Household survey on Human Papilloma Virus vaccine awareness among women of reproductive age in Ibadan, Nigeria

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Abstract

Background: Cervical cancer is the commonest female genital tract malignancy associated with high mortality in sub-Saharan Africa due to poor prevention plan. Human Papilloma Virus (HPV) is a necessary cause of cervical cancer, and the infection is vaccine preventable. Since the introduction of HPV vaccine, robust community surveys on awareness of the vaccine that capture end-users perspective is scarce. The aim of this study is to determine HPV vaccine awareness among women of reproductive age group.

Methods: This was a household survey that used multi-stage random sampling conducted amongst 1002 women aged 18 - 49 years from August to September 2012 in Mokola area, Ibadan, south western Nigeria. A self-administered pre-tested questionnaire was used for data collection. Descriptive, bivariate and multivariable analyses were performed, and statistical significance was set at 95% confidence level.

Results: The mean age was 29.8 ± 8.2 years and 49.9% had female children. Only 4.6% had heard of HPV vaccine. A significantly higher odds of HPV vaccine awareness was found among highly skilled women, those initiating sexual intercourse at older ages; women with multiple sexual partners and those aware that cervical cancer is preventable.

Conclusion: The awareness of HPV vaccine is low. Policies and programs that will improve awareness utilising culturally sensitive messages are imperative.

Keyword s: *HPV vaccine/vaccination, Awareness, Africa, Women*

Résumé

Contexte: Le cancer cervical est la plus fréquente tumeur maligne des voies génitales féminines associée à une forte mortalité en Afrique sub-saharienne en
prevention plan. Human Papilloma Virus (HPV) is a raison de pauvre plan de prévention. Le Virus du Papillome Humain (VPH) est une cause nécessaire du cancer cervical, et l'infection évitable par la vaccination. Depuis l'introduction du vaccin contre le VPH, des enquêtes communautaires robustes sur la sensibilisation du vaccin qui capture le perspectif des ultimes-utilisatrices sont rares. Le but de cette étude est de déterminer la sensibilisation de vaccin contre le VPH chez les femmes en âge de procréation.

Méthodes: Ceci fut une enquête de ménage qui a utilisée plusieurs étapes d'échantillonnage aléatoire menée parmi de 1002 femmes âgées de 18 - 49 ans d'Août à Septembre 2012 dans le quartier de Mokola, Ibadan, sud ouest du Nigeria. Un questionnaire testé auparavant auto-administré a été utilisé pour la collecte des données. Des analyses descriptives, bi-variées et multi-variées ont été effectuées, et la signification statistique a été fixée au niveau de confiance de 95%.

Résultats: L'âge moyen était de 29,8 8,2 ans et 49,9% avaient des enfants de sexe féminin. Seulement 4,6% avait entendu parler du vaccin contre le VPH. Une chance significativement plus élevés de sensibilisation du vaccin contre le VPH a été trouvé chez les femmes hautement qualifiés, ceux initiant des relations sexuelles à un âge plus avancé; les femmes ayant des partenaires sexuels multiples et ceux conscient que le cancer cervical est évitable.

Conclusion: La prise de conscience du vaccin contre le VPH est faible. Les politiques et programmes qui permettront d'améliorer la sensibilisation en utilisant des messages culturellement sensibles sont impératives.

Mots-clés: *Vaccin contre le VPH / vaccination, sensibilisation, Afrique, les femmes*

Introduction

Human papilloma virus (HPV) infection is mostly sexually transmitted, and it is associated with both benign and malignant neoplasms. In general, HPV is broadly classified into low risk (HPV types 6, 11), and the high-risk variety (HPV types 16, 18, 31, 33, 35, 39, 45, 51, 52, 58, 59, 68, 73 and 82)[1, 2]. The pattern of HPV infection varies by location and âge of women studied [3]. Of all the HPV infection related morbidities, cervical cancer burden is the highest.

