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Journal of Vaccines & Vaccination

Research Article

Male Acceptance of Human Papillomavirus Vaccine for Family Members in Enugu, South-East Nigeria

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ABSTRACT

Introduction: Cervical Cancer (CC) is a global public health issue, with four-fifth of the global burden found to be present in developing countries. Effectiveness of preventive strategies depends on the knowledge of cervical cancer, Human papilloma virus (HPV), HPV vaccine, and the acceptability of cervical screening and uptake of the vaccine. Men are the key decision makers in family life in Nigeria. We therefore sought to assess the acceptance and attitude of men towards HPV vaccination in the prevention of cervical cancer in Enugu, Southeast Nigeria.

Methods: This is a cross-sectional descriptive study using self-administered questionnaires. Data analysis was by descriptive statistics and cross-tabulation using SPSS version 20.

Results: 146 (70.5%) of the respondents are aware of the aetiology of cervical cancer, but only 38.6% (80), 36.7% (76), and 30.9% (64) know that multiple sexual partners, early age of sexual intercourse and polygamy are important risk factors. Level of knowledge of HPV and HPV vaccines were 38 (18.4%) and 37 (17.9%) respectively. Acceptance of preadolescent vaccination was poor at 8.2% (son) and 35.7% (daughter). Good attitude to HPV vaccination was associated with being married (p=0.012) and being self-employed (p=0.005).

Conclusion: Men in Enugu Nigeria accept HPV vaccination for their wives, but not for their preadolescent children. This calls for reproductive health programs educating men as family decision makers on the greater benefits of primary prevention targeting preadolescents prior to sexual debut, while still encouraging pap smear screening among sexually active women and girls.

Keywords: Men; Cervical cancer; Human Papillomavirus; Human Papillomavirus Vaccine, Pre-adolescents; Nigeria

INTRODUCTION

In Nigeria, the estimated incidence rate of invasive Cervical Cancer (CC) is 25 per 100,000 women and about 8000 new cases of cervical cancer are diagnosed in the country each year [1]. However, its true burden may be greater due to failure of women to report CC in hospital settings [2].

Human Papilloma Virus (HPV), a sexually transmitted virus, has been implicated as its aetiological agent [3]. Approximately 73% of men and 23.7% of women in the general population in Nigeria carry an HPV infection [4]. Most infections by HPV are transient and usually clear in more than 90% of cases over a period of about 2 years [5]. However, in some women, oncogenic HPV strains can progress to cause cervical intraepithelial neoplasia (CIN 1-3), carcinoma-*in situ* or invasive cervical cancer over prolonged periods ranging from many years to decades. It is during this long precancerous stage that screening, detection and treatment has been found to prevent progress to invasive disease [6].

Several strategies have been recommended by the WHO to prevent HPV infections and identify precancerous cervical lesions and these include education and awareness programs on reduction of high risk sexual behavior, regular cervical screening of sexually-active females, and introduction of an effective and affordable HPV Vaccine [7]. Treatment is hinged on primary prevention of infection by vaccination, or screening for evidence

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Received: November 15, 2019; **Accepted**: November 29, 2019; **Published**: December 06, 2019

Citation: Ezeome I, Ezugworie J (2019) Male Acceptance of Human Papillomavirus Vaccine for Family Members in Enugu, South-East Nigeria. J Vaccines Vaccin. 10:408. DOI: 10.35248/ 2157-7560.19.10.408

of preinvasive lesion of the cervix as secondary prevention [8]. Pre-adolescent vaccination of boys and girls prior to first sexual activity has been found to be of great effectiveness in preventing HPV infection [9], since it prevents the acquisition of the aetiological agent. Challenges to vaccination in Sub-Saharan Africa include religious and cultural resistance due to its association with sexually transmitted infections and targeting of preadolescents [10,11]. Other barriers include issues of cost and vaccine safety [12,13].

Previous studies on cervical cancer awareness and HPV vaccine acceptability in Nigeria has focused mainly on women [14,15]. Though there is a changing trend towards more equality between men and women, in most societies especially Sub-Saharan Africa including Nigeria, men have more power than women, and are the key decision makers [16,17] on all aspects of family life including healthcare [18]. In addition, due to the mode of transmission of the aetiological agent, the cooperation of men is needed for a meaningful impact to be made in the fight against HPV infection.

