

HUMAN PAPILLOMAVIRUS (HPV) VACCINE: AWARENESS, ACCEPTABILITY, AND UPTAKE IN KOGI STATE, NIGERIA

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ABSTRACT

Introduction: Human papillomavirus (HPV) is a prerequisite for cervical cancer accounting for about 99% of cervical cancer cases as attributed by the world health organization. HPV vaccination and screening for cervical cancer are two important measures to reduce the burden of the disease however the populace needs to be aware and understand such interventions for uptake to be optimal.

Materials and methods: This was a primary study with a cross-sectional design utilizing a house-to-house survey and an interviewer-administered questionnaire. The sample size was 390 drawn by multistage cluster sampling from adults aged 18-49 years of age.

Results: Among the participants 24.1% had heard of cervical cancer while 11% were aware of HPV. Also 8.46% were aware of an HPV vaccine of which 57.6% confirmed the health workers as their source of information. Acceptance of the vaccine was 97.7%. Vaccine uptake was 0.26%, and the most common reason for the lack of acceptance and uptake was insufficient knowledge. The price of the vaccine (42.5%) closely followed by not knowing where to get/ buy the vaccine from (31.4%) were the most common barriers to the uptake of the vaccine.

Conclusion: The awareness of cervical cancer, HPV and HPV vaccine is very low in Kogi state; however the acceptability of the vaccine is high and the population is receptive to new knowledge.

Keywords: Human papillomavirus, Cervical cancer, PAP smear, Vaccine

INTRODUCTION

Cervical cancer is a contemporary public health issue that has continued to gain significant attention as it is a largely preventable disease still ranking amongst the top causes of morbidity and mortality. This trend is worst hit by developing countries.

Nigeria, a developing country has a rather significant burden of cervical cancer as it accounts for 21.8% of female cancers and 20.3% of women's cancer mortality thus ranking as the 2nd commonest female cancer and third most prevalent cancer in Nigeria.¹

Cervical cancer is the uncontrollable growth of cells in the uterine cervix which connects the body of the uterus to the vagina. There are two different types of cells in the uterine cervix which meet at a point termed the transformation zone which is where cervical cancer is thought to begin.² Human papillomavirus (HPV) infection is a necessary prerequisite for cervical cancer in the presence of other risk factors such as age, sexual activity, smoking, hormonal changes, parity, and immune status.³

HPV is a group of over 200 viruses associated with a spectrum of diseases ranging from asymptomatic and relatively harmless lesions to clinical infections resolving spontaneously with normal cytology or to invasive cervical cancer secondary to persistent infections from high-risk HPV types.³

Worldwide, about 80% of sexually active females have been reported to be infected with HPV at some point.⁴ Also 23.7% of

females and 73% of males in Nigeria are also infected with high-risk HPV 16 and 18.⁴⁻⁶ HPV 16 and 18 are associated with 70% of cervical cancer cases in addition to types 31, 33, 35, 45, 52, and 58 responsible for an additional 20%.²

Vaccination of adolescents before sexual exposure holds enormous benefits; it has the potential of providing an estimated 100% protection and thus could cut the incidence of cervical cancer by two-thirds via herd immunity.⁷ However because the available vaccines do not protect against all potential cancer-causing HPV types, vaccinated females are encouraged to screen still for cervical cancer based on the current world health organization recommendations.⁷

The natural history of progression from precancerous lesions to cervical cancer is relatively long, and HPV is sexually transmitted, therefore the two-prong prevention approach of HPV vaccination before puberty and screening for early disease is considered as most effective protective combination; it is on this premise that the Nigerian national cancer control program was built and developed.⁷

Nigeria is a resource-constrained country regarding workforce and funds' as such investing in a two-dose vaccination schedule before implementing a screening program is most efficient. Cervarix: a bivalent vaccine and Gardasil: a quadrivalent vaccine has been licensed for use in Nigeria. However, there is yet to be a national implementation plan covering either a preventive policy or

inclusion in the routine immunization schedule.⁵

Several studies have documented poor knowledge of HPV as a causative agent for cervical cancer; a lack of awareness of HPV vaccine and various barriers to uptake of the HPV vaccine.^{8,9} Crucial to the acceptability and uptake of the HPV vaccine is the knowledge of HPV as a causative agent for cervical cancer as there still exists pockets of those who are aware of cervical cancer and HPV but do not know there exists a relationship between them.^{10,11} This missing link could impede the uptake of the vaccine hence adequate knowledge is crucial in improving the acceptability and uptake of the vaccine.

Screening services like vaccination services are not controlled or regulated in Nigeria. There is no standard policy, the population at risk is largely unaware of where and how services are rendered, there is the clustering of services in the cities and services are not patient-friendly in terms of cost hence access to services is usually opportunistic for females attending clinics and women reached by medical outreaches.^{12,13}

Based on pockets of studies done across Nigeria, the awareness of cervical cancer has been reported to be low. In populations with good awareness, this does not necessarily translate to real knowledge as the awareness of the causative role of HPV in cervical cancer is usually low hence uptake of the vaccine is almost non-existent.¹¹

Significant positive associations have been established between good knowledge of the HPV vaccine and its acceptance.^{5,14-16} However a contradictory report further

highlighted funding and accessibility as barriers to uptake of the vaccine and this fact was buttressed by other studies citing cost and accessibility as major barriers to the high acceptability of vaccine translating to high uptake.^{13,14,16}

MATERIALS AND METHODS

This was a population-based cross-sectional study involving adults aged between 18-49 years, living in the Lokoja local government area of Kogi state, Nigeria.

Lokoja LGA is one of the 21 LGAs in Kogi state. It has an approximate land mass of 3,180 km with an estimated population of 262,414 (Demographic data, 2016). It is divided into five districts; each district is further divided into wards with a total of 10 wards. It has one urban district, three rural districts, and one mixed district (Demographic Data, 2016).

Participants were recruited via multistage sampling. Lokoja local government area was picked as a primary cluster. The LGA was then divided into secondary clusters via wards. 6 of the 10 clusters were picked (Lokoja Ward A, B, C, D, E, and Oworo Ward) and the sample size was divided equally amongst the clusters. In each cluster, the sample size was allocated equally to the catchment areas. Catchment areas are designated streets/areas to be covered by healthcare facilities during routine immunization. Lokoja ward A has 15 health facilities offering routine immunization thus it is divided into 15 catchment areas; Lokoja wards B, C, and D have only 1 facility each offering routine immunizations hence they are termed one catchment area ward;

Lokoja ward E has 2 facilities offering routine immunizations while Oworo ward has 12 facilities offering routine immunizations (Demographic data, 2016). In Lokoja Ward A and Oworo Ward, three catchment areas were randomly chosen per ward. In each catchment area, a random household was chosen. From the first home, every third household was selected for the study. In every home, all those who met the eligibility criteria were interviewed after consent was taken.

The sample size population was calculated with the formula below

$$\text{Sample size} = n = \frac{(Z_{1-\alpha} / \delta)^2 * p (1 - p)}{D^2}$$

$(Z_{1-\alpha} / \delta)^2 =$ the standard normal variate.
At 5% type 1 error ($P < 0.05$), it is 1.96

$P =$ expected proportion in population based on previous studies or pilot studies. There was no national data for awareness, acceptability, or uptake of the HPV vaccine and the data range from various studies is wide hence awareness, acceptability, and uptake level of 50% was assumed to give the largest sample size of $= 50\% = 0.5$

$d =$ absolute error $= 5\% = 0.05$

$$n = \frac{(1.96)^2 * 0.5 (1 - 0.5)}{0.05^2}$$

$$n = 384.16$$

Adjusting for a non-response rate of 20%
 $= (0.2 \times 384.16) + 384.16$
 $= 76.832 + 384.16$
 $= 460.992$
 $= 461$ participants were recruited for the study (Jaykaran & Tamoghna, 2013; WHO, 2001)

The data was collected from the participants using a self-administered pretested survey questionnaire.

Data was entered and analyzed using statistical package for the social sciences (SPSS).

RESULTS

In this study, 437 participants were recruited, and 390 participants were successfully interviewed with complete data for analysis. The response rate for participation was 89%.

