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ORIGINAL

Knowledge, acceptability and willingness to receive HPV vaccine among women in Owerri municipal Imo state

Conocimiento, aceptabilidad y voluntad de recibir la vacuna contra el VPH entre las mujeres del municipio de Owerri, estado de Imo

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Abstract

Background: Regrettably, levels of HPV awareness among the general population are poor throughout the world. The aim of the study was to determine the Knowledge, acceptability and willingness to receive HPV Vaccine among women in Owerri Municipal Imo State.
Methods: A descriptive cross sectional study design was adopted for this study. A multi stage sampling method was using in recruiting 424 women for the study and the Statistical Package for Sciences the Social (SPSS) version 20.0 was used in the analysis of the study. Data was obtained using an interviewer based semi structured questionnaire.
Results: The study showed that majority of the women (participants) were of Igbo origin 65.8% (280) and for the knowledge of HPV Vaccine, 78.9% (335) of the respondents agreed they had heard about HPV vaccine, while 21.0% (89) denied. Majority of the respondents affirmed they would accept HPV vaccine if offered a chance (85.9%). Based on the association between Socio demographic Characteristics and willingness to receive HPV Vaccine among women, Marital status (P = 0.0042) and educational level (P = 0.0015) had a statistically significant relationship with willingness to receive HPV Vaccine among women.
Conclusion: This study established that even though a number of women showed considerable knowledge of HPV vaccine, several others are deficient of relevant information and this finding is evident in the willingness to receive HPV vaccines among respondents. Counseling of women on the safety and efficacy of HPV vaccine to improve their willingness to receive the vaccine.

Key words: Knowledge, Willingness, Acceptability, Vaccine, Human Papilloma Virus.

Resumen

Antecedentes: Lamentablemente, los niveles de concienciación sobre el VPH entre la población general son bajos en todo el mundo. El objetivo del estudio era determinar los conocimientos, la aceptabilidad y la disposición a recibir la vacuna contra el VPH entre las mujeres del municipio de Owerri, en el estado de Imo.
Métodos: Se adoptó un diseño de estudio descriptivo transversal. Se utilizó un método de muestreo en varias etapas para reclutar a 424 mujeres para el estudio y se utilizó el paquete estadístico Statistical Package for Sciences the Social (SPSS) versión 20.0 para el análisis del estudio. Los datos se obtuvieron mediante un cuestionario semiestructurado basado en entrevistas.
Resultados: El estudio mostró que la mayoría de las mujeres (participantes) eran de origen Igbo 65,8% (280) y para el conocimiento de la vacuna contra el VPH, el 78,9% (335) de las encuestadas estaban de acuerdo en que habían oído hablar de la vacuna contra el VPH, mientras que el 21,0% (89) lo negaron. La mayoría de los encuestados afirmaron que aceptarían la vacuna contra el VPH si se les ofreciera la oportunidad (85,9%). Según la asociación entre las características sociodemográficas y la disposición a recibir la vacuna contra el VPH entre las mujeres, el estado civil (p = 0,0042) y el nivel educativo (p = 0,0015) tenían una relación estadísticamente significativa con la disposición a recibir la vacuna contra el VPH entre las mujeres.
Conclusiones: Este estudio estableció que aunque un número de mujeres mostró un conocimiento considerable de la vacuna contra el VPH, varias otras carecen de información relevante y este hallazgo es evidente en la disposición a recibir vacunas contra el VPH entre las encuestadas. Es necesario asesorar a las mujeres sobre la seguridad y eficacia de la vacuna contra el VPH para mejorar su disposición a recibirla.

Palabras clave: Conocimiento, Disposición, Aceptabilidad, Vacuna, Virus del Papiloma Humano.

