International Journal of Science and Research (IJSR)
ISSN: 2319-7064
ResearchGate Impact Factor (2018): 0.28 | SJIF (2018): 7.426

Awareness and Acceptance of Human Papillomavirus (HPV) Vaccine: A Study among Female Undergraduates and Antenatal Mothers in Port Harcourt, Nigeria

George-Opuda I.M[1], Ojimah C[2], Eddeh-Adjugah O[3], Adegoke O.A[4]

Department of Medical Laboratory Science, Rivers State University of Science and Technology, Port Harcourt, Nigeria

Department of Public Health, University of Port Harcourt, Rivers State, Nigeria

Abstract: ***There has been no reported study on the awareness and acceptability of Human Papilloma Virus (HPV) vaccination among female University students and antenatal mothers in Port Harcourt. HPV has been implicated as the highest risk factor for cervical cancer. Reports have shown that the vaccine prevents a high percentage of cervical cancer. This study was carried out to assess the level of awareness and acceptance of HPV vaccine amongst female undergraduate students and Antenatal (ANC) mothers in Port Harcourt.A descriptive cross-sectional study was conducted among 800 participant; 436 female undergraduates and 364 ANC mothers.The Level of HPV awareness was poor, but the level ofHPV vaccine acceptability was high. Enlightenment programs and public health promotion talk on HPV and HPV vaccination among female undergraduate students and ANC mothers should be encouraged. Context: There has been no reported study on the awareness and acceptability of Human Papilloma Virus (HPV) vaccination among female University students and antenatal mothers in Port Harcourt. HPV has been implicated as the highest risk factor for cervical cancer. Reports have shown that the vaccine prevents a high percentage of cervical cancer. Objective: To assess the level of awareness and acceptance of HPV vaccine amongst female undergraduate students and Antenatal (ANC) mothers in Port Harcourt. Method: A descriptive cross-sectional study was conducted among 800 participant; 436 female undergraduates and 364 ANC mothers. The University of Port Harcourt and the Braithwaite Memorial Specialist Hospital (BMSH) in Port Harcourt was used to obtain data from female undergraduates and registered ANC mothers respectively. Recruitment of students was by random and systemic sampling and recruitment for ANC mothers was based on routine antenatal check-up. A self- administered questionnaire was used to obtain relevant information from participants. Results: Level of HPV awareness was poor, but the level ofHPV vaccine acceptability was high. Conclusions: Enlightenment programs and public health promotion talk on HPV and HPV vaccination among female undergraduate students and ANC mothers was necessary. Recommendation: HPV vaccination should be part of the health evaluation of all female students at entry point and a HPV vaccination program should be included for ANC mothers in health facilities.***

1. Introduction

Cervical cancer is the fourth most common cause of both cancer and deaths from malignancies in women, world-wide (WHO, 2014). It was also reported as the second most common cause of females' specific cancer after breast cancer, accounting for about 8% of both total cancer cases and total cancer deaths in women (WHO, 2014). In Nigeria, cervical cancer ranks the second most frequent cancer and about 24.8% of women in the general population are estimated to harbour cervical Human Papilloma Virus (HPV) infection at a given time (Castellsagué et.al, 2007).In 2007, it was reported that 36.59 million women aged ≥15 years in Nigeria were at riskof developing cervical cancer, and 9922 cases were diagnosed annually with 8030 deaths(WHO, 2014; Castellsagué, et al., 2007 ; Akinremi, Nazeer, &Totsch, 2005; Udigwe, 2006). The projection for new cervical cancer cases and deaths in 2025 is about 22,914(WHO, 2014; Castellsagué, et al. 2007).Similar research indicated that at any point in time, 42.5% of women have genital HPV infections, whereas less than 7% of adults have oral HPV infections (Bruni, et.al., 2016;Hariri, et al., 2006;Gillison, et al., 2012). High prevalence rates for the disease was also reported from some other parts of Africa like Kenya and Ghana (De Vuyst, et al., 2003; Domfeh, et al., 2008). In Nigeria, Thomas et al, documented a 26.3% prevalence rate of HPV infection in a community based study in Ibadan, South-Western Nigeria (Thomas, et al., 2004). The very high prevalence rate reports of cervical cancer in Nigeria indicates that cervical cancer is a disease of public health importance(WHO, 2014; Castellsagué et al. 2007;Mohammed, et al., 2008).