The commonest age was the 22 – 25 age range (23.3%). The majority of the participants were females ($n = 230$; 59.0%), of the Muslim faith ($n = 230$; 59.0%), and married ($n = 196$; 50.3%). However, more participants were students ($n = 101$; 25.9%) with tertiary level of education dominating ($n = 159$; 40.8%) and did not have children ($n = 202$; 51.8%). The Nupe tribe was the largest ethnic group represented with 16.7% ($n = 65$). Figure 1 depicts the socio-demographic characteristics of the participants.

Figure 2 depicts the awareness, knowledge, and risk perception of participants toward cervical cancer. Ninety-four participants (24.1%) out of 390 have heard of cervical cancer before the study. Fifty-five of the 94 (58.5%) participants who have heard of cervical cancer knew it was the most common gynecological cancer, 73 participants (77.7%) knew it was possible to have cervical cancer without knowing and 83 participants (88.3%) knew it could be prevented. Thirty-five participants (37.2%) exhibited a good knowledge of the disease. Of the 94 participants aware of cervical cancer, 46 were females, and of those 16 (34.8%) knew they were at risk of cervical cancer.

Out of the 43 participants who had ever heard of HPV before this study, 10 (23.3) participants knew condoms were not protective, and 40 participants (93%) were aware it is sexually transmitted. Also, 37 (86%) knew a person could get HPV without knowing, 33(76.3%) knew it could be prevented with a vaccine and 9 (20.9%) knew the HPV infection could clear on its own without treatment. Over half of those aware of HPV knew its relationship with cervical cancer. Thirty-two (74.4%) knew it is a cause of cervical cancer, 28 (65.1) accepted it as a leading cause of cervical cancer while 24(55.8%) knew there are specific types of HPV responsible for cervical cancer. In summary, 48.8% demonstrated good knowledge of HPV and its relationship with cervical cancer. Figure 3 shows 43 participants (11%) are aware of HPV.

Acceptance of the vaccine was sought from the 33 participants aware of the vaccine and 63.6% fully accepted the vaccine as shown in Figure 4. Post fact sheet information, acceptance increased to 100% for respondents initially aware of the HPV vaccine, and it was 97.7% for the entire study population. Vaccine uptake is reported at 0.26% as only 1 of 390 respondents had received the vaccine (figure 4).

Sixteen respondents (48.5%) could state at least one correct use of the vaccine as depicted in Figure 6 while three respondents (9.1%) were aware that three types of the

vaccine (e.g., bivalent, quadrivalent, and 9-valent) exist. As shown in Figure 7, 78.8% did not know any brand name of the vaccine: Cervarix, Gardasil, or Gardasil 9 (fig 8), 69.7% were not aware of the recommended dose regimen (e.g., 2 doses for those who start before their 15th birthday and 3 doses for those who start thereafter as well as for immune-compromised patients). Approximately 85% were not aware of the time interval between doses (e.g., 6-12 months interval between doses) and 66.7% did not know the recommended age range to receive the vaccine (e.g., 9-26 years) as depicted in figure 9, 10 and 11, respectively. Figure 5 shows their sources of information with 57.6% confirming the health workers as their source.

The brand of vaccine taken by the participant is Cervarix, a bivalent vaccine and the only brand available within the state. The most common reason for the lack of acceptance and uptake was insufficient knowledge (Figures 12 and 13, respectively).

Figure 14 depicts the barriers put forward by participants likely to hinder their uptake of the vaccine. The price of the vaccine (42.5%; 237 responses) closely followed by not knowing where to get/buy the vaccine from (31.4%; 175 responses) were the most common barriers while 43 participants were positive nothing would constitute an obstacle to uptake of the vaccine.

Figure 1: A table showing the Socio-demographic characteristics of participants (n = 390).

VARIABLE	N	%
<i>AGE (years)</i>		
18 – 21	79	20.3
22 – 25	91	23.3
26 – 29	74	19.0
30 – 33	49	12.6
34 – 37	33	8.5
38 – 41	26	6.7
42 – 45	18	4.6
46 – 49	20	5.1
<i>SEX</i>		
Male	160	41.0
Female	230	59.0
<i>RELIGION</i>		
Muslim	230	59.0
Christian	158	40.5
Traditionalist	2	0.5
<i>MARITAL STATUS</i>		
Single	183	46.9
Divorced	2	0.5
Married	196	50.3
Widowed	9	2.3
<i>DOES PARTICIPANT HAVE CHILDREN</i>		
Yes	188	48.2
No	202	51.8
<i>OCCUPATION</i>		
Health care worker	36	9.2
Manual worker	5	1.3
Business man/woman	84	21.5
Teacher	15	3.8
Housewife	38	9.7
Student	101	25.9
Engineer	2	5.0
Civil servant	37	9.5
Tailor	18	4.6
Saloonist	3	0.8

Driver	5	1.3
Applicant	3	0.8
Others	43	11.0
<i>ETHNICITY</i>		
Igbo	40	10.3
Yoruba	49	12.6
Hausa	34	8.7
Igbira	53	13.6
Igala	57	14.6
Bassa	43	11.0
Kakanda	16	4.1
Kupa	1	0.3
Nupe	65	16.7
Oworo	6	1.5
Others	26	6.7
<i>EDUCATIONAL LEVEL</i>		
None	19	4.9
Primary	38	9.7
Secondary	143	36.7
Tertiary	159	40.8
Post-tertiary	31	7.9

Figure 2: A table depicting cervical cancer awareness, knowledge and risk perception

VARIABLE	YES	%
AWARENESS <i>n = 390</i>		
Have you ever heard of cervical cancer before now	94	24.1
KNOWLEDGE <i>n = 94</i>		
It is the most common gynecological cancer	55	58.5
It is possible to have cervical cancer without knowing	73	77.7
Cervical cancer can be prevented	83	88.3
Knowledge score <i>n = 94</i>		
Poor	23	24.5
Intermediate	36	38.3
Good	35	37.2
RISK PERCEPTION <i>n = 46</i>		
Do you think you are at risk for cervical cancer	16	34.8

Figure 3: A table showing HPV awareness, knowledge and relationship with cervical cancer

VARIABLE	YES	%
AWARENESS <i>n= 390</i>		
Have you ever heard of HPV before now	43	11.0
KNOWLEDGE <i>n= 43</i>		
Men can get HPV	34	79.1
HPV is sexually transmitted	40	93.0
Condoms can protect against HPV	10 (no)	23.3
A person can get HPV without knowing	37	86.0
HPV is preventable with a vaccine	33	76.7
HPV infection can clear on its own without treatment	9	20.9
HPV relationship with cervical cancer		
HPV is a cause of cervical cancer	32	74.4
HPV is a leading cause of cervical cancer	28	65.1
There are specific types of HPV that cause cervical cancer	24	55.8
Knowledge score		
Poor	6	14.0
Intermediate	16	37.2
Good	21	48.8

Figure 4: A table showing HPV vaccine awareness, acceptance and uptake

VARIABLE	YES	%
AWARENESS <i>n = 43</i>		
Have you ever heard of HPV vaccine before now	33	76.7
ACCEPTANCE <i>n = 33</i>		
Do you support HPV vaccination for boys	21	63.6
Do you support HPV vaccination for girls	30	90.9
Would you recommend the vaccine to others	29	87.9
Are you willing to pay for the vaccine	26	78.8
<i>n = 11 (11 of the 33 participants had children)</i>		
Are you willing to give your daughter the vaccine	10	90.9
Are you willing to give your son the vaccine	8	72.7
<i>n = 19 (19 of 33 participants were eligible for the vaccine)</i>		
Are you willing to take the vaccine	14	73.7
HPV vaccine acceptance among those aware of the vaccine <i>n = 33</i>		
Full	21	63.6
Partial	9	27.3
No acceptance	3	9.1
HPV vaccine acceptance among those aware of the vaccine post fact sheet information		
Full	33	100
HPV acceptance for entire study population <i>n = 390</i>		
HPV vaccine acceptance pre-fact sheet information	30	7.7
HPV vaccine acceptance post-fact sheet information	381	97.7
UPTAKE <i>n = 390</i>		
HPV vaccine uptake	1	0.26