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Introduction

Human papillomavirus (HPV) vaccinations are shots that protect against contracting specific strains of the virus (HPV). There are HPV vaccinations that can defend against two, four, or nine different forms of HPV[1]. The HPV types 16 and 18 that are most likely to cause cervical cancer are at least partially protected by all HPV vaccinations. HPV vaccinations may prevent 70% of cervical cancer, according to estimates[1]. The high prevalence, mode of transmission, association with cervical cancer and availability of effective vaccines all have made Human Papillomavirus (HPV) a significant virus and of public health importance[2]. Cervical cancer is the second most common type of cancer occurring in women worldwide, it has caused the death of about 275,000 women with about 529,000 new cases yearly[1,3,4,5]. Some studies reported that more than 80% of these deaths occur in developing countries, where cervical cancer is the leading cause of death in adult females[6,7,8,9,10,11,12].

In Nigeria, cervical cancer is the most common genital tract malignancy among women[13]. Most of which are caused by HPV. Cancer is usually preceded by a premalignant stage which can be prevented by HPV immunization when appropriate and can be cured if detected early by regular screening[7]. Follow up of abnormal test results have also been recommended[2]. An estimate of 40.43 million women are at risk of developing cervical cancer and the number of women estimated to harbor cervical Human Papillomavirus (HPV) infection is about 23.7% with over 90% of invasive cervical cancer attributed to HPV subtypes 16 or 18, current estimates also indicates that 14,089 women are diagnosed and 8,240 die from cervical cancer[13]. HPV 16 and HPV 18 are responsible for 70% of cervical cancer and most non-cervical HPV associated cancers[14,15]. While HPV infection is the most important risk factor for cervical cancer, other predisposing factors include: early age of sexual activities, early marriage (below 20 years of age), multiple sexual partners, unprotected sex, long term use of hormonal contraceptives, increased number of pregnancies, smoking, and unhygienic practices[16,17].

HPV is one of the common sexually transmitted infections implicated in 5% of cancers globally including most cervical cancer cases [18]. In Sub Saharan Africa, HPV vaccine has been offered routinely to girls aged 11-13 years and cervical cancer screening to women aged 25-64 years since 2008[18]. Several reports have posited that HPV vaccination offers a unique opportunity for primary prevention of cervical cancer. Two HPV vaccines (Gardasil and Cervarix) protect against the two strains of HPV types 16 and 18, the vaccine is approved and recommended for use in females between 9-26 years of age, and the Advisory Committee on Immunization Practices (ACIP) recommends 'catch up vaccination' for females between 13-26 years of age.

A significant impact has been made on the health and well-being of the world through the different types of life-saving vaccines[7,9,19]. There is however the need for a robust public health and primary care partnership in order to continuously achieve national immunization coverage targets and low incidence of vaccine-preventable diseases. Some publications have revealed that primary care providers detect infectious disease among patients and report same to state or local health departments[1,3,4,5.] This information usually drives public health response. Public health usually works with primary care providers to ensure adequate access to vaccines and provision of healthcare services to individuals, families and the community as a whole. This collaboration and integration of public health and primary care influences and reinforces the capabilities of each entity to deliver critical services[4,5]. Primary care benefits from public health's role in policy, population health, health equity and education, while public health benefits from primary care's ability to provide individual patient assessment, disease management, care coordination, and quality improvement[1]. Most parents follow the advice of their primary health care providers and conform to the national immunization requirements[13,16,17].

According to some recent reports, HPV has remained prevalent with the presence of a safe and effective vaccine with highest risk period in the late adolescence and early adulthood[8,11]. Therefore, college students have been the target for HPV prevention and vaccination promotion particularly in regions with low vaccination rates.

Cervical cancer is the fourth most common cancer among women worldwide, with an estimated 528, 000 new cases and 266, 000 deaths in 2010[7,9,14,15,20,21]. Despite the fact that the Pap smear test is well integrated into the Nigerian healthcare system and widely accepted by women. HPV vaccine is recommended for female aged 20-45,[13]. The acceptance of HPV vaccination will be expected to depend on factors such as knowledge of HPV infection and its link to cervical cancer.

