Original

Knowledge, Attitude and Practice of Cervical Cancer Screening among Female Undergraduate Students in the College of Medical Sciences, University of Benin

[1]Idewele EI, [2]Idewele RO, [3]Enagbonma BJ, [4]Imade EE [3]Osasumwen O, [5]Isemede EE

[1]*Narrow Way Clinic, Benin City, Nigeria*
[2]*Department of Wood Materials Science, Faculty of Science, Forestry and Technology, University of Eastern Finland.*
[3]*Department of Environmental Management and Toxicology; Faculty of Life Sciences, University of Benin, P.M.B. 1154, Benin City, Nigeria.*
[4]*Department of Microbiology, Faculty of Life Sciences, University of Benin, P.M.B. 1154, Benin City, Nigeria.*
[5]*Department of Environmental Health and Technology, University of Eastern Finland.*

Corresponding author: Emmanuel Edoghogho Imade, *Department of Microbiology, Faculty of Life Sciences, University of Benin, Benin City, Nigeria; emmanuel.imade@uniben.edu; +2347034248047*

Article history: Received 13 October 2024, Reviewed 27 November 2024, Accepted for publication 11 December 2024

Abstract

Background: Cervical cancer poses a major threat to women's health, impacting their sexual, reproductive, and overall quality of life. Despite being a leading cause of death among middle-aged women in developing countries, it is largely preventable through early detection and treatment of precancerous lesions. This study assessed the knowledge, attitudes, and practices regarding cervical cancer screening among female undergraduate students at the College of Medical Sciences, University of Benin, Nigeria.

Method: A descriptive cross-sectional survey was conducted with 580 students, selected through multi-stage sampling. Data were collected using structured, interviewer-administered questionnaires and analyzed with IBM SPSS version 22.0. Quantitative data were presented as frequencies, percentages, means, and standard deviations, with a p-value of < 0.05 considered statistically significant.

Results: The mean age of respondents was 20.3 ± 2.6 years. While 79.0% of participants demonstrated good knowledge of cervical cancer screening, only 1.7% had undergone screening. A statistically significant association was found between attitudes and screening practices ($\chi 2 = 4.726$, $p = 0.030$). Among the 98.1% who had never been screened, 74.0% perceived themselves as being at low risk. Despite high levels of knowledge and positive attitudes (80.3%), the actual uptake of screening was very low (1.7%).

Conclusion: To address this gap, university health education programs should focus on improving risk perception and promoting cervical cancer screening among students.

Keywords: Prevention of cervical cancer, cancer screening, public health, risk perception, human papillomavirus, cross-sectional study.

How to cite this article:

Idewele EI, Idewele RO, Enagbonma BJ, Imade EE Osasumwen O, Isemede EE. Knowledge, Attitude and Practice of Cervical Cancer Screening among Female Undergraduate Students in the College of Medical Sciences, University of Benin. The Nigerian Health Journal 2024; 24(4):1779 – 1788
https://doi.org/10.60787/tnhj.v24i4.931

Introduction

Cervical cancer is a malignant disease of the cervix that typically occurs in the 5th or 6th decade of life, with a mean age of onset at 54 years.[1] However, premalignant lesions are commonly detected amongst women of reproductive age (15-49 years).[2] Persistent high-risk human papillomavirus (hrHPV) infection of the cervix is considered the main etiological factor in over 99% of cervical cancer cases.[3] Although HPV transmission is predominantly sexual, 90% of immuno- competent women will experience spontaneous resolution over a two-year period.[4] Carcinoma of the cervix is associated with the several risk factors, including early age at first sexual intercourse, multiple male sexual partners, male sexual partners with multiple partners, early age at first delivery childbirth, multiparity, smoking, long-term use of oral contraceptive pills, and immunosuppressed states.[5,6] These major risk factors have been shown to be prevalent in Nigeria.[7]