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Cervical cancer (CC) remains a public health challenge especially in developing countries because of poor preventive strategies. Worldwide, CC is the commonest female genital cancer with an annual incidence of 530,000 cases, and mortality of 273,000 with 85 percent of these in developing countries [4]. Estimates show that about 8,000 new cases of CC are diagnosed in Nigeria per year with more than three-quarters presenting in advanced stage when curative management is no longer feasible.

The World Health Organisation recommends HPV vaccination with either Cervarix (bivalent – effective against HPV types 16 and 18), or Gardasil (quadrivalent - that protects against HPV types 6, 11, 16 and 18) for primary prevention of CC before sexual debut. There is emerging evidence that vaccination may also be useful for sexually active females aside screening[5]. Evidence abounds that mass HPV vaccine immunization has the potential of providing herd immunity in the population, and this in turn, result in reducing incidence of HPV infection and CC [6]. Another important debate is the inclusion of male vaccination in the prevention strategy but this is yet to be universally accepted [7]. Currently, WHO recommends that immunization of adolescent males is not cost effective as a strategy for CC prevention but some countries including Australia are vaccinating them [7].

Unlike many developed countries, several developing countries are yet to adopt routine immunization policy due to their poor financial state and lack of political commitment [8]. In response to this, the Global Alliance for Vaccine Implementation (GAVI) has lobbied pharmaceutical companies to reduce the cost of the vaccine for it to be affordable to the generality of the populace in the third world [8, 9]. A critical strategy for successful HPV vaccine implementation is involvement of key stakeholders such as policy makers, experts, community/religious leaders, and the womenfolk that represents the end-users [10]. Studies from various settings revealed different factors associated with HPV vaccine acceptability [11, 12].

Nigeria is the most populous nation in Africa accounting for about 20 percent of the continent's population with a population of about 170 million people. The female population constitutes about 49 percent with about two-thirds within the reproductive age group. Most studies in Nigeria report average female sexual debut age to be 13 years, and that the first exposure is mostly unprotected [13]. Currently, there is lack of equitable access to maternal health service and health insurance is still very limited. There is a strong socio-cultural belief system that often shapes interpretation of health conditions and interventions.

At present, Nigeria national cancer control implementation plan document expires this year and most of the policy were not achievable due to lack of appropriate budget and commitment[14]. Access to screening methods is limited and at best opportunistic due to lack of resources such as manpower, equipment, funding and poor health seeking behaviour[14]. In 2008, the country had licenced bivalent vaccine initially, and later the quadrivalent form but is yet to adopt any national implementation programme [15]. Rather, access is via individual efforts through health workers or self-interest. All these contribute to the very high level of CC morbidity and mortality in the country.

Since the introduction of HPV vaccine in Nigeria, research efforts have largely focused on health care provider's perspective with little on end-users especially women[16-18]. Previous studies are either facility based or those conducted in the community had relatively small sample sizes with low statistical power [19]. To address this gap, the study aims to determine awareness level of women of reproductive age group on HPV vaccine introduction and its use in Nigeria.

Materials and methods

This was a household survey conducted at Mokola community located in Ibadan North Local Government Area (LGA), Ibadan in Nigeria. According to the 2006 census, population of the LGA is 308,119 with 152,608 males and 155, 511 females, and a landmass of 27 km Square [20]. Mokola has a population of 43,453 with 79 enumeration areas (EA), and each of the EAs has a population of 550 [20]. Low and medium income people largely reside in the community. Yoruba is the predominant ethnicity and others are Hausa and Igbo. Before the study, we conducted consultative meeting with opinion leaders and household heads to inform them about the study protocol.

The sample size was determined using a prevalence of 52.8% for the awareness for CC in Nigerian study as proxy estimate of population proportion [21] with 4% precision, design effect of 1.5 and 10 percent non-response rate. The minimum sample size was 996. The boundary delineation was performed with the National Population Commission (NPC) area map of Mokola.

A multi-stage sampling technique was used. First, from list of all enumeration areas (EAs) in Mokola community, a simple random sampling was used to select 16 EAs. Thereafter, all residential houses in the 16 selected EAs were listed and assigned identification numbers. In each of 520 listed

houses, eligible participants according to the study protocol were listed on a form and each of them was assigned a line number.

