



## RESEARCH ARTICLE

# Determinants of cervical cancer screening uptake among female undergraduates in a tertiary institution in south eastern Nigeria: a cross sectional study

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## Keywords

Determinants • Cervical cancer • Screening uptake • Human Papillomavirus

## Summary

**Introduction.** Cancer of the cervix is the second most common cancer among women worldwide and is the major cause of cancer deaths in developing countries. Screening is among the common cost-effective control methods for the disease. This study ascertained the determinants of cervical cancer screening uptake among female undergraduates in a tertiary institution in south eastern Nigeria.

**Methods.** This cross-sectional study was conducted using a stratified sampling technique among 375 respondents. A pretested semi structured questionnaire was used for data collection and SPSS version 21 was used in data analysis in which the association between qualitative variables was ascertained using Chi-square test at  $P < 0.05$  probability level.

**Results.** The result revealed that majority of 321 (85.6%) were aware of CC as a disease and 202 (53.9%) of the respondents were aware of cervical cancer screening test. The study revealed that the uptake of cervical cancer screening was low among the female undergraduates. Only few 27 (7.2%) of the respondents have been previously screened for cervical cancer. High cost of screening 128 (31.2%) was the major reason for not undergo-

ing screening. Significant association existed between socio-demographic variables (age, level of study, marital status and monthly allowance) and uptake of cervical cancer. Most of the respondents 10 (17.2%) that had been screened for cervical cancer were within the age bracket of 25-29 years and were in 500 level 21 (19.4%). Cervical cancer uptake was higher 9 (29%) in married females compared to single females 18 (5.2%). It was also indicated that all the participants who have been screened were screened at a cost of ₦ 1,001 - ₦ 2,000. Majority of them 11 (25.6%) earned monthly allowance of ₦ 23,001 - ₦ 30,000. Strong association were also found between awareness of cervical cancer ( $X^2 = 4.89$ ,  $P = 0.027$ ), availability of screening center ( $X^2 = 37.433$ ,  $P \leq 0.001$ ), cost of screening ( $X^2 = 100.793$ ,  $P \leq 0.001$ ) and uptake of screening.

**Conclusions.** The study revealed that the uptake of cervical cancer screening was low among the female undergraduates. In order to enhance screening uptake among female undergraduates, there is an urgent need to review the cost of screening especially in the school's health center and other hospitals/clinics within the school environment.

## Introduction

Worldwide, cancer of the cervix is the second most popular cancer among women and is the main cause of cancer deaths in developing nations [1]. In sub-Saharan Africa region, 34.8 new cases of cervical cancer are diagnosed per 100,000 women per annum and 22.5 per 100,000 women die from the disease [2]. Globally, more than 530,000 new cases of cervical cancer and subsequent 275,000 deaths were documented in 2008 alone. Incidence of cervical cancer related death is usually highest among middle age women (between 30-40 years) and 90% of these deaths were observed in the developing countries [3]. This indicated that cancer is a universal health issue whose burden is more acutely felt in developing countries characterized by limited resources prevention, diagnosis, and treatment of the disease. This is actually the case in Nigeria, where estimated five-year prevalence of 21.6% for the disease was postulated in 2012 fact sheets of GLOBOCAN (2012) [4] and an estimated 10,000 new cases of the

disease and 8,000 deaths caused by cervical cancer are reported among women annually. It was also reported by Oguntayo et al. (2011) [5] that about 65.7% gynecological cancers in Northern part of Nigeria were caused by this disease. Cervical cancer disease is preventable and the disease can be detected at early stage when appropriate steps can be taken to avert progression to life-threatening advanced level of it [6]. Ingwu (2016) stressed that this disease is causing untold havoc and control measures are seriously needed [7].

Papanicolaou (Pap) smear cytology screening technique used in identifying precancerous lesions has assisted in achieving massive decrease in the burden of cervical cancer particularly in the developed countries. There are other less invasive methods that were produced for rapid screening of the disease such as Visual Inspection with Lugol's Iodine (VILI) and Visual Inspection with Acetic Acid (VIA). Even though these techniques are less cumbersome and faster, they have been found to be less sensitive when compared to cytologic screening through Pap smear. Visual Inspection with Acetic Acid

