Knowledge and Awareness of Cervical Cancer, Screening and Vaccination among Female Undergraduates in a Public Tertiary Institution, Enugu Nigeria

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Authors' contributions

This work was carried out in collaboration among all authors. Author NMA conceptualized the study. Authors NMA and OCE designed the study. Author AKDI wrote the study protocol, compiled and produced the draft. Authors ACS and DOJ managed the analyses of the study. All authors wrote different segments of the study. All authors read and approved the final manuscript.

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ABSTRACT

Introduction: Cervical cancer is the fourth most common cancer among women globally, constituting a major public health problem with a mortality rate that is 18 times higher in low-income countries, including Nigeria, where there are over 8000 annual deaths attributable to cervical cancer. This study assessed the knowledge and awareness of cervical cancer, screening and vaccination among female undergraduates of the University of Nigeria Enugu Campus (UNEC).

Methods: This was a descriptive cross-sectional study conducted among 420 female undergraduates of the University of Nigeria Enugu Campus using a multistage sampling technique. A semi-structured, self-administered questionnaire was used to collect data on knowledge and awareness of cervical cancer, screening, and vaccination. Data was analyzed with the use of IBM SPSS, version 23.0. Descriptive analysis was done using percentages, and frequencies. Pearson's chi-square test was used to find the association between variables. A p-value of ≤ 0.05 was considered statistically significant.

Results: The result revealed that majority of the respondents 90.7% had heard of cervical cancer, 43.7% were aware of the cervical cancer screening test, and 56.6% knew human papillomavirus. 70.2% of the respondents agreed that the Human Papillomavirus vaccine can protect against cervical cancer while 57.8% mentioned bloodstain discharge from the vagina as signs and symptoms of cervical cancer. Furthermore, based on socio-demographic characteristics and level of knowledge of cervical cancer among study respondents, a statistically significant relationship exists between faculty (*P*=.020) and level of knowledge of cervical cancer.

Conclusion: The study revealed good knowledge and awareness of cervical cancer, and human papillomavirus (HPV) but poor awareness of pap smear test among the study participants. Sustained and targeted comprehensive educational campaigns on cervical cancer, screening and vaccination were recommended.

1. INTRODUCTION

"The world is moving towards an increasing epidemic of non-communicable diseases (NCDs) in the modern era. Among the non-communicable diseases (NCDs), cancer is the second most prevalent cause of mortality worldwide. An estimated 9.6 million deaths or one in every six deaths, were caused by cancer in 2018, making it the second-highest cause of death worldwide" [1]. "Cancer is a large group of diseases that can start in almost any organ or tissue of the body when abnormal cells grow uncontrollably, go beyond their usual boundaries to invade adjoining parts of the body and spread to other organ" [2]. Cancer arises from genetic alterations that disrupt the normal regulatory mechanisms of cell growth and division, leading to the formation of tumours.

"Cancer of the cervix is the development of malignant cells in the cervix, which is the lower part of the uterus that connects to the vagina. It is primarily caused by persistent infection with high-risk types of the Human Papillomavirus (HPV), a sexually transmitted virus" [3]. "HPV refers to a group of small, non-enveloped deoxyribonucleic acid (DNA) viruses, that can infect the mucous membranes and skin. Among the various strains of HPV, certain high-risk types, such as HPV 16 and 18, are strongly associated with cervical cancer development" [4]. "HPV was estimated to cause almost half a million cases and 250,000 deaths from cervical cancer in 2002, of which about 80% occurred in developing countries" [3]. "The incidence of adeno cervical cancer is high due to some factors like increased sexual activity and age of first intercourse, increased use of combined oral contraceptive, immunodeficiency and smoking among other factors. Persistent infection with high-risk HPV types can lead to the development of cervical pre-cancers, which, if left untreated, may progress to cervical cancer over time" [5]. "Cervical cancer is the most prevalent cancer of the female reproductive system and the second most prevalent cancer among women in Nigeria after breast cancer" [5].

