



## Awareness and Uptake of Cervical Cancer Screening, Vaccination and Associated Factors among Female Undergraduates in Nigeria

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### Abstract

Cervical cancer though preventable, is one of the leading causes of death among women. Its incidence is still very high in Nigeria despite the availability of a vaccine against the virus that has been implicated in the incidence of many cases of cervical cancer. This study determines awareness, uptake, screening and vaccination against cervical cancer (CC) among female undergraduates in a Nigerian University. This descriptive cross-sectional study was done among female undergraduates. Participants were recruited using a multistage sampling technique. A structured questionnaire with ascertained validity and reliability (0.86) was administered to 313 female students. Data analysis was done using descriptive statistics. Awareness of CC was high (73.5%) while that of screening (52.1%) and vaccination (26.8%) were moderate and low respectively. Only 9.3% had good knowledge of CC. The uptake of screening (9.3%) and vaccination (6.1%) were low. Some of the participants opined that lack of awareness was the major reason mentioned for non-uptake of screening (47.9%) and vaccination (73.2%). The study showed that awareness and uptake of screening and vaccination were low. There is a great need to reduce the incidence of CC which seems almost impossible with the current level of screening and vaccination uptake. Though there is an advocacy for a policy on national screening and vaccination, there is a great need to leverage opportunistic screening by healthcare workers.

**Keywords:** Cervical Cancer, Knowledge, Screening, Uptake, Vaccination.

<https://dx.doi.org/10.4314/bjnhc.v6i1.11>

### Introduction

Worldwide, Cervical Cancer though preventable is the fourth most common type of cancer seen in women worldwide and third in Nigeria (Sung et al, 2021). When detected and treated early, it is a highly avertable and curable disease, especially in its precancerous stage (Sowemimo, et al., 2017). The incidence is increasing in Sub-Sahara Africa (Jedy-

Agba et al., 2020). All over the world in 2020 alone there are 604 127 cases of CC resulting in 341 831 deaths (Singh, et al., 2022). Several risk factors are implicated in the aetiology of CC which includes many male sexual partners, early sexual debut, and male sexual partners who have many partners (Braun et al, 2021). Others are smoking and frequent sexually transmitted infections like

Chlamydia and HIV (Franchini, et al 2022; Pillai, et al., 2022). However, CC is largely preventable with screening and prompt vaccination.

One of the known effective ways to abate the incidence of CC, the number of new cases and mortality from CC is through cervical cancer screening (CCS) (Adewumi, et al, 2022). However, in many countries, the attendance rate of CCS is far from satisfactory (Ubah et al, 2022; Mafiana, 2022). Studies have shown that there is limited access to CCS facilities (Mba & Ndie, 2016; Fuzzell, *et al.*, 2021; Gizaw et al. 2022). Poor infrastructure, marital status, inadequate staff, distance to health facilities, poor knowledge and illiteracy have been documented to result in poor uptake of screening among women especially those in places with available screening facilities (Ubah, et al, 2022; and Mafiana, 2022). The uptake of CCS is high and effective in the prevention of CC in many developed nations of the world (Wymann, et al., 2018). Conversely, the uptake of CCS is rather low in Nigeria and other LMICs unlike in the more high-income nations (Uchendu, et al, 2021). Oluwole et al. (2017) documented a 13.3% level of screening uptake among rural women in Lagos. In another related study among women in urban slums in Lagos, 0.7% of the women have had CCS done before (Olubodun, et al., 2019).

Nigeria as one of the low-income countries faces the challenges of CCS including limited access to healthcare; attitudes of healthcare workers, and inadequate laboratory services. In addition, few screening programs are offered, population awareness is limited or nonexistent, and referrals are poor (Dulla, et al., 2017). Also, the screening is not

free except in a few facilities that enjoy funding to conduct screening services for research purposes. Scholars have suggested infrastructural deficits (Finocchiaro-Kessler, 2016). Inadequate knowledge, personnel, illiteracy and poverty (Bao, et al, 2018) as factors associated with low uptake of CCS (Gebreegziabher, et al., 2014). Idowu et al (2016) also suggested attitudes of women about CCS as a strong predictor of uptake of CCS. Higher parity and age have also been documented to be associated with the uptake of CCS (Chang, 2017).