specifically has been linked with high false positive outcomes giving rise to enormous psychological issues and wrong treatment of the patient involved [3]. The great differences in morbidity and mortality in developed and developing countries occur as a result of the fact that developed countries have executed effective program over the last few decades. Such programs include screening for the prevention of cancer of the cervix, in many countries decreasing the incidence and mortality by up to 80%. But then, the incidence of women suffering from the disease continues to be high in developing countries characterized by limited access to screening services for the disease [8]. Hyacinth et al. [9] noted that although a single visit for cervical cancer screening may save above 6,000 Nigerian women yearly, but its uptake is still low. There is dearth of information on factors that influence cervical screening especially in university female students. According to previous study conducted by Ezem (2007) in mixed population in Owerri, Imo State, the reason for not undergoing cervical cancer screening test were lack of awareness (46.1%), no need for it (12.5%) and fear of bad result (11.6%) [10]. This study showed that the level of awareness of cervical cancer screening is poor and worse still is the level of uptake. The present study therefore, ascertained the determinants of cervical cancer screening uptake among female undergraduate in a tertiary institution in south eastern Nigeria.

**OBJECTIVES**

The present study ascertained the determinants of cervical cancer screening uptake among female undergraduates in a tertiary institution in south eastern Nigeria

**Materials and method**

**STUDY PARTICIPANTS**

The study employed a cross sectional study design to assess the factors influencing cervical cancer screening knowledge and participation among female undergraduates in Federal University of Technology, Owerri. The design was considered appropriately in carrying out this study because it will facilitate the collection of data systematically from a sample of the population and at a defined time.

**AREA OF THE STUDY**

This study was conducted in Federal University of Technology, Owerri, Imo State, and southeastern Nigeria. It is located in Owerri West Local Government Area and bounded by the communities of Umuchima, Ihiagwa, Eziobodo, and Obinze in Imo State. The school has eight faculties namely: School of Health Technology (SOHT), School of Engineering and Engineering Technology (SEET), School of Management Technology (SMAT), School of Environmental Sciences (SOES), School of Biological Sciences (SOBS), School of Physical Sciences (SOPS), School of Agriculture and

Agricultural Technology (SAAT) and School of Basic Medical Sciences (SBMS).

**STUDY POPULATION**

The target population for the female undergraduate is 5,500 students (FUTO registry, 2018).

**SAMPLE SIZE AND SAMPLING TECHNIQUE**

*Sample size*

The sample size is 373. The sample size was determined using Taro Yamane’s (1967) [11] formula:  $n = \frac{N}{1 + Ne^2}$ , where:

N = population size;  
 n = sample size;  
 e = coefficient of margin which is 0.05;  

$$n = \frac{5,550}{1 + 5,550(0.0025)}$$

$$n = 373.$$

Therefore 373 female students were used for the study.

*Sampling technique*

Stratified sampling combined with simple random sampling technique was used on the different categories of the study population. This was necessary as a result of discrepancy in gender distribution within the study population. Using the formula below, the ratio of participants was randomly selected.

Ratio of participants =  $\frac{n \times N1}{N}$

Where:  
 n = sample size;  
 N1 = stratum size;  
 N = total population.

SOHT female students =  $\frac{373 \times 1,450}{5,550} = 96.8 = 97$

SEET female students =  $\frac{373 \times 310}{5,550} = 20.8 = 21$

SMAT female students =  $\frac{373 \times 573}{5,550} = 38.5 = 39$

SOBS female students =  $\frac{373 \times 1,290}{5,550} = 86.7 = 87$

SOPS female students =  $\frac{373 \times 523}{5,550} = 35.1 = 35$

SOES female students =  $\frac{373 \times 400}{5,550} = 26.9 = 27$

SAAT female students =  $\frac{373 \times 934}{5,550} = 62.8 = 63$

SBMS female students =  $\frac{373 \times 70}{5,550} = 4.7 = 5$

**POPULATION DISTRIBUTION OF THE PARTICIPANTS**

S/N	Stratum; Schools	Population
1	SOHT	1,450
2	SEET	310
3	SMAT	573
4	SOBS	1,290
5	SOPS	523
6	SOES	400
7	SAAT	934
8	SBMS	70
	<b>TOTAL</b>	<b>5,550</b>

**DATA COLLECTION**

The instrument for data collection consists of a semi-structured self-administered questionnaire which was administered on the 375 respondents. The structured questionnaire was validated using face-validity. Pre-testing was carried out on a 40 respondents in different location as a trial run for the main research intended. Cronbach’s Alpha was used to determine the internal consistency and degree of relationship of the test item. Prior to administration of the questionnaire to the respondent, an informed consent was obtained. Data collection involved recruitment of participants in open spaces such as lecture halls and this done over a period of four days. Ethical clearance was obtained from the ethical review committee of Department of Public Health. Verbal informed consent was obtained from all the participants before being allowed to participate in the study. Objective of the study was explained to the respondents before the commencement of the interview. Each of the respondents was assured of confidentiality of the information she may volunteer. Each questionnaire took about 5-10 minutes to be completed.

