Volume 1 Issue 1 January, 2025

Maiden Edition

NIGERIAN JOURNAL OF ONCOLOGY

NJO

ARCON
Association of Radiation and Clinical Oncologists of Nigeria

w.w.w.ngjoncology.com

Printed by Ahmadu Bello University Press Ltd.,
P.M.B. 1094 Samaru, Zaria, Nigeria. Tel: 08065949711.
E-mail: abupress@abu.edu.ng, info@abupress.com.ng
Website: www.abupress.com.ng

RETHINKING OPPORTUNISTIC CERVICAL CANCER SCREENING IN RESOURCE-LIMITED SETTINGS: A TEN-YEAR REVIEW OF SCREENING AT BINGHAM UNIVERSITY TEACHING HOSPITAL, JOS, NIGERIA

Nuhu Tumba[1], Mbwas Mashor[2], Onyeka Tina Ubanyi[3], Timothy Ataguba Achema[3], John Onyeji[4], James Bitrus[4]:

1. Clinical Oncology Unit, Department of Radiology, Faculty of Clinical Sciences, College of Medicine & Allied Health Sciences Bingham University, Jos Campus.
2. Department of Anatomical Pathology and Forensic Medicine, Faculty of Basic Clinical Sciences, College of Medicine & Allied Health Sciences Bingham University, Jos Campus.
3. Department of Community Medicine & Primary Health Care, Faculty of Clinical Sciences, College of Medicine & Allied Health Sciences Bingham University, Jos Campus.
4. Department of Obstetrics & Gynaecology. Faculty of Clinical Sciences, College of Medicine & Allied Health Sciences Bingham University, Jos Campus.

Corresponding Author:
Dr Nuhu Tumba
Clinical Oncology Unit, Department of Radiology Faculty of Clinical Sciences, College of Medicine & Allied Health Sciences Bingham University, Jos Campus.
nuhu.tumba@bnghamuni.edu.ng

Citation: Tumba N, Mashor M, Ubanyi OT, Achema TA, Onyeji J, Bitrus J. Rethinking Opportunistic Cervical Cancer Screening in Resource-Limited Settings: A Ten-Year Review of Screening at Bingham University Teaching Hospital, Jos, Nigeria. *Niger J Oncol 2025;*1(1):1-11.

ABSTRACT

Background: Cervical cancer is the most common gynaecological cancer affecting women in Nigeria. Despite the availability of screening methods for precancerous lesions, screening is largely opportunistic and hospital-based in Nigeria.

Objectives: This study aimed to determine the prevalence and patterns of cervical dysplasia among women in a tertiary health facility in North Central Nigeria.

Methods: A 10-year (2010-2019) review of the results of cervical cytology of 1,124 consecutive women who had cervical smears at Bingham University Teaching Hospital, Jos, Plateau State, Nigeria was done. Classification of cytology results was according to the Bethesda system. The data was analysed using the Statistical Package for the Social Sciences (SPSS) version 21. Bivariate analysis was done, and the level of significance was set at $P < 0.05$.

Results: The mean age was 43.8 ± 10.2 years (range 16 – 85 years). Most women (86.8%) presenting for screening are within the age 30-59 years. 212 (18.9%) of the smear results were abnormal, of which High Grade Squamous

Intraepithelial Lesion (HSIL) was 2.8% (n = 32), Low Grade Squamous Intraepithelial Lesion (LSIL) was 4.7% (n = 53), Atypical Squamous Cells of Undetermined Significance (ASC-US) was 8.3% (n = 93), Atypical Glandular Cells of Undetermined Significance (AGUS) was 0.4% (n = 4) and Atypical Squamous Cells cannot exclude High-Grade Lesion (ASC-H) was 2.7% (n = 30). 2.3% (n = 26) had inflammatory features. Normal cytological features were present in 78.8% (n = 886). About 84% of HSIL is found within the age group 30-59. There was a significant association between abnormal cervical cytology and increasing age ($p < 0.001$).

Conclusions: Cervical dysplasia is common accounting for 18.9% of results reviewed. Majority of women screened, and had high-grade lesions are within the age group 30-59 years. While organized routine nationwide screening is yet to be implemented, this study emphasizes the need to maximise opportunistic cervical cancer screening among women in Northern Nigeria.

Keywords: Cervical Cancer, Opportunistic Screening, Resource-Limited Setting

INTRODUCTION

Cervical cancer ranked as the fourth most diagnosed cancer and the fourth cause of cancer-related death in women worldwide. In 2020, an estimated 604,000 new cases and 342,000 deaths occurred globally. The burden of cervical cancer has been projected to rise from 500,000 to 700,000 between the time interval of 2018 and 2030, with an alarming estimation of the number of deaths increasing from 311,000 to 400,000. Several international reports shows that women from low- and middle-income countries are disproportionately affected by cervical cancer. Human papilloma virus has been recognized as the most potent risk factor for cervical and it has been classified as a group I carcinogens by the International Agency for Research on Cancer Monographs. In sub-Saharan Africa, cervical cancer is second to breast cancer as the most diagnosed cancer on the continent. Southern Africa has the highest age standardized incidence rate of 43.1 per 100,000 globally.