Figure 5: A bar chart showing sources of information for HPV vaccine n=33

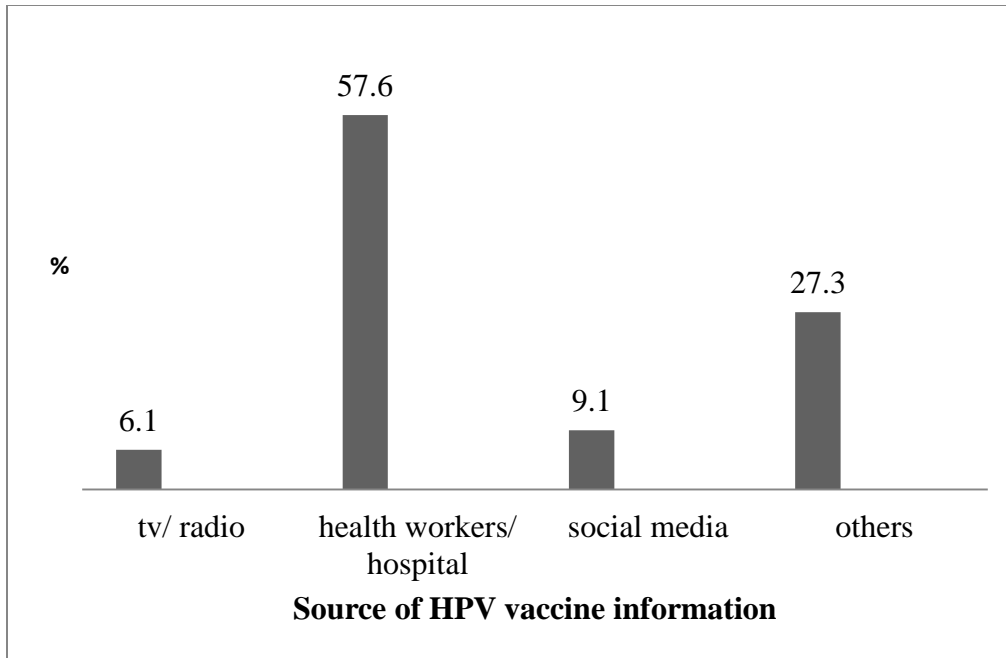


Figure 5 shows that 57.6% of participants aware of HPV vaccine got their information from the hospital/health workers.

Figure 6: A bar chart showing the uses of HPV vaccine n = 33

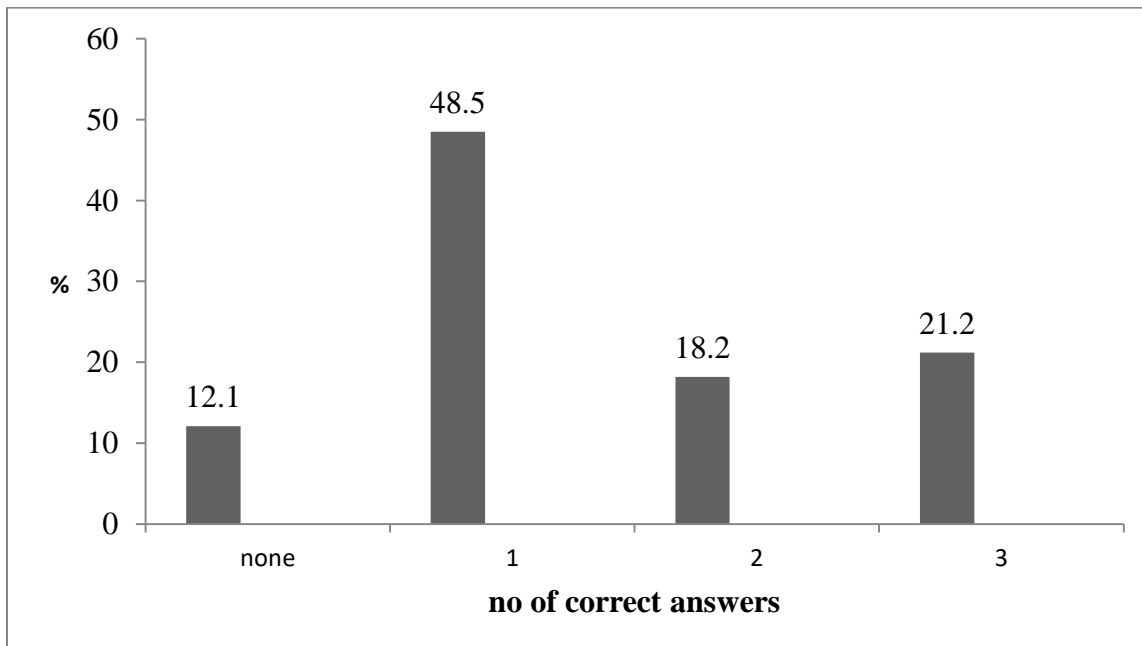


Figure 6 shows that 48.5% of the participants aware of cervical cancer could state at least one correct use of the HPV vaccine while 12.1% did not know any use for the vaccine

Figure 7: A bar chart showing the types of HPV vaccine n = 33

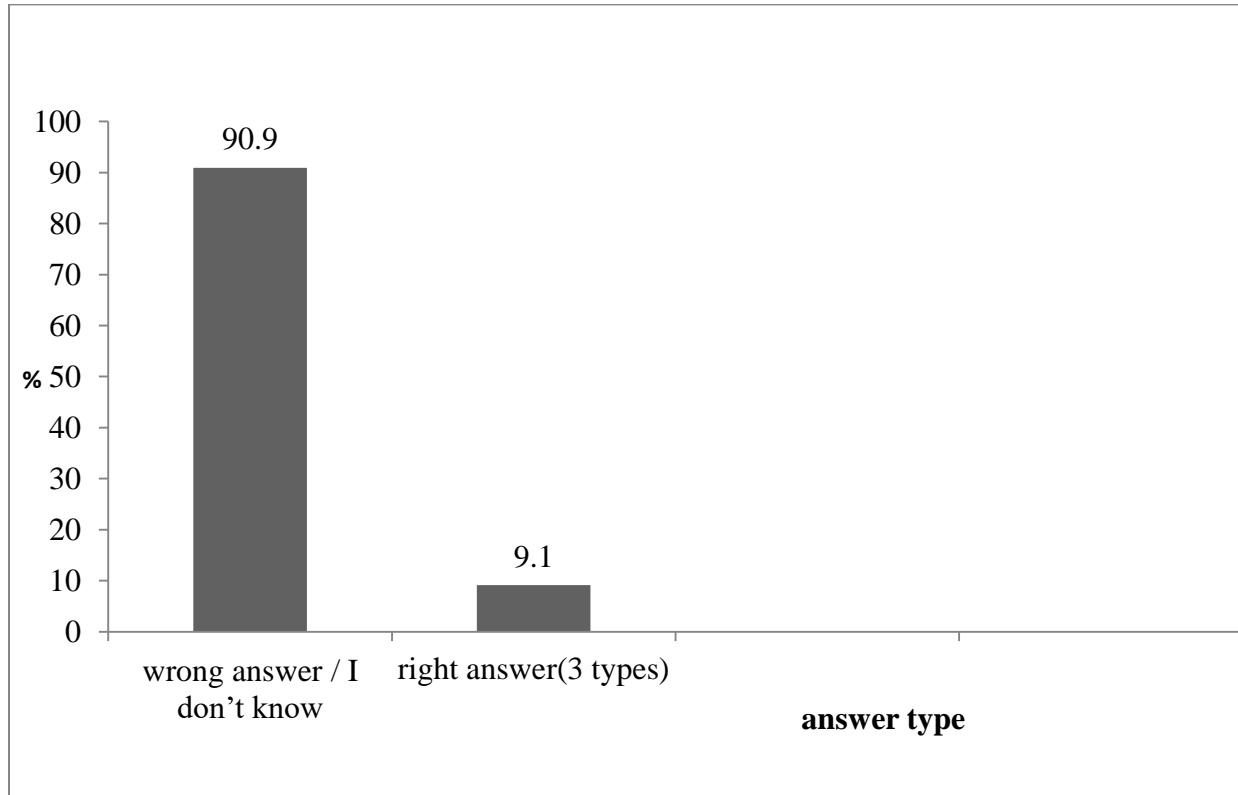


Figure 7 shows that only 9.1% of those aware of HPV vaccine knew there were three types namely bivalent, quadrivalent and 9-valent vaccines.

