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Human Papilloma Virus Vaccine Acceptance Among In-School Female Adolescents: A Comparative Study in Osun- State Nigeria

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ABSTRACT

Globally, Human papillomavirus is a sexually transmitted infection. It is one of the major causes of infection-related cancer worldwide and is the causal factor in other diseases such as genital warts. Half of the sexually active adolescents are estimated to have HPV infection at one time during their lifetime. Protection against HPV includes abstinence from sex and immunization against the HPV virus with HPV vaccines before an adolescent has any sexual contact with another person. There is a dearth of studies exploring the acceptance of the HPV vaccine among secondary school female adolescents, hence the study aims to identify and compare the willingness and factors that influence the acceptance of HPV vaccine among in-school female adolescents in rural and urban areas in Osun State. A comparative cross-sectional study of 400 adolescents in rural and urban areas (200 per group) of Osun state utilized the multistage sampling technique. Quantitative data were collected using a semi-structured questionnaire and analyzed using SPSS version 25.

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The level of acceptance of the HPV vaccine among the respondents is low. In addition, there is a statistically significant difference between the level of acceptance of the HPV vaccine among rural and urban dwellers, with 23% of respondents from urban areas willing to accept the HPV vaccine compared with 17.5% of rural regions (p-value =0.01). Furthermore, (63.0%) of the respondents were from urban areas, and a more significant percentage (72.0%) of the respondents from rural areas were unaware of the HPV vaccine; this difference was statistically significant p= 0.043.
This study revealed that rural/urban location significantly affects the awareness and acceptance of the HPV vaccine among these adolescents. Therefore, information and communication programs that are culturally appropriate and target educational intervention for accepting the HPV vaccine are recommended.

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INTRODUCTION

Globally, Human papillomavirus (HPV) infection is a common sexually transmitted infection, and about fifty percent of sexually active adolescents are estimated to have HPV infection at one time during their lifetime (Ndikom et al., 2017)

Adolescents, as defined by the World Health Organization, refer to individuals between the ages of 10 and 19. There are about 1.2 billion adolescents globally, and about 90% live in developing countries. Adolescents represent 18% of the world's population, and by 2050, Sub-Saharan Africa will have more adolescents than any other region of the world. (Igras et al., 2014)

Cancer of the cervix constitutes a significant public health threat to women in many developing countries in South and Central America, sub-Saharan Africa, and South and Southeast Asia, where it is still the leading type of cancer among women. (Fasanu et al., 2014). Cancer of the cervix ranks as the second most frequent cancer among women in Nigeria after breast cancer, and about 24.8% of women in the general population are estimated to harbour cervical HPV infection at a given time. (Oluwole et al., 2017)

There are specific high-risk HPV types associated with cervical cancer. Approximately 70% of cancer of the cervix is mostly caused by HPV type 16 and 18. Genital warts are benign growths that are most often caused by certain low-risk types of HPV. HPV types 6 and 11 are related to low risk, which causes more than 90% of genital warts (Makwe et al., 2012)

Two HPV vaccine types are now available for the prevention of HPV-related diseases. The quadrivalent vaccine targets HPV types 6, 11, 16, and 18, and the bivalent vaccine

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targets HPV types 16 and 18. Both the quadrivalent and the bivalent vaccines have high efficacy against HPV type 16—and 18-related cervical intraepithelial neoplasia (CIN) and cervical cancers, and the HPV vaccine was licensed in Nigeria in 2008. (Makwe et al., 2012)

Cervical cancer contributes to 20-25% of all cancers among women in sub-Saharan Africa, about twice the percentage in women worldwide. Even though cervical cancer is preventable, the prevalence is expected to increase to almost double the current rate by 2025. (Okunade et al., 2018)

The high burden of cervical cancer in these countries is due both to a high prevalence of Human Papillomavirus (HPV) infection, the lack of effective cervical cancer screening programs and awareness about the various preventive methods. (Fasanu et al., 2014) The burden of cervical cancer in Nigeria is enormous, and Nigeria has a population of over 40 million women aged 15 and above who are potentially at risk of cervical cancer. Current estimates indicate that every year, 14,550 women are diagnosed with cervical cancer, and 9,659 die from the disease. It is projected that in 2025, there will be 22,914 incidence cases of cervical cancer and 15,251 cervical cancer mortality in Nigeria. (Abiodun et al., 2013)

