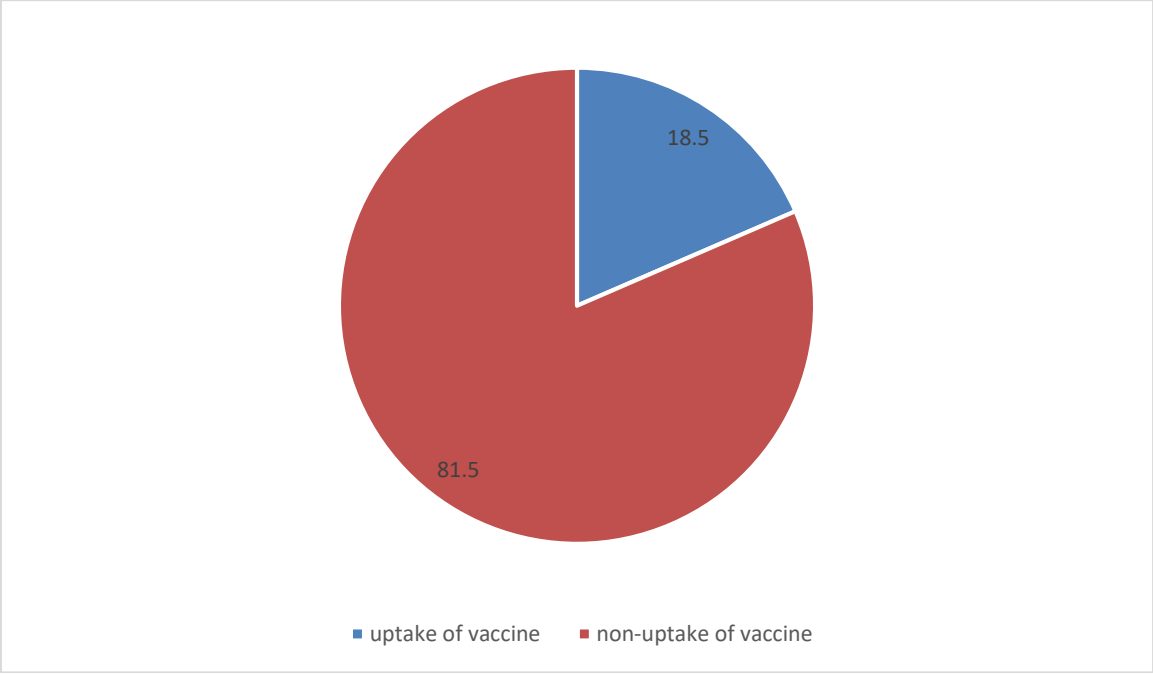
From the results in Table 4, the factors that are significantly associated with uptake of HPV vaccine by adolescents include sex of adolescents, parent's gender, parent's occupation, family monthly income, and adolescent education. In figure 1, it is seen that 18.5% of the adolescents have taken the vaccine, while 81.5% had not. Furthermore, a higher proportion of female adolescents had taken the vaccine compared to their male counterparts (85.7 % vs 14.3 %). While 55.4 % of respondents whose key parents were female had taken the vaccine, 44.6% of those whose key parents were male took the vaccine. A higher proportion of adolescents whose key parents were employed had taken the vaccine when compared to those adolescents whose key parents were unemployed (53.6% vs. 46.4%). The highest proportion of adolescent who have taken the vaccine were those whose family monthly income is within 46,000-60,000 (i.e., 40.8 %), while the lowest proportion is those whose family income is within 61,000-90,000 (i.e., 6.9 %). The proportion of adolescents who have taken the vaccine improves with educational attainment from 0 % for non-formal, 10.5 % for primary, 15.5 % for secondary and 90.9 % for higher.