Figure 8: A bar chart showing the brand names of HPV vaccine, n = 33

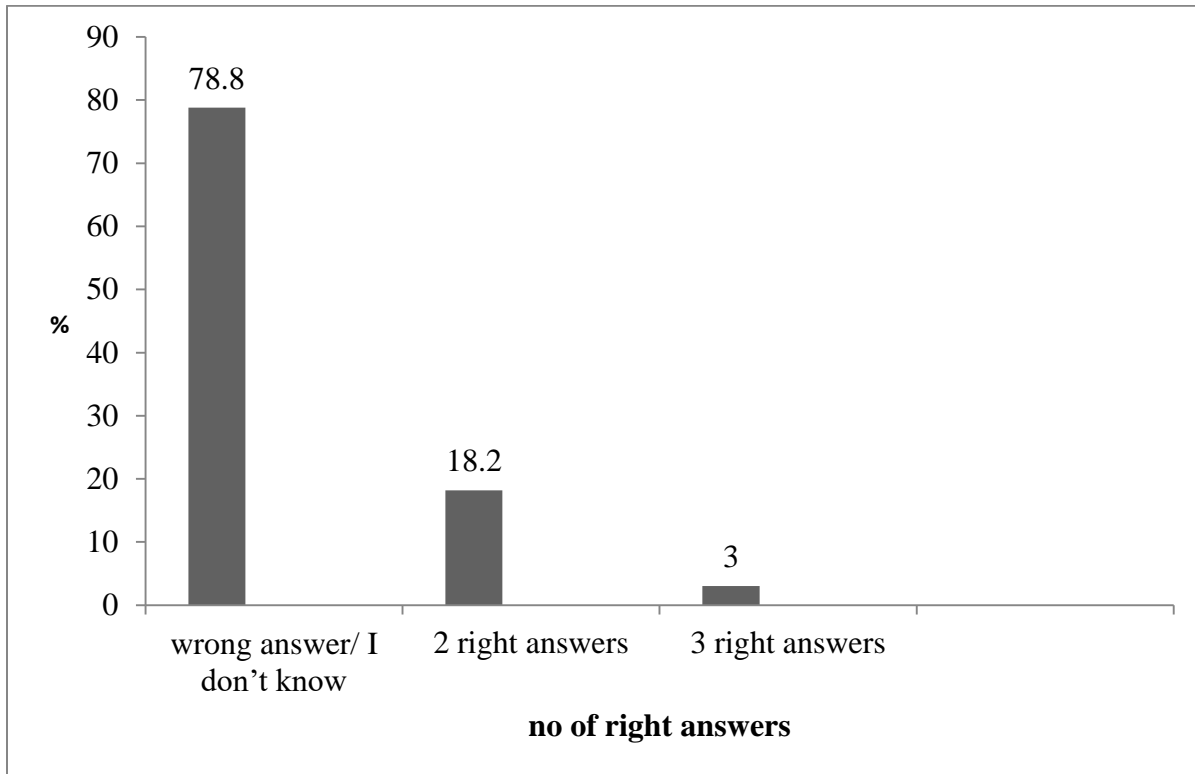


Figure 8 shows only 3% of those aware of HPV vaccine knew the three brand names of HPV vaccine namely Cervarix, Gardasil and Gardasil 9, 18.2% knew Gardasil and Cervarix while 78.8% did not know any brand name.

Figure 9: A bar chart showing the recommended doses of HPV vaccine, n = 33

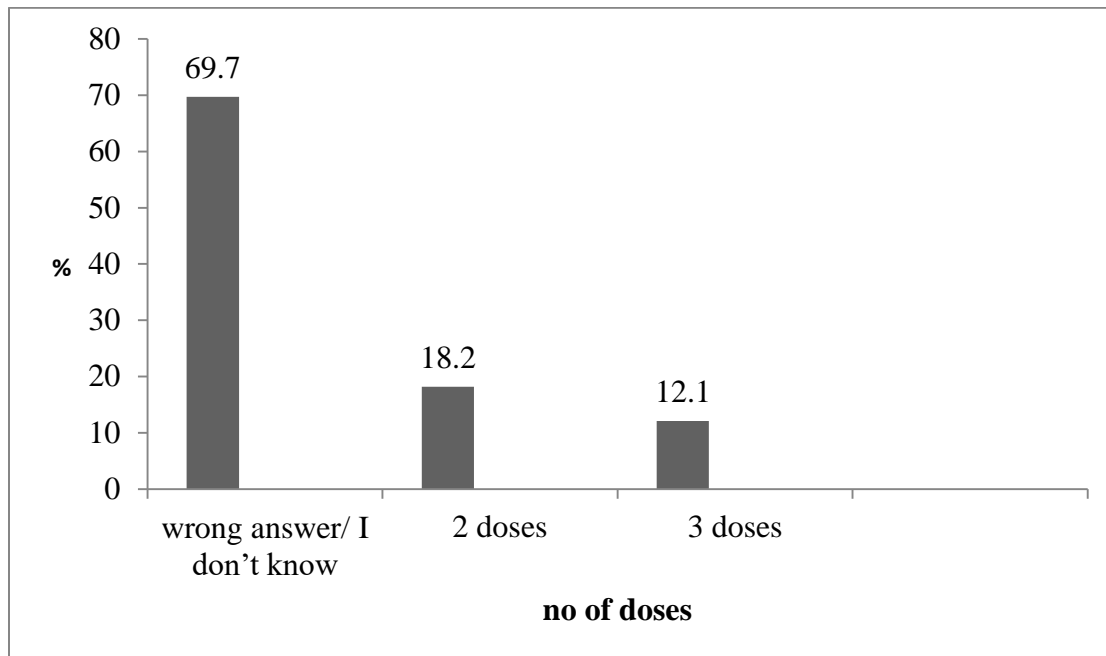


Figure 9 shows 18.2% of those aware of the vaccine opting for two doses while 12.1% believes it is three doses.

Figure 10: A bar chart showing the recommended time interval between HPV vaccine doses, n = 33