A systematic random sampling of eligible participants within each house was performed sequentially using every 2nd interval till the desired sample size was achieved. Non response or refusal were defined as out-right refusal or woman not met at home after 2 visits. In all, 2,492 eligible women were listed out of which 1,002 consenting women were eventually recruited. Two eligible participants refused to participate and the reason given was 'I am busy'. The inclusion criterion was every consenting woman of reproductive age group (18 - 49 years) living within the study setting.

A pretested semi-structured questionnaire developed from literature review was used. Apart from the socio-demographic variables, the main question was awareness of HPV vaccine in Nigeria with a closed-ended design. Translation and back translation into local language was done to ensure consistency of information. Trained data entry assistants (DEA) collected data from 26th August to 29th September 2012. A written informed consent was obtained from each participant by signature or thumb printing. The questionnaire with an envelope was given to the consented participant to fill privately, and the DEA only provided any assistance requested (Interpretation and clarification) by the participants. Upon completion, the questionnaires were sealed in an envelope by participant and posted into a locked waiting box with the DEA to ensure anonymity/ privacy and confidentiality. On each day, filled questionnaires were opened by the Principal investigator (PI) and inspected for any inconsistencies.

Data collected was coded and inputted into Statistical Package for Social Science 16.0 software (SPSS inc., Chicago, IL, USA). Visual check of the entered data was done and thereafter frequencies of all variables were generated to check for any errors or missing data. Data cleaning was thereafter performed. Quantitative variables were summarized using means and standard deviation. The descriptive analysis was performed and frequency tables generated. The primary outcome question was *Have you heard about HPV vaccine as a preventive strategy for CC? (1) Yes (2) No*

An analytical framework was used in determining factors associated with the dependent variable on multiple regression (Figure 1). Three groups of variables were identified: socio-
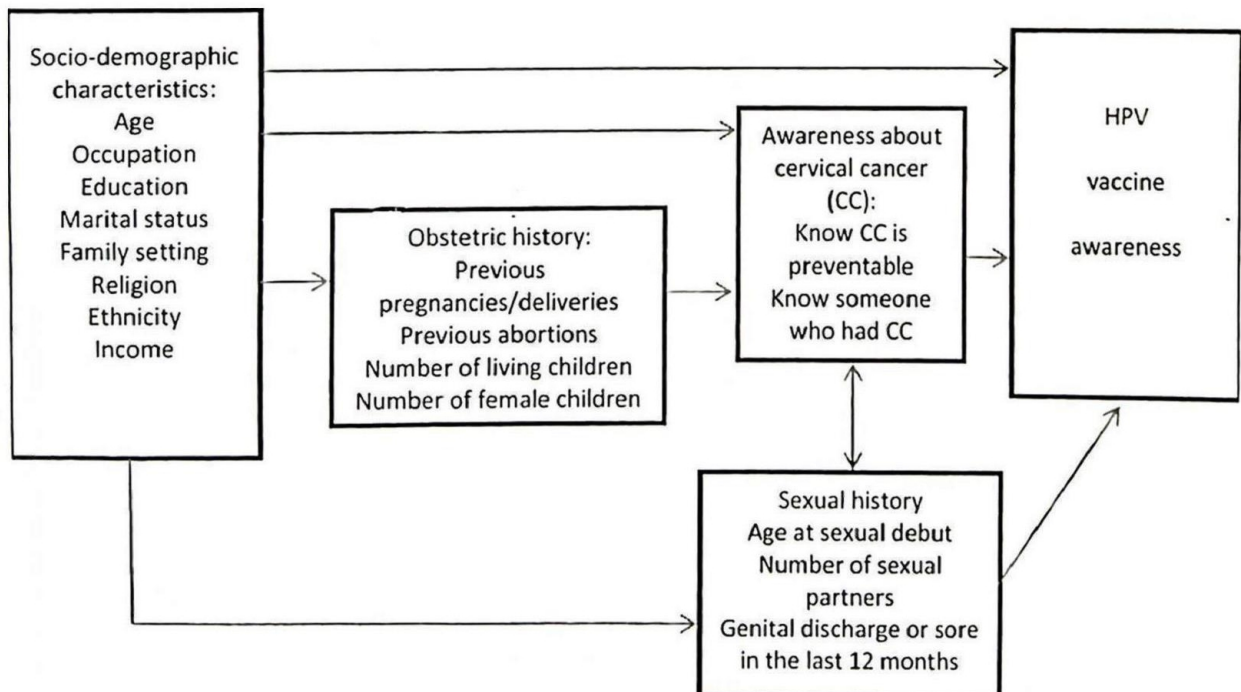