**ETHICAL ISSUES**

The research followed the tenets of the Declaration of Helsinki. Ethical approval was given by the Ethical Committee of the School of Health Technology, Federal University of Technology Owerri, Nigeria. Informed verbal consent was sought and obtained from all the participants before they could take part in the study.

**METHOD OF DATA ANALYSIS**

Data collected were subjected to statistical analysis using Statistical Package for Social Sciences (SPSS) version 21 in which Chi-square test at P < 0.05 was used in ascertaining the degree of relationship between qualitative variables and screening.

**Results**

**SOCIO-DEMOGRAPHIC CHARACTERISTICS OF RESPONDENTS**

Table I showed the socio-demographic characteristics of the respondents. The respondents that were within the age

Tab. I. Socio-demographic characteristics of respondents.

Variables	Frequency (n = 375)	Percentage (%)
<b>Age (years)</b>		
16-19	117	31.2
20-24	200	53.3
25-29	58	15.5
<b>Level of study</b>		
100 L	60	16
200 L	74	19.7
300 L	96	25.6
400 L	37	9.9
500 L	108	28.8
<b>Marital status</b>		
Single	344	91.7
Married	31	8.3
<b>Monthly allowance</b>		
1,000-8,000	131	34.9
8,001-15,000	121	32.3
15,001-23,000	53	14.1
23,001-30,000	43	11.5
Above 30,000	27	7.2

bracket of 16-19 years were 117 (31.2%), 200 (53.3%) were within the age range of 20-24 years and 58 (15.5%) were within the age range of 25-29 years. Out of the 375 students, 60 (16.0%) were in 100 L, 74 (19.7%) were in 200L, 96 (25.6%) were in 300 L, 37 (9.9%) were in 400 L and 108 (28.8%) were in 500 L. Majority of them were single 344 (91.7%), while 31 (8.3%) were married. Average monthly allowance of respondents shows that 131 (34.9%) earned ₦ 1,000 - ₦ 8,000, 121 (32.3%) earned ₦ 8,001 - ₦ 15,000, 53 (14.1%) earned ₦ 15,001 - ₦ 23,000, 43 (11.5%) earned ₦ 23,001 - ₦ 30,000 and 27 (7.2%) earned above ₦30,000.

**AWARENESS AND KNOWLEDGE OF CERVICAL CANCER**

Table II showed the respondents’ awareness and knowledge of cervical cancer. Three hundred and twenty-one (85.6%) of respondents reported that they have heard of cervical cancer while 54 (14.4%) have not heard of cervical cancer. Among the 321 (85.6%) respondents who have heard of cervical cancer more than large proportions of them 110 (34%) reported that they heard it from the mass media. Most of the respondents 223 (59.5%) were aware that human papillomavirus is the major cause of the disease. As indicated in the Table, majority 202 (53.9%) reported that the signs and symptoms of the disease is blood stained discharge from the vagina. In response to awareness of prevention of cervical cancer, majority of them 345 (92.0%) believed that cervical cancer can be prevented while 30 (8.0%) of them disbelieved. Most of the respondents 202 (53.9%) revealed that they have heard of pap test for cervical cancer screening.

**SOURCE OF INFORMATION ON CERVICAL CANCER AND PAP TEST**

Figure 1 indicated the source of information on cervical cancer and pap test. A higher proportion of the respondents

Tab. II. Awareness and knowledge of cervical cancer.

