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Knowledge and attitude towards cervical cancer prevention strategies among female undergraduate students in a private university in Nigeria

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Abstract
Objective: Cervical cancer has been a significant public health issue, mostly in developing countries. It is the fourth most common cancer among women globally, with its contribution to the cancer burden, significant across all cultures and economies. Most cervical cancer cases are diagnosed late leading to poor outcomes, particularly in Sub-Saharan Africa and other low- and middle-income countries. So, this study aimed to assess the knowledge and attitude towards cervical cancer prevention strategies.
Methods: This was a cross-sectional study among undergraduate female students at Babcock University. A self-administered questionnaire was used for data collection from 255 respondents selected using a multistage sampling method. Data was entered and analysed using IBM SPSS version 23. Chi-square and logistic regression were done.
Results: More than half (56.1%) of respondents had good knowledge, while 62.7% had a favourable attitude towards cervical cancer prevention strategies. However, only 26.7% and 36.1% of the respondents had received the HPV vaccine and screened for cervical cancer, respectively. The reasons for the poor uptake of the screening services were no time to go for screening and a lack of awareness of screening centres. Factors associated with acceptance of cervical cancer screening were knowledge (OR= 15; 95% CI 0.149 -0.524; p=0.0001), and having received the HPV vaccine in the past (OR=29; 95% CI 3.151-1.654; p=0.0001).
Conclusion: There is an urgent need to improve the knowledge and attitude of female undergraduate students towards cervical cancer prevention strategies to achieve the elimination of the disease.

Keywords: Cervical cancer prevention strategies, Human Papillomavirus vaccine, Knowledge, Attitude, Female Undergraduate Students

Plain English Summary

Cervical cancer is the cancer of the lower part of the uterus in women. It is a major cause of morbidity and mortality in women especially women living in poor and developing countries in the world. Infection with the human papillomavirus (HPV) is the main factor in the development of cervical cancer. Cervical cancer can be prevented by receiving a vaccine against the human papillomavirus for girls who are between the ages

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of 9 and 14 years. Screening for cervical cancer can also be done the detect the lesion early enough to achieve a cure with the available options of treatment. This study was conducted to assess the knowledge and attitude towards cervical cancer prevention strategies among female undergraduate students of Babcock University in Nigeria. The study found that the students had fair knowledge but acceptance of HPV vaccines and cervical cancer screening was poor. We, therefore, recommend that efforts should be made to improve the knowledge and attitude of students on cervical cancer prevention strategies and make cervical cancer prevention services available and affordable to eliminate the disease as a public health problem.

Introduction

Cervical cancer is cancer that affects the uterine cervix in women. It is a health condition of major public health concern as it is a major cause of morbidity and mortality among women in the world. It is the fourth most common cancer among women (1, 2). In 2020, about 604,127 women had cervical cancer globally resulting in the death of about 341,831 women, and about 90% of these cases and deaths occurred in low-and middle-income countries (LMIC) (3, 4, 5). It is the second most common cancer among women in Nigeria and other LMICs (3) and causes the most frequent cancer death among women between the ages of 15 to 44 in Nigeria (6, 7). In 2020, the incidence of cervical was about 12,000 cases resulting in about 8,000 deaths (8).

The main agent implicated in the development of cervical cancer is the Human Papilloma Virus (HPV), an extremely common virus that is transmitted through sexual contact. It accounts for more than 95% of cervical cancers. More than 150 different HPV types have been identified. However, HPV types 16, 18, 31, 33, 35, 39, 45, 51, 52, 56, 58, 59, and 68 have been identified and classified as “high-risk HPV” as a result of their relatively high carcinogenic potential leading to the development of cancer of the cervix. HPV types 16 and 18 are responsible for about 70% of all cervical cancer cases worldwide (2, 4, 5). Other risk factors for cervical cancer include early onset sexual activities, having multiple sexual partners, prolonged use of oral contraceptives, and smoking of cigarettes (2).

Effective primary prevention measures using the HPV vaccination, and secondary prevention approaches involving screening for, and treating precancerous lesions will lead to the prevention of most cases of cervical cancer. Effective management following early detection of cervical cancer can result in successful treatment of the disease. When detected at late stages, appropriate treatment and palliative care can also be used to control the disease. With a comprehensive approach to preventing, screening, and treating, cervical cancer can be eliminated as a public health problem (1, 9). About 74 million new cases of cervical cancer can be avoided and 62 million deaths prevented if the preventive strategies are effectively implemented (10).

Human Papilloma Virus vaccine is recommended for girls between the ages of 9 and 14 years who have not commenced sexual activities. The vaccine is effective against HPV 16 and 18 and other HPV types that in combination are responsible for 90% of cervical cancers (2, 4).