MATERIALS AND METHODS

The study area is Osun State, situated in the Southwestern part of Nigeria; it is divided into three senatorial districts with 30 Local Government Areas (LGAs) and grouped into 18 rural and 12 urban LGAs. (Osun State Government, 2009) The 2024 projected population of 4,846,768 inhabitants and adolescents are 1,657,522 based on the 2006 population census and 55% of the population live in urban areas, and the rest reside in rural areas. (Federal Republic of Nigeria, 2007)

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The people are predominantly of the Yoruba tribe and the religions generally practiced in Osun State include Christianity, Islam and Traditional religion.

There are two tertiary hospitals, 52 secondary health facilities and 876 primary health centers with numerous private health centers. The reproductive health services available in the State include family-planning information, counselling services, reproductive health education, immunization against vaccine-preventable diseases (HPV vaccine available free of charge in all government hospitals) management of the consequences of abortion, treatment of reproductive tract infections, HIV counselling and Testing (HCT) and treatment of sexually transmitted diseases and other reproductive health conditions. The State has two youth and adolescent-friendly centers in the urban area (a Non-governmental Organization owns one, and the other is owned by the State government), while there is none in the rural areas.

The State has 136 public nursery schools, 1,460 public primary schools, 570 private secondary schools, and 244 public secondary schools. (Osun State Ministry of Education, 2009). Numerous private nurseries and primary and secondary schools are also in the State.

Study Design

This was a comparative cross-sectional study that utilized a quantitative method of data collection.

Inclusion criteria

Female students aged 10-19 as of their last birthday who were in public senior secondary schools in selected rural and urban areas in Osun State and who gave consent or accent, or their parents/guardians gave consent to participate, were included in the study.

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Exclusion criteria

Female students in these senior public secondary schools who are under ten and above 19 years old. Acutely ill or with mental health problems were excluded, and those in senior secondary schools who were older than 19 years were excluded.

Sample Size Determination

A minimum sample size of 194 was obtained for each group (rural and urban), using the formula for comparing proportions: 55% based on a previous study on adolescents[1] for urban and 40% assumed for rural. A correction for non-response was done, and 200 participants were enrolled per group. A total of 400 participants were, therefore, studied.

Data collection

Multistage sampling techniques were adopted as follows:

Osun State is administratively divided into three (3) senatorial districts with each comprising ten (10) Local Government and one area office

First stage: - (selection of LGAs). From each of the three senatorial districts, one Local Government Area (LGA) were selected using a simple random sampling technique by balloting method, giving a total of three LGAs

Second stage: - (selection of schools). The lists of all public secondary schools in the selected three LGAs were obtained from the State Ministry of Education. The schools in each of the LGA were pre-stratified into rural and urban areas and from this; two secondary schools (one rural, one urban) were selected in each of the three LGAs by simple random samplings technique using the balloting method, making a total of 6 schools

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Third stage: (selection of classes) From each of the selected schools, the total numbers of all female students from SS1-SS3 were obtained. Simple random sampling was used to select one class in each of the arms SS1-SS3 in the selected schools. Proportional allocation was used to determine the number of students who were interviewed in the selected classes in each of the six schools using the number of eligible students in each class.

Fourth stage: (selection of female students). The systematic sampling technique was used to select female students who were interviewed in each class using the class register. After calculating the sampling interval, the first participant was selected from the first kth person on the list by simple random sampling using the balloting method. Subsequent participants were selected based on the sampling interval in each class until the sample size was achieved.

Data collection

A semi-structured closed-ended questionnaire was designed to seek information about the adolescent's socio-demographic characteristics and factors influencing acceptance of the Human papillomavirus vaccine among in-school female adolescents. The questionnaires were administered to respondents from both rural and urban eligible areas. The questionnaires were analyzed using Statistical Product and Service Solution (SPSS) software, and necessary modifications were effected. Finally, the pretested copies of the questionnaire were subjected to internal consistency measures using Cronbach's Alpha coefficient analysis to determine its reliability. This model of internal consistency is based on the average inter-item correlation.

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In this study, the reliability coefficient for the adolescent questionnaires was 0.98, thus confirming its high degree of reliability.