Table 4: Factors associated with uptake of vaccine by adolescents included in the study

	uptake of vaccines			
Variables	**Yes (n=246)**	**No (n= 56)**	**Chi (χ2)**	**P-values**
Age of adolescents (years):				
13-15	106(43.1)	29(51.8)	2.807	0.246
14-16	75(30.5)	18(32.1)		
17-19	65(26.4)	09(16.1)		

Gender:				
Male	108(43.9)	8(14.3)	16.913	<0.001*
Female	138(56.1)	48(85.7)		
Parents' age:				
31-40	63(25.6)	13(23.2)	0.524	0.914
41-50	139(56.5)	31(55.4)		
51-60	39(15.9)	11(19.6)		
≥61	05(2.0)	01(1.8)		
Parents' Gender:				
Male	113(45.9)	25(44.6)	0.031	0.021*
Female	133(54.1)	31(55.4)		
Religion:				
Christianity	213(86.6)	50(89.3)	0.296	0.587
Islam	33(13.4)	06(10.7)		
Parents' occupation				
unemployed	100(40.7)	26(46.4)	0.626	0.029*
Employed	146(59.3)	30(53.6)		
Family monthly income (₦,000)				
≤30	21(84.0)	4(16.0)	0.218	0.006*
31-45	28(77.8)	8(22.2)		
46-60	45(59.2)	31(40.8)		
61-90	108(93.1)	8(6.9)		
91-120	44(89.8)	5(10.2)		
Adolescent's Education:				
non-formal	00(0.0)	00(0.0)	0.987	0.002*
Primary	137(89.5)	16(10.5)		
Secondary	107(84.5)	20(15.5)		
Higher	02(9.1)	20(90.9)		

Figure 1: The proportion of adolescents that have taken HPV vaccine versus those that have not.



Determinants of Acceptance of HPV Uptake for Children by Parents

In Table 5, we present the results of the binary logistic regression which helps to explore the determinants of uptake of HPV vaccine by adolescents. The variables included in this model are only those that were significant at 5% level of significance in the chi-square tests presented in Table 4.

Table 5: Logistic regression predicting uptake of HPV for child

Variables	Adjusted odds ratios (AoR)	95% CI	Probability
Adolescent education: Non-formal (ref)	1.0	-	-

Primary	2.67	0.81-3.79	0.78
Secondary	2.11	0.25-3.56	0.67
Tertiary	1.98	0.98-3.98	0.04**
Parent's monthly income (₦'000):			
≤ 30 (ref)			
31-45	1.0	-	-
46-60	2.11	0.21-2.87	0.78
61-90	2.98	0.78-3.11	0.65
91-120	3.56	0.98-4.05	0.01***
	3.67	2.67-5.67	0.02**
Parent's Gender:			
Male (ref)	1.0	-	-
Female	2.11	0.01-3.12	0.02**
Parent's Occupation:			
Unemployed (ref)	1.0	-	-
Employed	3.56	0.03- 4.78	0.01*
Gender of child:			
Male (ref)	1.0	-	-
Female	3.78	0.01-4.23	0.21

Note: aOR: adjusted odds ratio; COR: Crude odds ratio; CI: confidence interval; ref: reference category.
*, ** are aOR that are statistically significant respectively at 1 and 5 % level of significance

In Table 5, the logistic regression for the determinants of uptake of HPV vaccine by adolescents is presented. From the results, adolescent educational level, family monthly income, gender of parents, and parents' occupation were the significant determinants of uptake of HPV by adolescents. Compared to adolescents who had non-formal education, those who reported higher education (aOR=1.98, P= 0.04) were 98% significantly more likely to have taken the vaccine. Compared to family whose monthly income is ≤ ₦30,000, those who earned ₦61,000 to 90,000 (aOR= 3.56, P = 0.01) and ₦91,000 to 120,000 (aOR= 3.67, P = 0.02) were 256% and 267%, respectively, more likely to have taken HPV vaccine. Compared to adolescents whose key parents are males, those who had their key parents as females (aOR = 2.11, P = 0.02) were significantly more likely to have taken the vaccine. Compared to adolescents whose key parents were unemployed, those whose parents and head of households were employed (aOR= 3.56, P = 0.01) were 256% significantly more likely to have taken the vaccine.