Cancer is responsible for about 51million deaths annually, with cervical cancer accounting for about 8.5% of these deaths.[8] Cervical cancer is a global public health issue, being the second most common cancer in women and the most prevalent gynecological cancer worldwide,[9] with an estimated 528,000 new cases and 266,000 deaths in 2012.[9] It is further estimated that over one million women worldwide currently have cervical cancer, many of whom remain undiagnosed, or have no access to treatment that could either cure them or prolong their lives.[10] The incidence of cervical cancer begins to rise at age 20-29 years, peaks around 55-64 years, and declines somewhat after 65 years.[11] In Nigeria, cervical cancer is a leading cause of cancer-related mortality and ranks as the second most common cancer. It is the second most frequent cancer among Nigerian women, following breast cancer, with an estimated 24.8% of women in the general population harbouring cervical HPV infection at any given time.[12] Cervical cancer has a pre-malignant stage which usually occurs in women under the age of 40 years.[13] The goal of screening and treating cervical premalignant lesion is to reduce the incidence of cervical cancer and its associated mortality by truncating the progress from precancerous lesion to invasive cancer.[14]

The WHO recommends starting cervical cancer screening as a form of secondary prevention from the age of 25.[15] It suggests a 5-year screening interval for women over 50 years and a 3-year interval for those within the age group of 25-49 years if resources are available.[16] Evidence indicates that the burden of cervical cancer is rising.[17] However, with early detection through screening, the disease does not have to claim so many lives.[17] Current estimates indicate that approximately 9,922 women are diagnosed with cervical cancer each year and about 8,030 die from the disease.[18] The greatest burden of cervical cancer occurs in the developing world where the mortality rate ranges from 10 to 35 deaths per 100,000 compared to 2 to 4 deaths per 100,000 in developed nations.[19] Sub-Saharan Africa is by far the most affected region, accounting for 80% of the new cases and 85% of cervical cancer deaths worldwide.[20] More than 80% of the world's new cases and deaths due to cervical cancer occur in the developing world and less than 5% of women in these settings are never screened for cervical cancer even once in their lifetime.[21]

Health workers are often regarded as "role models" in health-related issues. They play a major role in enlightening the public on the availability and necessity for cervical cancer screening services.[22] In a study among nurses in Nnamdi Azikiwe University Teaching Hospital, Nnewi, Nigeria, on awareness of cervical cancer screening services, results showed that 87% were aware of the existence of cervical cancer screening services, only 5.7% had ever been screened for cervical cancer.[23] Their attitude and practice relating to such issues can either positively or negatively influence the decision made by community members. It is therefore pertinent to appraise their perception and utilization of cervical cancer screening services. Consequently, this study aimed to evaluate the knowledge, attitude and practices of medical undergraduates at the University of Benin regarding cytological screening for cervical cancer (Pap smear).

Method

Setting

The study was conducted among female undergraduate students from the College of Medical Sciences, University of Benin, Benin City, Edo State, Nigeria. The University of Benin was founded in 1970, and the College of Medical Sciences consists of three schools: the School of Basic Medical Sciences, the School of Dentistry and the School of Medicine.

Study design

A descriptive cross-sectional study design was utilized for this study, which was carried out from October 2018 to October 2019.

Sample size estimation

The sample size was determined using the formula below (24).

$$"n" = (Z\_(\alpha/2)\text{^}2\ p(1-p)D)/d\text{^}2$$

Where:

Print ISSN: 0189-9287 Online ISSN: 2992-345X

n = the desired sample size when population is greater than 10,000

$Z_{\alpha/2}$ = normal deviate for two-tailed alternative hypothesis at 5% level of significance

p = the prevalence or proportion of event of interest for the study

D = design effect (reflecting the sampling design used in the survey) taken as 1.5 for this study

D = desired degree of accuracy (0.05)

Based on a study conducted on the Knowledge, attitude and practice of cervical cancer screening among health clients at a teaching hospital in Addis Ababa,[25] the proportion of cervical cancer screening practice was 34.6%. Therefore, the minimum sample size after taking into consideration a 10% non-response rate was 580.

Sampling methodology

A multistage sampling technique was used to select the study population.

Stage 1: Selection of Faculties

The College of Medical Sciences consists of three schools: Medicine, Dentistry, and Basic Medical Sciences. Samples were obtained from all the schools.

Stage 2: Selection of Departments

Respondents were selected from all departments within the College, including Medicine, Dentistry, Nursing, Medical Biochemistry, Physiology, Anatomy, Medical Laboratory Science, and Physiotherapy.

Stage 3: Selection of Levels

Each selected department consists of various academic levels. A stratified sampling technique was used to proportionally allocate number of respondents from each level, using a sampling fraction. The sampling fraction was calculated as: Sampling fraction = n/N

Stage 4: Selection of Respondents

Samples were taken from each selected level using a systematic sampling technique. A sampling interval (k) was employed to select participants, where: Sampling interval = N/n.