We therefore sought to assess the acceptance and attitude of men towards human papillomavirus vaccine in Enugu, Southeast Nigeria.

METHOD

This was a cross-sectional descriptive study using systematic sampling. Enugu Metropolis has three Local Government Areas (LGA) comprising Enugu South (ENS), Enugu West (ENW) and Enugu East (ENE), with a Federal Republic of Nigeria (FRN) 2006 population census figure of 722,664 inhabitants. Using simple random sampling, Enugu East LGA was picked. Abakpa Market, a daily busy local market was picked purposively since it afforded the researchers opportunity to meet men of different educational and professional backgrounds. Every third shop was selected, with men found within or around the shop including buyers and sellers who gave oral informed consent to the study included.

Using an HPV vaccine acceptability rate of 91% [19], and simple random/systematic sample size formula $N=Z2pq/d^2$, a sample size of 126 was found to be adequate but 210 men agreed for inclusion into the study. Educated study participants had the questionnaires self-administered while those who were not literate enough had the questionnaires administered by an interviewer in the local language. Exclusion criteria were being a health-worker or student in a health-related field. 207 questionnaires were properly filled for inclusion into the study. Four key questions each on knowledge of cervical cancer, HPV and HPV vaccines had to be answered correctly (4/4) to be graded as good knowledge in each instance.

Ethical Approval for the study was from the Research Ethics Committee of University of Nigeria Teaching Hospital, Enugu, Nigeria. The research was carried out in compliance with the Helsinki Declaration.

Data analysis

Data collected included demographics, level of knowledge of cervical cancer, HPV, HPV vaccine, and acceptability of HPV vaccine. Data analysis was by descriptive statistics of simple frequency, percentage and cross tabulation using SPSS Version 20 (SPSS Inc. Chicago, IL, USA). A p value of<0.05 was considered statistically significant.

RESULTS

Demographic characteristics

The age range of our respondents was 21-60 years, with a mean of 31.89 +/-7.59 SD. 80.2% (166) were 20-39 years while 45.9% (95) were all in monogamous marital relationships. Majority (206) was Christians and 22.2% (46) had secondary education or less. 95 (45.9%) were self-employed while 51 (24.6%) were unemployed (Table 1).

Table 1: Demographic characteristics.

Variables	Frequency (T=207)	Percentage (100%)	
Age in years			
20-39	166	80.2	Range: 20-60 years
40 and above	41	19.8	Mean: 31.89 ± 7.59 SD
Marital Status			
Single	112	54.1	
Married	95	45.9	
Religion			
Christianity	206	99.5	

Islam	1	0.5
Educational Status		
Secondary or Less	46	22.2
>Secondary	161	77.8
Employment Status		
Unemployed	51	24.6
Self-employed	95	45.9
Govt/Private company employed	61	29.5

Knowledge of Cervical Cancer

90.8% (188) of our respondents were aware of the existence of cervical cancer as a disease entity. 70.5% (146) of the studied population knew that HPV is the aetiological agent of cervical cancer while 10.1% were unsure of cervical cancer causation. 28 (13.5%) respondents are of the view that CC is not preventable, 19 (9.2%) were unsure of whether it is preventable or not. However, 136 (65.7%) agree that it can be detected early by regular Papanicolaou smear. 58.9% (122) had poor knowledge about cervical cancer (Table 2).

Table 2: Knowledge of cervical cancer.