IV. Discussion of the Results

The study examined attitude and acceptance of HPV vaccine among 302 adolescents who received care in GPC of the University of Benin Teaching Hospital, Southern Nigeria. There is a dearth of evidence on attitude and acceptance of HPV vaccine among adolescents in developing countries. The study investigated the knowledge of HPV vaccine among adolescents and parents. The result showed that 18.5 % of adolescents had heard of HPV vaccine and 81.5 % have not heard, which shows low level of knowledge of the vaccine among respondents. This result is in conformity with results from past studies conducted in Mali (De Groot et al., 2017), Morocco (Zouher et al., 2016), United Arab Emirates (Saqer et al., 2017), South Korea (Davis et al., 2004) and a past Nigerian study (Ojimeh et al., 2017) which reported low knowledge of HPV and its vaccine among the study participants. Furthermore, the knowledge of HPV vaccine reported in this study is lower than what was reported by an Italian study, in which knowledge of HPV infection and vaccine were low among study participants (Di Giuseppe et al., 2018). Also, the result on knowledge and awareness of HPV vaccine in this study is out of place with what was reported by studies conducted among developed countries, in which high knowledge of HPV vaccine was reported among the participants (Kamzol et al., 2013; Lenselink et al., 2008; Hoque et al., 2013; Shazia et al., 2016; Jessica et al., 2014; Kehinde et al., 2017; Isabirye et al., 2020). Low level of knowledge of the vaccine may be due to the fact that the participants are still young people gaining experience in many areas of life. Though, parents had high knowledge of the vaccine as 75.2% of the parents to the adolescents have heard of the vaccine, but knowledge is low among their wards. This shows that there is need for enlightenment and awareness of HPV and its vaccine especially among adolescents in Nigeria.

The result showed that adolescent' education, parent monthly income, parent occupation and gender of parents were significantly associated with uptake of HPV vaccine among adolescents. Specifically, the result showed that adolescents whose tertiary educational qualifications, and whose parent's monthly income is ≥ ₦ 61,000 per month and those whose parents were female were more likely to have undertaken HPV vaccine. The result that education influences choice of uptake of the vaccine is in conformity with a study conducted in United Arab Emirates (Sager et al., 2017); a German study (Schuleni et al., 2016) and a Benin Republic study (Feirring et al., 2015) and a study conducted in USA (Henry et al., 2017). Education influences uptake of HPV vaccine because it empowers respondents with knowledge of the health risk associated with non-uptake of the vaccine (Sager et al., 2017). The result that income and household socioeconomic status influence parental acceptance of the uptake of the vaccine is in conformity with results from past Chinese study (Lin et al., 2019); a German study (Schuleni et al., 2016) and a Chinese study (You et al., 2020). Household income and wealth influence the uptake

of healthcare services in general because there are costs in using health care services among developing countries, more especially where services are paid out-of- pocket (Feirring et al., 2015). This suggests that intervention schemes with the intent to improve coverage of HPV vaccination among adolescents should target unemployed parents, those who earn low monthly, male parents, and those whose educational attainment is below tertiary.

Despite the utility of the results from this study, it has some noteworthy limitations. First, the data analyzed in this study were collected through verbal reporting, and as such was not subjected to any form of validation such as the use of vaccination cards. Second, there is a possibility that respondents gave socially-desirable responses. Third, the study only used questionnaire to elicit information from respondents, hence there is possibility that the study did not probe deeper to get more details from respondents due to the structured nature of questionnaire.

V. Recommendations

In the light of the results, we proffer the following recommendations:

(i) efforts should be made to encourage adolescents in the study area to attain at least tertiary education so that they are empowered to make inform health decision;
(ii) efforts and policy direction should be used to improve employment opportunities among parents in the study area;
(iii) multi-pronged approach should be used to improve the income sources of parents in the study area;
(iv) intervention programmes to improve knowledge and attitude of adolescents on HPV vaccine and treatment should target unemployed parents with unpredictable and little means of livelihood and male parents.

VI. Conclusions

The study examined attitude and uptake of HPV vaccine among 302 adolescents who received care at the GPC of UBTH, Southern Nigeria. The study found out that the knowledge of HPV and vaccine is low among adolescents in the study. Conclusively, adolescents' education, parents' income, gender and employment are the determinants of uptake of vaccine among adolescents.

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Availability of data and materials

The dataset used and analyzed during the current study is available from the corresponding author on a reasonable request**.**

Conflict of interests
The author declared no conflicts of interests.

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Contributions of authors

O.T.E contributed to the conceptualization, review of literature, initial manuscript preparation, study design, data analysis, wrote the results, and discussed the findings. O.T.E read and approved the final draft.

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