Survey Instrument

An interviewer-administered structured questionnaire adopted from Vishwakarma, Rawat[26] and Ifemelumma, Anikwe[27] was used for data collection. The questionnaire included sections designed to capture the socio-demographic characteristics of the respondents, assess their knowledge of cervical cancer screening and examine their screening practices. Another section aimed to determine the respondents' level of acceptance of cervical cancer screening and identify barriers to screening. The questionnaire contains both open-ended and close-ended questions.

The data obtained were sorted and screened for completeness and accuracy of information before being coded and inputted into the IBM SPSS version 22.0 Spreadsheet for analysis. Univariate analysis was done to assess the distribution of variables, while bivariate analysis was done to determine association between independent variables (socio-demographic characteristics) and the outcome variables. A p-value less than 0.05 was considered statistically significant and results were presented in prose and frequency tables.

To evaluate the knowledge, attitude, and practice of cervical cancer screening among respondents, a scoring system was developed by the researchers, allowing further analysis and interpretation. The details of the scoring system are as follows:

Knowledge: A total of 9 questions were used to assess knowledge under five domains (awareness about cervical cancer and Pap smear, symptoms of cervical cancer, types of cervical cancer screening methods, source of information and prevention of cervical cancer). For each domain, a score of 1 was awarded for a correct answer and 0 for a wrong answer. Minimum and maximum scores for each domain were calculated. The scores were converted to percentages and scores of 49.9% and below were categorized as poor knowledge, while 50.0% and above were categorized as good knowledge. The questions used in scoring knowledge were internally consistent and reliable with a Cronbach's alpha value of 0.790.

Attitude: A total of 7 questions were used to assess the attitude of the respondents towards cervical cancer screening. A score of 1 was awarded for a correct answer and 0 for a wrong answer. Minimum and maximum scores for each domain were calculated. The scores were converted to percentages and scores of 49.9% and below were categorized as poor knowledge, while 50.0% and above were categorized as good knowledge. The questions used in scoring knowledge were internally consistent and reliable with a Cronbach's alpha value of 0.792.

Practice: A total of 8 questions were used to assess the practice of the respondents towards cervical cancer screening. A score of 1 was awarded for a correct answer and 0 for a wrong answer. Minimum and maximum scores for each domain were calculated. The scores were converted to percentages and scores of 49.9% and below were categorized as poor practice, while 50.0% and

Print ISSN: 0189-9287 Online ISSN: 2992-345X

above were categorized as good practice. The questions used in scoring knowledge were internally consistent and reliable with a Cronbach's alpha value of 0.783.

Results

A total of 580 female undergraduates participated in the study, with the results presented in tables and charts. Table 1 outlines the sociodemographic characteristics of the respondents. Almost half, 282 (48.6%), were within the age group of 15 – 19 years, and the mean age of the respondents was 20.3 ± 2.6 years. Additionally, 577 (99.5%) of the respondents were single, and 569 (98.1%) identified as Christians.

The School of Medicine had the highest proportion of respondents, with 223 (38.4%), while the Department of Radiotherapy had the lowest proportion 22 (3.8%) of the respondents. Furthermore, 171 (29.5%) of the respondents were in their first year (100 Level), while only 29 (5.0%) were in their final year (600 Level).

Table 1: Socio-demographic characteristics of respondents

Variable	Freq	Percent
Age group (years)		
15 – 19	282	48.6
20 – 24	264	45.5
25 – 29	34	5.9
Mean age ± SD = 20.3 ± 2.6 years		
Tribe		
Benin	263	45.3
Esan	156	26.9
Hausa	13	2.2
Igbo	96	16.6
Yoruba	50	8.6
Etsako	1	0.2
Tiv	1	0.2
Marital status		
Single	577	99.5
Married	3	0.5
Religion		
Christianity	569	98.1
Islam	11	1.9
Department		
Anatomy	62	10.7
Dentistry	45	7.8
MBC	54	9.3
Medicine	223	38.4
MLS	45	7.8
Nursing	31	5.3
Physiology	71	12.2
Physiotherapy	27	4.7
Radiotherapy	22	3.8
Level		
100	171	29.5
200	122	21.0
300	108	18.6
400	107	18.4
500	43	7.4
600	29	5.0

Table 2 presents the association between the socio-demographic characteristics of respondents and their knowledge of cervical cancer screening. The data indicates that with increasing age, there was a corresponding increase in the proportion of respondents with good knowledge of cervical cancer screening. Respondents aged 25 – 29 years had the highest proportion, with 32 (94.1%) demonstrating good knowledge, whereas those aged 15 – 19 years had the lowest proportion, with 179 (63.5%) showing good knowledge. The association between age of respondents and knowledge of cervical cancer screening was statistically significant ($\chi^2 = 79.295$; $p < 0.001$).