Variable	Yes 207/ (%)	No 207/ (%)	Not sure 207/ (%)
Awareness of cervical cancer	188 (90.8)	19 (9.2)	
It is caused by HPV (Yes)*	146 (70.5)	40 (19.3)	21 (10.1)
It is a preventable condition (Yes)*	112 (54.1)	28 (13.5)	19 (9.2)
It can be prevented by vaccination (Yes)*	112 (54.1)	29 (14)	66 (31.9)
It can be detected early by regular pap smears (yes)*	136 (65.7)	46 (22.2)	25 (12.1)
Removal of the uterus is a treatment at early detection	81 (39.1)	103(49.8)	23 (11.1)
It is a very common gynaecological cancer among Nigerian women	133 (64.3)	58 (28)	16 (7.7)
Knowledge of Cervical Cancer			
Good Knowledge	85 (41.1)		
Poor Knowledge	122 (58.9)		
Correct response to all the 4 Indicate good knowledge			

Knowledge of HPV

49.8% (103) agree that HPV is transmitted via sexual contact. Multiple sexual partners, early age of sexual intercourse, polygamy and anal intercourse were risk factors of HPV infection identified by 38.6% (80), 36.7% (76), 30.9% (64), and 36.7% (76) of our respondents. Prevention of HPV infection can be achieved by faithfulness to an uninfected partner and HPV vaccination as identified by 46.8% (97) and 62.8% (130) of our respondents respectively. 169 (81.6%) had poor knowledge of HPV (Table 3).

Table 3: Knowledge of Human Papilloma Virus (HPV).

HPV is transmitted via sexual contact (Yes)*	103 (49.8)	78 (37.7)	26 (12.6)
HPV is transmissible via genital skin contact (Yes)	63 (30.4)	115 (55.6)	29 (14.0)
Risk factor to HPV is multiple sexual partners (Yes)*	80 (38.6)	98 (47.3)	29 (14.0)
Risk factor to HPV is early age of sexual intercourse (Yes)*	76 (36.7)	103 (49.8)	28 (13.5)
Risk factor to HPV is polygamy (Yes)	64 (30.9)	109 (52.7)	34 (16.4)
Risk factor to HPV is anal intercourse (Yes)	76 (36.7)	97 (46.9)	34 (16.4)
HPV can be prevented by vaccination (Yes)*	130 (62.8)	45 (21.7)	32 (15.5)
HPV can be prevented by condom use (No)	98 (47.3)	80 (38.6)	29 (14.0)
HPV can be prevented by faithfulness to a faithful partner (Yes)	97 (46.9)	83 (40.1)	27 (13.0)
HPV can be prevented by sexual abstinence (Yes)	113 (54.6)	65 (31.4)	29 (14.0)
HPV causes genital warts (Yes)	112 (54.6)	65 (31.4)	29 (14.0)
Knowledge of HPV			
Good Knowledge	38 (18.4)		
Poor Knowledge	169 (81.6)		
Correct response to all the 4* indicate good knowledge			

Knowledge of HPV vaccines

68.1% (141) of the respondents were aware that there are HPV vaccines available for prevention of HPV infection. While 90 (43.5%) had heard of the bivalent Cervarix vaccine, only 75 (36.2%) had knowledge of the quadrivalent vaccine, Gardasil. 44.9% (93) also noted that HPV vaccines prevent genital warts but only 47 (22.7%) knew that the age group 9-26 years is the recommended age for immunization. 112 (54.1%) and 105 (50.7%) respondents noted that vaccination prevents cervical cancer and HPV infection. Only 37 (17.9%) of the studied population had good knowledge of HPV Vaccines (Table 4).

Table 4: Knowledge of HPV vaccines.

Awareness of HPV vaccines*	141 (68.1)	56 (27.1)	10 (4.8)
Awareness of Gardasil vaccine	75 (36.2)	120 (58.0)	12 (5.8)
Awareness of Cervarix vaccine	90 (43.5)	104 (50.2)	13 (6.3)
Vaccine prevents cervical cancer (Yes)*	112 (54.1)	29 (14.0)	66 (31.9)
Vaccine prevents HPV infection (Yes)*	105 (50.7)	37 (17.9)	65 (31.4)
Vaccine prevents genital warts (Yes)	93 (44.9)	47 (22.7)	67 (32.4)
Adolescent vaccination is 9-26 years (Yes)*	47 (22.7)	84 (40.6)	76 (36.7)
Knowledge of HPV Vaccine	37 (17.9)		
Good Knowledge	170 (82.1)		
Poor Knowledge			
Correct response to all 4* indicate good knowledge			

Acceptance and attitude to vaccination

17 (8.2%) of the respondents will not accept vaccination for any family member but 15 (7.2%) will totally accept it for wives, and preadolescent boys and girls. 71.9% will accept vaccination for

their wives. Overall, 90.3% of the studied population had a good attitude to HPV vaccination (Table 5).