Regrettably, levels of HPV awareness among the general population are poor throughout the world[20,21]. Among the general population of Nigerian women, 24% have heard of HPV. In a cross-sectional survey on parents in Northern Nigeria, 22.63% have heard of HPV, 40.8% parents are willing to accept HPV vaccination for children[13]. Only 10% of high school students have heard of HPV, and only 19% know that HPV infection can lead to cervical cancer (Markowitz et al., 2017). It is unclear how much knowledge the general population in Nigeria has about HPV, such as how the virus is transmitted, how infection can be detected, and whether it is linked to cervical cancer. Therefore, it is due to this burden that this research aims to investigate the Knowledge, acceptability and willingness to receive HPV Vaccine among women in Owerri Municipal Imo State.

Methods

Study Design and Settings

A descriptive Cross-sectional Research design was adopted for this study on the Knowledge, acceptability and willingness to receive HPV Vaccine among women in Owerri Municipal Imo State.

This study included only women aged 18 years and above in Owerri Municipal LGA who were available and gave in their consent for the study. Women in Owerri Municipal LGA, who were sick, physically disabled and who refused to give in their consent were excluded from the study.

Sampling Size

The sample size was determined using the Yamene formula (1967) for sample size determination.

$$n = \frac{N}{1+Ne^2}$$

Where:
n is the desired sample size
N is the population size (20,201)
e is margin of error (0.05)

Therefore,

$$n = \frac{N}{1+Ne^2}$$

$$\frac{20201}{1+20201 * (0.05)^2}$$

n = 392.23242718

Furthermore, to account for Non Response Rate, the sample size was increased by 10% = 0.10 = 392 x 0.10 = 39.2 ≈40
n =392+40 = 432.

Sampling Techniques

A Probability based Multi stage sampling method was adopted for the study on Knowledge, acceptability and willingness to receive HPV Vaccine among women in Owerri Municipal Imo State.

First stage: Selection of Wards /Communities
A total of six (6) communities were selected through simple random sampling via balloting which gave every ward an equal chance of being selected. And a total of 72 (i.e 432/6). questionnaires were allocated for each of the community.

Second stage: Selection of households
A systematic probability sampling method was used to select each household in the selected streets which gave each household an equal chance of selection.

Third stage: Selection of Respondents
The researcher purposefully selected residents present at the time of study. They were selected until the minimum sample size was reached to ensure that the appropriate number respondents were obtained from each of the communities namely Umuororonjo, Amawom, Umuonyeche, Umuodu and Umuoyima proportionately.

Data Collection

The instrument for data collection was a semi-structured questionnaire aimed to obtain relevant information on the Knowledge, acceptability and willingness to receive HPV Vaccine among women in Owerri Municipal Imo State. The Data tool (Questionnaire) consisted of Five (5) sections as follows:

Section A: Consisted of information on the socio demographic characteristics of respondents.
Section B: Consisted of questions on the level of knowledge of respondents towards HPV Vaccine.
Section C: Consisted of Questions on the acceptability of HPV vaccine among the respondents.
Section D: Consisted of questions on the willingness towards HPV vaccine among respondents in Owerri Municipal L.G.A Imo State.
Section E: Consisted of questions on the factors affecting the acceptability towards HPV vaccine among respondents in Owerri Municipal L.G.A Imo State.

Reliability of the instrument was determined using test retest method. 40 copies of the questionnaire were given to some respondents outside the area of study by the researcher. This area for reliability testing was Ihiagwa community in Owerri west LGA. This area shared similar characteristics with the Owerri Municipal LGA that was used for the study. Chrombach alpha test was used to test for the reliability of the questionnaire.

Data was obtained with the aid of Two (2) field assistants who were hired and trained to aid the researcher in the data collection process.

Data Analysis

The Statistical Package for the Social Sciences (SPSS) version 20 were used in the analysis of the data gotten from the study. Results were expressed in percentages, frequencies, tables and charts (Descriptive Statistics).

Ethical Consideration

A letter of introduction and ethical clearance were obtained from the Department of Public Health Ethical clearance committee in Federal University of Technology Owerri (FUTO) before the research was conducted. The purpose of the research was explained to each respondent and verbal informed consent obtained from them before inclusion into the study. Also, anonymity of the respondents was assured and ensured. The confidentiality of the information they gave was maintained.

