

Willingness to Pay for Cervical Cancer Vaccines Among Female Secondary School Teachers in Enugu, Nigeria

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Abstract

Cervical cancer is preventable using vaccines given to adolescents in three doses. The affordability of these vaccines and people's willingness to pay (WTP) could affect the uptake of the vaccines, especially in developing countries. The study aimed to determine the willingness to pay for the vaccines and identify the factors associated with different levels of WTP among the participants. A cross-sectional study of 377 female teachers in the Enugu metropolis was undertaken between July and October 2017. A structured pre-tested interviewer-administered questionnaire was utilized for the collection of data. Willingness to pay was determined by the contingent valuation method utilizing the bidding game technique to estimate the maximum amount each participant would pay for the three doses of the HPV vaccine. Data were analyzed using SPSS version 20. The average monthly income of the participants was 152.18 USD (₦56307.91), with a range of 5.41-2162.16 USD (₦2,000 – 800,000). A considerable proportion (74.3%) of the respondents was willing to pay out of pocket for the vaccine. The average maximum willingness to pay for the three doses of the bivalent vaccine was 15USD, far below 63USD, which was the lowest cost for the three doses of the vaccine in Nigeria. Small family size ($P<0.05$) and high husband's monthly income ($P<0.05$) were significantly associated with increased willingness to pay for cervical cancer vaccine by the participants. In conclusion, the willingness to pay for the cervical cancer vaccine among the participants was high but at a lower average cost than it currently goes for in Nigeria.

Keywords: Cervical cancer, Enugu, Female, Teachers, vaccination, Willingness-to-pay.

Introduction

Cervical cancer is the second most common cause of death among women globally. It is the commonest genital tract cancer, especially among women residing in developing countries [1]. The World Health Organization (WHO) recognizes this disease as a public health problem. This disease has continued to kill a lot of women in developing countries because of the poor screening practices of women in these countries [2]. Poor vaccination of adolescents

with human papillomavirus vaccines has continued to maintain the burden of cervical cancer in developing countries.

The discovery of human papillomavirus (HPV) as the main agent responsible for the development of cervical cancer has brought a lot of hope in the treatment and possible elimination of this disease among women, especially those in developing countries where the disease burden is high. The discovery of HPV has further led to the development of

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potent vaccines to help primarily prevent cervical cancer globally.

Vaccination of uninfected girls/women before their first sexual intercourse protects against HPV and cervical cancer [3]. HPV vaccination has revolutionized and transformed the prospects of cervical cancer reduction worldwide. The target groups are young women aged 9-25 years [4]. A combination of HPV vaccination and various cervical cancer screening techniques will give higher and better outcomes in the reduction of morbidities and mortalities due to cervical cancer.

The common HPV vaccines (Cervarix (bivalent) and Gardasil (quadrivalent)) both protect against HPV serotypes 16 and 18. The Gardasil equally protects against HPV serotypes 6 and 11, which are “low-risk” viruses that cause genital warts. Three doses of each vaccine are given over six months. Cervarix is given at contact, a month later and six months from the first dose, while Gardasil is given at contact, two months later and six months from the first dose. Antibody production was noted in approximately 100% of women aged 15-26 years that were used in trials. This antibody production was about 10-104 times higher than what was obtainable following natural infections [5, 6, 7]. Both vaccines have been shown to have demonstrated efficacy in the clearance of over 90% of persistent HPV infections due to serotypes 16 and 18 in women that completed the three doses of the vaccine [8]. Cross protection against HPV serotypes 31 and 45 closely related to serotypes 16 and 18 respectively have been equally documented [9].