Human Papilloma Virus (HPV) has been implicated as the greatest risk factor for cervical cancer((WHO, 2014; Castellsagué,et al. 2007). It was reported that in Nigeria, the high burden of cervical cancer is due both to a high prevalence of HPV infection and the lack of effective cervical cancer screening programs (Arulogun & Maxwel2012).HPV are a group of more than150 related viruses, and more than 40 of these viruses are contracted by direct skin to skin contact during vaginal, anal, and oral sex (WHO, 2007). Two types of HPV (16 and 18) currently cause about 70% of cervical cancer cases, and two other types (6 and 11) are reported to be responsible for 90% of genital wart cases (Hariri, et al., 2006;Gillison, et al., 2012 ;WHO, 2007). However, it has also been stated that most people who have had HPV infections, do not develop cervical cancer (Dunne & Park, 2013).

Sexual intercourse is the primary route of transmission of genital HPV infection. Information aboutsexual and reproductive health behaviours in Port Harcourt would be

useful to the design of effective preventive strategies against cervical cancers. Port Harcourt is found in the Niger Delta Region (NDR) of Nigeria and the region is situated in the Southern part of Nigeria. It is bounded on the south by the AtlanticOcean and to the east by Cameroon.It is estimated that 10million people in the area are destitute with 14million people living below the poverty line found mainly in ruralcommunities (Udonwa, et al., 2004). Port Harcourt is one of the urban settlements but the majority of the settlements are small consisting of fewer than 5000 inhabitants (Okonta, 2007).Thegeographic environment, economic and socio-cultural factors have an influence on the health of the people. It is believed that these have created a social environment, where health-relevant behaviour patterns are practised and established at very early age periods among males and females. Despite the overwhelming evidence that HPV is sexually transmitted, other routes of transmission have been proposed(Kjaer, et al., 2001). Several studies have explored whether HPV can be vertically transmitted from mother to child by direct contact during labour, or horizontally through manipulation of the child with infected hands, bathing, towels and fomites (Kjaer, et al., 2001;Burchell, et al.,2006).

The youths in Nigeria account for 32.0% of Nigerian's 140 million people and nearly half (48.6%) of adolescents aged 15-19 are sexually active(NPC, 2009; NPC, 2014). Pregnancy is associated with a sexually active society. However the Nigerian legislative Act on consensual Sex is from 18 years of age for both sexes.Several reports have shown that marriages and sexual practices have been initiated before the age of 18 years in Nigeria especially in the Northern region(NPC, 2009; Thomas, et al., 2012**;** Wusu, 2015). These social realities are said to be deeply rooted in socio-cultural and religious practices and beliefs. Similarly some other study in Port Harcourthave shown that adolescents aged 14-21years have been sexually exposed and the meanage at sexual initiation was 15.04 years with 2%of them having initiated sex at the age of twelve years;(Okpani&Okpani, 2000**;**Imaled, Peter-Kio &Asuquo, 2012).The numerous underlying cultural beliefs, practices and social structure of the society, encourages gender bias and discriminatory harmful habits, skewed towards the Nigerian woman (Wusu, 2015).Often times this has encouraged early marriages of the Nigerian girl, and exposes her to early sexual activity in her lifetime. In Nigeria, researchers have confirmed that risky sexual behaviour is common among young people. These risky behaviours include: early debut in sexual activities, sex with many partners, low and inconsistent use of condoms, use of drugs and alcohol, anal sexual intercourse and mouth to genital contact (Kemp, 2000; Okpani&Okpani, 2000**;**Imaled, Peter-Kio &Asuquo, 2012). The majority of students in tertiary institutions are single, young adults who easily fall prey to early sexual exposure, associated with the liberal nature of campus life that predisposes them to high risk sexual behaviour.

In recent times, cancer prevention efforts have led to the development of a vaccine against HPV (Harper, Franco, &Wheeler, et al., 2004). It was also reported that HPV vaccine protects two important strains of this family, thus preventing a high percentage of cervical cancer occurrence. The two HPV vaccines types Gardasil and Cervarix, reduce the risk of cancerous and precancerous changes of the cervix and perineum by about 93% and 62% respectively (**;**Imaled, Peter-Kio &Asuquo, 2012). Clinical trials found that both vaccines are 93% effective in preventing vaccine type specific lesions when given to girls prior to sexual activity, or to women without prior infection with the 16 or 18 HPV (WHO, 2007; Villa, Ault, & Giuliano, 2006).