Fig. 1: Analytical framework used for the HPV vaccine awareness

demographic characteristics; obstetric history; and proximate variables such as sexual history, history of genital discharge or sore and awareness about cervical cancer. Each independent variable was cross tabulated with the dependent variable and significance tested using the Chi-square test. No variable was excluded from the multivariable logistic regression based on significance on the cross tabulations. Multiple logistic regression was done using backward elimination methods. Three models were tested: the first model included socio-demographic characteristics and a liberal p value of 15% was used for removal to ensure no variable with an appreciable confounding effect was excluded. The significant socio-demographic characteristics were then included in a second stage model with three obstetric variables added (previous pregnancies, previous abortions and number of female children).

The second stage model used a 5% nominal p value for removal. Two variables (number of deliveries and number of living children) were excluded due to multicollinearity. The final model added the remaining proximate variables (sexual history and cervical cancer awareness) to the variables significant from the second stage model. The logistic regression results were checked by using forward selection, and similar results were obtained as for backward selection. Model fit was checked and tested using Hosmer Lemeshow goodness of fit test (p<0.05) for all models. Odds ratios and 95% Confidence intervals were reported. Ethical clearance was obtained from University of Liverpool, United Kingdom, and the Oyo State Ethical Committee, Ibadan, Nigeria.

Results

Sociodemographic characteristics of respondents
The socio demographic characteristics of the respondents are presented in Table 1. The mean age of the women was 29.8 ± 8.2 years, and about one third were less than 25 years (29.2%). More than half had semiskilled occupations (56.2%), and more than half had secondary education (55.2%). Majority were married (63.1%), while about a third were single. Among those that were married, the mean age at marriage was 24.4 ± 4.1 years with less than half getting married between 25-29 years of age (42.0%). Majority were in monogamous unions (81.1%). Most of the respondents were Christians (75.9%) and mainly from the Yoruba ethnic group (70.7%). Income was not disclosed by over a third of respondents.

Table 1: Sociodemographic characteristics of respondents

Variable	Frequency	Percentage
Mean Age (SD) (years)	29.8 (8.2)	
Age group		
Less than 25	293	29.2
25-29	214	21.4
30-34	192	19.2
35-39	142	14.2
40 and above	155	15.5
No response	6	0.6
Occupation		
Highly Skilled	11	1.1
Skilled	62	6.2
Semiskilled	563	56.2
Unskilled	106	10.6
None/Housewife	249	24.9
No response	11	1.1
Educational status		
Primary	92	9.3
Secondary	553	55.2
Tertiary	311	31.0
None	29	2.9
No response	17	1.7
Marital status		
Single	347	34.6
Married	632	63.1
Separated	13	1.3
Widowed	2	0.2
No response	8	0.8
Mean age at marriage (SD)	24.5 (3.9)	
Age group at marriage		
<20	59	9.1
20-24	223	34.5
25-29	272	42.0
30 and above	55	8.5
No response	38	5.9
Family setting		
Monogamous	538	85.1
Polygamous	86	13.6
No response	8	1.3
Religion		
Christianity	761	75.9
Islam	214	21.4
No response	27	2.7
Ethnicity		
Yoruba	708	70.7
Hausa	114	11.4
Igbo	42	4.3
Others	104	10.4
No response	34	3.4
Income (naira / month)		
10,000 and less	282	28.1
11000-20000	185	18.5
20001+	135	13.5
Undisclosed	400	39.9

Table 2: Association between awareness of HPV vaccine as preventive strategy for CC and socio-demographic characteristics