Variables	Frequency (n = 375)	Percentage (%)
<b>Heard of cervical cancer</b>		
Yes	321	85.6
No	54	14.4
<b>Heard of pap test</b>		
Yes	202	53.9
No	173	46.1
<b>Source of information</b>		
Parents/family	63	20
Friends	50	16
Medical practitioners	82	26
Mass media	110	34
Others	16	5
<b>Causes or risk factors for cervical cancer</b>		
Human Papillomavirus	223	59.5
Late onset of sexual activity	27	7.2
Diabetes	8	2.1
Single sexual partner	3	0.8
All of the above	3	0.8
I don't know	111	29.6
<b>Signs and symptoms of cervical cancer</b>		
Regular menstrual bleeding	6	2
Blood stained discharge from vagina	202	54
High blood pressure	15	4
All the above	10	3
I don't know	142	38
<b>Can cervical cancer be prevented</b>		
Yes	345	92
No	30	8

110 (29.2%) reported mass media as the major source of information on cervical cancer and pap test.

**PERCEPTION AND ATTITUDE TOWARDS CERVICAL CANCER SCREENING**

Presented in Figure 2 are the responses to perception and attitude of respondents towards cervical cancer screening. The respondents gave their responses on people they thought should be tested for cervical cancer. Most of them 185 (49.3%) believed women above the age of 21 years should go for the test (Fig. 3). In response to the willingness of respondents to do the pap test (Fig. 4), almost all of them 349 (93.1%) admitted that they will be willing to do so.

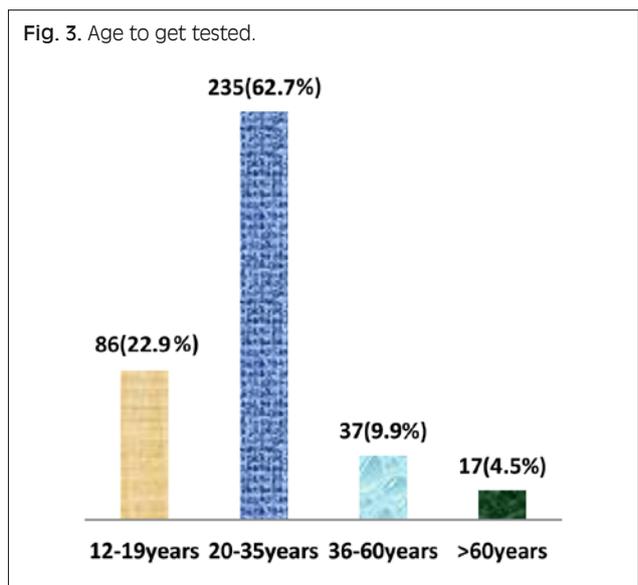
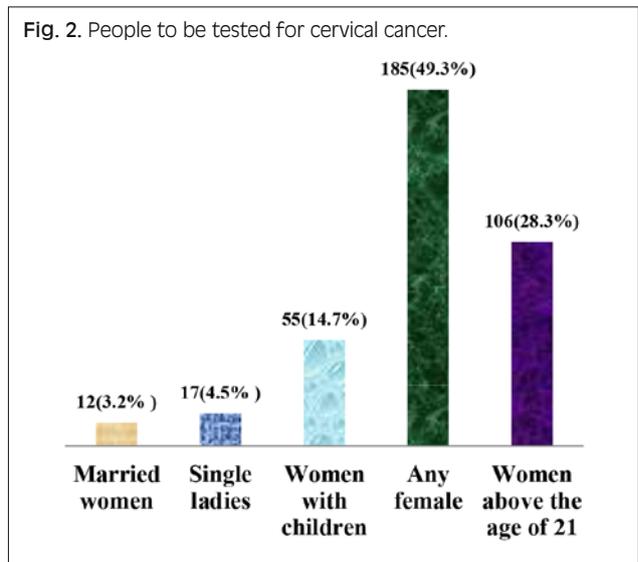
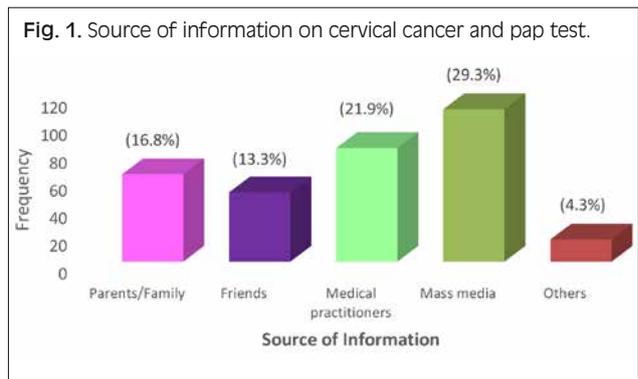


Figure 4 showed the willingness of respondents to utilize cervical cancer screening. Majority of them 349 (93.1%) said yes while 26 (6.9%) said no.