Perception of HPV vaccine in Nigeria is related to its acceptability. The perception that there is no immediate need for vaccination, and therefore acceptability of HPV vaccine had been shown to be influenced by knowledge of (cancer, HPV and HPV vaccine), religion, customs and traditions, and fear or misconception of side effects(Iliyasu, et al., 2010;Agida, et al., 2015; Enzinwa, Balogun&Okafor, 2013).Also reports from other countries have shown that HPV vaccine acceptability is associated with knowledge, in addition to several other factors not related to the above mentioned ones (Turiho, et al., 2014; Chen &, Leung 2014). In developing interventions for vaccination acceptability, it is imperative that these factors are addressed. Interventions such as educating the female undergraduate and antenatal mothers would help to improve knowledge of HPV vaccine and its acceptability. There was therefore a need, to create awareness on the usefulness of HPV vaccine in reducing the risk of cervical cancer and HPV related diseases. HPV vaccine presents a great opportunity to reduce the burden of cervical cancer in Port Harcourt. The aim of the study is to create awareness and recommend HPV vaccine as an acceptable option for decreasing HPV related diseases, with particular reference to cancer.

This study assessed the level of knowledge, and awareness of HPV vaccine among female undergraduate students and Antenatal Care (ANC) mothers in Port Harcourt. This will help to ascertain whether their attitude towards HPV vaccine and its acceptability is associated with some of the factors mentioned earlier. It will also help to create awareness in all aspects of preventive health care, especially in HPV vaccination.The study therefore, will help to identify the weaknesses and strengths in the HPV vaccination program, and therefore help in designing a program that can increase the awareness and knowledge of HPV vaccine among female undergraduates and ANC mothers. It would further help to address the barriers associated with the acceptability of the vaccine especially in the culturally related areas. The knowledge gained will help policy makers responsible in developing and implementing health policies and programmes to improve and maintain quality healthcare services.The findings in this study would help to provide policy makers the needed information to make an informed decision on HPV vaccine availability and vaccination. Creating awareness and improving the knowledge level and acceptability of HPV immunization will reduce the morbidity and mortality associated with cervical cancer.

2. Material and Methods

2.1 Sample Collection

A cross-sectional survey, using a self-administered questionnaire was designed and administered at both the

University of Port Harcourt and the Braithwaite Memorial Specialist Hospital. This was to assess the level of knowledge and therefore acceptability of HPV vaccine among female undergraduates and ANC mothers. It was also to determine other socio-cultural factors that are associated with the knowledge (or lack of it), and acceptability of HPV vaccine within the study group in Port Harcourt. A total of 800 participants completed the questionnaire, 436 were female undergraduates and 364 were Antenatal Care Mothers (ANC). Among the returned questionnaires, only 3 participants were non Nigerians.

3. Results

Data were analysed using SPSS 20.0, with p-values less than 0.001 considered statistically significant in the final logistic regression model. The data obtained was summarized by descriptive statistics, mean and standard deviation. Bivariate analyse was used to identify factors associated with HPV vaccine acceptability and the chi-square test was used for categorical variables.

3.1 Demographic data

The mean age of the female undergraduates that participated in the study was 19.41(SD±3.38), and the mean age for ANC mothers was 28.02(SD 6.11). The data categorized age of participants into 4 age ranges: 15-24 years, 25-34 years, 35-44 years and greater than 44 years. Overall, the ages of participants were seen to be more in the age range of 15-24 years and 25-34years. The total number of participants between the ages of 15-24 years was 512(64%). Out of this number of participants, 394(90.4%) were undergraduates and 118(32.4%) were ANC mothers. Also, the total number recorded for participants between the age ranges of 25-34 years was 220(27.5%). ANC mothers were 180(49.5%) and 40(9.2%) were female undergraduates. Details are shown in **Tables 3.1.1**and **3.1.2**.

Table 3.1.1: Demographic Data (Age in Years)

Participants	Total	Mean	Median	Mode	Standard deviation(SD)	Minimum	Maximum
Female undergraduates	436	19.41	18.50	17	3.378	15	36
ANC Mothers	364	28.02	28.00	30	6.108	15	49

Note: Total = Total number of participants

Table 3.1.2: Demographic Data (Age Range)

Variable Years	Total (%)	Female undergraduates Total (%)	ANC Mothers Total (%)
15-24	512(64.0)	394(90.4)	118(32.4)
25-34	220(27.5)	40(9.2)	180(49.5)
35-44	63(7.9)	2(0.5)	61(16.8)
>44	5(0.6)	0(0.0)	5(1.4)

Total= Total number of respondents

Out of the 800 participants, 113(14.4%) were Muslims, 673(84.1%) were Christians, and 14 participants did not indicate their religion. These undecided 14 participants were observed in the female undergraduate students. Christians were analysed under different denominations which include: Catholics, Anglican, Presbyterian, Pentecostal, Jehovah Witness and "Other" (Grail message, Eckanker etc.) In the different Christian denominations, Pentecostal recorded the highest number of participants 168(21.0%). In this group, female undergraduates were 111(26.3%), and ANC mothers were 57(15.7%). In the Jehovah witness denomination, ANC mothers had the highest participation of 79(21.7%) out of a total number of 110. The details are shown in Tables 3.1.3