Data analysis

Measurement of outcome variables

Knowledge about preventive methods against HPV infection had 4 questions in all. Each correct response scored 1 point, while an incorrect response scored 0. Average knowledge scores about preventive methods against HPV infection of ≤ 2 and > 2 were categorized as poor and good, respectively.

Knowledge about factors influencing acceptance of the HPV vaccine had 9 questions in all. Each correct response scored 1 point, while an incorrect response scored 0. The average knowledge score about preventive methods against HPV infection of SD ≤ 5 and SD > 5 was categorized as poor and good, respectively.

The questionnaire was analyzed using SPSS software, univariate analyses were done to generate frequencies of variables and mean, and proportions were computed appropriately, e.g. for age and other socio-demographics; this was presented using frequency tables and charts. Chi-square analyses were used to compare the rural and urban respondents with those with good/poor knowledge of factors influencing acceptance of the HPV vaccine and various preventive methods against HPV infection. Statistically significant variables from Chi-square analysis were subjected to multivariate analysis using binary logistic regression. Determinants of factors influencing acceptance of HPV vaccine with odds ratio and confidence interval were thus computed. All analyses were done at the 95% significance level, with a p-value of less than or equal to 0.05, which was considered significant.

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Ethical clearance for the study was obtained from the Osun State Health Research Ethics Committee (OSHREC), Ministry of Health, Osogbo, Osun State, with ref number /PRS/569T/156. The study participants who were less than 18 years old were given consent forms to be filled out by their parents or guardians, and verbal assent was obtained from them. The respondents aged 18 years and above were given the consent form to sign.

RESULTS

Socio-demographic characteristics of respondents

The study response rate was 100%. Table 1 shows that most respondents were 15-19 years old, with a mean age of 15.8±1.49 years for rural adolescents and 15.93 ±1.40 years for urban adolescents. A more significant proportion of respondents from the rural (46.5%) were in SS1, while for the urban, a more significant proportion was in SS3 (44.5%). More adolescents stayed with their parents in urban areas (71.0%) than in rural areas (54.0%). There was a statistically significant difference in the age group distribution of the two groups. Greater proportions of respondents in the rural region were in the 2nd birth order 62 (31.0%), while that of the urban area were in the 3rd birth order (28.5%). These differences were statistically significant at $p<0.05$.

The majority of rural adolescents were not sure of the age at which they should receive the HPV vaccine, while their urban counterparts did not have any idea.

Table 2 shows the willingness to accept the HPV Vaccine among the adolescent respondents; 126 (63.0%) of the respondents from urban areas and 144 (72.0%) from rural areas were not aware of the HPV vaccine, and this difference was statistically significant at

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a p-value of 0.043. About two-fifths of 46(23.0%) of the respondents from urban areas were willing to accept the HPV vaccine, while only 35(17.5%) from rural areas were willing to accept the HPV vaccine. This difference was statistically significant, with a p-value of 0.01.

The majority of respondents from both rural 137(68.5%) and urban 175 (87.5%) areas had not received the HPV vaccine before, and this difference was statistically significant at p = 0.001.

Table 3 shows the distribution of respondents according to factors that influence the acceptance of HPV vaccines among adolescents in urban and rural areas. Anxieties about needle cleanliness were a factor associated with the acceptance of the HPV Vaccine among adolescents from both urban 44(22.0%) and rural 64 (32.0%) areas. This difference was statistically significant at p-value =0.03.

Table 4 shows the association between respondents' socio-demographic characteristics and willingness to accept the HPV vaccine. It shows that respondents' class, religion and family type were statistically significantly associated with their willingness to receive the HPV vaccine with a p-value <0.05**.**

DISCUSSION

This study aimed to identify and compare the knowledge about the various preventive methods against HPV infections and factors influencing the acceptance of HPV vaccine among secondary school female adolescents in urban and rural areas of Osun state. The majority (above 4/5th) of the 400 respondents engaged in this study are in their late adolescence, and their average age was 16. This was expected as only female senior secondary school students were included in

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this study and expected to be more mature, knowledgeable, and able to form opinions accordingly.