There is a poor knowledge of CC and CCS in low-income countries (Ndejjo et al, 2016; Bayu et al, 2016). In Lagos, Nigeria, a study submitted that half of the female study participants have a good knowledge of the preventive strategies for CC (Egbonrelu & Wright, 2018). Oluwole et al. (2017) also documented poor knowledge of CCS among women. Undoubtedly, these statistics will be worse in rural areas.

Cervical cancer vaccination (CCV) is a cost-effective means of preventing CC (Cunningham et al 2015). However, awareness and uptake of CCV in Nigeria are low (Ojimah & Maduka, 2018). The main concern about the introduction of CCV in Nigeria is the possibility of side effects and high costs (Balogun & Omotade, 2018). Also, marital status, parity and knowledge about human papillomavirus (HPV) have been documented as the predictors of uptake of the vaccine (Ojimah & Maduka, 2018). While a lot has been documented about the uptake of CCS in Nigeria, little is known about CCV in Nigeria. A recent study among female undergraduates from the South-south region of Nigeria only assessed the uptake of CCV (Ojimah &

Maduka, 2018). Despite the documented importance of CCS and CCV in abating morbidity and mortality related to CC (Finocchiaro-Kessler et al, 2016), its uptake is still very low.

### **Objective**

Our study aimed at assessing awareness and uptake of CCS and CCV among young people. Factors associated with the uptake of CCS and CCV were also examined. This is to suggest possible ways of improving CCS and CCV among young people in Nigeria.

### **Material and Methods**

Female undergraduate students of Ladoke Akintola University of Technology Ogbomosho, Oyo State, Nigeria were recruited for the study. A descriptive cross-sectional design was adopted to assess awareness and uptake of CCS, CCV, and associated factors among the students.

The sample size was calculated using the Cochran, (1963) formula for single proportions. A multistage sampling technique was used to recruit a total of 313 female undergraduate students for the study. Random selection of three (3) of the nine (9) faculties in the university using the ballot system was done. This is followed by randomly selecting two (2) undergraduate departments in each of the previously selected faculties making a total of six (6) departments in all. In the last stage of recruitment, simple random techniques were used to recruit female students from each of the selected departments.

A structured questionnaire was the scale used to retrieve information from the participants. Information from previous studies on CC was used to develop the questionnaire. The scale is subdivided into

four (4) sections. The first section assesses the sociodemographic characteristics of the participants. Awareness of CC, CCS, and CCV was assessed in the second section of the scale which is made up of fourteen (14) items. The third section consisted of 10 questions of “yes”, “no” and ‘I don’t know’ options that assessed participants’ knowledge, of CC risk factors. The 14-item scale that assessed CCS and CCV practices formed the last section of the scale.

The validity of the scale was ensured using face and content validity criteria. The scale has a reliability index of 0.86 when it was pretested in a similar population to the population of the study. Verbal and written consent was obtained from all participants after thorough information about the study was provided to them. The research protocol was approved by the Research and Ethics Committee of Bowen University Teaching Hospital, Ogbomosho (BUTH/REC-878).

The data were cleaned as appropriate and entered into the Statistical Package for Social Sciences (SPSS) for analysis. Knowledge score was calculated and the score “1” was given to every correct answer, the highest score attainable was 10. Knowledge was graded into “poor” (0 – 3), “moderate” (4 – 7), and “high” (8 – 10). Frequency tables were generated.