"According to the National Cancer Institute (NCI), cervical cancer has the potential to arise from two distinct cell types that form the lining of the cervix, the lower part of the uterus in women" [6]. "The main types of cervical cancers are

squamous cell carcinoma and adenocarcinoma" [6]. "The squamous cell carcinoma is the main common cause of cervical cancer accounting for approximately 90% of cervical cancers which can develop from cells in the ectocervix. Cervical adenocarcinomas represent a smaller proportion of cervical cancer cases, approximately 10% and they develop in the glandular cells of the endocervix" [7]. "UK Cancer Research opined that Adenosquamous cancers are tumours that have both squamous and glandular cancer cells. It is a rare type of cervical cancer of which 5% to 6% out of 100 cervical cancers are this type. Very rarely, other types of cancer can occur in the cervix, For example, lymphomas and sarcomas. They are treated in a different way than cervical cancer" [8].

Knowledge about cervical cancer entails understanding its causes, risk factors, symptoms, and the importance of early detection. Predictors of cervical squamous intraepithelial lesions among women in Enugu, Nigeria revealed that age at first sexual contact, parity, having numerous partners, having STDs, using oral contraceptives (OCP), and tobacco use were all risk factors for premalignant and malignant lesions of the cervix [9].

1.2 Need for the Study

A critical review of 5-year hospital data in Enugu State on the prevalence of cervical cancer reported a prevalence rate of 13% in the state indicating that despite the low rates of screening for cervical cancer in Enugu state, the prevalence rate remains high [10]; therefore, it is important that a study be conducted to determine the knowledge and awareness of cervical cancer, screening, and vaccination. There are few evidence studies done on knowledge and awareness of cervical cancer screening, and vaccination in the University of Nigeria Enugu campus Community. Given this gap in studies done on cervical cancer, it is important that a study to determine the knowledge and awareness of cervical cancer, screening, and vaccination among Female undergraduates in the University of Nigeria Enugu Campus is conducted. There is also observed negligence, and reluctance to go for screening and get vaccinated. It is envisaged that the findings from this study will be used by the health care team to increase strategies and knowledge on cervical cancer screening, and vaccination for women. Findings will also be used in planning and designing training manuals and guidelines and

formulating deliberate policies in training nurses, doctors and other health personnel involved in the fight against cervical cancer. It has also been found appropriate to carry out this study because the results will be used to influence women's behaviour and practice towards cervical cancer vaccination positively. Furthermore, the study results will form a basis for further research on cervical cancer screening, and vaccination.

1.3 Theoretical Framework

"This study was based on the health belief model developed in the 1950s by social psychologists Irwin Rosenstock and Godfrey Hochbaum" [11]. The theory postulates that people will engage in preventive health behavior if they have the following beliefs: They are at risk of contracting a particular disease or condition (Perceived Susceptibility), the consequences of the disease are severe or life-threatening (Perceived Severity) and a particular behavior can be engaged in to prevent the disease (Perceived Benefits), of which the benefits outweigh any barriers (Perceived Barrier).

1.3.1 Application of the theory to the study

Perceived Susceptibility: In this study, perceived susceptibility means having knowledge of the predisposing factors to cervical cancer, vulnerable age group, effect of HPV, self-awareness of being at risk and incidence of the disease.

Perceived Severity: For this study, perceived severity has been attributed to knowledge about cervical cancer as a condition, its signs and symptoms, treatment implication, fears associated with the condition, progression of the condition, and potential mortality.

Perceived Benefits: For the purpose of this study, perceived benefits will facilitate them to make a positive health-related decision such as cervical cancer screening and vaccination against HPV.

Perceived Barrier: Perceived barrier in this study are those things that hinders cervical cancer screening and vaccination uptake which include: financial constraints, difficulty in screening such as time, lack of access to healthcare, fear etc.

The cues to action refer to factors that trigger and give cause for action such as bodily changes or environmental indicators like media. Other variables that affect health behaviour are diverse demographic, socio-psychological, and cultural factors.