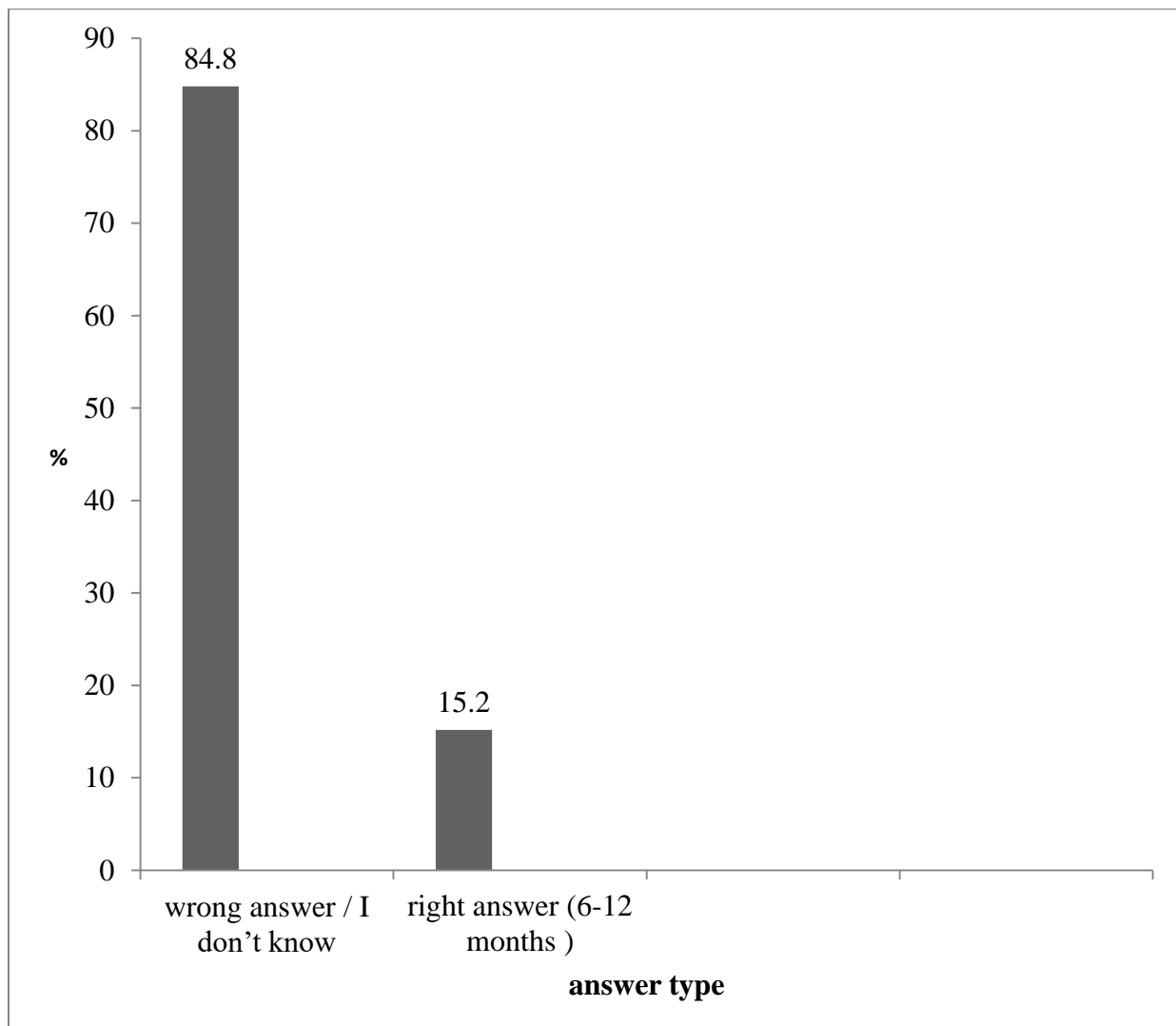


Figure 10 shows that 15.2% of those aware of HPV vaccine knew a second dose of the vaccine is given after 6- 12 months.

Figure 11: A bar chart showing the recommended age to receive HPV vaccine, n = 33

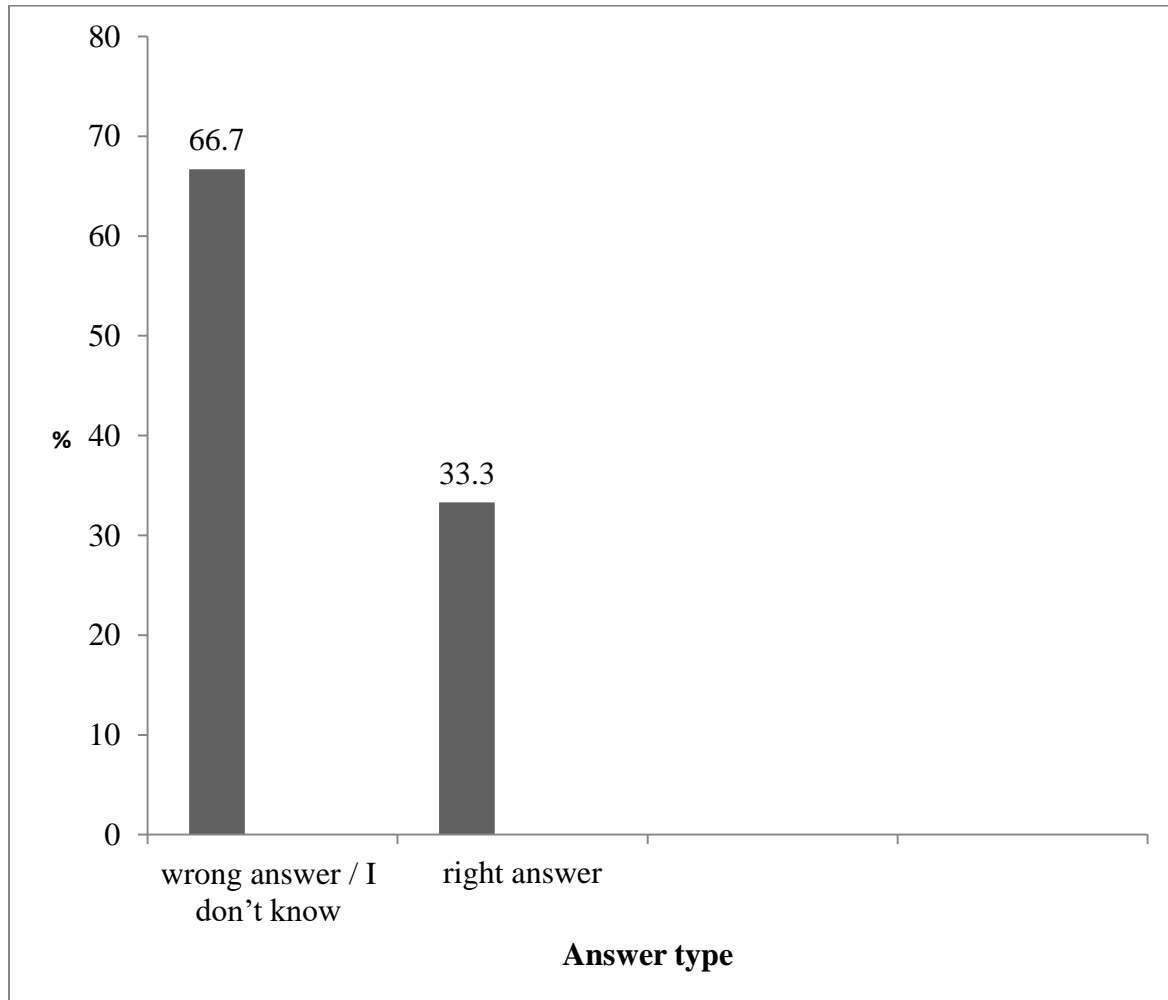


Figure 11 shows 33.3% of those aware of HPV vaccine knew the recommended age range eligible for the vaccine i.e., 9-26years.

Figure 12: A bar chart showing reasons for non-acceptance of HPV vaccine among those aware of the vaccine, n = 33