Table 3.1.3: Demographic Data (Religion Of Participants)

Religion	Total (%)	Female Undergraduates No. of respondents (%)	ANC Mothers No. of respondents (%)
Muslims	113(14.4)	71(16.3)	42(11.5)
Catholics	139(17.7)	73(16.7)	66(18.1)
Anglican	162(20.6)	96(22.7)	66(18.1)
Presbyterian	49(6.2)	22(5.2)	27(7.4)
Pentecostal	168(21.0)	111(26.3)	57(15.7)
Jehovah Witness	110(13.8)	31(7.1)	79(21.7)
Baptist	35(4.5)	18(4.1)	17(4.7)
Others	10(1.3)	0	10(2.7)

Note: Total =Total number of respondents

3.2 Knowledge of Cervical Cancer

Table 3.2.1 summarises the participants' knowledge of cervical cancer. Out of the 436 female undergraduate participants, 408(93.6%) had knowledge of cervical cancer, and 12(2.8%) did not have knowledge of cervical cancer. Whereas, among the 364 ANC mothers, 311(85.4%) had knowledge of cervical cancer, and 41(11.5%) had no knowledge of cervical cancer. Overall, the respondents were quite knowledgeable about cervical cancer.

Table 3.2.1: Knowledge Of Cervical Cancer

Cervical cancer knowledge	Yes (%)	No (%)	Total
Female undergraduates	408(93.6%)	12(2.8%)	436
ANC Mothers	311(85.4%)	41(11.5%)	364

3.3 Knowledge of HPV and HPV Vaccine

Out of the 800 returned questionnaires, 59 participants (27 female undergraduates and 32 ANC mothers) were undecided on knowledge of HPV. Out of the 751 valid data, 238(54.6%) of the female undergraduates indicated 'NO' knowledge and 258(70.9%) of the ANC mothers indicated 'NO' knowledge of HPV. The data for knowledge on HPV vaccine showed that 754 questionnaires were valid and 46 participants (26 female undergraduates and 20 ANC mothers) were undecided. The number of female undergraduates with no knowledge of HPV vaccine was 309(69.0%) and the number of ANC mothers with no knowledge of HPV vaccine was 275(75%). The details are shown in Table 3.5.1. The analysis on the data obtained on knowledge of HPV and HPV vaccine showed that participants had little or no knowledge about HPV. The analysis also showed that not all of the participants who had knowledge of HPV, showed knowledge of HPV vaccine.

Table 3.3.1: Knowledge of HPV And HPV Vaccine

HPV knowledge	YES (%)	NO (%)	TOTAL
Female undergraduates	171(39.2%)	238(54.6%)	419
ANC Mothers	74(20.3%)	258(70.9)	332
HPV vaccine Knowledge	YES (%)	NO (%)	TOTAL
Female undergraduates	109(25.0%)	301(69.0%)	410
ANC Mothers	69(19.0%)	275(75%)	344

3.4 Acceptability of HPV vaccine

All the variables assessed showed significant relationship with acceptability of HPV. Among the respondents who showed willingness for HPV vaccination, 198(43.3%) were female undergraduates and 259(56.7%) were ANC mothers (X^2=53.201; p<0.001). The data revealed that ANC mothers were more likely to accept HPV vaccine than the female undergraduates. The data also showed that 316(69.1%) of the respondents who were willing to accept the vaccine were <25 years as compared to 114(30.9%) who were >25years. The difference was statistically significant(X^2=12.483; p<0.001). Also, there were significantly more Christians who were willing to be vaccinated than non-Christians (359, 78.6% Vs. 98, 21.4%; X2=52.201; p<0.001). There was also a relationship between knowledge and HPV vaccine acceptability, among the respondents who indicated willingness to HPV vaccination, 228(49.9%) had knowledge of HPV compared to 299(50.1%) who did not have knowledge of HPV, and this was found to be significant (X^2=185.648; p=0.001). A similar level of significance was recorded for HPV vaccine where 158(34.6%) had knowledge of the vaccine 299(65.4%) did not have knowledge of the vaccine(X^2=93.220;p=0.001) see **Table 3.4.1**