In Nigeria, cervical cancer is the second most common cancer in women. It has been estimated that about 14,000 new cases of cervical cancer are diagnosed annually, with an estimated 8000 deaths. The National Cancer Control Programme in Nigeria was developed in 2008, with the aim of reducing cancer related disability and deaths among the Nigerian populace and lowering the socioeconomic impact of the disease. Embedded within the programme was the cervical cancer control plan, under the purview of the Federal Ministry of health, whose strategy was targeted at increasing the early detection of cervical cancer and HPV and focusing on the primary prevention of cervical cancer among girls aged 9–15 using vaccinations. However, implementation of the programme is yet to commence nationwide.

Recognizing the burden cervical cancer contributes to mortality, the World Health Organization has put in place a global strategy to address this issue. This global effort to eliminate cervical cancer is monumental because it is the first strategy that addresses cancer as a public health problem. The strategy was designed with the hope that cervical cancer would be eliminated all over the world. The 90:70:90 strategies for the elimination of cervical cancer focuses on achieving 90% full vaccination of girls under the age of 15 years, screening 70% of women with high performing tests and also ensuring that 90% of women with cervical cancer receive treatment. There is growing body of evidence which shows that even a twice in a life time screening

at 35 and 45 years of age significantly reduces the mortality from cervical cancer.[7] As part of the intervention to curb cervical cancer, HPV vaccines were introduced in 2006. As of 2017, approximately 100 million girls had been immunized, but 95% of them coming from high-income countries. A key factor contributing to the increasing number of deaths from cervical cancer is lack of global coordinated efforts from the global community as it currently being galvanized through the WHO. The current strategy will ensure focus on women's health, better availability of vaccines, and cost-effective technologies for screening and treatment of cervical cancer, including surgical training and other advancements, the vision of eliminating cervical cancer looks promising.

However, Nigerian women still face significant challenges regarding accessing both primary, secondary, and tertiary preventive services. This study reviews 10-year retrospective data from a tertiary health center in North Central Nigeria, looking at pattern and prevalence of cervical dysplasia.

MATERIALS AND METHODS

Study design

It was a retrospective cross-sectional study.

Study setting

This was a cross-sectional study carried out at Bingham University Teaching Hospital, Jos, Plateau State, Nigeria. The Hospital, formally known as ECWA Evangel hospital is a 250-bed capacity hospital, affiliated to Bingham University, and located in Jos, North-central geo-political region of Nigeria. We receive patients mainly from the North-central states and other parts of the country.

Prior to 2010, tissue and cytology samples are sent to Jos University Teaching Hospital, located within Jos metropolis for evaluation. In 2010 pathology services started following the establishment of pathology laboratory in the hospital. All cytology samples including Pap smear and tissue samples from the hospital and other health facilities around the hospital are examined at the histopathology laboratory of the hospital. Because organized cervical screening programme is currently not available in Nigeria, women who came to the hospital for other medical problems or self-referred women are directed to the cervical cancer screening unit in the Obstetrics & Gynaecology department for opportunistic screening.

Data collection and analysis

We reviewed the records of consecutive patients screened at the cervical cancer screening Unit in the Department of Obstetrics & Gynaecology from January 2010 to December 2019. Data extracted includes year of examination, age, and the laboratory report of Pap smear test. Those with incomplete data were excluded from the analysis. Cytology reports were classified according to the Bethesda system of classification of cervical precancerous lesions. The data was analyzed using Statistical Package for the Social Sciences (SPSS) version 21. Bivariate analysis was done, and the level of significance was set at $P < 0.05$.

Ethical consideration

Patients' details were kept confidential and ethical clearance was sought from the ethical review committee of the teaching hospital with reference number NHREC/21/05/2005/00736
.

RESULTS

A total of 1124 women were included in the analysis, with 18.9% of them having abnormal cervical cytology. The median age at screening is 44 years and the modal age is 50 years. High grade intraepithelial lesion (HSIL) accounts for 2.8% (32/1124) of all women screened, this is shown in figure 3.

As depicted in Figure 1, the number of women per annum has been steadily increasing over the past decade and indicates potential acceleration in the future. Figure 2 reveals that the modal age group is 40-49 accounting for 39.7% of the study population and 86% are within 30-59 years of age.

Table 1 shows that the vast majority, 27 out of 32 (84%), of women with HSIL are within the 30-59 age range, with more than half, 17 out of 32 (53%), being between 50-59 years old. Conversely, only 5 out of 32 (16%) are in the age ranges of under 29 years and over 60 years.

Recent guidelines recommend screening twice in a lifetime at ages 35 and 45. Therefore, we analyzed our data to determine the proportion of women with HSIL below and above 35 years old. Table 2 reveals that 31 out of 32 women (96.9%) with HSIL are over 35, while only 1 out of 32 (3.1%) is under 35.