There is an overall low awareness of the HPV vaccine among the respondents, with only about one-fifth of them being aware of the vaccine, and there is a disparity in the level of awareness between the rural and urban dwellers. The low awareness indicates the need for improvement in communication on the HPV vaccine among the students and the inclusion of reproductive health in the school curriculum. Although a small fraction (about 18%) of the respondents are aware of the HPV vaccine, almost all of the respondents did not know the age at which the HPV vaccine was supposed to be given. This is alarming as most respondents were senior secondary students and, therefore, were expected to have received the vaccine. The finding collaborates with similar studies among adolescents of about the same age group. (Makwe et al., 2012)

Although the overall proportion of respondents willing to accept the HPV vaccine is low, there is a significant difference in the proportion of respondents in rural and urban areas willing to take the HPV vaccine, with 23% and 18% willing to accept the HPV vaccine among rural and urban dwellers respectively. Similar findings were obtained in previous literature highlighting the willingness to receive the HPV vaccine. A study done in Ibadan, Nigeria, reported that 40.9% of the respondents were willing to accept the vaccine. However, this study was carried out in urban settings only (Ndikom et al., 2017)

The study further showed that only 8.3% of the 400 respondents had ever received the HPV Vaccine, with a greater proportion of urban respondents having received the HPV

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vaccine with a significant marginal difference of 2.5%. This is similar to the reported low uptake of HPV vaccines in previous research, especially among studies carried out in other African countries and other states in Nigeria. (Shabani et al., 2019)

Factors influencing the acceptance of the HPV vaccine among adolescents were "worries about side effects, adolescents' anxieties about needle cleanliness, anticipated pain on injection religious beliefs, cultural beliefs, privacy and lack of orders from schools". Among socio-demographic factors influencing respondents' knowledge of the HPV vaccine, the type of family (monogamous/polygamous) setting is significantly associated with the knowledge in rural and urban settings.

CONCLUSION

The level of awareness and willingness to accept the HPV vaccine among secondary school students in both rural and urban areas was very low. Therefore, information and communication programs culturally appropriate and targeted educational intervention on acceptance of the HPV vaccine are recommended.

Limitations to the Study

This study touched on sensitive matters in a setting where the issue under study was faced with social disapproval and cultural undertones. Thus, there was the possibility of underreporting and responder bias. The respondents were, however, assured of the confidentiality of the study and were encouraged to be sincere in their responses.

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Table 1: Socio-demographic characteristics of respondents according to their place of residence

Variables	Urban (n=200)%	Rural (n=200)%	Total	χ^2	Df	p-value
Age(years)						
10-14	36(18.0)	25(12.5)	61(15.3)	2.34	1	0.13
15-19	164(82.0)	175(87.5)	339(84.7)			
Mean value	15.8±1.49	15.93±1.40				
Class						
SS1	58(29.0)	93(46.5)	151(37.7)	34.52	3	<0.001*
SS2	53(26.5)	72(36.0)	125(31.3)			
SS3	89(44.5)	35(17.5)	124(31.0)			
Ethnicity						
Yoruba	185(92.5)	189(94.5)	374(93.5)	0.66	1	0.42
Others	15(7.5)	11(5.5)	26(6.5)			
Family type						
Monogamous	162(81.0)	118(59.0)	280(70.0)	23.05	1	<0.001*
Polygamous	38(19.0)	82(41.0)	120(30.0)			
Birth order						

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1st	53(26.5)	53(26.5)	106(26.5)	16.95	4	0.002*
2nd	48(24.0)	62(31.0)	110(27.5)			
3rd	57(28.5)	34(17.0)	91(22.7)			
4th	25(12.5)	44(22.0)	69(17.3)			
5th	17(8.5)	7(3.5)	24(6.0)			
Respondent live with						
Father only	5(2.5)	23(11.5)	28(7.0)	18.91	3	<0.001*
Mother only	43(21.5)	58(29.0)	101(25.2)			
Both parent	142(71.0)	108(54.0)	250(62.5)			
Others	10(5.0)	7(3.5)	17(0.8)			

*Statistically significant <0.05 Others – siblings, relatives, family friends

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Table 2: Awareness and willingness to accept HPV Vaccine among adolescents in Rural and Urban Areas