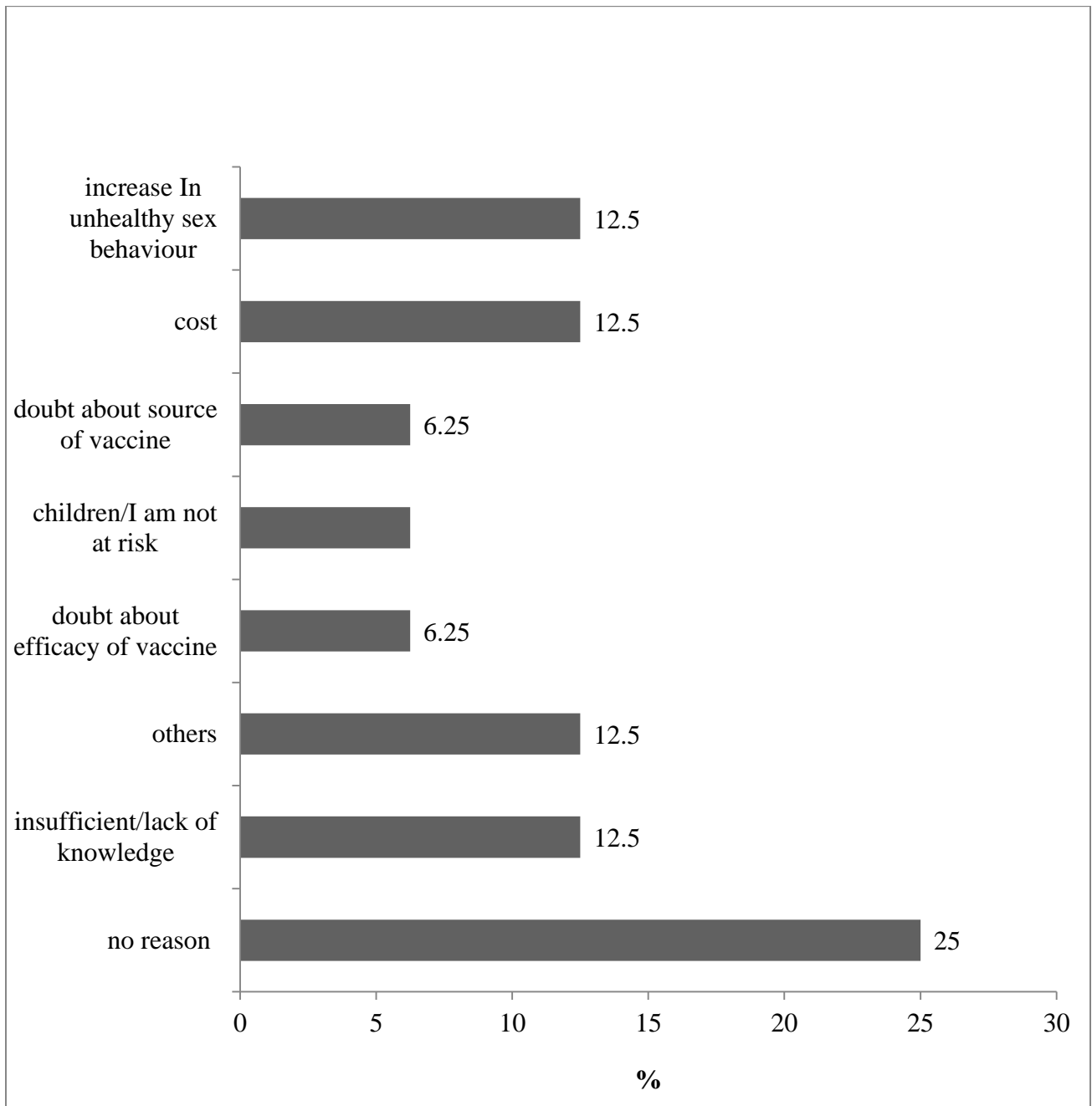


Figure 12 shows the most common reasons for non-acceptance of the HPV vaccine were insufficient/lack of information, cost and the fear about an increase in unhealthy sexual behavior.

Figure 13: A bar chart showing reasons for non-uptake of vaccine, n = 33

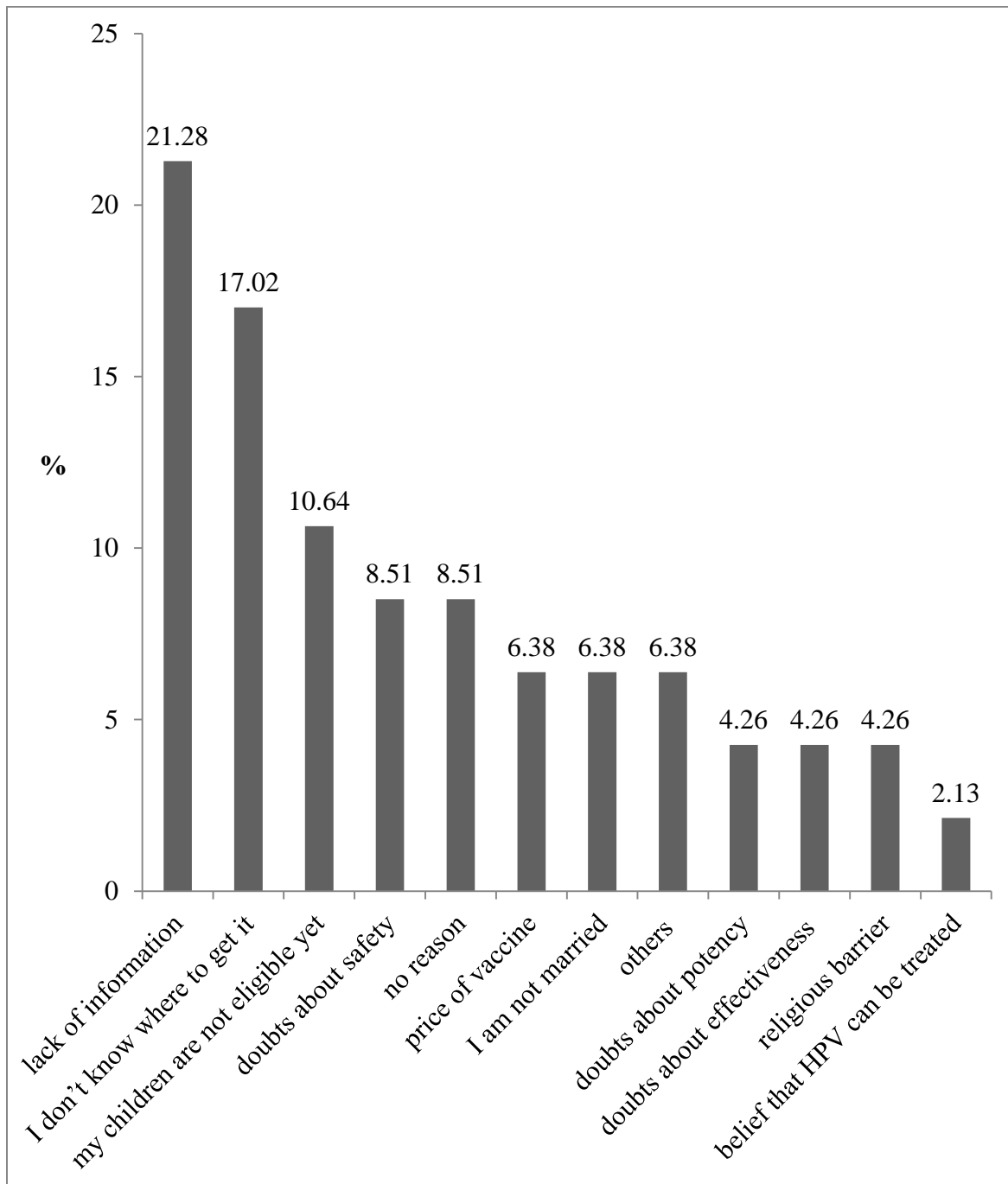


Figure 13 shows the major reason for non-uptake of vaccine was lack of information

Figure 14: A bar chart showing barriers to HPV vaccine uptake, n = 390

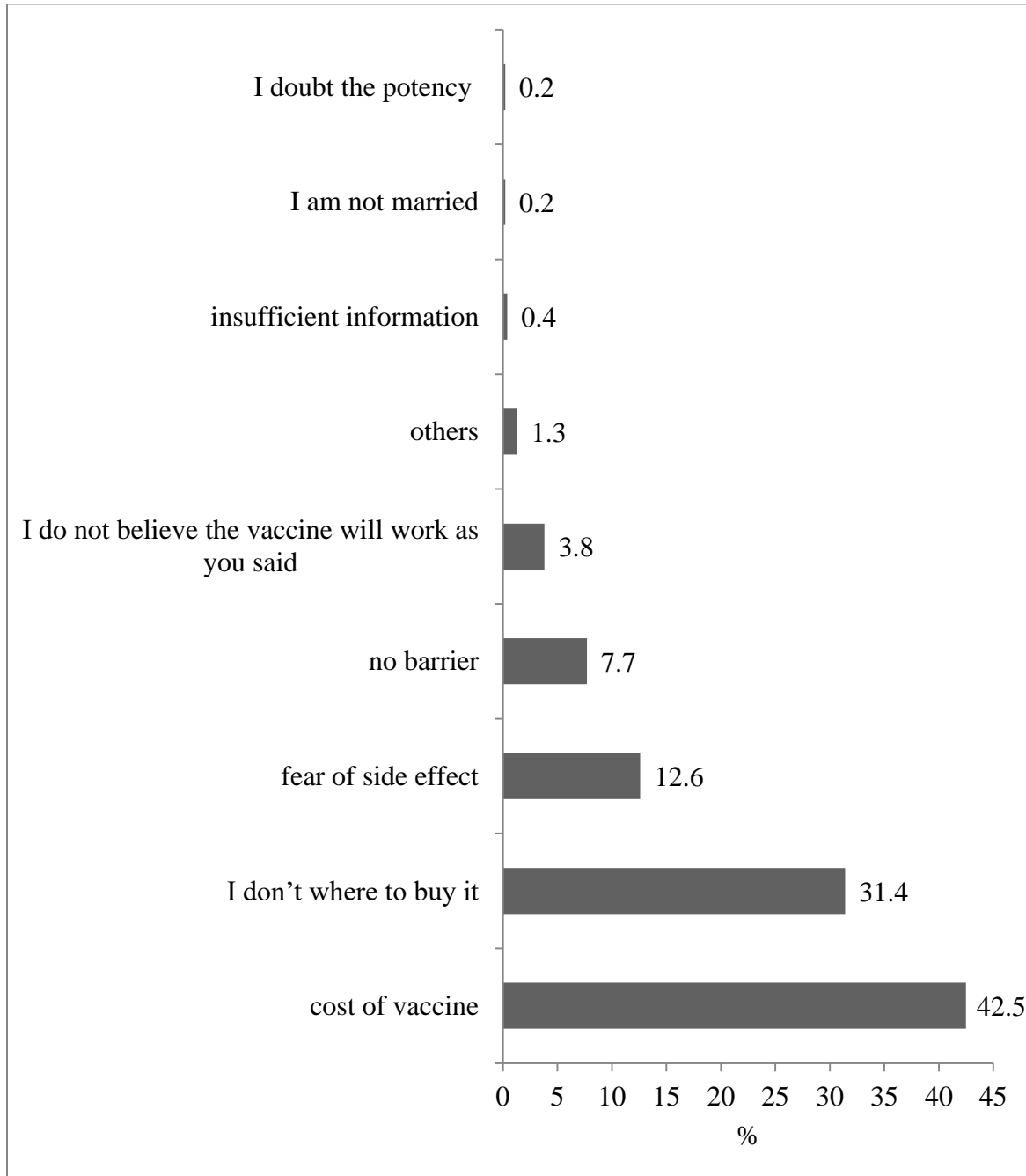


Figure 14 shows the cost of the vaccine was the major potential barrier to uptake of the vaccine in the entire study population.