Results

Socio-demographic Factors of the women

Table I revealed that 27.8% (118) of the women represented age groups between 25-34 and 45-49, 19.9% (85) of the women were 35-44 years of age, 13.8% (59) were aged 50 years and above, and 10.8% (46) aged 18-24 years. 65.8% (280) of the women were of Igbo origin, 19.1% (81) reported 'others', 11.8% (50) Yoruba, and 3.4% (14) Hausa/Fulani. 65.1% (276) of the respondents were Christians, 21.9% (93) listed religions not included in the options but label 'others', 11.3% (48) Muslims and 1.8% (8) Traditional.

Table I: Socio-demographic Factors of the women.

Characteristics	Frequency (n=424)	Percentage (%)
Age		
18-24	46	10.8
25-34	118	27.8
35-44	85	19.9
45-49	118	27.8
50 and Above	59	13.8
Total	**424**	**100**
Ethnicity		
Igbo	280	65.8
Hausa/Fulani	14	3.4
Yoruba	50	11.8
Others	81	19.1
Total	**424**	**100**
Religion		
Christianity	276	65.1
Muslim	48	11.3
Traditional	8	1.8
Others	93	21.9
Total	**424**	**100**
Marital Status		
Married	180	42.5
Single	118	27.8
Separated	82	19.3
Widowed	44	10.4
Total	**424**	**100**
Educational Level		
No formal education	29	6.7
Primary	38	8.8
Secondary	88	20.8
Tertiary	270	63.6
Total	**424**	**100**
Occupation		
Artisan e.g. Carpenter, Hairdresser, Tailor, Driver	41	9.7
Civil servant e.g. Teacher	202	47.6
Self-employed e.g. Trader, Photographer	36	8.4
Unemployed	15	3.4
Professionals e.g. Doctor, Nurse, Lawyer, Accountant	60	14.2
Total	**424**	**100**
What is your Level of Income		
1-1,000	16	3.6
2,000-10,000	27	6.4
11,000-30,000	47	11.1
31,000-60,000	86	20.1
61,000-100,000	79	18.6
Above 100,000	109	25.6
Others	60	14.1
Total	**424**	**100**
Are you satisfied with your monthly income?		
Yes	110	25.9
No	142	33.4
Somehow	172	40.7
Total	**424**	**100**
Number of Children (Parity)		
None	13	3.1
1	175	41.3
2	136	32.2
3 and above	99	23.5
Total	**424**	**100**
Do you have a Health plan/insurance at any healthcare		
Yes	145	34.1
No	279	65.8
Total	**424**	**100**

41.3% (175) of the women had a child, 32.2% (136) had two children, 23.5% (99) had 3 children and above, and 3.1% (13) had no children. Concerning the educational level of the respondents, 63.6% (270) were tertiary education level certificate holders, 20.8% (88) secondary, 8.8% (38) primary education, and 6.7% (29) of the women had no formal education. 47.6% (202) of the respondents were civil servants, 14.2% (60) professionals, 9.7% (41) were artisans, 8.4% (36) were self-employed, and 3.4% (15) were unemployed. On the monthly income level of the respondents, 25.6% (109) earned above 100,000, 20.1% (86) earned between 31,000-60,000, 18.6% (79) 61,000-100,000, 14.1% (60) earned figures not mentioned but label 'others', 11.1% (47) earned 11,000-30,000, 6.4% (27) from 2,000-10,000, and 3.6% (16) of the women earned a meagerly 1-1000 monthly. 40.7% (172) were not sure concerning monthly income satisfaction, 33.4% (142) were not satisfied, and 25.9% (110) of the women said "Yes". 42.5% (180) of the respondents were married, 27.8% (118) single, 19.3% (82) separated, and 10.4% (44) widowed. 65.8% (279) of the respondents did not have a health plan/insurance at any healthcare facility, while 34.1% (145) affirmed they did.