Table 5: Acceptance and attitude to HPV vaccination.

Variable	Yes 207/(%)	No 207/(%)	Not sure 207/(%)
Daughter vaccination ≥ 10 years	74 (35.7)	115 (55.6)	18 (8.7)
Son vaccination ≥ 10 years	17 (8.2)	170 (82.1)	20 (9.7)
Wife vaccination	149 (71.9)	38 (18.4)	20 (9.7)
Acceptance of vaccination			
Total (wife, daughter and son)	15 (7.2)		
Partial (one or two of wife, daughter or son)	175 (84.5)		
None	17 (8.2)		
Overall attitude to vaccination			
Good	187 (90.3)		
Poor	20 (9.7)		

Methods of prevention of cervical cancer in Nigeria

Faithfulness to an uninfected partner (53; 25.6%), regular pap smear for wives (150; 72.5%), vaccination of wives (90; 43.5%), preadolescent vaccination of boys and girls (34; 16.4%), vaccination of daughters (74; 35.7%), vaccination of sons (17; 8.2%), and education of fellow males about what cervical cancer is about (36; 17.4%) were suggestions given by our respondents on how to curb the menace of cervical cancer (Table 6).

Table 6: Prevention of HPV infection.

Variable	Yes 207/(%)	No 207/(%)	Not sure 207/(%)
Faithful monogamous relationships	53 (25.6)	143 (69.1)	11 (5.3)
Encouraging women to go for regular Pap smears	150 (72.5)	47 (22.7)	10 (4.8)
Encouraging preadolescent vaccination of boys and girls	34 (16.4)	162 (78.3)	11 (5.3)
Encouraging women to have HPV vaccination	90 (43.5)	107 (51.7)	10 (4.8)
Education of fellow men about HPV infection by respondents	36 (17.4)	161 (77.8)	10 (4.8)

Factors associated with awareness to cervical cancer, HPV knowledge and attitude to HPV vaccination

Using cross tabulation, those with secondary education or below were less aware of cervical cancer as a disease entity (p=0.034). Also, a higher proportion of those who were 21-39 years (p=0.028) and those self-employed (p=0.044) had good knowledge of HPV. In addition, marital (p=0.004) and employment status (p=0.001) were significant determinants of acceptability of HPV vaccination. The proportion of those who were single (p=0.012) and those who were unemployed (p=0.005) had poorer attitude to HPV vaccination. However, neither age, education, marital status, nor employment were significant determinants of Knowledge of cervical cancer or HPV vaccines (Table 7). Those who accepted HPV vaccination were likely to have good attitude to vaccination.

DISCUSSION

The WHO has suggested that men play an important role in the cervical cancer screening behaviors of women in lower and middle-income countries [7], such as Nigeria. Men and women sexual behaviour impact on women's lives [20]. Early age of intercourse is an important factor in HPV infection [21]. Men are the primary decision makers about family life including healthcare in Nigeria [22], as obtains in most Sub-Saharan African countries [23]. In order to make decisions that impact positively on their families, it is important that men have adequate knowledge about causation and preventive measures to curb the cervical cancer scourge.

Majority of our respondents were aware of CC as a disease, with two thirds knowing that it is a very common female cancer. Sources of information on awareness could be from media (television, radio) and healthcare jingles as confirmed in several community studies [24]. However, information from these sources does not usually cover enough to aid decision-making. Awareness and knowledge are not synonymous, which explains why more than half of our respondents who were aware of cervical cancer had poor knowledge of what cervical cancer is about. Our findings are in agreement with similar studies in Sub-Saharan Africa [25]. Only half of our respondents knew it is a preventable condition by vaccination, which is in agreement with findings among female university students in South Africa [26]. Though knowledge does not automatically translate to acceptability, it is a prerequisite for attitudinal change [27].

Table 7: Crosstabulation and p-values of factors associated with awareness of cervical cancer, knowledge of cervical cancer, HPV, HPV vaccine, acceptability and attitude to HPV vaccination.