Papanicolaou (Pap) smear cytology screening method used to identify precancerous lesions has helped in achieving a massive reduction in the burden of cervical cancer especially in the developed countries. Other less invasive techniques that have been developed for rapid screening of cervical cancer are visual inspection with acetic acid and Lugol’s iodine (4, 11). Regular Pap screening reduces the incidence and mortality of cervical cancer by at least 80% (12).

Some of the features of cervical cancer include pelvic pain, abnormal vaginal bleeding during menstrual periods, pain and vaginal bleeds during or after sexual intercourse and abnormal vaginal discharge (2, 13).

In high-income countries, programmes are in place which enable girls to be vaccinated against HPV and women to get screened regularly, for pre-cancerous lesions identified at stages when they can easily be treated. However, in LMICs, there is limited access to these preventative measures and cervical cancer is often not identified until it has further advanced and symptoms develop. In addition, access to treatment of cancerous lesions using surgery, radiotherapy and chemotherapy is limited, with a resultant higher rate of death from cervical cancer in these countries (4, 14).

Globally, only one in eight girls have received vaccination against HPV (15). About 70% of girls live in countries (LMICs) where the HPV vaccine has not been introduced as a national programme. HPV vaccines are provided in some health facilities in Nigeria at an average cost of about 13 USD and this is expensive considering the high poverty rate in the country (8).

Some studies have been done among female undergraduate students on cervical cancer prevention and the findings varied in the various

studies. In Debre Berhan, Ethiopia 40.5% of the students were aware of cervical cancer, 35.6% had good knowledge, and 0.9% had ever screened for cervical cancer. The reason for not screening was a lack of information on cervical cancer and screening. Only 33.2% perceived that they were susceptible to cervical cancer (16). Another study in Gondar, Northwest Ethiopia showed that 50.6% of the students knew about HPV, and 19.5% knew HPV as the main cause of cervical cancer. 1.5% were vaccinated against HPV, and 3.0% screened for cervical cancer, (17) while in Brazil. 90.9% of study participants knew about Pap smear tests, 94.5% had heard about HPV and 52.2% knew that HPV can cause cervical cancer (18). Also, in Karachi. 74.5% knew about Pap smear, only 1.2% had been screened for cervical cancer, and the reasons for not screening were lack of awareness of the procedure and no recommendation for screening by healthcare provider (19).

Furthermore, in Nigeria, one study showed that 79.5% of the respondents have not heard about cervical cancer screening, 78.5% do not know about the HPV vaccine, and just 4% have had pap smear screening, and the reasons for not screening were no awareness of a centre where service is available, and fear of getting a positive result, (20) while a second study reported that 72.1% of the respondents were aware of cervical cancer, and 16.1% had pap smear screening. Reasons for not screening were not knowing centres where services were available and fear of positive results (21). These studies revealed that there is a gap in knowledge of cervical cancer and uptake of cervical cancer screening was poor.

Despite the high burden of cervical cancer in Nigeria, there is limited access to preventive measures and the country has yet to commence vaccination programmes for HPV at a national level (1). This study aimed to determine the knowledge and attitude towards cervical cancer prevention strategies among female undergraduate students in a private university in southwest Nigeria to inform policy for the elimination of cervical cancer as a disease of public health importance.

Materials and Methods

Study area

This study was conducted at Babcock University, southwest Nigeria. It is a faith-based private higher institution established in 1959 as a theological seminary school but was upgraded to a university in 1999. The University is among the first three private Universities approved in Nigeria. It has an estimated undergraduate student population of about 10,300 with about 55% of them females. The university has eleven schools for undergraduate studies and a postgraduate school. The schools include Education and Humanities, Management Sciences, Science and Technology, Basic Medical Sciences, Nursing Sciences, Law and Security Studies, Social Sciences, Computing and Engineering Sciences, Public and Allied Health, Basic Clinical Sciences and Clinical Sciences. It also operates a teaching hospital within the same campus. The university teaching hospital provides cervical cancer screening and HPV vaccines. Most of the students reside on campus (22, 23).

Study design

This study was cross-sectional.

Study population

The study population was female undergraduate students attending Babcock University.

Exclusion criteria

Part-time female students, female students who were sick and those who were not on campus at the time of data collection were excluded from the study.

Sample size determination

The minimum sample size was determined by using the formula (24)

$$n = \frac{Z^2 \times p\,(1-p)}{d^2}$$

where n is the minimum sample size, Zα is the value of alpha error at 95% confidence interval given as 1.96, d is the precision set at 0.05, p is 18.7%, the proportion of students who had ever been screened for cervical cancer from a previous study (14) and q is 1-p. Substituting the figures into the formula, a minimum sample size of 236 was obtained. A non-response rate of 10% (0.1 x 236=24) was added to make a sample size of 260 students.