Knowledge of HPV Vaccine among Women

From **table II** below, 78.9% (335) of the respondents had heard about HPV vaccine, while 21.0% (89) denied. For example, sources include (**Figure 1**); 28.5% (95) health practitioners, 25.7% (86) social media, 23.5% (79) school, 8.7% (29) each for Tv/radio programs and 'others' respectively, 3.1% (10) for newspapers/magazines, and 1.7% (6) from parents/family. Majority of the respondents replied "yes" when asked if 'Human papillomavirus (HPV) vaccines are vaccines that prevent infection by certain types of human papillomavirus' (97.4%), while 2.5% (9) replied "no". Also, 88.2% (296) of the women accepted that HPV vaccines prevent 70% of cervical cancer, 80% of anal cancer, 60% of vaginal cancer, 40% of vulvar cancer, and show more than 90% efficacy in preventing HPV-positive oropharyngeal cancers, while 11.7% (39) disagreed. Over 90% of the respondents also confirmed that HPV vaccines were safe (91.0%), while 8.9% (30) reported otherwise. 49.2% (165) of the women reported that cervical cancer screening is still required following HPV vaccination, while 50.7% (170) disagreed.

Figure 1: Sources of Information on HPV Vaccines among women.

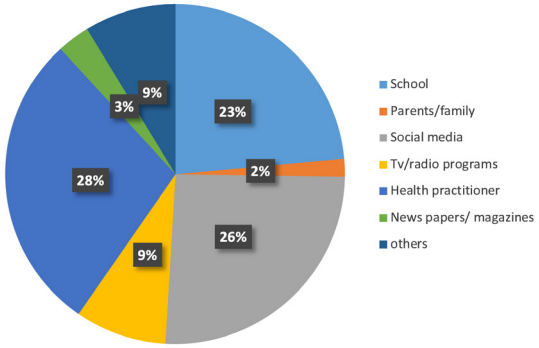

Table II: Knowledge of HPV Vaccine among Women.

Variables	Frequency (n=424)	Percentage (%)
Have you heard about HPV Vaccine?		
Yes	335	78.9
No	89	21.0
Total	**424**	**100**
What is your source of information?		
School	79	23.5
Parents/family	6	1.7
Social media	86	25.7
Tv/radio programs	29	8.7
Health practitioner	95	28.5
Newspapers/ magazines	10	3.1
Others	29	8.7
Total	**335**	**100**
Human papillomavirus (HPV) vaccines are vaccines that prevent infection by certain types of human papillomavirus?		
Yes	326	97.4
No	9	2.5
Total	**335**	**100**
HPV vaccines prevent 70% of cervical cancer, 80% of anal cancer, 60% of vaginal cancer, 40% of vulvar cancer, and show more than 90% efficacy in preventing HPV-positiveoropharyngeal cancers?		
Yes	296	88.2
No	39	11.7
Total	**335**	**100**
HPV vaccines are very safe		
Yes	305	91.0
No	30	8.9
Total	**335**	**100**
Cervical cancer screening is still required following HPV vaccination		
Yes	165	49.2
No	170	50.7
Total	**335**	**100**

Acceptability of HPV Vaccine among Women

Table III below illustrated the acceptability of HPV vaccine among the women in this survey. Majority of the respondents affirmed they would accept HPV vaccine if offered a chance (85.9%), while 14.1% (60) reported otherwise. 63.5% (269) of the respondents affirmed they had been advised to receive HPV vaccine by a physician, 35.2% (149) reported 'no', while 1.2% (5) said they could not remember. 69.8% (296) of the women denied receiving vaccination against cervical cancer and related, 8.9% (38) said 'yes', and 21.2% (90) could not remember. 29.3% (11) of the women who affirmed said 6-12 months ago, 21.3% (8) reported 2 years or more, 17.3% (7) reported more than a year but less than two years, and 1.3% (1) said "3 months ago". 'Less than a month' was reported by 30.6% (12). The reason for vaccination as reported by the women were 'just decided to go for the examination' 31.5% (12), 29.7% (11) cancer cases in the family, 16.2% (6) reported reasons not listed but mention 'others', 12.6% (5) said "for prevention", and 9.9% (4) reported they were presented with symptoms.