### **Results**

The socio-demographic characteristics of the participants as revealed in Table 1 showed that the majority 48.6% of the students were within the age range of 21-25 years (mean age 22.39 years), and 87.2% were single. Assessing the awareness of CC, CCS and CCV as shown in Table 2 revealed that most of the students, 230(73.5%) were aware of CC. A major source of awareness about CC

was the internet (34.2%). More than half of the students in the study were aware of CCS (52.1%). Similarly, the internet was found to be the highest source of awareness of CCS (14.4%). Out of those that were aware of CCS 18.8% first heard about it between 6 months to a year from the time of data collection. Only one of the participants has heard about CCS for more than five years. When asked about Pap smear, only 42.5% of the students in the study had heard about Pap smear before. Likewise, only 5.1% of the participants were aware of any CCS centre in Ogbomosho where this study was carried out. Conversely, only 26.8% have heard about CCV. Doctor (7.7%) was found to be the highest source of information about CCV.

Results as presented in Table 2 also showed that only half (50.5%) of the participants know that Pap smear is a diagnostic test for CC. About 22.0% opined that it is used to treat CC. On the appropriate time for CCS, very few know when it should be done. Knowledge of the participants in this study about the frequency of CCS showed that very few (13.7%) said it should be done once in ten years.

Assessment of the knowledge of CC risk factors as shown in Table 3 revealed that respondents' knowledge of CC risk factors as early age of sexual debut (55.6%), and multiple sexual partners (63.9%). Some of the students agreed that CC risk factors; include witches and wizards (7.3%); uncircumcised husband/wife (18.2%) and previous family history (44.7%). Results also showed that 44.4% of the students opined that viral infection caused by human papillomavirus can cause CC while 13.7% believe that having too many children is a

risk factor for CC. A summary of participants' knowledge about risk factors for CC showed that only 9.3% had good knowledge of CC risk factors (Figure 1).

The uptake of CCS and CCV as shown in Table 4 revealed that only 9.3% had been screened for CC before. Among those that had been screened before, the majority (82.8%) had been screened only once while 17.2% had been screened twice. Results also showed that 55.2% of those who had been screened before had the screening done within the last 6 months, 41.4% had the screening done 6 months to 1 year ago and only one participant had been screened for more than two years. The majority (8%) had the screening between 20 and 22 years of age. Results also showed that the majority of the participants (70.9%) did not plan to take up or continue Pap smear.

Only 6.1% have been vaccinated with only one (1) dose of the vaccine. Among the participants who have never been vaccinated, the majority (89.5%) would like to be vaccinated. The major factor affecting the uptake of CCS as shown in Table 5, was lack of awareness (47.9%). Other factors included; cost (5.8%), ignorance of the need for it (20.1%), lack of information about the centre of screening (9.3%) and time (7.7%). Similarly, the major factor affecting the uptake of CCV was a lack of awareness (73.2%). Other factors included; ignorance of the need for it (9.6%), lack of information about vaccination centres (4.8%) and of time (5.4%).

## Discussion

This study assessed the awareness and uptake of CC, CCS, and CCV among female undergraduates in a Nigerian university. The awareness of women on CC, CCS and CCV is very important as it

increases the uptake of screening and vaccination, thereby, helping to reduce the prevalence of CC. Similar to the submission of Omorogbe and Ehizemwogie (2019) in a study in Benin City Nigeria, the majority of the students that participated in this study were aware of CC. This is also similar to the findings of previous studies (Olubodun, et al., 2019; and Abugu, Nwagu, 2021). Conversely, a low level of awareness and knowledge has been documented among female professional college students (Manikandan et al, 2019), women in Pakistan (Sultana, et al., 2019); rural women in India (Kadian, et al, 2021); female students in an Ethiopian University (Tesfaye, et al, 2019) and at two district health centres in Cameroon (Simo, et al, 2021). The reason for a high level of awareness among the participants in our study might not be unconnected to the fact that our study was carried out in a university in an urban centre with a high rate of publicity and campaign about CC and CCS.