2. METHODOLOGY

2.1 Study Population

This study was conducted at University of Nigeria Enugu Campus (UNEC) located in Enugu, Nigeria. The school has seven faculties namely: Faculty of Business Management, Faculty of Environmental Studies, Faculty of Medical Sciences, Faculty of Law, Faculty of Dentistry, Faculty of Basic Medical Sciences, and Faculty of Health Science & Technology. The population for this study were female undergraduates in the University of Nigeria Enugu Campus. The choice of female undergraduates was that cervical cancer only affects women.

2.2 Study Design

A descriptive cross-sectional study design was adopted in this study in order to assess the knowledge and awareness of cervical cancer, screening, and vaccination among female undergraduates of University of Nigeria Enugu Campus. This design was considered appropriate in carrying out this study because it will facilitate the collection of data systematically from a sample of population and at a defined time.

2.3 Sample Size Determination

The sample size was determined using Taro Yamane's (1967) formula:

$$n = N/1 + Ne^2$$

Where:

n = Sample Size
N = Estimated population size (Female undergraduates of UNEC at 9000 from all faculties)
e = degree of accuracy desired =0.05

$$= (9,000/1 + 9,000 \times 0.05^2)$$

$$= (9,000/1 + 9,000 \times 0.0025) = 382$$

Thus, the minimum sample size was 382 female undergraduates. However, 10% was used to make provision for non-responses. Therefore, a total of 420 respondents was the actual sample size.

2.4 Sampling Technique

A multistage sampling method was used to select participants in this study. In stage one, a purposive sampling technique was used to select all the faculties in the school. In stage two, a simple random sampling was used to select two departments from five faculties (Health Science, Business Administration, Dentistry, Basic Medical Science and Environmental Studies), three departments were selected from Law and one from Medical Sciences. In stage three, a stratified sampling technique was used to stratify according to class levels. In stage four, a simple random sampling technique was used to select two levels from each department. Lastly, a systematic sampling method was used to select consenting participants in their lecture halls until fifteen students were selected from each level in a department. Using simple random sampling, the first person in each level was selected, and continued with a ratio of 2:1 till the assigned number of participants were selected.

The same process was applied to other faculties, and each department was assigned 30 questionnaires. Proportionate allocation was used in the selection of the department from the faculties.

2.5 Data Collection Tool

The instrument that was used for data collection was a pre-tested and semi-structured questionnaire developed by the researchers based on the objectives of the study. The Questionnaire was vetted by a senior Researcher. The questionnaire consisted of open-ended questions which were arranged in sections that handled socio-demographic, knowledge and awareness of cervical cancer, screening and vaccination.

2.6 Data Management

Data was entered using Microsoft Excel. The data was stored in the computer under password. Data cleaning was done whereby missing values, extreme values and inconsistencies were identified and corrected. After cleaning, the data was then exported to IBM SPSS software version 23.0 for analysis. Coding and verification of the data was done for easy manipulation, analysis and presentation. Data was presented using tables showing frequency distribution for independent and dependent variables.

Data was analysed with the use of IBM SPSS, version 23.0. Descriptive statistics were computed for all relevant variables. Descriptive analysis was done using percentages, and

frequencies. Pearson's chi-square test was used to find association between variables. A p-value of < 0.05 was considered statistically significant.

3. RESULTS

A total of 420 copies of questionnaire were distributed and retrieved. However, 410 copies that were completely and correctly filled were analyzed giving a response rate of 97.6%.

Table 1 indicated that respondents aged 19-21 years were the largest age group comprising 46.6% of the sample. In terms of monthly allowance, the highest percentage (30.0%) fell in the category above #30,000. Furthermore, the study revealed that the majority of respondents were single (93.2%), Igbos (92.0%) and identified as Christian (99.0%).

Table 2 indicated that faculty of Law had the largest faculty which represented 22.0% of the sample, and were primarily from the 200 Level (42.2%).