Variable	Ever heard about HPV vaccine as preventive strategy for CC		Total	X²	P Value
	Yes (%)	No (%)			
Age group (years)					
Less than 25	8 (2.8)	282 (97.2)	290 (100)	9.909	0.042
25-29	5 (2.4)	200 (97.6)	205 (100)		
30-34	14 (7.4)	175 (92.6)	189 (100)		
35-39	9 (6.4)	132 (93.6)	141 (100)		
40 and above	10 (6.5)	143 (93.5)	153 (100)		
Occupation					
Skilled	14 (19.2)	59 (80.8)	73 (100)	37.986	<0.001
Semiskilled	18 (3.3)	531 (96.7)	549 (100)		
Unskilled	4 (3.8)	101 (96.2)	105 (100)		
None	9 (3.7)	237 (96.3)	246 (100)		
Educational status					
Secondary and less	19 (2.9)	647 (97.1)	666 (100)	15.64	<0.001
Tertiary	26 (8.6)	275 (91.4)	301 (100)		
Marital status					
Married	32 (5.2)	589 (94.8)	621 (100)	0.736	0.391
Others	14 (3.9)	341 (96.1)	355 (100)		
Family setting					
Monogamous	26 (4.9)	503 (95.1)	529 (100)	0.007	0.934
Polygamous	4 (4.7)	81 (95.3)	85 (100)		
Religion					
Christianity	39 (5.2)	709 (94.8)	748 (100)	1.296	0.255
Islam	7 (3.3)	204 (96.7)	211 (100)		
Ethnicity					
Yoruba	34 (4.9)	660 (95.1)	694 (100)	0.417	0.518
Others	10 (3.9)	246 (96.1)	256 (100)		
Income (naira/month)					
10,000 and less	8 (2.9)	270 (97.1)	278 (100)	3.744	0.290
11000-20000	10 (5.5)	171 (94.5)	181 (100)		
20001+	9 (6.9)	122 (93.1)	131 (100)		
Undisclosed	19 (4.8)	375 (95.2)	394 (100)		

Awareness and source of information about HPV vaccine

In all, only 46 respondents (4.6%) had heard of HPV vaccine as a preventive strategy and the reported sources of information were health workers (32.6%), the media (26.1%), friends/relations (10.9%), scientific presentations/conferences (8.7%) and medical literature (6.5%). Of the 46 that have heard about HPV vaccine, three (6.5%) respondents knew that HPV vaccines has been approved in Nigeria while 4(8.7%) had knowledge of its cost, and only one respondent (2.2%) had knowledge of the associated health problems with the HPV vaccine use (Table not shown). Concerning awareness about HPV vaccine, more than half of the respondents said

that HPV vaccine can prevent CC (53.9%), 42.8% were not sure and 2.8% felt that the vaccine cannot prevent CC.

Association between HPV vaccine awareness and variables

Tables: 2 and 3 show cross-tabulations of the association between awareness of HPV vaccine as preventive strategy for cervical cancer prevention and variables. A statistically significant relationship was found between awareness of HPV vaccine and age (p=0.042), occupation (p<0.001), and educational status (p<0.001) (Table 2). There was no significant relationship between awareness for HPV vaccine and selected obstetric variables such as number of previous pregnancies, abortion,

Table 3: Association between awareness of HPV vaccine as preventive strategy for cervical cancer, knowledge about cervical cancer and sexual health history