Immunization funding has been on the increase, especially with the introduction of new vaccines in low- and middle-income countries. Global Alliance for Vaccines (GAVI)/GAVI Alliance which is a Public-private partnership introduced by the WHO to increase the introduction of new vaccines in low and middle-income countries have requested part funding from GAVI-eligible

countries to help in reducing the increasing cost of supply of such vaccines in those countries [10]. As health needs continue to rise globally and health financing sub-optimal in most low and middle-income countries, providing health funding for subsidizing vaccines for the people in respective countries has become leaner. Therefore, prioritization of health funds during policy-making and determination of the willingness of individuals and families to pay for new and very essential vaccines becomes very important.

The human papillomavirus vaccine has been hailed globally as a pharmaceutical innovation that could benefit women maximally in terms of reducing the burden and infection rate of HPV in humans. However, this hope was cut short as the implementation of the use of this vaccine, especially according to the age group that needed the vaccine, was variously implemented sub-optimally and differently among countries of the world due to mostly financial reasons. Despite the huge efforts that have been put into ensuring universal/equitable distribution of this vaccine, economically marginalized populations still cannot have access to the vaccine due to several barriers that included the high cost of the vaccines, inadequate delivery infrastructure, and poor community engagement to create the necessary awareness about cervical cancer and early screening tools [11].

In light of the above, it, therefore, means that most individuals and families will procure this vaccine by out-of-pocket payment in most countries. Although the willingness of women to pay for this vaccine vary globally due mostly to affordability issues, with some studies reporting WTP above the current value of the vaccines in the area of study while others were far below the current cost of the vaccine [12, 13]; the WTP was found to be about 50% of the actual price of the vaccine in countries with GAVI alliance assistance for the supply of the vaccine [14].

In a Nigerian quantitative, cross-sectional, survey-based study that involved 438 mothers of girls aged 9-12 years in schools in both urban and rural secondary schools of Anambra state, the study was conducted over six months on the mothers' WTP for HPV vaccines. They found that the average WTP was US\$11.68, this was opposed to the delivery cost of US\$18.16 and US\$19.26 for urban and rural populations, respectively at vaccine price offered by the GAVI alliance and US\$35.16 and US\$36.26 for urban and rural populations, respectively at the lowest obtainable public sector vaccine price [13].

The prevention of this virus through HPV vaccination will reduce the incidence of this disease among women globally, especially those residing in developing countries. Unlike other childhood immunizations that are sponsored by the federal government and included in the National Programme on Immunization (NPI) schedules, HPV vaccines are currently not given free by any government in Nigeria and even among other developing countries. The bivalent vaccine costs 63USD, which was the lowest cost for the three doses of the vaccine in Nigeria. The rising cost of living and devaluation of the Nigerian currency has equally worsened and reduced the purchasing capability of families in Nigeria. This by extension, has affected the ability of women in Nigeria and other developing countries to afford for the purchase of this vaccine. This, therefore, underscores the need for this review of the cost and WTP of this vaccine among Nigerians. The information obtained can be used to inform the development or review of existing policies that will directly or indirectly increase the use of this vaccine among women in Nigeria.

Globally, the awareness and the acceptability of the HPV vaccine remain averagely high. In Nigeria, most of the studies were conducted among health workers, and this is meant to positively affect perceptions of cervical cancer and acceptability of the HPV vaccine among

those participants in the studies. This leaves the other populations of women unexplored. The secondary school teachers who play very important roles in raising the adolescents and even advising parents on the need for their wards to be vaccinated against HPV have been left unstudied. Although the diagnosis of cervical cancer is almost a death sentence in our environment, there is a paucity of published works on the WTP for HPV vaccine in Africa and Nigeria. Furthermore, the economic and human waste caused by this disease can be reduced if the spread of this disease is halted [15]. This can easily be achieved primarily if the use of cervical cancer vaccines is increased in our environment and the WTP for the HPV is vital in achieving this. This study, therefore, evaluated the WTP for the HPV vaccine and the factors influencing it among female secondary school teachers in Enugu, Nigeria.

Methods

Study Area

This study was conducted in secondary schools located in the Enugu metropolis. Enugu metropolis is the capital of Enugu state, and it has three local governments (Enugu South, Enugu North, and Enugu East). It has so many educational institutions, and most of the people in the metropolis are civil servants.