Table 1. Socio-demographic characteristics of respondents. n = 410

Characteristics	Frequency	Percentage (%)
Age		
16 – 18 years	36	8.8
19 – 21 years	191	46.6
22-24 years	145	35.4
25 years and above	38	9.3
Ethnicity		
Igbo	376	91.7
Yoruba	14	3.4
Others (Edo, Tiv, Ijaw Isoko, Uhrobo, Igala, Efik Ibibio, Ikwere, etc)	20	4.9
Monthly Allowance (#)		
Less than 10,000	107	26.1
10,000 – 19,000	75	18.3
20,000 – 29,000	105	25.6
Above30,000	123	30.0
Marital Status		
Single	382	93.2
Married	28	6.8
Religion		
Christian	406	99.0
Muslim	4	1.0

Table 2. Distribution of respondents across faculties and levels of study n= 410

	Frequency	Percentage (%)
Faculty		
Health Sciences and Tech	61	14.9
Law	90	22.0
Environmental Studies	59	14.4
Medical Sciences	30	7.3
Dentistry	55	13.4
Basic Medical Science	60	14.6
Business Administration	55	13.4
Level of Study		
200 Level	173	42.2
300 Level	148	36.1
400 Level	73	17.8
500 Level	16	3.9

Table 3. Awareness of cervical cancer, screening and vaccination. n=410

Variables	Frequency	Percentage (%)
Have heard of cervical cancer	372	90.7
Have heard of Pap smear tests	179	43.7
All women are at risk of developing cervical cancer	210	51.2
Heard of Human Papilloma virus (HPV)	261	63.7
Human Papilloma virus (HPV)can be sexually transmitted.	274	66.8
Human Papilloma virus (HPV)vaccine can protect against cervical cancer.	288	70.2

Table 4. Knowledge of causative agent, age for screening, and signs and symptoms of cervical cancer

Variables	Frequency	Percentage (%)
Causative agent of cervical cancer		
Human papillomavirus		
Yes	232	56.6
No	178	43.4
Weakened immune system		
Yes	84	20.5
No	326	79.5
Sexually transmitted Infections		
Yes	80	19.5
No	330	80.5
Diabetes		
Yes	5	1.2
No	405	98.2
I don't know		
Yes	11	2.7
No	399	97.3
Source of the information		
Parents/Family		
Yes	8	2.0
No	402	98.0
Lectures		
Yes	37	9.0
No	373	91.0
Media		
Yes	74	18.0
No	336	82.0
Medical Practitioners		
Yes	27	6.6
No	383	93.4
Friends/Schoolmates		
Yes	27	6.6
No	383	93.4
I Don't Know	12	2.9
	398	97.1
Age recommended for cervical cancer screening		

Variables	Frequency	Percentage (%)
12-20 years	77	18.8
21-29 years	225	54.9
30-65 years	89	21.7
65 years Above	7	1.7
I Don't Know	12	2.9
Signs and symptoms of cervical cancer		
High blood pressure		
Yes	49	12.0
No	361	88.0
Blood stain discharge from the vagina		
Yes	237	57.8
No	173	42.2
Leg swelling		
Yes	45	11.0
No	365	89.0
Painful urination		
Yes	139	33.9
No	271	66.1
I don't know		
Yes	14	3.4
No	396	96.6

Table 5. Association between sociodemographic Factors with knowledge of cervical cancer

Socio-Demographic	P-value
Age	.735
≤24 years	
≤ 25 years	
Ethnicity	.729
Igbo	
Yoruba	
Others (Edo Tiv Ijaw Isoko Uhrobo Igala Efik Ibibio, Ikwere, etc)	
Marital Status	.113
Single	
Married	
Religion	.753
Christian	
Muslim	
Faculty	.020
Health Sci. and Tech	
Law	
Environmental Studies	
Medical Sciences	
Dentistry	
Basic Medical Science	
Business Admin.	
Level of Study	.275
200 Level	
300 Level	
400 Level	
500 Level	

Table 3 revealed that a high percentage (90.7%) of participants had heard of cervical cancer, while a smaller proportion (43.7%) were aware of Pap smear tests. When asked about the risk of developing cervical cancer, 51.2% answered affirmatively. In terms of HPV, 63.7% had heard of it, and of those who were aware, 66.8% knew that it can be sexually transmitted. Additionally, 70.2% of respondents understood that the HPV vaccine can protect against cervical cancer.