Figure 15: A table showing the relationship between awareness of cervical cancer and socio-demographic variables

VARIABLE	AWARENESS OF CERVICAL CANCER			DF	X ²	P-VALUE
	YES	NO	TOTAL			
<i>AGE (years)</i>						
18 – 21	5	74	79	7	23.973	0.001
22 – 25	27	64	91			
26 – 29	27	47	74			
30 – 33	12	37	49			
34 – 37	6	27	33			
38 – 41	5	21	26			
42 – 45	5	13	18			
46 – 49	7	13	20			
<i>Total</i>	<i>94</i>	<i>296</i>	<i>390</i>			
SEX						
Male	48	112	160	1	5.158	0.023
Female	46	184	230			
<i>Total</i>	<i>94</i>	<i>296</i>	<i>390</i>			
RELIGION						
Muslim	34	196	230	2	30.948	<0.001
Christian	58	100	158			
Traditionalist	2	0	2			
<i>Total</i>	<i>94</i>	<i>296</i>	<i>390</i>			
MARITAL STATUS						
Single	57	126	183	3	10.708	0.013
Divorced	1	1	2			
Married	35	161	196			
Widowed	1	8	9			
<i>Total</i>	<i>94</i>	<i>296</i>	<i>390</i>			
DOES THE PARTICIPANT HAVE CHILDREN						
Yes	36	152	188	1	4.864	0.027
No	58	144	202			
<i>Total</i>	<i>94</i>	<i>296</i>	<i>390</i>			
OCCUPATION						
Health care worker	32	4	36	12	122.294	<0.001
Manual worker	0	5	5			
Businessman/woman	7	77	84			
Teacher	7	8	15			
Housewife	0	38	38			

Student	21	80	101			
Engineer	1	1	2			
Civil servant	11	26	37			
Tailor	0	18	18			
Saloonist	1	2	3			
Driver	0	5	5			
Applicant	1	2	3			
Others	13	30	43			
<i>Total</i>	<i>94</i>	<i>296</i>	<i>390</i>			
<i>ETHNICITY</i>						
Igbo	25	15	40	11	54.983	<0.001
Yoruba	18	31	49			
Hausa	3	31	34			
Igbira	11	42	53			
Igala	14	43	57			
Bassa	6	37	43			
Kakanda	1	15	16			
Kupa	1	0	1			
Nupe	8	57	65			
Oworo	1	5	6			
Others	6	20	20			
<i>Total</i>	<i>94</i>	<i>296</i>	<i>390</i>			
<i>EDUCATIONAL LEVEL</i>						
None	0	19	19	4	77.138	<0.001
Primary	1	37	38			
Secondary	11	132	143			
Tertiary	65	94	159			
Post tertiary	17	14	31			
<i>Total</i>	<i>94</i>	<i>296</i>	<i>390</i>			

Figure 13 is a chi-square result table which shows a statistically significant association between awareness of cervical cancer and age, sex, religion, marital status, child status of participant, occupation, ethnicity and educational level. $\alpha = 0.05$

DISCUSSION

This study found a very low awareness and knowledge of cervical cancer, HPV and HPV vaccine as well as a near-zero utilization of both HPV vaccines. Vaccines such as the HPV vaccine which are not captured in the Nigerian routine immunization schedule may require significant awareness, basic knowledge, and accessibility in terms of cost and availability for the eligible population to derive optimal benefit from its introduction. The study site does not have the HPV vaccine in its routine immunization schedule. The vaccine is available in just one private pharmacy which stocks and dispenses and it cannot be procured at government or private health facilities.

The awareness of a disease entity termed cervical cancer in any population is the gateway to knowledge of its predisposing factor HPV and its preventive mechanisms and HPV vaccination. The abysmally low levels of awareness are not at par with several studies in Nigeria recording 85.9% (Ugwu et al., 2013), 95.4% (Adejuyigbe et al., 2015), and 99.4% (Makwe & Anorlu, 2011); this could be because these studies explored awareness amongst those in the medical field and it is understandable should such facts emerge.^{2,17} This finding was further buttressed in this study as a significant association was found between occupation and awareness of cervical cancer with healthcare workers more likely to have heard about cervical cancer and have good knowledge of the disease. Also contributing is the fact that awareness of cervical cancer is significantly associated with educational level as found in this study. However, figures from other studies are

relatively higher with Ezenwa et al., (2013), Akanbi et al., (2015), and Umeh et al., (2016) reporting 79.6%, 64.3%, and 27.9% respectively amongst the general population.^{3,13} This could be because these studies were conducted in the southwestern and southeastern parts of the country which have more educational exposure than the northern part of the country in which this study was undertaken. The low awareness of cervical cancer is also replicated in Africa as Becker-Dreps et al., (2010) reported 15% among Kenya women and outside Africa as Montgomery et al., reported an awareness level of 15% among women in India (2015).⁶ However, 61% and 87% awareness were both recorded by Francis et al., (2010) amongst South African women and Coleman et al., (2011) amongst Ghanaian women respectively with Cunningham et al., (2014) reporting a 67% average awareness of cervical cancer in Africa.^{9,14}

The knowledge that cervical cancer was the most common gynecological cancer in Nigeria was very low at 14.1% as against 59.3% and 96.6% reported by Adejuyigbe et al.,(2015) and Makwe & Anorlu, (2011) respectively; however, both studies were done amongst health care professionals.^{2,17} The knowledge that cervical cancer could also be prevented was low at 21.3% as against 85.9% and 92.7% by Ugwu et al., (2013) and Makwe & Anorlu, (2011) though both studies were done amongst health care professionals.^{17,18} The risk perception of cervical cancer in this study [34.8%] is in line with a report from Coleman et al., (2011) among Ghanaian women [37%] though Rosser et al., (2015) reported 66.7% among Kenyan women.^{9,19} These, however, are much higher than that obtained among

female undergraduates in Nigeria [6.9%] (Makwe et al., 2012) and could be because the majority of the females aware of cervical cancer in this study had at least completed tertiary education and awareness of cervical cancer was shown to be dependent on the educational level in this study.

Good knowledge of HPV and its relationship with cervical cancer was relatively low in this study in comparison with other studies within the country (Akanbi et al., 2015; Audu et al., 2014; Ezenwa et al., 2013; Makwe & Aorlu, 2011; Makwe et al., 2012; Owonikoko et al., 2013; Ugwu et al., 2012). Other studies within Africa have reported 19% (Francis et al., 2010) and 66% (Coleman et al., 2011). That the general population does not know the relationship between cervical cancer and HPV is a dangerous precedent as they would continue to engage in risky behaviors predisposing to the contraction of the virus.

The awareness of the HPV vaccine is understandably low and is in line with other studies within the country. However, a contrary view is held by Ugwu et al., which reported a 62.7% awareness of the HPV vaccine (2012). This low awareness of both the virus and its vaccine may stem from the fact that the vaccine is not under the routine immunization schedule and as such there is a dearth of information available to the public. The high awareness recorded by Ugwu et al. may be due to the study population of female healthcare workers used.