Variables	Urban n =200	Rural n =200	Total 400	X^2	df	p-value
Awareness of HPV vaccine						
Yes	37(18.5)	36(18.0)	73(18.3)	6.28	2	0.04*
No	126(63.)	144(72.0	270(67.)			
Indifferent	37(18.5)	20(10.0)	57(14.2)			
Acceptance of HPV Vaccine						
Yes	46(23.0)	35(17.5)	81(20.3)	10.72	2	0.01*
No	135(67.)	123(61.)	258(64.)			
Indifferent	19(9.5)	42(21.0)	61(15.2)			
Accept HPV vaccination as often as required						
Yes	48(24.0)	42(21.0)	90(22.5)	16.02	2	0.001*
No	131(65.)	106(53.)	237(59.)			
Indifferent	21(10.5)	52(26.0)	73(18.2)			
Ever received HPV vaccine						
Yes	19(9.5)	14(7.0)	33(8.3)	25.19	2	0.001*
No	175(87.5)	137(68.)	312(78.)			
Indifferent	11(5.5)	44(22.0)	55(13.8)			

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***Statistically significant <0.05**

Table 3: Factors influencing acceptance of HPV Vaccine among adolescents in Rural and Urban areas

Variables	Urban n =200	Rural n =200	Total	X^2	df	P value
Worries about side effects and infertility						
Yes						
No	45(22.5)	56(28.0)	101(25.2)	2.06	2	0.36
Indifferent	90(45.0)	78(39.0)	168(42.0)			
	65(32.5)	66(33.0)	131(32.8)			
Lack of orders from schools						
Yes	51(25.5)	55(27.5)	106(26.5)	1.11	2	0.57
No	76(38.0)	82(41.0)	158(39.5)			
Indifferent	73(36.5)	63(31.5)	136(34.0)			
Adolescent anxieties about needles cleanliness						
Yes						
No	44(22.0)	64(32.0)	108(27.0)	7.23	2	0.03*
Indifferent	68(34.0)	71(35.5)	139(34.8)			
	88(44.0)	65(32.5)	153(38.2)			

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Anticipated pain on injection						
Yes	49(24.5)	66(33.0)	115(28.8)	3.65	2	0.16
No	73(36.5)	62(31.0)	135(33.8)			
Indifferent	78(39.0)	72(36.0)	150(27.5)			
Privacy during vaccination						
Yes	40(20.0)	56(28.0)	96(24.0)	4.23	2	0.12
No	70(35.0)	70(35.0)	140(35.0)			
Indifferent	90(45.0)	74(37.0)	164(41.0)			
Vaccine approval is important						
Yes	59(29.5)	75(37.5)	134(33.5)	3.11	2	0.21
No	64(32.0)	53(26.5)	117(29.2)			
Indifferent	77(38.5)	72(36.0)	149(37.2)			
Religious belief encourage						
Yes	73(36.5)	84(42.0)	157(39.2)	1.27	2	0.53
No	64(32.0)	59(29.5)	123(30.8)			
Indifferent	63(31.5)	57(28.5)	120(30.0)			
HPV vaccination is against cultural belief						
Yes						
No	44(22.0)	57(28.5)	101(255)	2.93	2	0.23
Indifferent	82(41.0)	82(41.0)	164(41.0)			
	74(37.0)	61(30.5)	135(33.8)			

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Support from family encourages HPV vaccination acceptance						
Yes	53(26.5)	46(23.0)	99(24.8)	1.27	2	0.53
No	65(32.5)	75(37.5)	140(35.0)			
Indifferent	82(41.0)	79(39.5)	161(40.2)			
Support from friend encourages HPV vaccination acceptance						
Yes	40(20.0)	43(21.5)	83(20.8)	1.80	2	0.41
No	73(36.5)	83(41.5)	156(39.0)			
Indifferent	87(43.5)	74(37.0)	161(40.2)			
Counseling about the HPV vaccination encourages acceptance						
Yes	62(31.0)	55(27.5)	117(29.2)	3.94	2	0.14
No	49(24.5)	67(33.5)	116(29.0)			
Indifferent	89(44.5)	78(39.0)	167(41.8)			
Vaccine is very expensive						
Yes	35(17.5)	44(22.0)	79(19.8)	1.40	2	0.50
No	92(46.0)	90(45.0)	182(45.5)			
Indifferent	73(36.5)	66(33.0)	139(34.8)			