Fig. 4. Willingness to do the pap smear test.

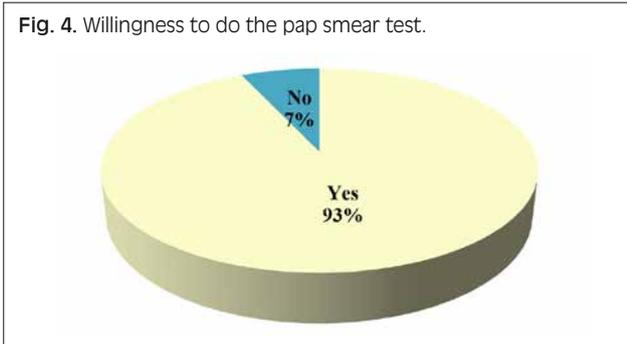
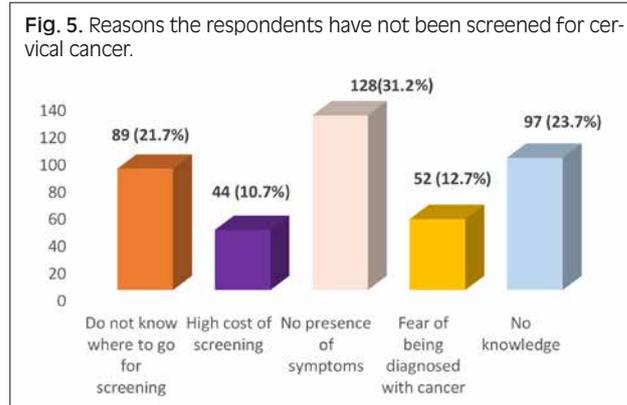


Fig. 5. Reasons the respondents have not been screened for cervical cancer.



**CERVICAL CANCER SCREENING UPTAKE**

Table III below showed the cervical cancer screening uptake among the Respondents. Those that have been screened for cervical cancer are 27 (7.2%) while those that have not been screened are 348 (92.8%). The Table also shows that all of the 27 (7.2%) who have been screened have done the screening once. The result revealed that on the participants’ response to the interval of pap test, majority 171 (45.6%) reported they had no idea of the appropriate interval. All the 27 (7.2%) respondents who have been screened for cervical cancer reported cost of screening was ₦ 1,001 - ₦ 2,000. Majority of the participants were aware of screening centers within their locality. The respondents gave their reasons for not being

screened, 89 (21.7%) respondents reported they do not know where to go for screening, 44 (10.7%) stated due to high cost of screening, 128 (31.2%) revealed no presence of symptoms, 52 (12.7%) stated they had the fear of being diagnosed with cancer and 97 (23.7%) reported they have no knowledge of cervical cancer (Fig. 5).

Tab. III. Cervical cancer screening uptake.

Variables	Frequency (n = 375)	Percentage (%)
<b>Previously screened for cervical cancer</b>		
Yes	27	7.2
No	348	92.8
<b>Number of times screened</b>		
Once	27	100
2-3 times	0	0
> 3 times	0	0
<b>Interval of pap test</b>		
6-monthly	33	8.8
1-yearly	63	16.8
3-yearly	108	28.8
I don't know	171	45.6
<b>Cost of screening in Naira</b>		
500-1,000	27	7.2
1,001-2,000	84	22.4
2,001-3,000	63	16.8
No idea	201	53.6
<b>Availability of screening center in the locality</b>		
Yes	164	43.7
No	211	56.3

**INFLUENCE OF CERVICAL CANCER AWARENESS, AVAILABILITY OF SCREENING CENTER AND COST OF CERVICAL CANCER SCREENING ON UPTAKE OF THE CERVICAL CANCER SCREENING AMONG UNDERGRADUATE FEMALES**

Presented in Table IV is the influence of major determinant factors of cervical cancer screening uptake (cervical cancer awareness and knowledge, availability of screening center and cost of screening) on uptake of the cervical cancer screening among undergraduate females. It was showed that a significant statistical association existed between all the major determinant factors of cervical cancer and uptake of cervical cancer screening among undergraduate females (P < 0.05). Out of the 164 respondents who have cervical cancer screening centers in their locality only few of them 27 (16.5%) have gone for screening. All the 211 (100%) respondents who do not have screening centers in their locality have not been screened for cervical cancer. It was also shown that all the 27 (100%) respondents who said the cost of screening is between 500-1,000 did not uptake screening for cervical cancer. Of the 84 (100%) respondents who reported that the cost of screening is between 1,001-2,000, 27 (32.1%) have been screened whereas greater proportions 57 (67.8%) have not been screened. 63 (100%) respondents who reported the cost of screening is between 2,001-3,000 have not been screened for cervical cancer. All the 201 (100%) respondents who have no idea of the cost of screening have not been screened for cervical cancer with significant association ( $\chi^2 = 100.793, P \leq 0.001$ ).