The main source of awareness about CC by respondents in this study was observed to be through the Internet, this is in contrast to the findings of previous studies where the school was reported to be the highest source of awareness (Tesfaye et al 2019). The difference in the results of the study to the previous study might not be unconnected to the fact that in recent times adolescent usage of the internet and social media as sources of information especially on reproductive health issues has been on the increase (Ibegbulam et al 2018)

On awareness of CCS, only about half of the respondents have heard of CCS, this is consistent with the findings of Leo, (2020) in a study among women of reproductive

age in Abuja, Nigeria. However, other previous studies in Nigeria and other countries documented very low levels of awareness of CCS among women (Manikandan et al, 2019; and Sultana, et al., 2019). Generally, previous studies conducted among women in urban slums and those living in rural areas in Nigeria documented a low level of awareness of cervical cancer screening (Olubodun, et al., 2019; Okunowo, & Smith-Okonu, 2020) contrary to the findings of this study. However, studies among students and women in elite communities supported the findings of this study. (Okunowo et al, 2018; and Musa, et al., 2019)

Awareness of CCV reveals that most of the participants have not heard of CCV before (Ojimah & Maduka, 2018). This further confirms the non-awareness of vaccination against CC. While the government, international donors and organizations emphasize and promote immunization among children under 5, little attention is devoted to older children, adolescents, and adult immunization which vaccination against CC falls under. Cervical cancer vaccination is recommended for children between 11 and 12 years old but may be earlier at age 9 and through age 26 provided such individuals have not made their first sexual debut. Presently in Nigeria, vaccination against CC is not on the national programme of immunization. Results of our study further confirmed health workers as a major source of health information among the populace (Aliu et al, 2022)

On assessing knowledge of CC risk factors, most of the students knew that the early age of sexual debut is a risk factor for CC (Itarat et al 2019). About two-

thirds knew that having multiple sexual partners can also expose an individual to the risk of CC similar to the findings of previous studies (Olubodun, et al., 2019; and Zhang et al, 2020). Only one-third knew that smoking can predispose people to CC. Also, two-thirds of the respondents knew that frequent sexually transmitted diseases can increase the tendency of someone to have CC. Less than one-quarter of the students identify diet as a CC risk factor. About half of the students knew that previous family history and viral infection caused by HPV can predispose people to CC. Knowledge scores were awarded to each correct answer and only a few participants had good knowledge of the risk factors of CC (Olubodun, et al., 2019; and Ijezie & Johnson, 2019).

In our study, most of the students had not been screened for CC. This corroborated the poor uptake of screening that had been documented among different populations in Nigeria (Okunowo et al, 2018 and Olubodun et al, 2019). The Majority, out of the very few that have had CCS done before in this study have done it only once. This generally reveals a very poor uptake of CCS among the students who participated in this study. Omorogbe and Ehizemwogie (2019) in an earlier study among female students in Nigeria documented poor uptake of CCS. Our study therefore showed that despite high awareness of CC and CCS, uptake of screening is very poor (Abugu & Nwagu, 2021). The reason for this might be due to the persistence of earlier documented barriers of culture, religion, and socioeconomic status among women in Nigeria (Uchendu et al, 2021).

The uptake of vaccination against CC is poor among women in LMIC like Nigeria

(Islam et al, 2017; and Aliu et al, 2022) despite its numerous advantages (Brisson, 2020). The findings of this study further confirm this poor uptake of CCV. Also, the uptake of CCV among participants in this study was found to be lower than what was documented among female undergraduates in the south-south region of Nigeria (Ojimah & Maduka, 2018). However, similar to what was reported among parents of adolescent girls in Nigeria (Azuogu et al, 2019 and Aliu et al, 2022) but better than submissions of previous studies among secondary school teachers in Enugu (Enebe et al, 2021) and female undergraduates in Lagos State (Oluwole, et al, 2017). Our findings are far lower than what was reported in the United States of America (Degife et al., 2023) and Nepal et al. (2023)

The most mentioned factor affecting the uptake of both CCS and CCV among participants in this study was found to be awareness. This is closely related to the submissions of an earlier study. (Devarapalli, et al, 2018; and Donatus, et al, 2019). This emphasizes the importance of awareness creation in promoting the uptake of CCS and CCV. Previously, scholars had also emphasized the importance of motivation in promoting the uptake of CCS (Abadi, et al., 2018). Awareness can therefore be the first step in motivating undergraduate students to go for CCS and CCV.