Study Population

The study population was female secondary school teachers in Enugu metropolis that were in both public and private secondary schools.

Study Design and Selection of Participants

This cross-sectional analytical study involving female secondary school teachers was conducted in public and private secondary schools in the Enugu metropolis. A well-structured self-administered questionnaire was used to collect data from consenting respondents in both the public and private secondary schools in the metropolis. Data from

the Statistics Department of Enugu state Ministry of Education showed that there were 35 public secondary schools and 117 private secondary schools in the Enugu metropolis. There were also 4608 female and 1577 male secondary school teachers in both public and private schools in the metropolis.

In all, a total of eighteen secondary schools were selected from the schools in three local government areas that made up the Enugu metropolis. Using a multi-stage sampling technique, six secondary schools were selected from each local government. From the sample frame of all the public secondary schools in each local government, four public secondary schools were randomly selected. Also, two private secondary schools were selected from each local government purposefully and proportionately since there were wide variations in the number of female teachers in these private schools. Consecutively consenting female teachers were selected and interviewed from each school until the number of teachers allotted to that school was reached.

Inclusion Criteria

All the consenting female secondary school teachers in the selected secondary schools were recruited for this study.

Exclusion Criteria

All the female secondary school teachers who were too sick to respond to the study questionnaires were excluded from the study.

Sample Size Estimation

The minimum sample size (n) was determined using the formula [16]: $n = Z^2 pq/E^2$, where Z = coefficient of Z statistics obtained from the standard normal distribution table. Using a willingness to pay rate (p) of 91.6% for the HPV vaccine for a similar study carried out in Onitsha, Anambra state [13], at a confidence limit of 95%, and sampling error of 3%. The calculated sample size (n) was 314. And assuming a non-response rate of 10% (31), the minimum sample size was 345 female

secondary school teachers. This study was a part of a bigger study whose sample size was 368; this minimum sample size was used.

Sampling Method

A multi-stage sampling technique was used in sample selection for this study. Purposively, all the local governments in the metropolis were selected. More public schools were chosen to reflect the population of public schools in the metropolis. The public schools were also more organized and accessible than the private schools in terms of knowing the staff strengths of the different schools readily. The public secondary schools used were selected using simple random sampling, while the private schools were purposively selected from each local government area (LGA). Four public secondary schools selected from each local government were selected using a simple random method from the list of all the secondary schools in each local government in the Enugu metropolis, while the two private schools were selected purposefully from each LGA. The female secondary school teachers used were consecutively selected from each school until the number allotted for that school was reached. The questionnaire was then administered only to the female secondary school teachers that gave consent for the research.

Willingness to pay among the participants was determined using the contingent valuation approach using the payment card technique to estimate the maximal amount each participant was willing to pay for the HPV vaccine [17, 18]. Difficulties in understanding some questions were clarified by the interviewer immediately but not answering the questions. Data extracted from these questionnaires were used for analysis.

Data Analysis

Analysis was done with Statistical Package for Social Sciences (SPSS) version 20.0 Evaluation version software. Analysis was both

descriptive and inferential with values set at 95% confidence level; a p-value of 0.05 was considered significant. Proportions were compared with Pearson's Chi-square, while means were compared with Student's t-test and cross-tabulation. Data were presented using tables, graphs, charts, etc., as appropriate.

Exchange Rate for Calculation of Costs

All calculations of costs were based on the exchange rate of ₦370 for US\$1, which was the average exchange rate of the local currency in Nigeria for a United States of American Dollars when this study was conducted.

Ethical Consideration

The ethical clearance certificate with number NHREC/05/01/2008B – FWA00002458 – IRB 00002323 for this research was obtained primarily from the University of Nigeria Teaching Hospital Ituku/ Ozalla, Enugu. Also, clearance was obtained from the principal of each of the schools used for this study.