Sampling method

A multistage sampling was employed to select the study participants. The study population was stratified based on the schools and using simple random sampling by balloting five schools were selected from a total of eleven schools. Then from the five schools, one department was selected from each of the schools using simple random sampling by balloting. The sample size was proportionately allocated to the departments based on their female population. This was done by multiplying the minimum sample size by the number of females in each department and dividing by the total female

population in the five departments. The total female population was 456.

Instrument of data collection

Data was collected using a self-administered questionnaire adapted from previous studies (2, 25). Data collection was done over one month. Two research assistants (female resident doctors) were recruited and trained for data collection. The questionnaire was pretested in another tertiary institution for clarity and correction of any ambiguity. The questionnaire was filled in the presence of the research assistants to ensure completeness and avoid missing questionnaires.

Data processing and analysis

Data was analysed using the IBM SPSS version 23. Age was summarized using mean and standard deviation. Other variables were presented in tables as frequencies and percentages.

Knowledge was accessed using 14 questions. Each correct response was scored 1 mark and an incorrect response was scored 0 marks. The total maximum attainable score was 14 while the minimum was 0. Any total score less than or equal to 7 was considered poor knowledge. Any score of 8 and above was considered good knowledge. The knowledge score was summarized using mean and standard deviation.

Attitude was accessed using 5 questions. Each correct response was scored 1 mark and an incorrect response was scored 0 marks. The total maximum attainable score was 5 while the minimum was 0. Any total score less than or equal to 3 was considered a poor attitude. Any score of 4 and above was considered a good attitude. Acceptance of cervical cancer screening was accessed using the history of whether respondents have ever been screened or not for cervical cancer. Those who have been screened were considered to have accepted cervical cancer screening while those who have not been screened were considered to not have accepted cervical cancer screening.

The independent variables were the sociodemographic characteristics, knowledge, and attitude while acceptance of cervical cancer screening was the dependent variable.

Bivariate analysis was done to determine the association between the dependable variables and acceptability of cervical cancer screening, at a 95% confidence interval (CI) a p-value <0.05 was considered statistically significant. Variables found to be statistically significant were included in a logistic regression to explore association.

Results

A total of 255 undergraduate female students participated in this study.

Table 1: Socio-demographic characteristics of the respondents

Variable	frequency	Percentage (%)
Age (years)		
≤ 20	82	32.1
21-25	169	66.3
> 25	4	1.6
Marital status		
Single	252	98.8
Married	3	1.2
Department of study		
Accounting	73	28.6
Education and Humanities	27	10.6
Mass Communication	56	22.0
Nursing	83	32.5
Nutrition and Dietetics	16	6.3
Age at menarche (years)		
< 9	3	1.2
9-12	147	57.6
13-15	99	38.8
>15	6	2.4
Ever screened for cervical cancer		
Yes	92	36.1
No	163	63.9

One hundred and sixty-nine (66.3%) of the respondents were between the ages of 21-25 years. The majority of the respondents were single 252 (98.8%). A larger proportion 147 (57.6%) of the respondents attained menarche between the ages of 9-12 years, while 92 (36.1%; 95% CI: 31.0 to 42.3%) have been screened for cervical cancer, Table 1.

Table 2: Knowledge of cervical cancer among the respondents

Questions	Frequency (%)
Have you ever heard of cancer of the cervix?	
Yes	226 (88.6)
No	29 (11.4)
How did you learn about cervical cancer?*	
Social media	169 (66.3)
Hospital	121 (47.5)
Family/friends/neighbours	115 (45.1)
Church/mosque	60 (23.5)
Magazine/Newspaper	53 (20.8)
Lecturer	49 (19.2)
Cervical cancer is caused by the Human Papilloma Virus (HPV).	
True	187 (73.3)
False	68 (26.7)
What are the symptoms of cervical cancer?*	
Lower abdominal pain	159 (62.4)
Bleeding per vagina after sexual intercourse	142 (55.7)
Foul-smelling vaginal discharge	128 (50.2)
Irregular vaginal bleeding	94 (36.9)
Fever	59 (23.1)
Vomiting	27 (10.6)
Don't know	42 (16.5)
How can cervical cancer be prevented?*	
Human Papilloma Virus (HPV) vaccine	152 (59.6)
Avoid multiple sexual partners	128 (50.2)
Avoid cigarette smoking	122 (47.8)
Avoid sexual intercourse at an early age	82 (32.2)
Don’t know	43 (16.9)
Can cancer of the cervix be cured in its earliest stages?	
Yes	66 (25.9)
No	24 (9.4)
Don't know	165 (64.7)
How can someone with cancer of the cervix be treated?*	
Use of chemotherapy (drugs)	109 (42.7)
Radiotherapy	64 (25.1)
Surgery	63 (24.7)
Don’t know	106 (41.6)
Which screening method for cervical cancer do you know?*	
Papanicolaou (Pap) smear	152 (59.6)
Visual inspection with acetic acid	49 (19.2)
Biopsy	47 (18.4)
Don’t know	83 (32.5)
How often should one screen for cervical cancer?	
Once a year	45 (17.6)
Every 3 years	80 (31.4)
Every 5 years	70 (27.5)
Don’t know	60 (23.5)
Who should be screened for cervical cancer?	
All women	171 (67.1)
Elderly women only	20 (7.8)