### **Conclusion**

The study found that although awareness of CC is high, awareness of CCS and CCV is low. Most of the students had average knowledge of CC risk factors. The majority of the respondents have never been screened or vaccinated against CC before. The major factor for the poor uptake of CCS and CCV was a lack of

awareness. Therefore, there is a need for more awareness regarding the importance of CCS and CCV and also awareness of screening centers. A national CCS and CCV policy is advocated in Nigeria but in the interim, greater use of opportunistic screening by health professionals should be strongly pursued.

### Implications

The result of this study showed that more awareness is required on CCS and CCV, furthermore, only a few got the information from nurses, which implied that nurses should work more on creating awareness of CCS and CCV. Health education can be provided in major women's health clinics.

### Authors' Contributions

MIO, GEE and GOA conceive the study and design the protocol. GEE, GOA, and CBB participated in the literature review. GEE, TOD and TTF participated in data collection. MIO and GEA analyze the data and write the initial draft of the manuscript. All authors review and approve the manuscript.

### Acknowledgement

The authors appreciate the contributions of the students who participated in the study.

### Conflict of Interest

No conflict of interest was declared by any of the authors

### Funding

No funding was received for this study.

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**Tables**

**Table 1: Socio-demographic Characteristics of Respondents**

<b>VARIABLE</b>	<b>FREQUENCY (n=313)</b>	<b>PERCENTAGE (%)</b>
<b>AGE (Years)</b>		
16-20	137	43.8
21-25	152	48.6
26-30	23	7.3
31-35	0	0
36-40	1	0.3
Mean age= 22.39 years		
<b>MARITAL STATUS</b>		
Single	273	87.2
Married	36	11.5
Divorced	4	1.3
<b>RELIGION</b>		
Christianity	221	70.6
Islam	86	27.5
Traditional	6	1.9
<b>ETHNICITY</b>		
Hausa	19	6.1
Igbo	37	11.8
Yoruba	249	79.6
Others	8	2.6
<b>AVERAGE MONTHLY INCOME /ALLOWANCE (NAIRA)</b>		
1000-10000	96	30.7
11000-20000	103	32.9
21000-30000	61	19.5
31000-40000	21	6.7
41000-50000	19	6.1
51000-60000	3	1.0
61000-70000	4	1.3
71000-80000	3	1.0
81000-90000	3	1.0

**Table 2:** *Awareness and Knowledge of Cervical Cancer, Cervical Cancer Screening and Vaccination*

VARIABLES	CHARACTERISTICS	FREQUENCY (n=313)	PERCENTAGE (%)
Ever heard of cervical cancer	Yes	230	73.5
	No	83	26.5
Through whom I first heard about cervical cancer N=230	Family	20	6.4
	Friends	27	8.6
	Doctor	34	10.9
	Nurse	16	5.1
	Newspaper	4	1.3
	Television	22	7.0
	Internet	107	34.2
Ever heard about cervical cancer screening	Yes	163	52.1
	No	150	47.9
Through whom I first heard about cervical cancer screening N=163	Family	16	5.1
	Friends	17	5.4
	Doctor	36	11.5
	Nurse	34	10.9
	Newspaper	11	3.5
	Television	4	1.3
	Internet	45	14.4
When I first heard about cervical cancer screening N=163	In the last 6 months	37	11.8
	6 months to a year ago	59	18.8
	In the last 1 to 2 years	50	16.0
	In the last 3 to 4 years	16	5.1
	5 years and above	1	0.3
Ever heard about cervical cancer vaccine	Yes	84	26.8
	No	229	73.2
Through whom I first heard about cervical cancer vaccine N= 84	Family	7	2.2
	Friends	14	4.5
	Doctor	24	7.7
	Nurse	11	3.5
	Newspaper	5	1.6
	Television	6	1.9
	Internet	17	5.4
When first heard about cervical cancer vaccine N=84	In the last 6 months	31	9.9
	6 months to a year ago	35	11.2
	In the last 1 to 2 years	17	5.4
	In the last 3 to 4 years	1	0.3
Ever heard about pap smear	Yes	133	42.5
	No	180	57.5
I am aware of screening centre	Yes	16	5.1
	No	297	94.9