Results

Socio-demographic Characteristics of the Participants

The overall response rate was 94.25% (377/400). The mean age of the participants was 37.46years, and most of the respondents were aged 30-39 years (40.6%). The majority of the participants were married in a monogamous family setting (75.9%) and were spouses in their families (73.2%). Most of the participants (69.0%) had tertiary education. The average duration the participants have worked as a teacher was 10.09 years, and most had taught for 1-9 years (61.3%). Most of the teachers (75.3%) did other jobs outside their primary teaching job to bolster their economic status. The other details of socio-demographic characteristics of the respondents are as shown in Table 1.

Household Income and Expenses of Participants

The average monthly income of the participants was 152.18 USD (₦56307.91), with a range of 5.41- 2162.16 USD (₦2000 – 800000). This monthly income is comprised of both the earnings from both school salary and any other sources of income at the disposal of the teacher. The mean monthly income of the husbands of the participants was 352.30 USD (₦130,349.35) with a range of 27.03 – 6756.76 USD (₦10000 – 2500000). The average weekly expense of the participants on food was 25.3 USD (₦9361) with a range of 3- 389.73 USD (₦1110.00- 144200). The mean yearly expense made on non-food items by the house-hold was 1447.99 USD (₦535758.63) with a range of 97.3 – 9797.30 USD (₦36000 – 3625000). The other details of house-hold income and expenses of participants are as shown in Table 2.

Distribution of Participant's Maximum amount Willing to Pay for Cervical Cancer Vaccine and Reasons for their Levels of Payment

Among all the participants, 74.3 % of them accepted to pay out of pocket for the cervical cancer vaccine. The average willingness to pay for the three doses of the bivalent vaccine among those who accepted to pay out of pocket was 15.01USD (N5,568.0), while among all participants, the average willingness to pay was 11.47 USD (N4, 242.84). Among the reasons the respondents noted for the different constraints to payment were, most (60.9%) believed that they couldn't afford to pay out of pocket for the three doses of the vaccine, while 35.8% of the respondents believed that government should provide this vaccine free to the people. Other reasons are shown in Table 3.

Table 1. Sociodemographic Characteristics of the Participants

Variables	Frequency (n=377)	Percent
Age (Years)		
10-19	2	0.6
20-29	75	19.9
30-39	153	40.6
40-49	100	26.5
50-59	45	11.9
60-69	2	0.5
Mean=37.46 SD=9.15, Range=18-60		
House-hold status		
Head	37	9.8
Spouse	276	73.2
Children	64	17.0
Number in the household category		
1-5	193	51.2
6-10	176	46.7
11-15	8	2.1
Years of experience category		
1-5	157	41.6
6-10	95	25.2
11-15	38	10.1
16-20	46	12.2
21-25	19	5.0
26-30	13	3.4
31-35	9	2.4
Mean = 10.08, SD=8.072, Mode = 5, Range= 1-35		
Level of Education		
Secondary	17	4.5
Tertiary	260	69.0
Post graduate	100	26.5
Marital status		
Married in monogamous	286	75.9
Married in polygamous	10	2.7
Divorced	2	0.5
Widowed	25	6.6
Single	52	13.8
Separated	2	0.5
Teaching only		
Yes	93	24.7
No	284	75.3

Table 2. Household Income and Expenses of Participants

Variable	Frequency (N)	Percentage
Participants monthly income category (₦)		
<18000	23	6.1
18000-49999	185	49.1
50000-99999	132	35.0
100000-199999	30	8.0
>199999	7	1.9
Mean= 56307.91, SD = 62358.37, Range = 2000 – 800000		
Husband's monthly income category (₦)		
1-17999	2	0.6
18000-49999	44	14.2
50000-99999	199	38.5
100000-199999	97	31.4
200000-499999	37	12.0
500000-999999	7	12.3
>999999	3	1.0
Mean = 130349.35, SD = 186758.56, Range = 10000-2500000		
Total food cost per week category (₦)		
<5000	85	22.5
5000-9999	172	45.6
10000-19999	102	27.1
20000-49999	17	4.5
50000-100000	0	0
>99999	1	0.3
Mean =9361.00, SD = 8981.67, Range = 1110 – 144200		
Non-food cost per year category (₦)		
<50000	2	0.5
50000-99999	3	0.8
100000-199999	33	8.8
200000-499999	179	47.5
500000-999999	129	34.2
1000000-2000000	26	6.9
>2000000	5	1.3
Mean = 535758.63, SD = 406685.67, Range = 36000 - 3625000		