Table 4 revealed that most of the respondent indicated HPV as the cause (56.6%) of cervical cancer. Regarding the source of information, the most common source mentioned was the media (18.0%). In terms of the perception on the recommended age for cervical cancer screening, the majority believed it should begin between 21-29 years (54.9%).

Table 5 showed the association between socio-demographic and knowledge of cervical cancer. Faculty of study was found to be statistically associated with Knowledge of cervical cancer (P = .02).

4. DISCUSSION

This study aimed to assess the level of knowledge and awareness of cervical cancer, screening, and vaccination among female undergraduates at University of Nigeria Enugu Campus (UNEC). Results from the study indicated that most of the respondents were between teenage and early twenties. This is quite similar to a study done in Imo State where more than half of the female undergraduate students selected were in this age range, which has also been known as one where risky sexual behavior likely to occur [12].Majority 92% were from Igbo ethnic group, and 99%were Christians. This can be attributed to the fact that this study was conducted in Enugu state which is one of the five Igbo speaking states in the South Eastern part of Nigeria.

The participants in this study had good knowledge and awareness of cervical cancer; however, they had poor awareness on cervical cancer screening. This can be seen in their answers to the questions; where majority of the respondents 90.7% had heard of cervical cancer, 63.7% had heard of HPV, 56.6% knew the causative agent of cervical cancer, while 43.7% had heard of pap smear test. These findings were consistent with studies conducted in Imo and Lagos, Nigeria where almost every respondent knew about cervical cancer [12,13]. Another similar study conducted in Kenya showed that 82.2% of the study participants were aware of cervical cancer [14]but was in contrast to the findings in Saudi Arabia which revealed lack of knowledge [15]. This could be because cervical cancer is rare and accounts for 2.2% of all cancer cases in Saudi Arabia than in Sub-Saharan Africa. More than half of the respondents 63.7% had heard about human papillomavirus (HPV), 56.6% pointed out human papillomavirus as the cause of cervical cancer, and 70.2% knew that HPV vaccine can protect against cervical cancer. This could be as a result of the respondents' high levels of education and the study's geographic location. Result from this research was consistent with recent study in South Carolina that found a substantial increase in HPV awareness among college students [16]. However, this study negates findings from the research carried out among female undergraduates in Lagos which reported low knowledge of human papillomavirus and the vaccine [17].A Study done in Kenya identified that only 23.5% were aware that Human Papillomavirus (HPV) is a risk factor for the development of cervical cancer [14]. In this study, 43.7% of the participants had heard of the Pap smear test and this result was slightly lower than the value obtained among females in Saudi Arabia where 48.9% had heard about Pap smear test [18]. Unlike the current study, which showed below average knowledge of Pap smear test, a similar study conducted among female undergraduates in Pakistan showed that 75.1%of the study respondents had high knowledge [19].Poor awareness of pap smear test could lead to low screening rates, delayed diagnosis, misconceptions, and increased risk of cervical cancer. To meet the needs and preferences of female undergraduates, educational materials such as pamphlets, videos, and online resources with emphasis on the importance of pap smear screening should be developed.

Furthermore, this study found fair knowledge on the signs and symptoms of cervical cancer, this study was dissimilar with the one carried out among female undergraduates in Lagos State which reported a poor knowledge of signs and symptoms of cervical cancer among the participants [20]. The source of information for people who had heard of pap smear tests and cervical cancer revealed that media 18% was their main source of information. This result was

in congruent with a study that found media as their major source of information [21]. Undergraduates often rely on their media (blog post, social media, articles) which can contribute to the spread of information about cervical cancer among the study community. This result is dissimilar to the study conducted in Jos among female undergraduates that reported main source of information for cervical cancer and Pap smear test from medical practitioner or health worker 35.8% [22]. Collaboration with student organizations to host educational events, and utilization of social media platforms like Facebook, Instagram or Twitter can provide valuable information about cervical cancer, its risk factors, and ways to prevent it. Health outreaches and campaigns can be done too. Cervical screening facilities can also be increased and closer to reach to the individuals, a center can be located not far from the institution. This will help increase knowledge and awareness of the undergraduates.