The acceptance of the HPV vaccine in this study is high though aided by the cervical cancer fact sheet made available during the study. Only 3(9.1%) of 33 participants aware of the HPV vaccine rejected the vaccine

however after information was made available via a fact sheet, all 33 participants (100%) accepted the vaccine. Owonikoko et al., (2013) reported an improvement in the acceptability of vaccines among respondents after a fact sheet was made available.²⁰ A similar high acceptance of 94% was reported by Coleman et al., (2011) among Ghanaian women while amongst Kenyan women, acceptability differed based on the cost of the vaccine and the number of shots required to complete the full doses (Becker-Dreps et al., 2010). The study found various reasons for non-acceptance of the vaccine of which insufficient/lack of knowledge, cost, and fear of an increase in unhealthy sexual behavior were the most prominent. Given this, stakeholders should explore this impressive acceptance by making available information to the general population and partnering with relevant institutions to share the cost of the vaccines.

Uptake of the vaccine against a background of low awareness of the vaccine is expected to tow the same line. Only 1 participant had taken the vaccine, and no child of any participant had received the vaccine either. This is in line with figures from Nyengidiki et al., (2016) and Olowookere et al., (2012) reporting both 0%.^{21,22} Slightly higher figures of 1.2% and 6.9% were reported by Adejuyigbe et al., (2015) and Ezenwa et al., (2013) respectively while in Ugwu et al., (2012), 55% of the survey population had adolescent daughters and 49.2% of this subpopulation had their daughters immunized.^{21,22} Among the reasons for non-uptake of vaccine as stated by those aware of the vaccine, lack of information and not

knowing where to get the vaccine were most common.

CONCLUSION AND RECOMMENDATIONS

The awareness of cervical cancer, HPV, and its vaccine is very low in Kogi state however the acceptability of the vaccine is high, and the population is receptive to new knowledge. The awareness of cervical cancer, HPV, and HPV vaccine is dependent on one or more socio-demographic factors such as age, sex, religion, marital status, number of children born to a parent, occupation, ethnicity, and level of education; these factors need to be explored and considered in planning for both educational and vaccination services to ensure optimal success.

REFERENCES

1. Elima J Agba MPC et al. Cancer Incidence in Nigeria. *Cancer Epidemiol* [Internet]. 2012;36(5):1–17. Available from: <http://europepmc.org/backend/ptpmcrender.fcgi?accid=PMC3438369&blobtype=pdf>
2. Adejuyigbe FF, Balogun BR, Sekoni AO, Adegbola AA. Cervical cancer and human papilloma virus knowledge and acceptance of vaccination among medical students in Southwest Nigeria. *Afr J Reprod Health*. 2015;19(1):140–8.
3. Akanbi OA, Iyanda A, Osundare F, Opaleye OO. Perceptions of Nigerian Women about Human Papilloma Virus, Cervical Cancer, and HPV Vaccine. *Scientifica (Cairo)*. 2015;2015:1–4.
4. Audu BM, Bukar M, Ibrahim AI, Swende TZ. Awareness and perception of human papilloma virus vaccine among healthcare professionals in Nigeria. *J Obstet Gynaecol (Lahore)*. 2014;34(8):714–7.
5. Bruni L, Albero G, Serrano B, Mena M et al. Human Papillomavirus and Related Diseases in the World. Summary Report 22 October 2021. *ICO/LARC Inf Cent HPV Cancer (HPV Inf Center)* [Internet]. 2021;(22 October):1–314. Available from: www.hpvcentre.com
6. Becker-Dreps S, Otieno WA, Brewer NT, Agot K, Smith JS. HPV vaccine acceptability among Kenyan women. *Vaccine* [Internet]. 2010;28(31):4864–7. Available from: <http://dx.doi.org/10.1016/j.vaccine.2010.05.034>
7. Burd E. Human papillomavirus and cervical cancer. *Clin Microbiol Rev* 16: 1–17 Available at: <http://www.sciencedirect.com/science/article/pii/S0140673607614160>. *Clin Microbiol Rev* [Internet]. 2003;16(1):1–17. Available from: <http://www.sciencedirect.com/science/article/pii/S0140673607614160>
8. CDC. HPV Vaccine Information For Young Women [Internet]. *Centre for Disease Control and Prevention*. 2015 [cited 2016 Aug 15]. Available from: <https://www.cdc.gov/std/hpv/stdfact-hpv-vaccine-young-women.htm>
9. Coleman MA, Levison J, Sangi-

- Haghpeykar H. HPV vaccine acceptability in Ghana, West Africa. *Vaccine [Internet]*. 2011;29(23):3945–50. Available from: <http://dx.doi.org/10.1016/j.vaccine.2011.03.093>
10. Cunningham MS, Davison C, Aronson KJ. HPV vaccine acceptability in Africa: A systematic review. *Prev Med (Baltim) [Internet]*. 2014;69:274–9. Available from: <http://dx.doi.org/10.1016/j.ypmed.2014.08.035>
 11. Dany M, Chidiac A, Nassar AH. Human papillomavirus vaccination: Assessing knowledge, attitudes, and intentions of college female students in Lebanon, a developing country. *Vaccine [Internet]*. 2015;33(8):1001–7. Available from: <http://dx.doi.org/10.1016/j.vaccine.2015.01.009>
 12. Health. K state ministry of. Demographic data Lokoja Local Government Area. *Kogi state ministry of health*; 2016.
 13. Ezenwa BN, Balogun MR, Okafor IP. Mothers' human papilloma virus knowledge and willingness to vaccinate their adolescent daughters in Lagos, Nigeria. *Int J Womens Health*. 2013;5(1):371–7.
 14. Francis SA, Nelson J, Liverpool J, Soogun S, Mofammere N, Thorpe RJ. Examining attitudes and knowledge about HPV and cervical cancer risk among female clinic attendees in Johannesburg, South Africa. *Vaccine [Internet]*. 2010;28(50):8026–32. Available from: <http://dx.doi.org/10.1016/j.vaccine.2010.08.090>
 15. GLOBOCAN. Estimated Cancer Incidence, Mortality and Prevalence Worldwide In 2012. *GLOBOCAN*; 2012.
 16. Hestbech MS, Gyrd-Hansen D, Kragstrup J, Siersma V, Brodersen J. How does HPV vaccination status relate to risk perceptions and intention to participate in cervical screening? a survey study. *BMC Public Health [Internet]*. 2016;16(1):1–11. Available from: <http://dx.doi.org/10.1186/s12889-016-3397-y>
 17. Makwe CC, Anorlu RI. Knowledge of and attitude toward human papillomavirus infection and vaccines among female nurses at a tertiary hospital in Nigeria. *Int J Womens Health*. 2011;3(1):313–7.
 18. Ugwu EO, Obi SN, Ezechukwu PC, Okafor II, Ugwu AO. Acceptability of human papilloma virus vaccine and cervical cancer screening among female health-care workers in Enugu, Southeast Nigeria. *Niger J Clin Pract*. 2013;16(2):249–52.
 19. Rosser JI, Njoroge B, Huchko MJ. Knowledge about cervical cancer screening and perception of risk among women attending outpatient clinics in rural Kenya. *Int J Gynecol Obstet [Internet]*. 2015;128(3):211–5. Available from:

<http://dx.doi.org/10.1016/j.ijgo.2014.09.006>

20. Owonikoko KM, Afolabi AF, Adebusoye LA, Atanda OO. Human Papilloma Virus Vaccine: Knowledge, Attitude and Perception of Parents in Southwest. *Nigeria. Med Sci Public Heal [Internet]*. 2013;1(1):13–9. Available from: www.oricpub.com/journalhomepage:http://www.oricpub.com/j-med-sci-pub-healthORICPublicationswww.oricpub.com
21. Nyengidiki T, Durugbo I, Oranu E. Human Papilloma Virus Awareness and Uptake of HPV Vaccination among Human Immunodeficiency Virus Positive Women in Nigeria. *Int J Trop Dis Heal*. 2016;15(2):1–7.
22. SA Olowookere, EA Abioye-Kuteyi, EP Airewele, HA Fasure, O Fayose, F Onakpoma AI. Awareness and Uptake of Human Papilloma Virus Vaccination and Cervical Cancer Screening among Female Undergraduate Students in a Tertiary Institution in Nigeria. *Niger J Fam Pract*. 2012;3(1).