Women > 25 years	30 (11.8)
Women < 25 years	3 (1.2)
Commercial Sex workers	8 (3.1)
Do you know of any Hospital/centre where cervical screening is done?	
Yes	170 (66.7)
No	85 (33.3)
Females who have cervical cancers are at risk of the following infectious diseases? *	
Sexually transmitted Infections	216 (84.7)
HIV	100 (39.2)
Hepatitis	51 (20.0)
Tuberculosis	18 (7.1)
Have you heard of or seen anyone with cervical cancer?	
Yes	63 (24.7)
No	192 (75.3)
Level of Knowledge	
Good	143 (56.1%)
Poor	112 (43.9%)
Mean knowledge score (Mean ± SD)	10.55 ± 4.82

*Multiple responses

Two hundred and twenty-six (88.6%) of the respondents have heard about cervical cancer, and social media ranked highest as the source of information, 169 (66.3%). Also, 187 (73.3%) knew that HPV is the cause of cervical cancer while 159 (62.4%) and 142 (55.7%) knew that lower abdominal pain and bleeding after sexual intercourse respectively were the major symptoms of cervical cancer. In addition, 152 (59.6%) knew that the HPV vaccine can prevent cervical cancer, and 152 (59.6%) knew Pap smear as a method of screening for cervical cancer, with only 170 (66.7%) knowing a centre where screening for cervical cancer is done.

One hundred and forty-three (56.1%) of the respondents had good knowledge while the mean knowledge score of cervical cancer among the respondents was 10.55 (SD = 4.82), Table 2.

Table 3: Attitude towards cervical cancer prevention

Questions	Frequency (%)
Have you ever been screened before for cervical cancer?	
Yes	92 (36.1)
No	163 (63.9)
If not, why? (n=163) *	
No time	72 (44.2)
Don't know where to do the screening	50 (30.7)
I don't think I can have cervical cancer	42 (25.8)
No interest	35 (21.5)
Never heard of it	34 (20.9)
Scared of having a positive result	19 (11.7)
It's expensive	18 (11.0)
I have been vaccinated	17 (10.4)
If yes, what was your experience (n=92)	
Painful	39 (42.4)
Embarrassing	32 (34.8)
Time-consuming	13 (14.1)
Costly	8 (8.7)
Will you go for the screening soon?	
Yes	129 (50.6)
No	126 (49.4)
Will you recommend the screening to another female student?	
Yes	145 (56.9)
No	110 (43.1)
Have you received a vaccine against HPV to prevent cervical cancer?	

Yes	68 (26.7)
No	187 (73.3)
If yes, how long ago (n=68)	
< 6 months	8 (3.1)
6-11 months	22 (8.6)
1-3 years	27 (10.6)
>4 years	11(4.3)
If No, Why (n=187)*	
Don't know where to get the vaccine	93 (49.3)
It's expensive	71 (38.0)
I am not at risk of getting cervical cancer	50 (26.7)
No time	27 (14.4)
Will you be willing to receive a cervical cancer vaccine to prevent cervical cancer?	
Yes	219 (85.9)
No	36 (14.1)
Level of attitude towards cervical cancer and screening	
Good	160 (62.7)
Poor	95 (37.3)

*Multiple responses

According to Table 3, 163 (63.9%) had never been screened for cervical cancer, and out of this number a greater number 77 (44.2%), reported they had no time as their reason for not getting screened, while 50 (30.7%) did not know any screening centre.

Furthermore, 129 (50.6%) reported they would go for cervical cancer screening soon. The majority of the respondents 187 (73.3%) have never received an HPV vaccine, and 219 (85.9%) would be willing to receive a cervical cancer vaccine to prevent cervical cancer. 160 (62.7%) had an overall good attitude towards cervical cancer prevention, Table 3.