Table 3. Distribution of Participant’s Maximum Amount Willing to Pay for Cervical Cancer Vaccine and Reasons for their Levels of Payment

Variable	Frequency (n=377)	Percent	
Maximum amounts participants were willing to pay category (Naira)			
0-9999	324	85.9	
10000-19999	27	7.2	
20000-29999	16	4.2	
30000-39999	9	2.4	
40000-49999	1	0.3	
Mean 4,242.84, SD=7,313.84, Minimum= 0.00, Maximum = 40,000.00			
Reason for the levels of payment	Response	Frequency	Percent
Cannot afford the vaccine	Yes	229	60.7
	No	148	39.3
Don’t believe the vaccine can protect against cervical cancer	Yes	6	1.6
	No	371	98.4
Believed it will lead to promiscuity	Yes	9	2.4
	No	368	97.6
Believed government should provide the vaccine free to the people	Yes	135	35.8
	No	242	64.2
Cultural reasons	Yes	1	0.3
	No	376	99.7
Because of suspected side effects of the vaccine	Yes	9	2.4
	No	368	97.6
No obvious reason	Yes	27	7.2
	No	350	92.8

Social Factors Associated with Willingness to Pay among Respondents

Willingness to pay was significantly associated with the number in the households. The larger the household, the less likely the participants will be willing to pay for the cervical cancer vaccine. The details of the other social factors associated with willingness to pay of the respondents are shown in Table 4.

Economic Factors associated with Willingness to pay for HPV Vaccine among Respondents

The average monthly income of the husbands of the respondents was significantly

associated with participant’s willingness to pay for the vaccine (0.043). Below ₦18000 (USD48.65), very few responds were willing to pay for the HPV vaccine, while those whose husbands were earning ₦500000 (USD1351.35) are more likely to be willing to pay for the cervical cancer vaccine. Equally, the yearly income spent on non-food items was significantly associated with willingness to pay for the HPV vaccine. The higher the amounts spend on non-food items, the more the respondents were willing to pay for the HPV vaccine. The details of economic factors associated with willingness to pay were shown in Table 5.

Table 4. Factors associated with Willingness to Pay among Respondents

Variable	Sub-category	Willingness to pay for cervical cancer vaccine		Chi-square	P-value
		Yes	No		
Age group category	10-19	1	1	1.731	0.885
	20-29	57	18		
	30-39	111	42		
	40-49	75	25		
	50-59	34	11		
	60-69	2	0		
Marital status	Married monogamous	215	71	1.859	0.868
	Married polygamous	8	2		
	Divorced	1	1		
	Widowed	18	7		
	Single	37	15		
	separated	1	1		
Years of teaching	1-5	124	33	9.566	0.144
	6-10	66	29		
	11-15	27	11		
	16-20	34	12		
	21-25	10	9		
	26-30	11	2		
	31-35	8	1		
Household status	Head	24	13	2.042	0.360
	Spouse	209	67		
	Children	47	17		
Number in the household	1-5	147	46	6.038	0.049
	6-10	130	46		
	11-15	3	5		
Level of education	Secondary	13	4	0.144	0.931
	Tertiary	194	66		
	Post-graduate	73	27		
Received cervical cancer vaccine	Vaccinated	10	3	0.050	0.824
	Not vaccinated	270	94		
Any existing cervical cancer programme	School programme exists	27	7	0.517	0.472
	No school programme	253	90		
Taught students on cervical cancer vaccine	Have taught before	21	7	0.008	0.972
	Have not taught students	259	90		
Knowledge category	Good	114	44	0.598	0.439
	Poor	165	53		