**INFLUENCE OF SOCIO-DEMOGRAPHIC VARIABLES ON THE UPTAKE OF CERVICAL CANCER SCREENING AMONG UNDERGRADUATE FEMALES**

Results of Table V showed the socio-demographic factors influencing the uptake of cervical cancer screening among female undergraduates where all the

**Tab. IV.** Influence of cervical cancer awareness, availability of screening center and cost of cervical cancer screening on uptake of the cervical cancer screening.

Determinants	Previously screened for cervical cancer			Chi-square	P-value
	Yes (%)	No (%)	Total (%)		
<b>Heard of cervical cancer</b>					
Yes	27 (8.4)	294 (91.6)	321 (100.0)	4.894	0.027
No	0	54 (100.0)	54 (100.0)		
<b>Availability of screening center</b>					
Yes	27 (16.5)	137 (83.5)	164 (100.0)	37.433	< 0.001
No	0	211 (100.0)	211 (100.0)		
<b>Cost of screening in Naira</b>					
500-1,000	0	27 (100.0)	27 (100.0)	100.793	< 0.001
1,001-2,000	27 (32.1)	57 (67.9)	84 (100.0)		
2,001-3,000	0	63 (100.0)	63 (100.0)		
No idea	0	201 (100.0)	201 (100.0)		

**Tab. V.** Influence of Socio- Demographic characteristics on the uptake of cervical cancer screening among undergraduate females.

Socio-demographic determinants	Previously screened for cervical cancer			Chi-square	P-value
	Yes (%)	No (%)	Total (%)		
<b>Age</b>					
16-19	0	117 (100.0)	117 (100.0)	18.336	< 0.001
20-24	17 (8.5)	183 (91.5)	200 (100.0)		
25-29	10 (17.2)	48 (82.8)	58 (100.0)		
<b>Level of study</b>					
100 L	0	60 (100.0)	60 (100.0)	37.631	< 0.001
200 L	0	74 (100.0)	74 (100.0)		
300 L	6 (6.3)	90 (93.8)	96 (100.0)		
400 L	0	37 (100.0)	37 (100.0)		
500 L	21 (19.4)	87 (80.6)	108 (100.0)		
<b>Marital status</b>					
Single	18 (5.2)	326 (94.8)	344 (100.0)	24.107	< 0.001
Married	9 (29.0)	22 (71.0)	31 (100.0)		
<b>Average monthly allowance (#)</b>					
1,000-8,000	0	131 (100.0)	131 (100.0)	45.12	< 0.001
8,001-15,000	4 (3.3)	117 (96.7)	121 (100.0)		
15,001-23,000	6 (11.3)	47 (88.7)	53 (100.0)		
23,001-30,000	11 (25.6)	32 (74.4)	43 (100.0)		
> 30,000	6 (22.2)	21 (77.8)	27 (100.0)		

socio-demographic variables had strong association with the uptake of cervical cancer screening ( $P < 0.05$ ). It was indicated that across the age categories, uptake of screening was highest 10 (17.2%) amongst participants within the age bracket of 25-29 years compared to 20-24 years 17 (8.5%). All the respondents in 100L, 200L and 400 L have not done screening for cervical cancer. Of the 96 respondents in 300L, 6 (6.3%) have been screened while 90 (93.7%) have not been screened. Among the 108 respondents in 500 L, 21 (19.4%) have been screened while 87 (80.6%) have not undergo screening for cervical cancer. Out of 344 respondents that were single, only 18 (5.2%) have been screened. Out of the 31 respondents that are married, only 9 (29.0%) have been screened. Considering income categories, uptake of cervical cancer screening was highest among

respondents 11 (25.6%) who earned 23,001-30,000 ₦ followed by participants that earn > 30,000 ₦ 6 (22.2%), 15,001-23,000 ₦ 6 (11.3%) and 8,001-15,000 ₦ 4 (3.3%).