Table 4: Factors associated with uptake of cervical cancer screening.

	Uptake of cervical cancer screening (Ever screened)			
Variable	**Accepted (%)**	**Not accepted (%)**	**X^2**	**P-value**
Knowledge level				
Good	71 (49.7)	72 (50.3)	26.004	0.0001
Poor	21 (18.8)	91 (81.3)		
Attitude level				
Good	58 (36.3)	102 (63.7)	0.005	0.941
Poor	34 (35.8)	61 (64.2)		
Age group (years)				
16-20	26 (31.7)	56 (68.3)	7.793	0.02
21-25	62 (36.7)	107 (63.3)		
26-30	4 (100)	0 (0)		
Marital Status				
Married	3 (100)	0 (0)		*0.046
Single	89 (35.3)	163 (64.7)		
Age at menarche				
<9	2 (66.7)	1 (33.3)	2.94	0.401
9-12	48 (32.7)	99 (67.3)		
13-15	39 (39.4)	60 (60.6)		
>15	3 (50)	3 (50)		
Ever received the HPV vaccine				
Yes	49 (70.6)	20 (29.4)	47.885	0.0001
No	44 (23.5)	143 (6.5)		

*Fisher's exact

Knowledge (p=0.0001), age (p=0.02), marital status (p=0.046) and history of HPV vaccination (p=0.0001) were found to have a statistically significant association with the acceptability of cervical cancer screening, Table 4.

Table 5: Adjusted odds of uptake of cervical cancer screening.

Variable	Odd Ratio	95% Confidence Interval	P-value
Level of knowledge			
Good	15.80	0.149-0.524	0.0001
Poor	1		
Ever received the HPV vaccine			
Yes	29.15	3.151-11.654	0.0001
No	1		

*Adjustment for age and marital status.

Following logistic regression and adjustment for age and marital status, only knowledge and history of receiving the HPV vaccine were found to be statistically associated with the uptake of cervical cancer screening (history of cervical screening). Respondents who had good knowledge were 24 times more likely to accept cervical cancer screening (OR= 15; 95% CI 0.149 -0.524; p=0.0001), while those who have received the HPV vaccine in the past were 29 times more likely to accept cervical cancer screening (OR=29; 95% CI 3.151-1.654; p=0.0001), Table 5.

Discussion

This study assessed the knowledge and attitude of cervical cancer and the acceptability of cervical cancer screening among female undergraduate students in a private university in southwest Nigeria since cervical cancer can affect young women (9). The majority of the respondents were between the ages of 21-25 years and this was similar to a study in Northwest Ethiopia (2). In addition, most of the respondents attained menarche at the age of 9-12 years this was also similar to a study in Ghana (25). More than half of the respondents had good knowledge which was similar to the 59.3% and 56.8% in the studies in Northwest Ethiopia and Hawassa, Ethiopia respectively (2, 26). The majority (88.6%) of the study participants had heard about cervical cancer and this was the same when compared with similar studies done in Northwest Ethiopia of 90% and 87.3% in Ghana, (2, 25) but in Hawassa, Ethiopia lesser number (76.8%) of the respondent had heard of cervical cancer. This was attributed to the fact that most of the students had their main source information as their teachers and healthcare workers who may not have had poor knowledge of cervical cancer (26). The high level of awareness of cervical cancer in this study may also be due to the positive influence of social media as this was the main source of information for most of the respondents.

Furthermore, the majority (73.3%) of the respondents knew that HPV is the major cause of cervical cancer and this finding is, however, higher when compared to similar studies done in Hawassa, Ethiopia of 59.1% (26), and Owerri, Southeast Nigeria of 59.5% (27). This may be due to the increased awareness campaigns on cervical cancer between the time of the previous studies and the current. The major ways for the prevention of cervical cancer as reported by the respondents were the use of the HPV vaccine, avoiding multiple sexual partners, avoiding cigarette smoking, and avoiding early initiation of sexual intercourse. This was corroborated by studies in Ethiopia which also found similar knowledge among their study participants (2, 26).

The most common methods reported in this study for the treatment of cervical cancer were chemotherapy and radiotherapy. The respondents in the study in Hawassa, Ethiopia also identified radiotherapy and chemotherapy as possible options for the treatment of cervical cancer (26). Patients with cervical cancers present late to healthcare facilities in LMICs so surgery is the less likely option in such situations. Also, Papanicolaou (pap) smear was the type of cervical cancer screening known to most of the respondents in this study. This was the same in the study in Northwest Ethiopia even though a smaller number of the respondents knew about it when compared with the current study. Pap smear is one of the common methods of screening in most low- and middle-income countries due to the low cost and less invasive nature of the test, though the requirement of skilled personnel and the need for the patients to return for review with the test results before treatment is a drawback (2, 14, 27). In the study in Owerri, Southeast Nigeria, 53.9% of the respondents knew about Pap smear a finding

which is closely similar to that of the current study (27).