Willingness to receive HPV Vaccine among Women

From **table IV** below, 41.2% (175) of the women, agreed that they would accept HPV vaccination only if they were assured of its safety, 19.0% (81) strongly agreed, 6.1% (26) were undecided, 9.6% (41) disagreed, and 24.0% (102) strongly disagreed. 35.1% (149) of the respondents agreed that it was right to go for HPV vaccination irrespective of symptoms, 36.5% (155) were undecided, 9.4% (40) disagreed, 15.1% (64) strongly disagreed, and 4.0% (17) of the women strongly agreed. 28.2% (120) of the women strongly agreed that women should go for vaccination when it is appropriate, 21.4% (91) agreed, 17.8% (76) disagreed, 26.9% (114) strongly disagreed, and 5.7% (24) were undecided. 30.3% (128) strongly agreed that they would accept HPV vaccine because it increases the chances of living a healthier life, 26.4% (112) agreed, 0.6% (3) strongly disagreed, 18.8% (80) disagreed, and 23.9% (101) were undecided. Over half (54.0%) of the respondents 'strongly agreed' that they would accept the HPV Vaccination because the benefits of HPV vaccination outweighs any difficulty one might have going through in treatment, 23.8% (101) agreed, 5.8% (25) remained undecided, 10.1% (43) disagreed, and 6.2% (26) strongly disagreed. When the women were asked if they sought the consent of their family before going for HPV vaccination, 28.5% (121) agreed, 27.4% (116) undecided, 17.1% (73) strongly disagreed, 14.4% (61) disagreed, and 12.6% (53) strongly agreed.

Factors Influencing Willingness to receive HPV Vaccine among Women

From **table V** below, factors influencing willingness to receive HPV vaccine among employees include 41.5% (176) who listed lack of information, 18.2% (77) lack of time, 15.2% (65) financial constraints, 11.9% (51) cultural factors, and 5.1% (22) of the participants chose religious norms.

Association between Socio demographic Characteristics and willingness to receive HPV Vaccine among women

Table VI below shows the results for the test of a statistically significant association Socio demographic

Table III: Acceptability of HPV Vaccine among Women.

Variable	Frequency (n=424)	Percentage (%)
Would you accept HPV vaccine if offered a chance?		
Yes	364	85.9
No	60	14.1
Total	**424**	**100**
Has any physician advised you to receive HPV vaccination?		
Yes	269	63.5
No	149	35.2
Can't remember	5	1.2
Total	**424**	**100**
Have you vaccinated cervical cancer and related?		
Yes	38	8.9
No	296	69.8
Can't remember	90	21.2
Total	**424**	**100**
If YES, when was that?		
Less than a month	12	30.6
3 months ago	1	1.3
6-12 months ago	11	29.3
More than a year but less than two years	7	17.3
2 years or more	8	21.3
Total	**38**	**100**
What was your reason for the Vaccination?		
Presented with symptoms	4	9.9
Cancer cases in the family	11	29.7
For prevention	5	12.6
Just decided to go for the examination	12	31.5
Others	6	16.2
Total	**38**	**100**

characteristics and willingness to receive HPV vaccine among women. The table below shows that age was not significantly associated with willingness to receive HPV vaccine among women (P=0.735). Marital status was found to be significantly associated with willingness to receive HPV vaccine among women (P = 0.0042). Also, educational level is significantly associated with willingness to receive HPV vaccine among the women (P = 0.0015). Moving further, the table reveals that level of income of the participants was not significantly associated with the willingness to receive HPV vaccine among women (P = 0.784).

Table IV: Attitude of the women towards the Uptake of Routine HPV vaccine.