Print ISSN: 0189-9287 Online ISSN: 2992-345X

Table 2: Socio-demographic characteristics and knowledge of cervical cancer screening among female undergraduates in college of medical sciences, University of Benin

Variable	Knowledge of Cervical Cancer Screening		Test statistic	p-value
	Good (n = 458) Frequency (%)	Poor (n = 122) Frequency (%)		
Age group (years)				
15 – 19	179 (63.5)	103 (36.5)		
20 – 24	247 (93.6)	17 (6.4)		
25 – 29	32 (94.1)	2 (5.9)	$\chi^2 = 79.295$	< 0.001*
Marital status				
Single	455 (78.9)	122 (21.1)		
Married	3 (100.0)	0 (0.0)	$\chi^2 = 0.803$	0.370
Religion				
Christianity	447 (78.6)	122 (21.4)		
Islam	11 (100.0)	0 (0.0)	$\chi^2 = 2.987$	0.084

*Statistically significant

Table 3 shows the association between knowledge and attitude towards cervical cancer screening. The association between knowledge and attitude towards cervical cancer screening was statistically significant ($\chi^2 = 5.300$; $p = 0.021$).

Table 3: Knowledge of cervical cancer screening and attitude towards cervical cancer screening among female undergraduates in college of medical sciences, university of Benin

Variable	Attitude towards Cervical Cancer Screening		Test statistic	p-value
	Positive (n = 466) Frequency (%)	Negative (n = 114) Frequency (%)		
Knowledge of cervical cancer screening				
Good	359 (78.4)	99 (21.6)		
Poor	107 (87.7)	15 (12.3)	$\chi^2 = 5.300$	0.021*

Table 4 presents the association between knowledge, attitude and practice of cervical cancer screening. The association between attitude and practice of cervical cancer screening was statistically significant ($\chi^2 = 4.726$; $p = 0.030$).

Print ISSN: 0189-9287 Online ISSN: 2992-345X

Table 4: Knowledge, attitude and practice of cervical cancer screening among female undergraduates in College of Medical Sciences, University of Benin

Variable	Practice of Cervical Cancer Screening		Test statistic	p-value
	Good (n = 10) Frequency (%)	No (n = 570) Frequency (%)		
Knowledge of cervical cancer screening				
Good	10 (2.2)	447 (97.8)		
Poor	0 (0.0)	122 (100.0)	$\chi^2 = 2.987$	0.082
Attitude				
Positive	6 (1.3)	460 (98.7)		
Negative	4 (3.5)	109 (96.5)	$\chi^2 = 4.726$	0.030*

Discussion

This study assessed the knowledge, attitude, and practice of cervical cancer screening among female undergraduates of the College of Medical Sciences, University of Benin. Majority of the respondents were between the ages of 15 – 24 years. This is similar to a study done in 2013 among female undergraduates in Niger Delta University, Bayelsa State, where most respondents were aged 16 – 25 years.[28] About half of the respondents were Benin by tribe, this may be due to the location of the University in Edo South Senatorial District where Benin is the dominant ethnic group. Almost all the respondents were single, and a vast majority identified as Christians. This was also similar to the study done in Bayelsa State in 2013.[28] Findings from other similar studies done in Southeastern Nigeria also reported that most respondents were Christians.[291]

The majority of respondents in this study demonstrated good knowledge of cervical cancer screening. This may be attributed to the fact that the participants are female medical undergraduates with access to information through academic activities, as well as exposure to ongoing awareness campaigns conducted by both the government and Non-Governmental Organizations (NGOs) using various mass media platforms, including print and electronic media. A strong knowledge base of cervical cancer screening among this group, who will become future healthcare professionals, is significant. It will likely enhance their own willingness to undergo screening and enable them to effectively counsel others on the importance and benefits of cervical cancer screening once they begin their medical practice.