Variable	Ever heard about HPV vaccine as preventive strategy for CC		Total	X^2	P Value
	Yes (%)	No (%)			
Ever had sexual intercourse					
Yes	40 (4.8)	787 (95.2)	827 (100)	0.539	0.463
No	5 (3.4)	140 (96.6)	145 (100)		
Age at sexual debut					
<20	8 (2.8)	280 (97.2)	288 (100)	9.050	0.011
20-24	18 (5.1)	333 (94.9)	333 (100)		
25+	14 (9.5)	134 (90.5)	134 (100)		
Number of sexual partners					
1	25 (4.1)	586 (95.9)	611 (100)	9.228	0.010
2	4 (3.9)	98 (96.1)	102 (100)		
3+	10 (11.5)	77 (88.5)	87 (100)		
Had genital discharge or sore					
Yes	18 (7.8)	212 (92.2)	230 (100)		
No	27 (3.7)	700 (96.3)	727 (100)	6.593	-0.010
Has a relation/friend with CC					
Yes	2 (7.1)	26 (92.9)	28 (100)	0.420	0.517
No	43 (4.5)	905 (95.5)	948 (100)		
Know CC is preventable					
Yes	34 (7.1)	444 (92.9)	478 (100)	13.015	0.001
No	2 (3.3)	58 (96.7)	60 (100)		
Not sure	9 (2.1)	419 (97.9)	428 (100)		

miscarriages, and number of deliveries, living children and female children (Table not shown). Table 3 shows a significantly higher proportion of HPV vaccine awareness among respondents that reported older age at sexual debut (p=0.011), three or more sexual partners (p=0.010), previous genital discharge (p=0.010) and those who knew that CC is preventable (p=0.001).

The odds ratios and confidence intervals for Models 1 and 3 from the multivariable logistic regression are shown in Table 4. The results from Model 2 were excluded because there were no significant odds ratios for the obstetric variables that were considered. As shown in model 3, a significantly higher odd of HPV vaccine awareness was found among highly skilled women, those initiating sexual intercourse at older ages; women with multiple sexual partners and those aware that cervical cancer is preventable. The significant effect of age disappeared when the proximate variables were included in Model 3.

Discussion

Awareness of, and knowledge of health issues is widely accepted, as a gateway to making healthy choices or otherwise, and this is why it represents a key component of health promotion strategy [22, 23]. It has also been argued that the success of any public health intervention is determined by the overall awareness and perception of the community in question [22]. In general, low awareness is strongly associated with poor health outcomes when all other determinants such as personnel, cost and infrastructure are made available[23]. Even though most health policies indicate health awareness as a crucial aspect of interventions, it is sparingly considered especially in developing countries, and this gap has negatively impacted on the effect of such policies compared to western countries. For instance, cancer is sometimes not believed to be a medical disorder in Africa mythology and as such, this construct often precipitates delay in seeking health care till when definitive care is no longer feasible [24]. This has remained a recurring problem in developing countries on several health issues including CC.

This study shows that there is low level of awareness on HPV vaccine use in preventing CC, as only 4.6%had ever heard about it, and this is lower than 46.0%, 27.9% and 9.0% reported from similar studies in both Ghana, Lagos (Nigeria), and Botswana respectively[25-27]. A common similarity

Table 4: Logistic regression of awareness of HPV vaccine on variables+

Variable	Model 1		Model 3	
	Odds ratio (OR)	95% CI OR	Odds ratio (OR)	95% CI OR
Age group (years)				
<30	0.36	0.16 – 0.80		
30+	1			
Occupation				
Skilled (Ref)	1			
Semiskilled	0.25	0.11 – 0.56	0.15	0.06 – 0.34***
Unskilled	0.29	0.09 – 0.99	0.19	0.05 – 0.68*
None	0.35	0.12 – 0.99	0.24	0.09 – 0.69**
Educational status				
Secondary or less (ref)	1			
Tertiary	2.61	1.3 – 5.08		
Age at sexual debut				
<20(ref)			1	
20-24			2.56	0.95 – 6.94
25+			6.03	2.06 – 17.6**
Never had sex			1.20	0.18 – 8.21
Number of sexual partners				
1(ref)			1	
2			0.72	0.16 – 3.26
3+			4.72	1.94 – 11.44**
Never had sex			2.25	0.42 – 11.93
Had genital discharge or Sore				
Yes			2.07	1.02 – 4.20*
No (ref)			1	
Know CC is preventable				
Yes			3.26	1.53 – 6.94**
No (ref)			1	