Variable	Frequency (n=424)	Percentage (%)
I would accept HPV Vaccination only if I am assured of safety		
Strongly agree	81	19.0
Agree	175	41.2
Undecided	26	6.1
Strongly disagree	102	24.0
Disagree	41	9.6
Total	**424**	**100**
It is right to go for HPV Vaccination irrespective of symptoms		
Strongly agree	17	4.0
Agree	149	35.1
Undecided	155	36.5
Strongly disagree	64	15.1
Disagree	40	9.4
Total	**424**	**100**
A woman should go for Vaccination when it is appropriate		
Strongly agree	120	28.2
Agree	91	21.4
Undecided	24	5.7
Strongly disagree	114	26.9
Disagree	76	17.8
Total	**424**	**100**
I will accept HPV vaccine because it increases the chances of living a healthier life		
Strongly agree	128	30.3
Agree	112	26.4
Undecided	101	23.9
Strongly disagree	3	0.6
Disagree	80	18.8
Total	**424**	**100**
I will accept HPV Vaccination because the benefits of HPV vaccination outweighs the any difficulty one might have going through in treatment	Strongly agree	22954.0
Agree	101	23.8
Undecided	25	5.8
Strongly disagree	26	6.2
Disagree	43	10.1
Total	**424**	**100**
Before I accept HPV Vaccination I must seek the consent of my family before going for HPV vaccination		
Strongly agree	53	12.6
Agree	121	28.5
Undecided	116	27.4
Strongly disagree	73	17.1
Disagree	61	14.4
Total	**424**	**100**

Table V: Factors Influencing Willingness to receive HPV Vaccine among Women

Variable	Frequency (n=424)	Percentage (%)
Which of the factors influences your willingness to receive HPV vaccine?		
Lack of Information (Ignorance)	176	41.5
Financial Constraints	65	15.2
Distance to the Facility	33	7.8
Cultural Factors	51	11.9
Religious norms	22	5.1
Lack of time	77	18.2

Table VI: Association between Socio demographic Characteristics and willingness to receive HPV Vaccine among women.

Socio-demographics	X^2	D.F	P value	Decision
Age	6.411	36	0.735	NS
Marital Status	3.340	13	0.0042	S
Educational Level	4.008	24	0.0015	S
Level of Income	0.124	7	0.784	NS

NS: not significant S: significant

Discussion

According to the findings of this study on the socio demographic characteristics of the respondents, 27.8% of the women were between the ages of 25 and 34. This data supports a statement in a publication by Ferlay *et al.*[10] that women in a similar HPV study done among women in ABSUTH had an average age of 30 years. The bulk of the respondents (65.1%) were Christians of Igbo descent, according to the study's findings (65.8%). This could be owing to the fact that the study was done in a region of Nigeria where Igbo and Christian people prevail. According to the findings, 65.8% of respondents did not have a health plan or insurance at any healthcare facility as seen in another study by[9].

This study found that about 78.9% of the respondents had heard about HPV vaccine. The high knowledge of HPV vaccine is also found in studies according to Chauke-Moagi & Mumba[8], (83.5%) and Levine *et al.*[1], (79.2%), and thus corroborates this finding. The women mentioned 'health practitioners' (28.5%) as the commonest source of information on the HPV vaccine, followed by 25.7% who reported 'social media'. Another study however mentioned 'school' (23.5%), and Tv/ radio (22.1%), and hence disagrees with the findings of this study[6]. A similar study by Ozawa et al. (2011) corroborates this finding and suggested that 26.1% of the women affirmed they obtained information on HPV vaccine from health practitioners. Several other studies have mentioned 'health practitioners, social media, and school as principal sources of information on HPV vaccination[6]. 97.4% of the women correctly agreed with the study definition of Human papilloma-virus (HPV) vaccines with about 88.2% of the women also affirming the potency of HPV vaccines in preventing 70% of cervical cancer, 80% of anal cancer, 60% of vaginal cancer, 40% of vulvar cancer, and more than 90% efficacy in preventing HPV-positive oropharyngeal cancers. Some studies have shown poor knowledge of the efficacy of HPV vaccines among participants, while others have illustrated very good knowledge of the use of HPV vaccines[3,11,12]. 91.0% of the study population rightly confirmed that HPV vaccines were safe. This further confirms the perceived good knowledge of HPV vaccines among the respondents.