This finding aligns with studies conducted in Ibadan and Abakaliki, where the majority of respondents also exhibited good knowledge of cervical cancer screening.[27, 30] Similarly, a study conducted in Algeria revealed that three-quarters of the participants had a high level of knowledge regarding cervical screening.[32, 33] However, contrasting results were found in studies conducted in Ekiti State, Nigeria, and Malaysia, where the majority of respondents had poor knowledge of cervical cancer screening.[33] Factors associated with knowledge of cervical cancer screening identified in this study include increasing age, course of study, and academic level of the respondents.

Findings from this study revealed that most respondents had a positive attitude towards cervical cancer screening. This could be attributed to the fact that the respondents are medical students, who are likely to have a deeper understanding of the disease and the benefits of screening. This is similar to studies done in Zaria and India, where most respondents also demonstrated a positive attitude towards cervical cancer screening.[33] Conversely, studies done in Rivers State, and Malaysia had contrary findings as majority of the respondents exhibited a negative attitude towards cervical cancer screening.[33]

Knowledge of cervical cancer screening was found to be significantly associated with attitude towards cervical cancer screening. This is not surprising, as knowledge often influences behavioural changes and attitude. This is similar to findings from a study in Leon, Nicaragua,

Print ISSN: 0189-9287 Online ISSN: 2992-345X

where it was shown that good knowledge of cervical cancer screening was significantly associated with positive attitude towards cervical cancer screening.[34] Despite the good knowledge and positive attitude toward cervical cancer screening, the practice of screening was notably poor among the respondents. Gaps in understanding the importance of regular screening or fear associated with the procedure could explain the observed disconnect between knowledge and practice. These barriers, when compounded by systemic issues such as limited availability of screening centers, long wait times, and financial constraints, further hinder screening uptake.

Based on this research, the primary reason cited for this poor practice was that respondents did not perceive themselves to be at risk of cervical cancer. This was based on factors such as age, absence of symptoms, or assumptions about immunity based on limited sexual activity may contribute to this misperception. This perception is a barrier to effective control of the disease, as demonstrated by studies in the Netherlands, where women who considered themselves to be at low risk were less likely to participate in screening programs.[35]

Similar findings were reported in studies conducted in Abakaliki, Sokoto, Zaria, and Algeria, where only less than one-third of the respondents had undergone cervical cancer screening.[27, 31, 34, 36] However studies done in Lagos, Nigeria, and Canada showed that more than two third of the respondents had undergone cervical cancer screening.[37, 38] In this study, attitude towards cervical cancer screening was significantly associated with the uptake of screening, while knowledge was not found to be significantly associated with screening uptake. As a result, it is imperative to integrate risk-awareness modules into health education programs or leveraging social media to share testimonials from cervical cancer survivors to offer practical avenues for intervention. These strategies could help bridge the gap between knowledge and behaviour.

Cultural norms and stigma often play a significant role in deterring individuals from seeking preventive healthcare.[39] Misconceptions about cervical cancer, fear of the procedure, or stigma associated with gynaecological examinations may limit participation in screening programs. Addressing these factors requires exploring how societal attitudes shape behaviour,[40] even among medically educated populations.

Behavioural strategies aimed at increasing screening uptake also deserve attention. For instance, implementing peer-led education programs or scheduling reminders for cervical cancer screening in alignment with academic calendars could encourage students to prioritize screening. These approaches, grounded in behavioural science, could be particularly effective in addressing self-perceived low risk and improving accessibility. For example, integrating cervical cancer awareness and screening advocacy into university curricula or national health campaigns could create systemic support for increased uptake.

Future studies should prioritize exploring cultural and systemic barriers in greater detail, perhaps through qualitative approaches that capture participants' lived experiences. Longitudinal research tracking changes in knowledge, attitudes, and practices over time would also provide valuable insights. Finally, piloting and evaluating interventions—such as mobile screening units, community-based education programs, or targeted incentives—could help identify effective strategies for increasing screening uptake.

Strengths and Limitations of the Study

This study provides valuable insights into the awareness and behaviours surrounding cervical cancer prevention among future healthcare professionals. One of the primary strengths of this study is the use of a descriptive cross-sectional design which provided opportunity to assess the knowledge, attitudes, and practices of cervical cancer screening among a large sample of 580 female undergraduate students. The multistage sampling technique ensured diverse representation across different academic levels, departments, and schools within the College of Medical Sciences. This systematic approach enhances the study's internal validity and minimizes selection bias.