Table 3.4.1: Acceptability of HPV Vaccine

ACCEPTABILITY OF HPV VACCINE					
Variable	Yes	No	X2	df	P-value
Group					
Female undergraduates	198 (43.3%)	237 (69.3%)	53.201	1	<0.001
ANC Mothers	259 (56.7%)	105 (30.7%)			
Age group(years)					
<25years	316 (69.1%)	195 (57.0%)	12.483	1	<0.001
>25years	141 (30.9%)	147 (43.0%)			
Religion					
Christian	359 (78.6%)	303(88.6%)	53.201	1	<0.001
Non-Christian	98 (21.4%)	39 (11.4%)			
Knowledge About cervical cancer					
Yes	457(100%)	261(76.3%)	120.447	1	<0.001
No	(0.0%)				
Knowledge about HPV					
Yes	228(49.9%)	17(5.0%)	185.648	1	0.001
No	229(50.1%)	325(95.0%)			
Knowledge HVP vaccine					
Yes	158(34.6%)	20(5.8%)	93.220	1	0.001
No	299(65.4%)	322(94.2%)			

The bivariate analysis showed that only respondents who had knowledge of HPV had 3.4% less likelihood to accept HPV vaccine than those who had no knowledge of HPV(OR =0.034;95% CI for OR = 0.016-0.072; p<0.001). Logistic regression model showed that there was a significant difference between vaccine acceptability and knowledge of HPV vaccine (p<0.001). See **Table 3.4.2**below.

Table 3.4.2: Bivariate Analysis

Variable	Odds Ratio	95% CI for Odds Ratio		p-value
		Lower limit	Upper limit	
Religion				
Christian	1.883	0.942	3.765	0.073
Non-Christian	1			
Knowledge of HPV				
Yes	0.034	0.016	0.072	<0.001*
No	1			
Knowledge of HPV vaccine				
Yes	0.965	0.435	2.141	0.931
No	1			

*Significant

Table 3.4.2 also showed that Christians were about 1.9 times more likely to accept HPV vaccines when compared with non-Christians, although this was not seen to be significant (OR=1.883;95%; CI= 0.942-3.765; p=0.073). The review revealed high levels ofawareness of cervical cancer and willingness to the acceptability of HPV vaccine. There was however, low levels of knowledgeand awareness of HPV and HPV vaccine.

4. Discussion

There has been no reported study on awareness, knowledge and or acceptability of HPV vaccination among university students and ANC mothers in Port Harcourt, Rivers State, Nigeria. However, studies on HPV vaccination have been done in other States in Nigeria; Lagos, Sokoto, Imo, and Enugu(Thomas, et al., 2012; Agida TE, Akaba GO, Isah AY, et al., 2015; Enzinwa, Balogun&Okafor, 2013;Turiho, Okello, &Muhwezi et al., 2014; Chen &, Leung 2014). This study therefore, attempts to be the first in Port Harcourt, Rivers State.

In the study, the majority of the respondents were between 15 and 34 years of age, with a mean age of 19.41± 3.38 years for female undergraduates, and a mean age 28.02± 6.11 years for ANC mothers. It also showed that the percentage of ANC mothers between the age group of 15 – 24years was 32.4%. The study suggests that sex had been initiated in the majority of the respondents at quite an early age. This is in tandem with previous studies by Imaledo, et al., (2012) which stated that respondents' age at first sexual intercourse was revealed to be between 15 – 24years. This correlates also with other studies, which suggested that marriages and sex practices are initiated early in girls before the age of 18years (NPC, 2014; Thomas, et al., 2012**;** Wusu, 2015; Kemp, 2000; Okpani&Okpani, 2000**).** The social environment, which is vibrant, and less restrictive especially in Port Harcourt could be a factor. This had sexually exposed adolescents and undergraduates to early sexual activity and marriages. This could also be a result of the underlying cultural beliefs as reported by Wosu et al. The result of other studies suggested high peak of HPV prevalence among younger woman (Akarolo-Anthony, et al., 2014). This study therefore agrees with WHO

recommendation for HPV vaccination to be given to pre-teen or younger adolescent from the age of 9 to 13 years. This will help to protect them before they are exposed to the virus.

In this study, the majority of the respondents were Christians. Different denominations were recorded in the Christian religion; they make up 84.1% of the total study population. Muslims make up 14.4% of the total population, while 1.6% of the study population did not indicate any religion. The low number in Muslim respondents could be related to the fact that the majority of the Muslims are concentrated more in the Northern part of Nigeria. Among the Christian denomination, the Pentecostal group recorded the highest number with 111 (26.3%) of the female undergraduate study population, while the Jehovah witness denomination ranked the highest with 79(21.7%), among the ANC mothers study population. However, in the overall study population, Pentecostal had the highest respondents with 168(21.0%) and Baptist ranked the lowest, with 35(4.5%). Religious beliefs of people through socio-cultural influences could result in many health care engagements and practices which may be significantly different from best health care practices. These beliefs can affectdecision-making, commitment to treatment regimens, use of complementary health practicesand general wellbeing (Rumun, 2014). For effective interventions in health care management, understanding the religious beliefs of individuals is of great importance. The high number of undergraduates recorded under Pentecostal denomination can be attributed to the fast proliferation of Pentecostal churches in Nigeria. It is said to be the new 'drive' in the Christian faith. It was reported that apart from the evangelical activities and Pentecostal doctrines, one of the reasons why young people attend Pentecostal churches is that it improves their chances of getting married (Diara&Onah, 2014).