in Ogbomosho			
Screening centre in Ogbomosho that I am aware of	BUTH LAUTECHTH	13 3	4.2 1.0
<b><u>What is pap smear used for?</u></b>	<b>To detect cervical cancer</b> Yes No I don't know <b>To test for fertility</b> Yes No I don't know <b>To treat cervical cancer</b> Yes No I don't know	158 5 150 50 84 179 69 52 192	50.5 1.6 47.9 16.0 26.8 57.2 22.0 16.6 61.3
<b><u>When should cervical cancer screening be done?</u></b>	<b>At menopause</b> Yes No I don't know <b>After puberty</b> Yes No I don't know <b>Once every ten years</b> Yes No I don't know <b>After marriage</b> Yes No I don't know <b>After onset of sexual activity</b> Yes No I don't know <b>Annually</b> Yes No I don't know <b>Once every 3-4 years after age of 20</b> Yes No I don't know	55 74 184 92 61 160 43 77 193 66 75 172 99 54 160 104 62 147 104 30 179	17.6 23.6 58.8 29.4 19.5 51.1 13.7 24.6 61.7 21.0 24.0 55.0 31.6 17.3 51.1 33.2 19.8 47.0 33.2 9.6 57.2

**Table 3: Knowledge of Respondents on Risk Factors of Cervical Cancer**

<b>VARIABLES</b>	<b>YES</b>	<b>NO</b>	<b>I DON'T KNOW</b>
Early age of sexual experience (>18)	174(55.6)	37(11.8)	102(32.6)
Multiple sexual partners	200(63.9)	13(4.2)	100(31.9)
Smoking	117(37.4)	61(19.5)	135(43.1)
Frequent Sexual Transmitted Diseases	201(64.2)	9(2.9)	103(32.9)
Diet	53(16.9)	101(32.3)	159(50.8)
Witches & Wizards	23(7.3)	190(60.7)	100(31.9)
Uncircumcised husband/partner	57(18.2)	65(20.8)	191(61.0)
Previous Family History	140(44.7)	46(14.7)	127(40.6)
Too many Children	43(13.7)	87(27.8)	183(58.5)
Viral infection caused by Human Pappiloma Virus	139(44.4)	14(4.5)	160(51.1)