Variable	Awareness of cervical cancer	Knowledge of cervical cancer	Knowledge of HPV	Knowledge of HPV vaccine	Acceptability of HPV vaccination	Attitude to vaccination
Age	Yes No	G P	G P	G P	NA PA TA	G P
21-39	151 15	71 95	35 131	31 135	15 136 15	150 16
40 and>	37 4	14 27	3 38	6 35	2 39 0	37 4
X^2	0.02	1.01	4.158	0.366	5.074	0.001
p value	0.543	0.205	0.028	0.363	0.079	0.589
Marital status	Yes No	G P	G P	G P	NA PA TA	G P
Married	87 8	40 55	13 82	14 81	3 89 3	91 4
Single	101 11	14 27	25 87	23 89	14 86 12	96 16
X^2	0.121	0.079	2.559	1.177	11.249	5.978
p value	0.460	0.444	0.077	0.183	0.004	0.012
Education status	Yes No	G P	G P	G P	NA PA TA	G P
2° or less	38 18	22 24	8 38	8 38	6 40 0	40 6
>2°	150 11	63 98	30 131	29 132	11 135 15	147 14
X^2	4.79	1.118	0.037	0.009	6.007	0.775
p value	0.034	0.187	0.520	0.558	0.050	0.266
Employment status	Yes No	G P	G P	G P	NA PA TA	G P
UE	45 6	24 27	15 36	12 39	10 34 7	41 10
SE	85 10	34 61	12 83	13 82	3 89 3	92 3
GE/PE	58 3	27 34	11 50	12 49	4 52 5	54 7
X^2	1.94	2.107	6.241	2.382	19.315	10.614
p value	0.378	0.349	0.044	0.304	0.001	0.005

Abbreviations: G:Good; P:Poor; NA: Non-Acceptability; PA: Partial Acceptability; TA: Total Acceptability; X^2: chi-square; 2°: secondary; UE: Un-Employed; SE: Self-Employed; GE: Government Employee; PE: Private company Employee

HPV has been confirmed as the aetiological agent of cervical cancer and is known to be transmitted by sexual contact [28]. Though 70% of our respondents knew that HPV is the aetiological agent of cervical cancer, only 30% knew that multiple sexual partners and early age of intercourse are risk factors of HPV infection. This differs from the findings among medical students in Southwest, Nigeria [29] and healthcare workers in Sokoto, Nigeria [30] but is similar to those obtained among care givers in Enugu, Nigeria [31].

Polygamy is still being practiced in many parts of Sub-Saharan Africa including Nigeria. About three-quarter of our respondents did not know that polygamy is a risk factor of HPV infection. A woman in a polygamous relationship is effectively being exposed to the sexual contacts of her sister-wives or female consorts which increase her life-time risk to HPV infection, including other sexually-transmitted infections such as Human Immunodeficiency Virus [32]. In addition, early marriage which occur mostly among the Islamic sects of Northern Nigeria, where young girls are married off as early as 13 years to older men [33] and early sexual debut among unmarried adolescents due the loss of the African restraint on expression of sexuality [22,34] are important risk factors. The cervical cells in the transformation zone in girls undergo a high rate of multiplication during adolescence hence sexual intercourse during this period with an infected individual lead to incorporation of the HPV DNA into the cells and subsequent replication within the cervical cells and may progress to invasive cervical cancer [35].

The HPV vaccines have been found to be safe and effective for the prevention of HPV infection and cervical cancer. There are two vaccines available for prevention of some HPV infection in Nigeria [36]. They are Gardasil (2006) which is marketed by Merck, and it protects against infection of HPV types 6, 11, 16 and 18, and Cervarix (2009) marketed by GlaxoSmithKline which prevents infection of HPV types 16 and 18 [37]. They are available for sale over the counter and not through any government programme and has not been included in the National Programme on Immunization (NPI) schedule [25,36]. Gardasil 9 is another HPV vaccine which protects against types 16, 18, 6, 11 and additionally 31, 33, 45, 52, and 58 [38]. It is currently unavailable in Nigeria. Our respondents were aware of vaccines for HPV prevention but only 1/5 knew that the recommended age range was 9-26 years. This is similar to findings among French women [39] and female nurses in a Nigerian teaching hospital [40]. The Center for Disease and Control (CDC) recommends 2 doses given at 0, and 6-12 months for those 9-14 years, and 3 doses given 0, 1-2, and 6 months for those 15 -26 years and immunocompromised individuals 9-26 years. The knowledge of HPV Vaccines was very poor, which is consistent with findings among patients attending STI clinics in Nigeria [41] unlike among males in the UK, USA and Australia [42].