More than half of the respondents knew that lower abdominal pain, foul-smelling vaginal discharge, and bleeding per vagina following sexual intercourse were major signs of cervical cancer. Similar findings were also mentioned in the studies in Ethiopia (2, 26). Also, most of the respondents in this study did not know of anyone with cervical cancer and this finding was similar to a study in Ghana where most of the participants responded in the same way (25). This may be due to the late reporting of cases of cervical cancer.

The majority of the respondents had a good attitude toward cervical cancer and screening. This was found to be similar to a finding of 67.7% in the study in Northwest Ethiopia (2). However, in the study in Hawassa, Ethiopia, the level of good attitude was lower (55.3%) and was attributed to the fear of the procedure and negligence on the part of the students who had good knowledge of the benefits of cervical cancer screening. (26).

A majority (73.3%) of the respondents have not received the cervical cancer prevention vaccine (HPV vaccine) and part of the reasons given were no knowledge of a centre to get the vaccine, the vaccine is expensive, not at-risk of cervical cancer, and lack of time to go for the vaccine. A very low rate of vaccination was also observed in the study in Northwest Ethiopia where only 1.2% of the respondents were vaccinated (2). This is a major challenge towards the elimination of cervical cancer. However, the majority of the respondents in the current study indicated their willingness to receive the HPV vaccine soon to prevent cervical cancer. This finding was similar to the study in Ghana (25). In addition, more than half of the respondents will recommend cervical cancer screening to another female student. This is a favourable attitude to cervical cancer screening as a recommendation to attend screening is a facilitator to uptake of cervical cancer screening (28, 29).

About a third of the respondents have been screened for cervical cancer in this study, this is contrary to the finding in the studies done in Northwest Ethiopia where only 2 out of the 409 (less than 1%%) respondents had screened for cervical cancer, 8.7% in Ghana and 21.1% in Kampala, Uganda (2, 25, 29). The reasons for the low level of cervical screening included lack of time to go for screening, not being aware of any screening centre, never heard of cervical screening, being scared of getting a positive result, cost of screening and having been vaccinated against HPV. This current study had a higher acceptability of cervical cancer probably because the University Teaching Hospital which is located on the same campus as the university provides cervical cancer screening services.

In addition, a study in Benin, Nigeria found that only 18.7% of the respondents had been screened for cervical cancer (14). The reason for this low uptake of cervical cancer screening was that students did not see themselves as being at risk of having cervical cancer. Some of the respondents in the current study also mentioned that as a reason for not accepting cervical cancer screening. This wrong impression by the respondents of not being at risk of cervical cancer is a huge concern and this needs to be corrected to reduce the morbidity and mortality associated with cervical cancer. Also, students who have received the HPV vaccine should be enlightened to screen for cervical cancer as HPV vaccination should not replace cervical cancer screening (4).

Although this study found that age, marital status, knowledge of cervical cancer, and previous vaccination with the HPV vaccine were associated with the uptake of cervical cancer screening, however, following logistic regression only knowledge of cervical cancer and previous vaccination with HPV vaccines were predictors of cervical cancer screening uptake. Respondents who had good knowledge were 24 times more likely to accept cervical cancer screening compared to those who had poor knowledge, and those who had received the HPV vaccine in the past were 29 times more likely to accept cervical cancer screening compared to those who had not received the HPV vaccine. The studies in Owerri, southeast Nigeria, and Kampala, Uganda also reported knowledge of cervical cancer as a factor associated with the uptake of cervical cancer screening (27, 29).

Study imitations

This study was a cross-sectional study and reported findings are limited to the validity of self-reporting and possible recall bias. This was however minimized by reassuring the respondents of the confidentiality of the information provided.

Conclusion

This study revealed good knowledge of cervical cancer. However, uptake of cervical cancer screening was low. Furthermore, there was also a good attitude towards cervical cancer and screening. However, most of the students have not received the HPV vaccine to reduce the risk of cervical cancer. Some of the reasons for not screening and not receiving the HPV vaccine

include cost, lack of awareness of centres where these services are available, and low-risk perception of having cervical cancer. Therefore, there is a great need to increase awareness and promote cervical cancer screening and other prevention services at an affordable cost in all healthcare facilities to achieve the elimination of cervical cancer.