Table 5. Economic Factors associated with Willingness to Pay for HPV Vaccine among Respondents

Income/expenses category (Naira)		Willingness to pay for cervical cancer vaccine		Chi square	P value
		Yes	No		
Average monthly income of participant category	<18000	14	9	5.064	0.281
	18000-49999	140	45		
	50000-99999	98	34		
	100000-199999	21	9		
	>199999	7	0		
Average Husband income per month category	1-17999	1	1	13.002	0.043
	18000-49999	26	18		
	50000-99999	97	22		
	100000-199999	70	27		
	200000-499999	30	7		
	500000-999999	7	0		
	>999999	2	1		
Yearly non-food household expenses category	<5000	0	2	12.826	0.046
	50000-99999	1	2		
	100000-199999	20	13		
	200000-499999	135	44		
	500000-999999	99	30		
	1000000-2000000	21	5		
	>2000000	4	1		
Household food cost category	<5000	67	18	4.577	0.351
	5000-9999	128	44		
	10000-19999	72	30		
	20000-49999	13	4		
	>99999	0	1		

Discussion

In this study of female secondary school teachers' willingness to pay for the HPV vaccine, the high cost was expressed as a major challenge in accessing the HPV vaccine. A similar finding was reported in some earlier studies [19, 20, 21]. Other barriers to non-administration of HPV vaccines noted in other studies include unavailability/accessibility [20, 22] and fear of side effects [23]. These factors could be working together to perpetuate poor uptake of the HPV vaccine and as a result, the high prevalence of cervical cancer in this part of the world. The support these mothers get from their husbands may have been

instrumental as the husband's monthly income was found to be a major predictor of participant's willingness to pay.

The willingness to pay out of pocket for the cervical cancer vaccine was high (74.3%) among the respondents in this study. This finding was lower compared with 91.6% of mothers of secondary school children in a study in Anambra State, Nigeria [13] in a study in which mothers were willing to pay out of pocket for the vaccine. The difference noted in the proportion of women willing to pay for the HPV vaccine may be connected to the sharp decline in the purchasing power of the monthly salaries of the respondents over the period

between the two studies where 55.2% of them earned below 135USD (₦50000) in a month. In a study in Bangkok, Thailand [24], the proportions of respondents that were willing to pay for school girls aged 12-15 years were 68.9 and 67.3% for bivalent and quadrivalent HPV vaccines, respectively, and the values were similar to the finding in this study. In a similar study in Santiago, Chile, a similar proportion (75%) of women were willing to pay for the HPV vaccine, and this proportion increases to 95% if the price of the vaccines were reduced by 50% [25].

In this study, the average amount the respondents were willing to pay was approximately 15 USD (₦5568) for the three doses, i.e., 5 USD per dose. This value is about 10% of the average earnings of the respondents and may seem high for the consumption of such a preventive service. However, cancer of the cervix is not curable once established, and the resources involved in the management of cervical cancer cases are huge with the attendant reduced social life and self-esteem. Most cases lead to mortality or leave the patient with varying degrees of morbidities. Therefore, any amount budgeted for the prevention of this deadly disease will be deemed to be cost-effective.

The average amount the respondents were willing to pay is comparable to a willingness to pay amount, 5.84USD that was reported in a similar study in Anambra state, Nigeria, among mothers of secondary school students [13]. These values were consistent with the proportion of these women that were willing to pay in both studies. The average WTP per dose was also comparable to the findings in a study in Bangkok, Thailand, where 32% of the respondents accepted to pay between 10-16.67USD (300-500 Baht) for the three doses of the bivalent vaccine [24]. Both study populations in these studies above were urban dwellers, and this may have contributed to the level of their willingness to pay and the amount they accepted to pay. The finding of this report

was, however far below the average WTP of 349.33USD (10,479.9 Baht) for a bivalent vaccine among parents in Songkhla province of Thailand [12]. The high level of household income of the parents used in the Songkhla province, Thailand study may have contributed to their level of WTP for the bivalent vaccine.