"Statistically, significant associations were found between faculty and knowledge of cervical cancer screening, and vaccination with the Health Science faculty having the highest knowledge. This could be as a result of the exposure that health students receive in their various courses. These findings were comparable to a study conducted among female medical and dental students in a tertiary institution in Benin City, Nigeria, where knowledge of HPV was substantially correlated with age (P = 0.001), faculty (P = 0.014), and degree of study (*P* = .001)" [23]. "A similar study conducted in Ogun State also found a significant relationship between knowledge of cervical cancer screening among the female undergraduates" [24]. "Another study among female students and staff in a tertiary institution in Niger State showed a significant association between awareness of cervical cancer screening amongst staff and students (p-value =0.00)" [25].

5. CONCLUSION

The study revealed that majority of the respondents have heard of cervical cancer and HPV, they also know HPV can be sexually transmitted and know of the HPV vaccine although many not have heard of Pap smear test hence it can be concluded that the female undergraduates of University of Nigeria Enugu Campus. have good knowledge and awareness of cervical cancer and HPV vaccine but poor awareness on screening . The knowledge about

HPV is particularly important, as HPV is a major risk factor for cervical cancer. Increased awareness and knowledge of cervical cancer, screening, and vaccination should be promoted through university campaign, curricular changes, community and research projects.

ETHICAL APPROVAL AND CONSENT

Ethical permit was gotten from the University of Nigeria Teaching Hospital Health Research and Ethics Committee with certificate permit number: UNTH/HREC/2023/05/607. It was also a voluntary study and participants were randomly picked. The participants gave their consent and were confidentiality assured.

Competing interests

Authors have declared that no competing interests exist.

REFERENCES

1. World Health Organization. Cervical Cancer; 2022. Availavle:https://www.who.int/news-room/fact-sheets/detail/cervical-cancer.
2. American Cancer Society. What is cancer?; 2021. Availavle:https://www.cancer.org/cancer/cancer-basics/what-is-cancer.html
3. World Health Organization. Human papillomavirus; 2022. Availavle:https://www.who.int/teams/health-product-policy-and-standards/standards-and-specifications/vaccine-standardization/human-papillomavirus
4. Rahangdale L, Mungo C, O'Connor S, Chibwesha C J, Brewer N T. Human papillomavirus vaccination and cervical cancer risk BMJ. 2022;379:e070115. DOI:10.1136/bmj-2022-070115
5. Shanta V, Krishnamurthi S, Gajalakshmi CK, Swaminathan R, Ravichandran K. Epidemiology of cancer of the cervix: Global and national perspective. J Indian Med Assoc. 2000;98(2):49-52.
6. National Cancer Institute. Types of Cervical Cancer; (2023). Availavle:https://www.cancer.gov/types/cervical
7. American Cancer Society. What is cancer?; 2021. Availavle:https://www.cancer.org/cancer/cancer-basics/what-is-cancer.html

8. Cancer Research UK. Cervical Cancer Types and Grades; 2020. Availavle:https://www.cancerresearchuk.org/about-cancer/cervical-cancer/stages-types-grades/types-and-grades

9. Omeke CA, Enebe JT, Ugwu AI, Onyishi NT, Omeke MC, Enebe NO, Izuka EO, Aniwada EC. The magnitude and predictors of cervical squamous intraepithelial lesions among women in Enugu, Nigeria: A cross-sectional study of women in a low-resource setting. The Pan African medical journal. 2022; 41:130. DOI: 10.11604/pamj.2022.41.130.28173