List of Abbreviations

BUHREC: Babcock University Health Ethics Research Committee
CI: Confidence Interval
HPV: Human Papilloma Virus
LMIC: Low- and middle-income countries
OR: Odds Ratio
USD: United States Dollar

Declarations

Ethical approval and consent to participate

Ethical approval was obtained from the Babcock University Health Research Ethics Committee (BUHREC 781/22) before proceeding with the research and all aspects of the research were conducted following the standard of the approving body. Written informed consent was obtained from the respondents before the administration of the questionnaires. The respondents were assured of anonymity and confidentiality of information provided as they were not expected to write their names or matriculation numbers on the questionnaires

Consent for publication

All the authors gave consent for the publication of the work under the Creative Commons Attribution Non-Commercial 4.0 license.

Availability of data and materials

The data generated and analyzed in this study are available from the corresponding author upon reasonable request.

Competing interest

All authors do not have any competing interests.

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Authors contributions

AC was involved in the conception and design of the work, acquisition, analysis and interpretation of data, drafting and revising of the manuscript, final approval of the version for publication, and agrees to be accountable for all aspects of the work. SOO was involved in the study design, acquisition and interpretation of data, drafting of the manuscript, and final approval of the version for publication and agrees to be accountable for all aspects of the work. STO was involved in the study design, interpretation of data, drafting of the manuscript, and final approval of the version for publication and agrees to be accountable for all aspects of the work. OAO was involved in the study design, interpretation of data, drafting of the manuscript, and final approval of the version for publication and agrees to be accountable for all aspects of the work

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References

1. World Health Organization. Cervical cancer. 2023. Accessed on Oct 18, 2023. Available from: https://www.who.int/health-topics/cervical-cancer
2. Getaneh A, Tegene B, Belachew T. Knowledge, attitude and practices on cervical cancer screening among undergraduate female students in University of Gondar, Northwest Ethiopia: an institution based cross-sectional study. BMC Public Health. 2021 Dec 23;21(1):775. https://doi.org/10.1186/s12889-021-10853-2
3. The Global Cancer Observatory. Cervix uteri. 2021. Accessed on Oct 18, 2023. Available from: https://gco.iarc.fr/today
4. World Health Organization. Cervical cancer 2022. Accessed Oct 18, 2023. Available from: https://who.int/news-room/fact-sheets/detail/cervical-cancer
5. Stelzle D, Tanaka LF, Lee KK, Ibrahim Khalil A, Baussano I, Shah AS V, et al. Estimates of the global burden of cervical cancer associated with HIV. Lancet Glob Health. 2021 Feb;9(2):e161–9. https://doi.org/10.1016/S2214-109X(20)30459-9
6. World Health Organization. Cervical cancer - Early detection saves lives _ WHO _ Regional Office for Africa. 2023. Accessed on Oct 20, 2023. Available from: https://afro.who.int/countries/nigeria/news/cervical-cancer-early-detection-saves-lives
7. The Global Cancer Observatory. Nigeria Fact Sheets. 2021. Accessed on Oct 20, 2023. Available from: https://gco.iarc.fr/today/data/factsheets//population/566-Nigeria-facts-sheets.pdf
8. Okolie EA, Nwadike BI. Spotlight on Human Papillomavirus Vaccination Coverage: Is Nigeria Making Any Progress? JCO Glob