In a Malaysian study among medical undergraduates, their average WTP for cervical cancer vaccine was 108USD [26]. This report was far higher than that noted in this current study. The importance they attached to cervical cancer and the HPV vaccine, which protects against cancer, may have influenced their WTP. In a Nationwide study in the United States of America, the average maximum willingness to pay for the HPV vaccine ranged between 560-660USD for mothers of adolescent girls. The wide economic situations may have been responsible for the wide difference between the mothers in the USA study and those used in this study. It is understandable from the various levels of WTP among populations that the cost of the vaccine and the economic status of the study populations were related to the maximum amount respondents were willing to pay. This underscores the need for this vaccine to be subsidized or even given freely by the government of developing countries where payment for this vaccine may be difficult. This in the long run, will be a cheaper way of preventing cervical cancer, whose burden remains among developing countries.

The implication of the mean value of maximum WTP of the respondents (5USD) is that this amount is far less than the lowest cost of a dose of the HPV vaccine (21USD), although the cost of this vaccine can be as high as 100USD in some health facilities in the country. This further implies that most of the participants will not be able to afford a dose of the HPV vaccine. This, therefore, paints a gloomy picture for the prevention of cervical cancer in Nigeria, a country that contributes about 10% of cervical cancers globally and has no well-organized cervical cancer screening

programme in place. Government should therefore subsidize this vaccine to a price close to this mean willingness to pay amount (15USD for the three doses of vaccine) to help increase the uptake of the vaccine and this will be done at a cost that will not be a burden to the government.

As noted in this study, one of the predictors for WTP by the respondents was the husband's monthly income which is a major determinant of expendable family income. Mothers in this part of the country are usually dependent on their husband's income for the consumption of services, although in actual reality getting the money off some of the husbands may be difficult. Therefore, the higher the amounts available for that family to spend, the more WTP for preventive services like cervical cancer vaccination. When the husband's income is not readily available, the woman's income now becomes a big factor in determining WTP for this cervical cancer vaccine in addition to other household needs. Most of the respondents noted financial difficulty as one of their limitations to pay for this vaccine since their monthly take-home was lean; therefore, the monthly income of these teachers may not be a predictor of WTP for this vaccine, as noted in this study. This suggests that to increase the uptake of this vaccine, the government has to put all necessary effort to include this vaccine as one of the free vaccines in the National Programme on Immunization schedules. Secondly, secondary schools and their teachers can be utilized to help increase the awareness of this vaccine among parents to see the need for them to vaccinate their children against cervical cancer.

In addition, the number of add in households was also a predictor of willingness to pay as respondents with smaller family sizes had more

likelihood of recommending the vaccine to their children/relatives. Cervical cancer vaccination is therefore no longer a "need" but now becomes a "want" in these households with large family sizes due to several competing priorities. So, addressing the issue of very large family size among households with lean monthly income through increased uptake of contraception should be addressed by the government, and this may increase the uptake of cervical cancer vaccines in the long run.

Conclusion

The mean maximum willingness to pay was 15USD for the three doses of the vaccine, and one of the major predictors for their willingness to pay was the participant husband's monthly income.

Recommendations

Government should also increase their efforts towards adjusting the current minimum wage upwards above ₦18000 as this will help increase the economic status of women and equally increase uptake of the vaccine, as noted in this study.

Government should subsidize the current price of this vaccine to a value close to the average amount respondents were willing to pay for this vaccine, as noted in this study, to increase uptake of the vaccine by mothers.

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Conflicts of interest

There are no conflicts of interest.

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