Additionally, the study utilized a structured, interviewer-administered questionnaire, which was rigorously adapted from validated tools used in previous research. The reliability of the questionnaire was confirmed through high Cronbach's alpha values across knowledge, attitude, and practice domains, reflecting consistency and reliability in data collection. Furthermore, the comprehensive data analysis, performed using IBM SPSS version 22.0, employed both univariate and bivariate techniques to explore associations between variables, which strengthens the depth of the findings.
The focus on medical undergraduates is another notable strength, as this demographic will form a critical

Print ISSN: 0189-9287 Online ISSN: 2992-345X

component of the healthcare workforce. By targeting this group, the study not only evaluates current knowledge but also provides a foundation for future efforts to enhance cervical cancer screening uptake among healthcare professionals and the wider population. Finally, the ethical rigor of the study, demonstrated through obtaining ethical clearance and informed consent, ensures adherence to ethical standards, protecting participants' rights and confidentiality.

Despite its strengths, the study is not without limitations. One significant limitation is its reliance on self-reported data, which may be subject to response bias. Participants might have overestimated their knowledge or underreported barriers to cervical cancer screening due to social desirability bias. This could affect the accuracy of the reported findings and limit the generalizability of the results.

The cross-sectional nature of the study also poses a limitation, as it captures data at a single point in time and does not account for changes in knowledge, attitudes, or practices over time. Longitudinal studies would be more effective in assessing the evolution of these factors and identifying causal relationships. Another limitation is the study's restriction to female undergraduate students in the College of Medical Sciences, which may limit the generalizability of findings to the broader population of Nigerian women, including those in non-medical fields or older age groups. The high levels of knowledge and positive attitudes observed among the participants may not reflect the experiences of women with less access to medical education.

Finally, while the study highlights a critical gap between knowledge and screening practices, it does not deeply explore the structural or systemic barriers that contribute to the low uptake of screening services. Factors such as the availability, affordability, and accessibility of screening facilities were not extensively addressed, leaving a critical gap in understanding the broader context influencing these behaviours.

Conclusion

Most respondents demonstrated good knowledge and a positive attitude towards cervical cancer screening. However, the practice of cervical cancer screening was poor, with only about two percent of respondents having undergone cervical cancer screening test in the past. Based on these findings, it is important for the university authority to enhance efforts to further educate female undergraduates on the need to go for cervical cancer screening. Offering incentives to encourage participation and establishing a cervical cancer screening center at the University Health Center may significantly improve access and uptake among students.

Declarations

Ethical Consideration: Ethical clearance and approval: These were obtained from the University of Benin Teaching Hospital Research and Ethics Committee. Verbal Informed consent was obtained from each respondent. Their names and addresses were omitted to ensure confidentiality. The respondents were also informed that they had the right to withdraw from the study at any time, and that such withdrawal poses no threat or harm to them.

Authors' Contribution: Conceptualization- IEI, IRO, EBJ; Development- IEI, OO, IEE, Conduct- IEI, IRO, EBJ, IRO; Reporting- EEI, IEI, EBJ. All authors approve the final version of the submitted manuscript for publication.

Conflict of interest: The authors declare that there is no conflict of interest.

Funding: This research was self-funded.

References

1. Mahantshetty U, Deodhar K, Modi RD, Kerkar R. Cervical Cancer. Tata Memorial Centre Textbook of Oncology: Springer; 2024. p. 777-94.
2. Teklehaimanot DA, Mekuria AD, Dadi AF, Derseh BT. Precancerous lesion determinants in women attending cervical cancer screening at public health facilities in North Shoa Zone, Amhara, Ethiopia: an unmatched case-control study. BMC Women's Health. 2024;24(1):271.
3. Tang X, Zhang H, Wang T, Jiang W, Jones TE, He Y, et al. Single and multiple high-risk human papillomavirus infections in histopathologically confirmed cervical squamous lesions: incidences, distribution, and associated detection rates for precancerous and cancerous lesions. Laboratory Investigation. 2023;103(11):100234.
4. Shing JZ, Porras C, Pinheiro M, Herrero R, Hildesheim A, Liu D, et al. Differential long-term bivalent HPV vaccine cross-protection by variants in the Costa Rica HPV vaccine trial. npj Vaccines. 2024;9(1):101.
5. Bowden SJ, Doulgeraki T, Bouras E, Markozannes G, Athanasiou A, Grout-Smith H, et al. Risk factors for human papillomavirus infection, cervical intraepithelial