The study reported that most female undergraduatesand ANC mothers in Port Harcourt were aware of cervical cancer (93% and 85% respectively). Similar reports had indicated a high level of awareness about cervical cancer amongst female undergraduates and ANC mothers' (Iliyasu, et al., 2010;Agida, et al., 2015;Enzinwa, Balogun&Okafor, 2013). In this study, knowledge of cervical cancer appeared to have played a significant role in the acceptance of HPV vaccine. A majority of the respondents who were knowledgeable of cervical cancer showed willingness to accept HPV vaccine but even those who did not have knowledge of cervical cancer did show willingness to accept the vaccine. Similar studies have also shown that knowledge of cervical cancer could help in the acceptance of HPV vaccine (Iliyasu, et al., 2010;Agida, et al., 2015).However, in a recent study byTuriho, et al.,(2014), vaccinated girls were found to be knowledgeable, but knowledge alone was not associated with positive HPV vaccine acceptability (Turiho, Okello, &Muhwezi et al., 2014).Ezinwa, et al., (2013), also reported 79.6% on cervical cancer awareness and a 27.9% on HPV vaccine acceptability(Turiho, et al., 2014). The low percentage value obtained for HPV vaccine acceptability in the study by Ezinwa, et al., (2013) could be as a result of the mothers' lack of information on HPV and HPV vaccine.However, from this study, respondents who had knowledge of HPV showed 3.4% less likelihood to accepting the vaccine than those who had no knowledge of HPV. It is probable that some of those who had knowledge of HPV may have had some misconceived information, or had insufficient information on the subject matter to enable them to have an informed opinion. It is therefore necessary to educate people with the right information.

The study also reports that despite the vast knowledge of cervical cancer amongst female students and ANC mothers in Port Harcourt, only very few of the respondents knew about HPV (39.2% of female undergraduate and 20.3% of ANC mothers), and even fewer students had knowledge of HPV vaccines (25.0% of female undergraduates and 19.0% of ANC mothers). Despite the fact that HPV is a high risk factor for cervical cancer, and that millions of deaths are being recorded yearly as a result of cervical cancer, not too many persons have sufficient knowledge about the virus and the vaccine. This therefore calls for the importance of incorporating this common public health knowledge, as a policy into the schools undergraduate curriculum; while also creating programmes to incorporate HPV vaccine awareness in routine antenatal care activities. The willingness of the respondents towards acceptability of HPV vaccination was high (82.7%), irrespective of the poor knowledge of the vaccines observed in this study.

It was also recorded that ANC mothers are more likely to accept the vaccine when compared with the female undergraduates. It is possible that ANC mothers, who make multiple visits to health facilities for antenatal care, may have had some experience through earlier deliveries and immunizations. This enables themto show morereadiness for vaccine acceptability. Similar report had shown that even when knowledge, and awareness of HPV, HPV vaccine was reported low among ANC mothers, over 60% of the participants reported, showing willingness to recommend the vaccine for their female children((Brown & Folayan, 2015). Other studies by IIiyasu et al 2014; Enzinwa, et al.,(2013); and Turiho,(2014) all recorded increases in vaccination acceptability.

Religion had an effect on acceptability of the vaccine, though the difference was not statistically significant. However, it was recorded that respondents in the Pentecostal and Jehovah witness denominations are less likely to accept the vaccine when compared with the Anglicans, Catholics, and Muslims. The level of acceptability in these groups may be attributed to the difference in doctrinal practices.

This study was associated with a number of limitations. First, the study was conducted amongst female undergraduate students and ANC mothers aged 15 years and above. The study failed to take cognisance of any of the respondents who had received prior HPV vaccination before the study. In real practice, HPV vaccination is recommended for adolescents between 9-13 years. Secondly, sexual activity of participants was not considered in the study. Finally, the study did not extend to investigating the level of knowledge of cervical cancer, HPV and HPV vaccine of the respondents, to assist in assessing if the right knowledge was

received by the respondents. These limitations necessitate the need for caution in extrapolating the findings to the general population. However, these findings underscore the importance of advocacy to this group of people and implementation of effective public health policies and health promotion efforts towards vaccine introduction and acceptability.