10. Ajebo UC, Akubue AU. Prevalence of cervical cancer in enugu state: A critical review of 5-year hospital data in Enugu State, Southeast Nigeria. Texila International Journal of Public Health; 2022. DOI: 10.21522/TIJPH.2013.10.04. Art013

11. Champion VL, Skinner CS. The health belief model. Health behav Health Educ Theory Res Prac. 2008;4:45–65.

12. 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 south eastern Nigeria: A cross sectional study. Journal of preventive medicine and hygiene. 2021;29:62(1) E213-E221. DOI:10.15167/2421-4248/jpmh2021.62.1.1828

13. Bakare Omowunmi, Akinyinka Modupe, Ahmed Alebiosu. Cervical cancer screening and Vaccination Uptake among Non-Teaching Staff of LASUCOM. 2023;6:17-23.

14. Nthiga AM. Determinants of cervical cancer screening uptake among women in Embu County, Kenya. A Masters Dissertation in the Department of Public Health in the University of Nairobi; 2014.

15. Alsalmi SF, Othman SS. Cervical cancer screening uptake and predictors among women in Jeddah, Saudi Arabia. Cureus. 2022;14(4):e24065. DOI: 10.7759/cureus.24065 PMID: 35573538 PMCID: pmc9098102

16. Kasymova S, Harrison SE, Pascal C. Knowledge and awareness of human papillomavirus among college students in South Carolina. Infect Dis (Auckl). 2019;(12):1178633718825077. DOI: 10.1177/1178633718825077

PMID: 30728723
PMCID: PMC6351721

17. Oluwole OE, Idowu OM, Adejimi AA, Balogun MR, Osanyin GE. Knowledge, attitude and uptake of human papillomavirus vaccination among female undergraduates in Lagos State, Nigeria. Journal of Family Medicine and Primary Care. 2019;8(11):3627-3633. DOI: 10.4103/jfmpc.jfmpc_520_19

18. Jeddo ZA. Knowledge, perception, and sources of information towards cervical cancer and utilization of papanicolaou (pap) smear as screening among female in medina, Saudi Arabia. Obstet Gynecol Int J. 2022;13(6):378-383. DOI: 10.15406/ogij.2022.13.00680

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;10(6):e2784. DOI: 10.7759/cureus.2784

20. IARC/ICO Information Centre on HPV and Cancer Human Papillomavirus and Related Cancers, Fact Sheet; 2017.

21. Hyacinth HI, Adekeye OA, Ibeh JN, Osoba T. Cervical cancer and Pap smear awareness and utilization of pap smear test among Federal civil servants in North Central Nigeria. PLoS One. 2012;7(10): e46583. DOI: 10.1371/journal.pone.0046583

22. Gimba SM, Emmanue AA, Baidi B, Mangai MJ. Bukuta G. Awareness and Practice of cervical cancer screening among university of jos female undergraduates. Continental Journal of Nursing Science 2014;6(1). Availavle:https://doi.org/10.5281/zenodo.824616

23. Onowhakpor AO, Omuemu VO, Osagie OL, Odili CG. Human papilloma virus vaccination: Knowledge, attitude and uptake among female medical and dental students in a tertiary institution in Benin-City, Nigeria. J Community Med Primary Health Care 2016;(18):101-8.

24. Maitanmi JO, Fabiyi TE, Eniola O, Sansi TO, Blessing JO, Maitanmi B, Ojewale MO, Dairo AA, Adebiyi DA, Akingbade O. Knowledge and acceptability of cervical cancer screening among female undergraduates in Babcock University Ilishan-Remo, Ogun State, Nigeria. Ecancermedicalscience. 2023;17:1502. DOI: 10.3332/ecancer.2023.1502.

25. Owoeye IOG, Ibrahim IA. Knowledge and attitude towards cervical cancer screening among female students and staff in a tertiary institution in the Niger Delta. Int J Med Biomed Res. 2013;2(1):48-56.

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