***Statistically significant <0.05 Chi-square ***

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Table 4: Association between respondent's socio-demographic characteristics and their knowledge about HPV preventive method

Variables	Good knowledge		Statistics	Poor knowledge		Statistics
	Urban	Rural		Urban	rural	
Age (years)			X^2=1.38			X^2=0.73
10-14	8(14.5)	5(7.8)	df=1	28(19.3)	21(15.4)	df=1
15-19	47(85.5)	59(92.2)	p=0.24	117(80.7)	115(84.6)	p=0.40
Class						
SS1	14(25.5)	28(43.8)	X^2=1.97	44(30.3)	65(47.8)	X^2=10.56
SS2	14(25.5)	24(37.5)	df=2	39(26.9)	48(35.3)	df=2
SS3	27(49.1)	12(18.8)	p=0.16	62(42.8)	23(16.9)	p=0.001*
Ethnicity						
Yoruba	54(98.2)	63(98.4)	X^2=0.01**	131(90.3)	126(92.6)	X^2=0.48
Others	1(1.8)	1(1.5)	df=1	14(9.7)	10(7.4)	df=1
			p=0.91			p=0.49**
Religion						
Christianity	31(56.4)	25(39.1)	X^2=0.46	86(59.3)	75(55.1)	X^2=2.06
Islam	24(43.6)	37(57.8)	df=2	57(39.3)	61(44.9)	df=2
Traditional	0(0.0)	2(3.1)	p=0.50	2(1.4)	0(0.0)	p=0.15
Birth order						
1st	15(27.3)	16(25.0)	X^2=0.63	38(26.2)	37(27.2)	X^2=0.09

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2nd	13(23.6)	23(35.9)	df=4	35(24.1)	39(28.7)	df=4
3rd	17(30.9)	10(15.6)	p=1.84	40(27.6)	24(17.6)	p=0.17**
4th	6(10.9)	12(18.8)		19(13.1)	32(23.5)	
5th	4(7.3)	3(42.9)		13(9.0)	4(2.9)	
Number of children			X^2=2.68			X^2=1.84
1-3	16(29.1)	12(18.8)	df=3	36(24.8)	24(17.6)	df=3
4-6	35(63.6)	41(64.1)	p=0.08	87(60.0)	92(67.6)	p=0.36**
7-9	3(5.5)	10(15.6)		20(13.8)	15(11.0)	
>10	1(1.8)	1(1.6)		2(1.4)	5(3.7)	
Family type						
Monogamous	42(76.4)	36(56.2)	X^2=5.30	120(82.8)	82(60.3)	X^2=17.52
Polygamous	13(23.6)	28(43.8)	df=1	25(17.2)	54(39.7)	df=1
			p=0.02*			p=<0.001*
Father's occupation			X^2=0.07			X^2=0.19
Professional	12(21.8)	17(26.6)	df=3	43(29.7)	29(21.3)	df=3
Skilled worker	39(70.9)	45(70.3)	p=1.53	90(62.1)	95(69.9)	p=1.69
unskilled worker	3(5.5)	2(3.1)		7(4.8)	7(5.1)	
Unemployed	1(1.8)	0(0.0)		5(3.4)	5(3.7)	

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Mother's occupation			X^2=0.24			X^2=0.49
Professional	14(25.5)	9(14.1)	df=3	27(18.6)	21(15.4)	df=3
Skilled worker	38(69.1)	48(75.0)	p=0.62	104(71.7)	109(80.1)	p=0.14
unskilled worker	2(3.6)	2(3.1)		11(7.6)	3(2.2)	
Unemployed	1(1.8)	5(7.8)		3(2.1)	3(2.2)	

Statistically significant <0.05 Fischer exact test=*

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Table 5: Association between respondents' socio-demographic characteristics and willingness to accept the HPV vaccine