5. Conclusion

In conclusion, it is important to state that health awareness is the key to healthy living. The knowledge of female undergraduate students and ANC mothers in Port Harcourt, Rivers State, Nigeria about HPV vaccine is generally poor, though the findings suggest that the respondents have a positive attitude towards vaccine acceptability and vaccination. The study suggested that knowledge is associated with vaccine acceptability. The impact of knowledge could be positive or negative depending on the quality of information given and how the information was interpreted by the individual. Religion amongst other factors could affect the level of interpretation of the information by the individual. It is therefore important to collaborate with religious groups in increasing awareness on HPV vaccine.

It is also, expedient that public health promotion programs designed primarily to improve the knowledge level of female students, in Port Harcourt University is introduced at entry level; and the creation of HPV vaccine awareness activities should be incorporated into ANC programs, while sustaining the positive attitude towards its acceptability. Creating awareness will potentially show even higher levels of HPV vaccine acceptability in Port Harcourt.These measures will reduce the incidence of cervical cancer, and its associated morbidity and mortality.

References

[1] Steward BW, Wild CP. International Agency for Research on Cancer. World Health Organization: World Cancer Report 3rd ed. 2014.
[2] Castellsagué S, de Sanjose T, Aguado KS, et al. HPV and cervical cancer in the 2007 report. *Vaccine*. 2007 ; 1(25) :1-230.
[3] Akinremi TO, Nazeer S, Totsch M. Reduced alcohol use in the staining of Pap smears: a satisfactory low-cost protocol for cervical cancer screening. *ActaCytol.*2005 ;49(2):169-72.
[4] Udigwe GO. Knowledge, attitude and practice of cervical cancer screening (pap smear) among female nurses in Nnewi, South Eastern Nigeria. *Niger J ClinPract*. 2006; 9 (1): 40-43.
[5] Bruni L, Barrionuevo-Rose L, Serrano B, et.al. ICO Information Center on HPV and cancer (HPV Information center). Human papillomavirus and related diseases. Summary Report in Nigeria 2016.
[6] Hariri S, Unger ER, Sternberg M, et al. Prevalence of genital human papillomavirus among females in the United States, the National Health and Nutrition Examination Survey, 2003–2006. *Journal of Infectious Diseases* 2011; 204(4):566–573.
[7] Gillison ML, Broutian T, Pickard RK, et al. Prevalence of oral HPV infection in the United States, 2009–2010. *JAMA* 2012; 307(7):693–703.
[8] De Vuyst H, Steyaet S, Van Renterghem L, et al. Distribution of human papillomavirus in a family planning population in Nairobi, Kenya. *Sexually Transmitted Diseases* 2003; 30: 137-142
[9] Domfeh AB, Wiredu EK, Adjei A, et al. Cervical Human Papillomavirus infection in Accra, Ghana, *Ghana Medical Journal* 2008; 42(2): 71-78
[10] Thomas JO, Herrero R, Omigbodun AA, et al. Prevalence of Papillomavirus infection in women in Ibadan, Nigeria: A population-based study, *British Journal of Cancer* 2004; 90(3): 638-645
[11] Mohammed AZ, Edino ST, Ochicha O, et al. Cancer in Nigeria: a 10-year analysis of the Kano cancer registry, *Nigerian Journal of Medicine* 2008; 17(3):280-284
[12] Arulogun OS, Maxwel OO. Perception and utilization of cervical cancer screening services among female nurses in University college hospital, Ibadan, *Nigeria Pan African Medical Journal* 2012; 11:69
[13] WHO: World Health Organization editor. Cervical Cancer, Human Papillomavirus (HPV) vaccines. Key points for Policy makers and health professionals. Geneva, Switzerland; WHO Press; 2007.
[14] Dunne EF, Park IU. "HPV and HPV-associated diseases." *Infectious disease clinics of North America*2013; 27 (4): 765–78
[15] Udonwa NE, Ekpo M, EkanemIA,et al. Oil doom and AIDS boom in the NDR of Nigeria. *Rural and Remote Health*, 2004;273(4):1-7
a. http://rrh.deakin.edu.au.Down loaded 24th April 2005
[16] Okonta PI. Health in the Niger Delta Region of Nigeria, issues and challenges. *African Journal of Reproductive health* 2007;11(1)113-124
[17] Kjaer SK, Chackerian B, Brule van den AJ, et al. High-risk human papillomavirus is sexually transmitted: evidence from a follow-up study of virgins starting sexual activity (intercourse),*Cancer Epidemiol Biomarkers Prev*. 2001, 10: 101-106.
[18] Burchell AN, Winer RL, de Sanjose S, et al. Epidemiology and transmission dynamics of genital HPV infection. *Vaccine* 2006;24 (3): 52-61. doi;10.1016/j.vaccine.2006.05.031.
[19] National Population Commission (NPC) [Nigeria] and ICF Macro. Nigeria Demographic and Health Survey 2008. Abuja, Nigeria: National Populaton Commission and ICF Macro Calverton, Maryland, USA 2009.
[20] National Population Commission (NPC) [Nigeria] and ICF International. 2014. Nigeria Demographic and Health Survey 2013. Abuja, Nigeria, and Rockville, Maryland, USA: NPC andICF International.
[21] Thomas JO, Ojemakinde KO, Ajayi IO, et al. Population-based prevalence of abnormal cervical cytology findings and local risk factors in Ibadan, Nigeria: Implications for cervical cancer control programs and human papilloma virus immunization,*ActaCytol*. 2012; 56(3):251-8.doi: 10.1159/000337444. Epub 2012 Apr 26.
[22] Wusu O. Religion and sexual rights among young women in Nigeria: Implication for their sexual health. In: Demographic issues in Nigeria; Insights and