## Discussion

### SOCIO-DEMOGRAPHIC CHARACTERISTICS OF FEMALE UNDERGRADUATES

Majority of the students 200 (53.3%) were between the age group of 20-24 years. This is like the findings of Dozie et al. (2020) [12] who reported that the majority (81.7%) of the female undergraduate students selected from Imo State University were in their sexually active ages. There was strong association between uptake

of cervical cancer screening and age of participants. Screening was higher among participants aged 25-29 years (17.2%) compared to those other age groups indicating that uptake increased with increasing age. This is in agreement with the study of Nthiga (2004) [13] which found higher rates of screening within women between 25-34 years but was in contrast with other study that found screening rates to be higher among women aged 23 years [14]. Strong association was also recorded between level of study of the undergraduate females and cervical cancer screening uptake. Screening was seen to increase with level of study giving rise to majority of those screened 21 (19.4%) to belong to 500 level. This is in congruent to other study which found 300 L female students as majority of those who have taken part in the screening [14]. Majority of the respondents 344 (91.7%) were single. However, strong association between uptake of screening and marital status was showed by chi-square result where most of them who had been screened 9 (29.0%) were married. This suggested that married women are more likely to be screened than the unmarried ones. Considering marital status, previous studies also found that compared to married women, unmarried and widowed women are less willing to undergo [13]. These findings are in disagreement with the studies of Gimba (2014) [14] and Owoeye & Ibrahim (2013) [15] that showed single women to be more likely to undergo screening compared to married women. Of all the 375 students, majority 131 (34.9%) received an average monthly allowance of ₦ 1,000 - ₦ 8,000. Association between income and uptake of screening significantly showed that uptake of screening is higher among those who earn ₦ 23,001 - ₦ 30,000 as an average monthly income 11 (25.6%). This indicates that female students with higher allowance are more likely to undergo screening. In the study of Owoeye and Ibrahim (2013) [15] at Niger Delta Nigeria, it was revealed that the commonest reasons for undergoing screening was when it was free or subsidized or as part of a general screening exercise.

#### **CERVICAL CANCER KNOWLEDGE AND AWARENESS AMONG FEMALE UNDERGRADUATES**

Interestingly, high level of knowledge and awareness of the causes and risk factors of cervical cancer was recorded in the study where majority of the respondents 223 (59.5%) attributed the cause of cervical cancer to Human papillomavirus. In similar study conducted in Ghana, 140 college students only 11 (7.9%) identified HPV as a risk factor of cervical cancer [16]. Study of Nthiga (2014) [13] in Kenya identified that only 23.5% were aware that Human Papillomavirus (HPV) is a risk factor for the development of the disease. Another study [17] found that majority of the respondents (40%) identified early onset of sexual activity as a risk factor for the development of cervical cancer. There was poor knowledge on the signs and symptoms of cervical cancer in the present study since majority of respondents 202 (53.9%) attributed the signs and symptoms of cancer of the cervix to blood stained discharge from vagina.

Majority of the respondents 321 (85.6%) have heard of cervical cancer, this is similar to the study of Owoeye and Ibrahim (2013) [15] on cervical cancer screening among staff and students in the Niger Delta where 80% of the participants have heard of cervical cancer. The finding is also in line with the report of Nthiga (2014) [13] where 82.2% of respondents were aware of cervical cancer in Kenya. However, Akujobi et al. (2008) [17] in their study recorded a lower awareness (60.9%) among female students in south eastern Nigeria. Ezem (2007) [10] also reported lower (52.8%) cervical screening awareness in Owerri. Higher level of awareness in the present study could presumable be as a result of the many health related Departments in the school.

Knowledge of pap smear test was found to be 202 (53.9%) in this study. This is in agreement with Nthiga (2014) [13] and Owoeye & Ibrahim (2013) [15] studies which found the knowledge of pap test to be 75 and 56.2% respectively. However, other studies indicated low knowledge and awareness of cervical cancer screening by its respondents. A study in Onitsha, Anambra State and another study in Jos, Plateau State found awareness of pap test to be 35.56 and 33.04% respectively [8,14]. Majority of the respondents in this study 171 (45.6%) do not know the interval of pap test. this is not in agreement with a study in which 52.63% did not know the interval of pap test [14].