In concordance with recent studies based on the acceptability of HPV vaccine among the women, over three quarters of the women (85.9%) would accept HPV vaccine if offered a chance[4]. 63.5% of the respondents affirmed they had been advised to receive HPV vaccine by a physician. This is in consistence with statements in a publication by *Saville*,[20] that 65% of the women in an ABSUTH study affirmed they had been advised to receive the HPV vaccine. 35.2% reported otherwise. Whereas 45.1% of the respondents in another study denied being well-advised to receive the HPV vaccine by any medical personnel[5]. Only 8.9% of the women had received vaccination against cervical cancer and 31.5% of them 'just decided to go for the examination. A few others mentioned 'cancer cases in the family' (29.7%). A similar study has demonstrated cancer cases in the family (23.5%) and the need to go for an examination (25.6%) as reasons for cervical cancer vaccination[20].

Concerning the willingness of women to receive the HPV vaccine, study showed that 41.2% of the women 'agreed' that they would receive the HPV vaccine if assured of its safety. The next common response included 19.0% of the women who 'strongly agreed'. Similar findings on willingness of women to receive HPV vaccine in Delta suggested that over half of the respondents 'agreed' to the importance of HPV vaccines. Additionally, a study by Gakidou *et al.*[15] conducted in an Illorin medical facility revealed that 29.5% of the nurses in that survey emphasized the advantages associated with receiving HPV vaccine. The women were undecided concerning if it was right to go for HPV vaccination irrespective of symptoms, (36.5%). A statement in a recent publication by Ozawa *et al.*[7], goes against this finding that 37.2% of the respondents 'agreed' but supports another observation[14]. Over half of the respondents (54.0%) 'strongly agreed' that they would accept the HPV vaccination because the benefits of HPV vaccination outweighs any difficulty one might have going through in treatment. Several other studies have suggested willingness of the women to receive HPV vaccines if they were thoroughly informed of the process[14]. This shows a lack of information on the advantages of receiving HPV vaccines among the women of Owerri municipal. The most recurrent factor influencing the willingness to receive HPV vaccine among the women was lack of appropriate information (41.5%). This is similar to a finding by Alrum & Jamal,[21] that 43.4% of the women opined that they lacked adequate information and this influenced uptake of HPV vaccine. Another study by Sitas *et al.*,[19] corresponds to this finding that 46.6% of women who did not receive HPV vaccines reported reasons such as 'Ignorance'. Findings concerning the test of a statistically significant association between socio demographic characteristics and willingness to receive HPV vaccine among women, marital status ($P = 0.0042$) and educational level ($P = 0.0015$) were found to be significantly associated with willingness to receive HPV vaccine among women. The possibility that spouse and/or children of the women influenced their decisions to receive HPV vaccine. This study also observed the willingness of educated groups to receive the HPV vaccine compared to women who had attained primary education and respondents with no formal education at all. Other studies have also illustrated the association of education and willingness to receive vaccines among respondents ($p = 0.0012$, $p = 0.102$, and $p = 0.043$)[7]. A similar study demonstrated the influence of family members and decisions to receive vaccines[9].

Conclusion and recommendation

Observation from this study establish that even though a number of women showed considerable knowledge of HPV vaccine, several others are deficient of relevant information and this finding is evident in the willingness to receive HPV vaccines among respondents. Factors such as 'lack of information' and 'time' also evidently affected uptake of HPV vaccines among the women in Owerri municipal. The study also recommends the following:

1. Counselling of women on the safety and efficacy of HPV vaccine.
2. Awareness campaigns must provide accurate information especially on the misconceptions regarding the HPV vaccines so that the women and their families can make informed choices.
3. Emphasis must be made on the types of HPV vaccine that will be beneficial to the women.
4. Accessibility to HPV vaccine must be considered and policies should be established for easy and wide administration.
5. Factors such as 'time', and financial 'constraints' must be considered to promote the process for women.

Ethics approval and consent to participate
Not applicable.

Consent to publish
Not applicable.

Availability of data and materials
The Data set from the study are available to the corresponding author upon request.

Competing interests
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