implication, Wusu O, Nwokocha E, Ntoimo L. ed. Liberty Drive Blomington, USA: Author House publishing 2015; 17-1

[23] Kemp J.R. A study of sexual behaviour and RH, of adolescent girls in South East Nigeria. PhD thesis 2000. University of Liverpool.

[24] Okpani AOU, Okpani JU. Sexual activity and contraceptive use among female adolescents- A report from Port Harcourt, *Nigerian Afri J. Reprod Health* 2000; 4 (1): 40-47.

[25] ImaledoJA , Peter-Kio OB, Asuquo EO. Pattern of risky sexual behaviour and associated factors among undergraduate students of the University of Port Harcourt, Rivers State, *Nigerian Pan African Medical Journal* 2012; 12:97-

[26] Harper DM, Franco EL, Wheeler C, et al. Efficacy of a bivalent L1 virus-like particle vaccine in prevention of infection with human papillomavirus types 16 and 18 in young women: a randomised controlled trial. *Lancet*2004;364:1757–65

[27] Medeiros LR, Rosa DD, Rosa MI, et al. Efficacy of Human papillomavirus vaccines. *International Journal of Gynaecological cancers*2009;19(7): 1166-76

[28] Villa LL, Ault KA, Giuliano AR, et al. Immunologic responses following administration of a vaccine targeting human papillomavirus types 6, 11, 16, and 18. *Vaccine* 2006; 24: 5571-5583.

[29] Iliyasu Z, Abubakar IS Aliyu MH,et al. Cervical cancer risk perception and predicators of human papilloma virus vaccine acceptance among female university students in northern Nigeria. *J ObstetGyneacol*, 2010;30:875-62

[30] Agida TE, Akaba GO, Isah AY, et al. Knowledge and perception of human papilloma virus vaccine among the antenatal women in a Nigerian tertiary hospital. *Nigerian Medical Journal* 2015;56:23-7

[31] Enzinwa BN, Balogun MR, Okafor, IP. Mothers' human papilloma virus, knowledge and willingness to vaccinate their adolescent daughters in Lagos, Nigeria. *International Journal of Women's Health*. 2013; 5:371-377

[32] Turiho AK, Okello ES, Muhwezi WW et al. Effect of school-based human papillomavirus(HPV) vaccination of adolescent girls' knowledge and acceptability of the HPV vaccine in Ibadan district Uganda. *African Journal of Reproductive Health* 2014:18(4):45-53

[33] Chen MTJ, Leung DYP. Factors associated with human papillomavirus vaccination among Chinese female University students in Hong Kong. *American International Journal of Social Science* 2014; 3:56-61

[34] Park K. Cross sectional study: Descriptive epidemiology. In : Preventive and social Medicine. 22nd Edition, BarnarsidasBhanot Publishers, Jabalpur, India, 2013:60-76

[35] Argyrous G, Statistics for Research with a guide to SPSS, 3rd Edition, SAGE Publication international.

[36] Akarolo-Anthony SN, Famooto AO, Dareg EO et al. Age-specific prevalence of Human papilloma virus infection among Nigeria women. *BMC Public Health* 2014; 14:657 doi: 10.1186/1471-2458-14-656.

[37] Rumun AJ. Influence of religious beliefs on health care practice. *International Journal of education and Research*, 2014; 24:37-48

[38] Diara BCD, Onah NG. The phenomental growth of Pentecostalism in the contemporary Nigeria Society: A challenge to mainline churches, *Mediteranean Journal of Science* 2014; 56:395-402

[39] Brown B, Folayan M. Barriers to uptake of human papilloma virus vaccine in Nigeria: A population in need, *Nigerian Medical Journal* 2015; 56(4) 301-302 doi: 10.4103/0300-1652.165033