Variables	**Yes**		X^2= df= P=	**No**		X^2= df= P=	**Indifferent**		X^2= df= p
	Urban	**Rural**		**Urban**	**Rural**		**Urban**	**Rural**	
Age (years)			0.63**			0.45			1.05**
10-14	5(14.3)	4(8.7)	1	22(17.9)	20(14.8)	1	9(21.4)	2(10.5)	1
15-19	30(85.7)	42(91.3)	0.49	101(82.1)	115(85.2)	0.50	33(78.6)	17(89.5)	0.31
Class									
SS1	9(25.7)	19(41.3)	5.41	36(29.3)	65(69.9)	12.75	13(31.0)	9(47.4)	0.75**
SS2	11(31.4)	19(41.3)	2	30(24.4)	50(69.4)	2	12(28.6)	3(15.8)	2
SS3	15(42.9)	8(17.4)	0.02*	57(46.3)	20(14.8)	0.003*	17(40.5)	7(36.8)	0.39
Ethnicity			0.12**			2.12			1.10**
Yoruba	34(97.1)	44(95.7)	1	112(91.1)	129(95.6)	1	39(92.9)	16(84.2)	1

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Others	1(2.9)	2(4.3)	0.73	11(10.9)	6(4.4)	0.146	3(7.1)	3(15.8)	0.29
Religion									
Christianity	22(62.9)	23(50.0)	1.33**	76(61.8)	64(47.4)	5.36**	19(45.2)	13(68.4)	2.82**
Islam	13(37.1)	23(50.0)	2	46(37.4)	69(51.1)	2	22(52.4)	6(31.6)	2
Traditional	0(0.0)	0(0.0)	0.25	1(0.8)	2(1.5)	0.021*	1(2.4)	0(0.0)	0.09
Birth order									
1st	8(22.9)	10(21.7)	0.63**	33(26.8)	42(31.1)	1.82**	12(28.6)	1(5.3)	0.83**
2nd	9(25.7)	17(37.0)	4	29(23.6)	38(28.1)	4	10(23.8)	7(36.8)	4
3rd	11(31.4)	8(17.4)	1.63	34(27.6)	24(17.8)	0.93	12(28.6)	2(10.5)	1.26
4th	5(14.3)	10(21.7)		16(13.0)	27(20.0)		4(9.5)	7(36.8)	
5th	2(5.7)	1(2.2)		11(8.9)	4(57.1)		4(9.5)	2(10.5)	
Number of children									
1-3									
4-6	10(28.6)	6(13.0)	0.43**	29(23.6)	27(20.0)	1.27	13(31.0)	3(15.8)	0.94**
7-9	19(54.3)	29(63.0)	3	76(61.8)	93(68.9)	3	27(64.2)	11(57.9)	3

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>10	3(8.6)	8(17.4)	0.51	18(14.6)	12(8.9)	0.26	2(4.8)	5(26.3)	0.33
	3(8.6)	3(6.5)		0(0.0)	3(2.2)		0(0.0)	0(0.0)	
Family type			1.68			11.45			13.75*
Monogamous	24(68.6)	25(54.3)	1	100(81.3)	84(62.2)	1	38(90.5)	9(47.4)	*
Polygamous	11(31.4)	21(45.7)	0.20	23(18.7)	51(37.8)	0.00*	4(9.5)	10(52.6)	1
									0.00*
Father's occupation									
Professional	9(25.7)	11(23.9)	0.06**	42(34.1)	29(21.5)	0.74**	4(9.5)	6(31.6)	0.08**
Skilled worker	23(65.7)	32(69.6)	3	76(61.8)	96(71.1)	3	30(71.4)	12(63.2)	3
unskilled worker	1(2.9)	3(6.5)	1.07	4(3.3)	5(3.7)	1.68	5(11.9)	1(5.3)	1.26
Unemployed	2(5.7)	0(0.0)		1(0.8)	0(0.0)		3(7.1)	0(0.0)	
Mother's occupation									
Professional	10(28.6)	10(21.7)	0.24**	27(22.0)	17(12.6)	3.73**	4(9.5)	3(15.8)	0.03**

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Skilled worker	23(65.7)	33(71.7)	3	87(70.7)	110(81.5)	3	32(76.2)	14(73.7)	3
unskilled worker	1(2.9)	1(2.2)	0.62	8(6.5)	3(2.2)	0.05	4(9.5)	1(5.3)	0.86
Unemployed	1(2.9)	2(4.3)		1(0.8)	5(3.7)		2(4.8)	1(5.3)	

Statistically significant <0.05 Fischer exact test=*

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