Model 1 included age, occupation, education, marital status, family type, religion, ethnicity and income
Model 3 included age, occupation, education, age at first sex, number of sexual partners, ever had sex, genital discharge or sore last 12 months, aware that cervical cancer is preventable, and know a relation or friend who ever had cervical cancer
****p <0.001; **0.001<p<0.01; *0.01<p <0.05*
+ Model 2 not shown because none of the obstetric variables were significant in the model

of the three studies is that the population studied had higher level of education compared to this study. However, a comparison of the three showed that there is higher proportion of women with tertiary education (74%) in the Ghana study compared to the other two. This could plausibly explain the higher awareness level of HPV vaccine reported compared to the Botswana and the Lagos (Nigeria) studies, despite having a fairly similar mean age of women. On the contrary, the awareness level reported by Becker-Dreps *et al* among Kenyan women is lower than reported in this study as none of the 147 women studied had heard about HPV vaccine [28]. It can also be argued that the poor awareness reported in this Kenyan study may be due to the time the research was conducted. Specifically, the study was conducted around the time that HPV vaccine was being

introduced into the global market but the same explanation cannot be used for the current low level of awareness about HPV vaccine recorded in this study.

Regarding the associated factors with HPV vaccine awareness in this study, women who had skilled occupation, age of sexual debut 25 years and above, tertiary educational status, having three or more sexual partners, those with previous genital discharge or sore, and knowing that CC is preventable were independently associated with HPV vaccine awareness. Skilled occupation and tertiary level education are interrelated, and these attributes tend to be associated with better access to health related messages. This could be responsible for why both factors are associated with HPV vaccine awareness in this study. Access to the HPV vaccine

information could be from several educational resources such as literature, electronic platforms and other IEC sources. A study had shown that HPV vaccine related messages are abundantly available on the Internet and these social media platforms provide interactive information and networking of ideas between healthcare professionals and the consumer community [29]. Again, Yi *et al*, also reported that women that speak good English language among the Vietnamese population studied are more likely to be aware of HPV vaccination and this observation is similar to our finding[30].

Delayed sexual debut is surprisingly associated with better HPV vaccine awareness. The plausible explanation is that conservative sexual orientation such as delayed sexual debut might be due to an informed health choice. This may account for the result of this study. Again, women with multiple sexual partners tend to have better knowledge of how to prevent sexually transmitted infections and this could probably explain their better awareness in this study. Previous sexual infections and knowledge that CC is preventable suggest that women with these factors might have had contact with health information, which could be from health workers or from the facility. Elsewhere, other factors reported as influencing HPV vaccine awareness, which were not found significant in this study, are ethnicity and marital status[31].

Concerning the source of information about the vaccine, majority heard from health workers and the media. It is therefore not surprising that this finding is similar to those from studies in other settings [32]. The probable reason is that health workers form a significant porter of health promotion messages in many African countries. Again, use of media platforms (print and electronic) is another source of information dissemination that could be harnessed for promoting cervical cancer prevention messages including HPV vaccines. This could be by use of jingles, role-plays and discussion panels using culturally sensitive messages in local dialect. Although the study did not seek for preference of the media platform, radio followed by television and print in that order had been shown elsewhere to influence information dissemination [33].

Given that this paper focused on awareness of the HPV vaccine alone, it has been established elsewhere from several studies that there is a linear association between awareness and acceptability. The strength of this publication is manifold; first, the large sample size with negligible refusal provides adequate power to make valid conclusion. Second, the survey utilised a robust design of selecting study participants within their households and the community, this limits selection bias. Third, the wide age range of women that participated provided opportunity to assess intergenerational level of awareness. Fourth, the data collection was self-administered and each participant had sealed envelopes to guarantee confidentiality with a higher chance of more truthful response. A limitation of this study is that we did not explore how individual participants knew about the vaccine and other messages. In addition, it would have been interesting to determine the awareness level of men because of the recent clamour for inclusion of males in HPV vaccination, and the dominant role men play in decision-making within the household.

In conclusion, this study shows that HPV vaccine awareness is low among women who constitute the epicentre of the vaccination programme because of their strategic position within the household in sub-Saharan Africa. There is the need to design context specific promotional messages that will provide correct information on the significance of HPV vaccination in the prevention of cervical cancer.

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