Majority will accept vaccination for their wives but very few for their children, with less than 10% accepting son vaccination. This may be related to misconceptions about the effect of the vaccines on male sexuality [43]. Another reason may be the greater emphasis on the association between cervical cancer, a female disease and HPV infection with little mention of the role of HPV in anogenital male cancers such as penile cancer [29]. This low acceptability differs from the results of studies conducted among US parents and their adolescent sons before HPV vaccine licensure for males, which found relatively high levels of parental acceptability of the vaccine for their adolescent sons [44]. Prevalence estimates of infection among asymptomatic males are typically over 20% and range as high as 72.9% [45], with female partners being at increased risk for cervical disease. HPV Vaccination at ages 27 and above provides less benefit as most have already been exposed to HPV. However, vaccination may prevent the HPV strains to which the recipient has not been exposed. This is because HPV vaccine prevents new HPV infections but does not treat existing infections or diseases [38].

It is noteworthy that about 8.2% will not accept vaccination at all for any member of their family. This emphasizes the importance of reproductive health programs educating men on HPV infection. However, the overall attitude of our respondents to vaccination was good as majority will accept vaccination for at least one of wife, son or daughter. This is in agreement with findings in similar studies where vaccination is acceptable with proper education, availability and accessibility [25,40,46].

Encouraging regular pap smear for women, and less so, adult female vaccination were preventive measures agreed to by the respondents but majority will not encourage preadolescent vaccination of boys and girls. The greater awareness, knowledge and acceptance of pap smear for wives may be related to the fact that this information has been out there for a long time through awareness programmes by the media, government agencies and non-governmental organizations. The low acceptance of girl vaccination in this study differs from the fairly high acceptability by female healthcare workers in Enugu [19] for their daughters and may be because healthcare workers have greater awareness of the complications of cervical cancer unlike our respondents who are prone to wrong misconceptions such as fear of quality of the vaccine, adverse effects, effects on fertility, and promotion of promiscuity as identified in a previous study from developing countries [11].

A higher proportion of those who had greater than secondary education was more aware of cervical cancer as a disease entity among women in Nigeria. Formal education in having good knowledge of cervical cancer was documented among medical students in India [47], China [48], as well as female health workers in Sokoto [30]. Age, marital status and number of children were significantly associated with knowledge of Malaysian women on HPV and HPV vaccine [49].

A higher proportion of married respondents had good attitude to HPV Vaccination. This may be because respondents who were married were more likely to be exposed to information on sexually transmitted infections (STIs) including HPV infection and thus be better informed than those that were single. US parents who were married or living with a partner and of high socioeconomic status were also found to be more likely to be aware of HPV vaccines [50].

A higher proportion of self-employed respondents had higher vaccine acceptability. It is possible that our self-employed respondents may be of relatively higher income compared to the government/private company employees as socioeconomic status has been positively associated with awareness of HPV Vaccines [50] However, our findings differ from results among mothers of teenage daughters in China [46] where housewives and unemployed mothers had the highest acceptability.

The limitation of this study lies in that it was not a multicenter study and was carried out in a fairly economically developed part of the city and hence the results may not be generalized to other areas especially the rural underdeveloped regions. However, the respondents were sampled systematically and thus are representative of men in Enugu metropolis.

CONCLUSION

Acceptability of HPV vaccination for preadolescent children was poor. Public health enlightenment and reproductive health programs targeting males are recommended strategies that will improve their knowledge and thus ability to make correct choices of primary prevention by vaccinating their preadolescents, and regular pap smears for their wives.

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