Print ISSN: 0189-9287 Online ISSN: 2992-345X

neoplasia and cervical cancer: an umbrella review and follow-up Mendelian randomisation studies. BMC Medicine. 2023;21(1):274.
6. Imade EE, Obayagbona NO. Impact of cigarette smoking on gut microbial dysbiosis: a structured literature review. Gut Microbiome.1-43.
7. Zakka A, Ayolabi C, Olusola B, Egwuatu T. Prevalence and associated risk factors of cervical human papillomavirus (hpv) infection among women in Northcentral Nigeria: A cross-sectional study. Babcock University Medical Journal. 2023;6(2):88-98.
8. Ezem B. Awareness and uptake of cervical cancer screening in Owerri, South-Eastern Nigeria. Annals of African medicine. 2007;6(3):94-8.
9. GültekİN M, Ramirez P, Broutet N, Hutubessy R. World Health Organization call for action to eliminate cervical cancer globally. 2020.
10. De Sanjosé S, Diaz M, Castellsagué X, Clifford G, Bruni L, Muñoz N, et al. Worldwide prevalence and genotype distribution of cervical human papillomavirus DNA in women with normal cytology: a meta-analysis. The Lancet infectious diseases. 2007;7(7):453-9.
11. Li X, Zheng R, Li X, Shan H, Wu Q, Wang Y, et al. Trends of incidence rate and age at diagnosis for cervical cancer in China, from 2000 to 2014. Chinese Journal of Cancer Research. 2017;29(6):477.
12. Mafiana JJ, Dhital S, Halabia M, Wang X. Barriers to uptake of cervical cancer screening among women in Nigeria: a systematic review. African Health Sciences. 2022;22(2):295-309.
13. Mustafa WA, Alias NA, Jamlos MA, Ismail S, Alquran H. A recent systematic review of cervical cancer diagnosis: detection and classification. Journal of Advanced Research in Applied Sciences and Engineering Technology. 2022;28(1):81-96.
14. Áyen Á, Jimenez Martinez Y, Boulaiz H. Targeted gene delivery therapies for cervical cancer. Cancers. 2020;12(5):1301.
15. Liverani CA, Di Giuseppe J, Giannella L, Delli Carpini G, Ciavattini A. Cervical cancer screening guidelines in the postvaccination era: review of the literature. Journal of Oncology. 2020;2020(1):8887672.
16. Pesola F, Rebolj M, Sasieni P. Managing an extension of screening intervals: Avoiding boom and bust in health care workloads. International Journal of Cancer. 2023;152(10):2061-8.
17. Arbyn M, Weiderpass E, Bruni L, de Sanjosé S, Saraiya M, Ferlay J, et al. Estimates of incidence and mortality of cervical cancer in 2018: a worldwide analysis. The Lancet Global Health. 2020;8(2):e191-e203.
18. Ude-Akpeh CE. August meeting as a veritable tool for cervical cancer education for women in South East Nigeria. NTAtvc Journal of Communication. 2022;6(2):107-15.
19. He W-Q, Li C. Recent global burden of cervical cancer incidence and mortality, predictors, and temporal trends. Gynecologic Oncology. 2021;163(3):583-92.
20. Singh D, Vignat J, Lorenzoni V, Eslahi M, Ginsburg O, Lauby-Secretan B, et al. Global estimates of incidence and mortality of cervical cancer in 2020: a baseline analysis of the WHO Global Cervical Cancer Elimination Initiative. The Lancet Global Health. 2023;11(2):e197-e206.
21. Bruni L, Serrano B, Roura E, Alemany L, Cowan M, Herrero R, et al. Cervical cancer screening programmes and age-specific coverage estimates for 202 countries and territories worldwide: a review and synthetic analysis. The Lancet Global Health. 2022;10(8):e1115-e27.
22. Gebreegziabher M, Asefa NG, Berhe S. Factors Affecting the Practices of Cervical Cancer Screening among Female Nurses at Public Health Institutions in Mekelle Town, Northern Ethiopia, 2014: A Cross-Sectional Study. Journal of Cancer Research. 2016;2016(1):4743075.
23. Udigwe G. Knowledge, attitude and practice of cervical cancer screening (pap smear) among female nurses in Nnewi South Eastern Nigeria. Nigerian journal of clinical practice. 2006;9(1):40-3.
24. Arachchige CN, Prendergast LA, Staudte RG. Robust analogs to the coefficient of variation. Journal of Applied Statistics. 2022;49(2):268-90.
25. Terefe Y, Gaym A. Knowledge, attitude and practice of screening for carcinoma of the cervix among reproductive health clients at three teaching hospitals, Addis Ababa, Ethiopia. Ethiopian Journal of Reproductive Health. 2008;2(1).
26. Vishwakarma S, Rawat R, Mittal N, Shree P. Knowledge, attitude and practices about cervical cancer screening among nursing staff in rural tertiary care center. International Journal of Reproduction, Contraception, Obstetrics and Gynecology. 2018;7(9):3796-801.
27. Ifemelumma C, Anikwe C, Okorochukwu B, Onu F, Obuna J, Ejikeme B, et al. Cervical cancer screening: assessment of perception and utilization of services among health workers in low resource setting. International Journal of Reproductive Medicine. 2019;2019(1):6505482.
28. Owoeye I, Ibrahim I. Knowledge and attitude towards cervical cancer screening among female students and staff in a tertiary institution in the Niger Delta.