Oncol. 2023 Jun;9:e2300088. https://doi.org/10.1200/GO.23.00088
9. Osowiecka K, Yahuza S, Szwiec M, Gwara A, Kasprzycka K, Godawska M, et al. Students' Knowledge about Cervical Cancer Prevention in Poland. Medicina (B Aires). 2021 Sep 30;57(10):1045. https://doi.org/10.3390/medicina57101045
10. World Health Organization. Cervical cancer. 2024 Accessed Jan 22, 2024. Available from: https://who.ini/news-room/fact-sheets/detail/cervical-cancer
11. Endalew DA, Moti D, Mohammed N, Redi S, Alemu BW. Knowledge and practice of cervical cancer screening and associated factors among reproductive age group women in districts of Gurage zone, Southern Ethiopia. A cross-sectional study. PLoS One. 2020;15(9). https://doi.org/10.1371/journal.pone.0238869
12. National Institutes of Health. Cervical Cancer Screening (PDQ®) - NCI. Accessed Jan 22, 2024. Available from: https://cancer.gov/types/cervical/hp/cervical-screening-pdq
13. Dalla V, Panagiotopoulou EK, Deltsidou A, Kalogeropoulou M, Kostagiolas P, Niakas D, et al. Level of Awareness Regarding Cervical Cancer Among Female Syrian Refugees in Greece. Journal of Cancer Education. 2022 Jun 22;37(3):717–27. https://doi.org/10.1007/s13187-020-01873-4
14. Omorogbe CE, Ehizemwogie EJ. Awareness and Uptake of Cervical Cancer Screening Among Female Students in School of Basic Medical Sciences, University of Benin, Nigeria. American Journal of Nursing Science. 2019;8(4):169. https://doi.org/10.11648/j.ajns.20190804.17
15. United Nations Children's Fund (UNICEF). Closing the gap_ UNICEF bolsters country efforts to increase HPV vaccination _ UNICEF Supply Division [Internet]. 2023. Accessed on Oct 24, 2023. Available from: https://unicef.org/supply/stories/closing-gap-UNICEF-bolsters-country-efforts-increase-HPV-vaccination
16. Mruts KB, Gebremariam TB. Knowledge and Perception Towards Cervical Cancer among Female Debre Berhan University Students. Asian Pac J Cancer Prev. 2018 Jul 27;19(7):1771–7.
17. Tesfaye Z, Bhagavathula A, Gebreyohannes E, Tegegn H. Knowledge and awareness of cervical cancer and human papillomavirus among female students in an Ethiopian University: A cross-sectional study. Int J Prev Med. 2019;10(1):198. https://doi.org/10.4103/ijpvm.IJPVM_181_17
18. Baptista AD, Simão CX, Santos VCG dos, Melgaço JG, Cavalcanti SMB, Fonseca SC, et al. Knowledge of human papillomavirus and Pap test among Brazilian university students. Rev Assoc Med Bras [Internet]. 2019 May;65(5):625–32. https://doi.org/10.1590/1806-9282.65.5.625
19. Khan M, Zafar A, Muneer R, Siddiqui AA. Awareness Regarding Pap Smear Among Female University Students of Karachi: A Cross-sectional Survey. Cureus. 2018 Jun; 10(6): e2784. https://doi.org/10.7759/cureus.2784
20. Agboeze J, Nwali M, Ezeani N. Cervical Cancer Screening Knowledge and Behavior Among Female Undergraduate Students in a Nigerian University. J Glob Oncol. 2018 Oct 1;4(Supplement 2):3s–3s. https://doi.org/10.1200/jgo.18.69200
21. Agboeze J, Ezeani NN, Nwali MI, Ukaegbu C, Babale S. Cervical cancer screening knowledge, uptake and barriers among female undergraduates in a Nigerian University. _ Nigerian Medical Journal. Nigerian Medical Journal. 2022;63(3). https://doi.org/10.1200/jgo.18.69200
22. Babcock University. About Babcock University. 2023. Accessed on Oct 24, 2023. Available from: https://babcock.edu.ng/about
23. Babcock University. Babcock University Teaching Hospital. Accessed on Oct 24, 2023. Available from: https://buth.babcock.edu.ng
24. Kirkwood B, Sterne J. Essential Medical statistics. 2nd ed. Blackwell Science Limited; 2006.
25. Der E, Aduah R, Iddisa B, Awinboya G, Nakong N. The Knowledge and Acceptability of Cervical Cancer Screening among Female Students in University for Development Studies (UDS) Tamale Campus-Dungu. J Adv Med Med Res. 2018 Aug 3;27(4):1–9. https://doi.org/10.9734/JAMMR/2018/40783
26. Tsegaye S, Mengistu D, Gultie T. Knowledge and attitude towards cervical cancer screening and associated factors among female Hawassa University College of Medicine and Health Sciences students. MOJ Public Health. 2018;7(3):151?158. https://doi.org/10.15406/mojph.2018.07.00221
27. Dozie UW, Ebirim CIC, Dike CR, Dozie INS, Ibe SNO, Abanobi OC. Determinants of cervical cancer screening uptake among female undergraduates in a tertiary institution in southeastern Nigeria: a cross-sectional

study. J Prev Med Hyg. 2021 Mar;62(1):E213–21. https://doi.org/10.15167%2F2421-4248%2Fjpmh2021.62.1.1828
28. Black E, Hyslop F, Richmond R. Barriers and facilitators to uptake of cervical cancer screening among women in Uganda: a systematic review. BMC Womens Health. 2019 Dec 9;19(1):108. https://doi.org/10.1186/s12905-019-0809-z
29. Kabiri L, Komuhangi G. Facilitators and Barriers to Cervical Cancer Screening among Female Undergraduate Students of Makerere University. Open J Nurs [Internet]. 2021;11(07):620–41. https://doi.org/10.4236/ojn.2021.117053