The major source of information for those who have heard of cervical cancer and pap test in this study was the mass media 110 (29.3%). This is in contrast with other studies which found the major source of information of cervical cancer and pap test to be from a medical practitioner or health worker. Studies of Nwozor (2013), Akujobi et al. (2008) and Gimba et al. (2014) [8, 14, 17] also found medical practitioner or health worker as the major source of information for the respondents to be 64.44, 35.8 and 37.5% respectively. Interestingly, this study revealed that there was strong association between the level of knowledge and awareness of cervical cancer and cervical cancer screening and undergraduate female's uptake of screening. This implies that female students who are aware of cancer of the cervix and screening are more likely to go for screening.

#### **CERVICAL CANCER SCREENING UPTAKE**

Findings from this study indicated that only few 27 (7.2%) of the respondents had ever been screened. The uptake of 27 (7.2%) of cervical cancer screening as found in this study is in agreement with the 7.1% reported by Ezem (2007) in Owerri, Imo state capital [10]. Other studies done among women revealed similar low uptake of screening among women. Lower rate (1.78% of 450 women and 13.91% of 120 female students) was reported in a study done in Onitsha, Anambra State Nwozor & Oragudosi (2013) and Oluwole, et al. (2017) Lagos State respectively [8, 18].

#### **BARRIERS TO CERVICAL CANCER SCREENING**

In this study, a majority of the female undergraduates 128 (31.2%) were of the opinion that screening is not necessary

since they do not feel any presence of symptoms. Studies across Nigeria have reported different reasons for not doing the test. A study in Owerri reported that the most common reasons given for not doing the test were lack of awareness (46.1%), no need for it (12.5%) and fear of a bad result (11.6%) of the 846 respondents [10]. Another study reports that majority (60%) of the participants have not heard of cervical cancer screening, 15.5% do not know where to go for screening, 2.7% have concern about embarrassment of cancer being discovered and 13.6% have no reason [17]. A study in Kenya reported that drawbacks to cervical cancer screening was that most of the women lacked information about it (77%) and had low level of understanding about the disease (85.9%) [13]. In other study Nwozor & Oragudosi (2013) [8], lack of awareness 228 (51.58%), lack of facility 70 (15.84%), cost 70 (15.84%), don't think it is necessary 52 (11.76%), distance 13 (2.94%) were reported as reasons for not undergoing screening. However, in the study of Owoeye and Ibrahim [15] the barriers were that majority of the respondents (40.2%) feel they are healthy and so no need for it. At the same time, knowledge of cervical cancer, cost of screening, availability of screening and socio-demographic factors were found to be critical in determining cervical cancer screening uptake among female undergraduates. This is in line with the study of Nwobodo & Ba-Break [19] which found that low level of knowledge of cervical cancer and cervical cancer screening, unavailability, inaccessibility, unaffordability and unacceptability of cervical-cancer screening were the determinants of poor cervical cancer screening among typical Nigerian population.

## Conclusions

The study clearly showed that there was high level of awareness of cervical cancer screening as well as knowledge of the signs and symptoms and risk factors associated with it. However, uptake of screening was very low. Utmost barrier to screening by the respondents was the absence of symptoms. There was strong association between socio-demographic characteristics (age, level of study, marital status, monthly allowance), awareness of cervical cancer and screening (pap test), availability of cervical cancer screening centres, cost of screening and uptake of cervical cancer screening. Therefore, to enhance screening uptake among the female undergraduates, there is urgent need to reduce the cost of screening especially in the school's health centre and other hospitals/clinics within the school environment.

## LIMITATIONS OF THE STUDY

In many occasions, there was difficulty in collecting vital information as most of the students were busy with school activities. As a result of time constraints, much time was not spent every session of questionnaire filling and the included respondents were interviewed and

questionnaire filled but there may be female students who have higher level of awareness and knowledge on issues of cancer of the cervix are high but were unavailable during the period of the study.

## Ethical considerations

Ethical issues (including plagiarism, data fabrication, double publication) have been completely observed by the authors.

## Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author on request

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## Conflicts of interest statement

The authors declare no conflict of interest.

## Authors' contributions

UWD: conceived the study, supervised the study and drafted the manuscript, CICE: study design, data analysis, revisited the manuscript, CRD: data analysis and data collection, INSD, SNOI and OCA, revisited the manuscript and critically evaluated the intellectual contents. All authors read and signed the final version of paper.

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