Print ISSN: 0189-9287 Online ISSN: 2992-345X

International Journal of Medicine and Biomedical Research. 2013;2(1):48-56.
29. Ugwu E, Obi S, Ezechukwu P, Okafor I, Ugwu A. Acceptability of human papilloma virus vaccine and cervical cancer screening among female health-care workers in Enugu, Southeast Nigeria. Nigerian Journal of Clinical Practice. 2013;16(2):249-52.
30. Oyedunni SA, Obalase SB. Perception and utilization of cervical cancer screening services among female nurses in University College Hospital, Ibadan, Nigeria. Pan African Medical Journal, 2012; 11:69.
31. Belhadj A, Boublenza L, Sidaoui A, Chiah B, Benhamou A, Boulenouar F, et al. Women's knowledge about cervical cancer and their PAP SMEAR test participation in Algeria. Journal of Medicine and Health Research. 2017; 2:65-71.
32. Obalase SB, Akindutire IO, Adelusi JO. Knowledge and awareness of cervical cancer screening among women of reproductive age in Ikere Ekiti Local Government Area, Ekiti State, Nigeria. International Journal of Caring Sciences. 2017;10(2):755.
33. Wong L, Wong Y, Low W, Khoo E, Shuib R. Cervical cancer screening attitudes and beliefs of Malaysian women who have never had a pap smear: a qualitative study. International Journal of Behavioral Medicine. 2008; 15:289-92.
34. Ahmed SA, Sabitu K, Idris SH, Ahmed R. Knowledge, attitude and practice of cervical cancer screening among market women in Zaria, Nigeria. Nigerian Medical Journal. 2013;54(5):316-9.
35. Bansal AB, Pakhare AP, Kapoor N, Mehrotra R et al. Knowledge, attitude and practice related to cervical cancer among adult women: A hospital-based cross-sectional study. J Nat SciBiol Med, 2015; 6(2): 324-328.
36. Oche MO, Kaoje UM, Gana G, Ango JT. Cancer of the cervix and cervical screening: Current knowledge, attitude and practices of female health workers in Sokoto, Nigeria. International Journal of Medicine and Medical Sciences, 2013,5(3):106-109.
37. Toye MA, Okunade KS, Roberts AA, Salako O, Oridota ES, Onajole AT. Knowledge, perceptions and practice of cervical cancer prevention among female public secondary school teachers in Mushin local government area of Lagos State, Nigeria. Pan African Medical Journal. 2017;28(1).
38. Sauvageau C, Duval B, Gilca V, Lavoie F, Ouakki M. Human papilloma virus vaccine and cervical cancer screening acceptability among adults in Quebec, Canada. BMC Pub Health. 2007; 7:304-309.
39. Rees HD, Lombardo AR, Tangoren CG, Meyers SJ, Muppala VR, Niccolai LM. Knowledge and beliefs regarding cervical cancer screening and HPV vaccination among urban and rural women in León, Nicaragua. PeerJ. 2017;5:e3871.
40. Tacken MA, Braspenning JC, Hermens RP, Spreeuwenberg PM, Van Den Hoogen HJ, De Bakker DH, et al. Uptake of cervical cancer screening in The Netherlands is mainly influenced by women's beliefs about the screening and by the inviting organization. The European Journal of Public Health. 2007;17(2):178-85.

Print ISSN: 0189-9287 Online ISSN: 2992-345X