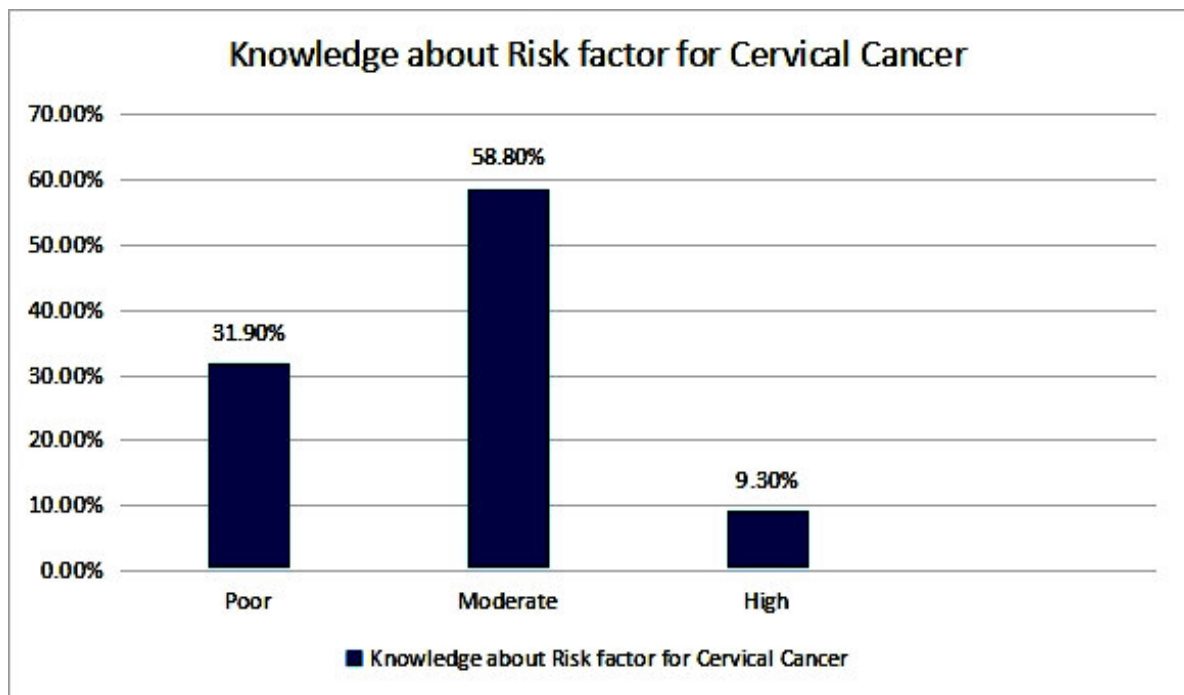


**Table 4:** *Uptake of Cervical Cancer Screening and Vaccination*

VARIABLE	CHARACTERISTICS	FREQUENCY (n=313)	PERCENTAGE (%)
Ever had cervical cancer screening done before	Yes	29	9.3
	No	284	90.7
Number of times have had the screening done (n = 29)	Once	24	82.8
	Twice	5	17.2
When was the last time you had the screening (n = 29)	Within the last 6 months	16	55.2
	6 month to 1 year ago	12	41.4
	2-4 years ago	1	3.4
Where did you have the screening (n = 29)	BUTH	9	31.1
	LAUTECHTH	1	3.4
	Others	19	65.5
How old were you when you had the screening (n = 29)	20-22	25	86.2
	23-25	3	10.4
	26-28	1	3.4
How often do you do the screening (n = 29)	Every 6 months	8	27.6
	Every 1 year	2	6.9
	Every 3 years	1	3.4
	Just once	18	62.1
Any plan to have or continue pap smear	Yes	91	29.1
	No	222	70.9
Have you been vaccinated against cervical cancer	Yes	19	6.1
	No	294	93.9
How many doses of the cervical cancer vaccine did you take (n = 19)	One	19	100.0
Where were you vaccinated against cervical cancer (n = 19)	Government hospital	9	47.4
	Private hospital	10	52.6
Would you like to be vaccinated (n = 294)	Yes	260	89.5
	No	34	11.5

**Table 5:** Factors Affecting Uptake of Cervical Cancer Screening and Vaccination

VARIABLE	FREQUENCY(n=313)	PERCENTAGE (%)
<b>Factors affecting uptake of cervical cancer screening</b>		
Lack of awareness	150	47.9
It is expensive	18	5.8
I don't see the need for it	63	20.1
I don't know where to get screened	29	9.3
Lack of time	24	7.7
<b>Factors affecting uptake of cervical cancer vaccination</b>		
Lack of awareness	229	73.2
It is expensive	3	1.0
I don't see the need for it	30	9.6
I don't know where to get vaccinated	15	4.8
Lack of time	17	5.4



**Figure 1:** Knowledge Score Range