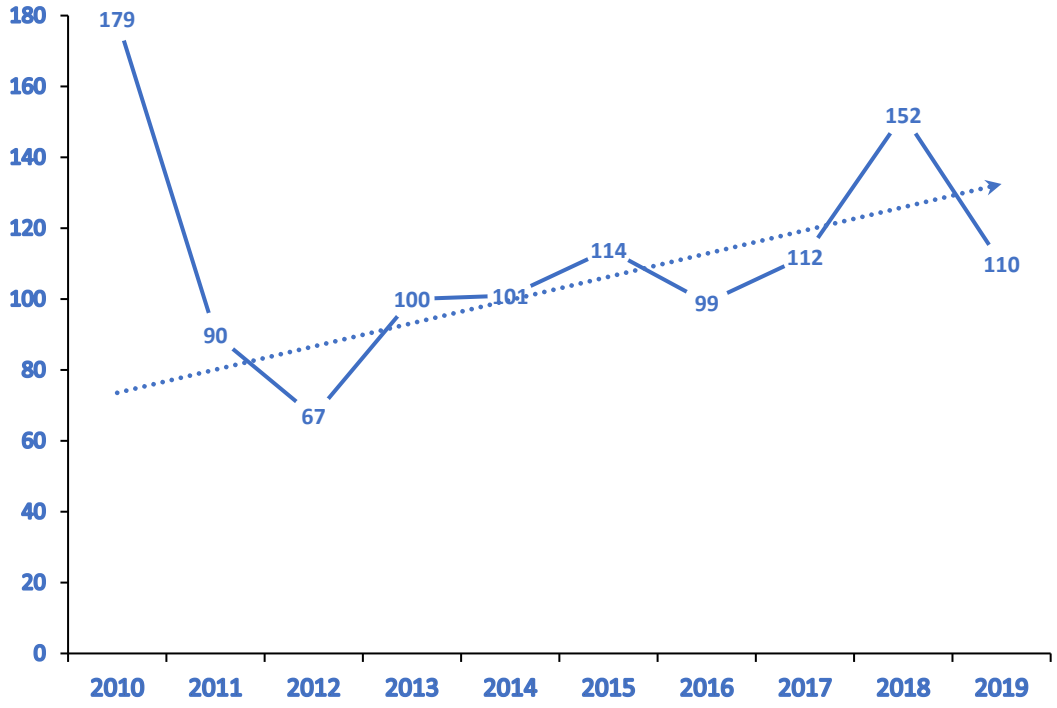

Figure 1: Line graph showing Trends in Cervical Screening at Bingham University Teaching Hospital, Jos over a 10 – year period.

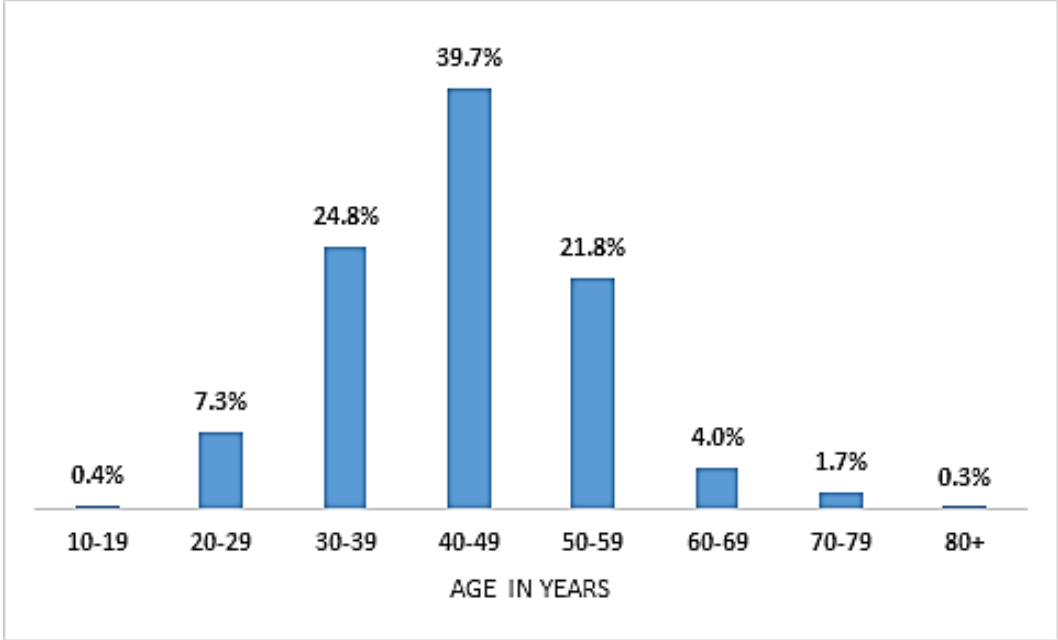

Figure 2: Showing Age distribution of women screened between 2010-2019
Majority of the women screened - 86% (970/1124) were within the ages of 30-59.

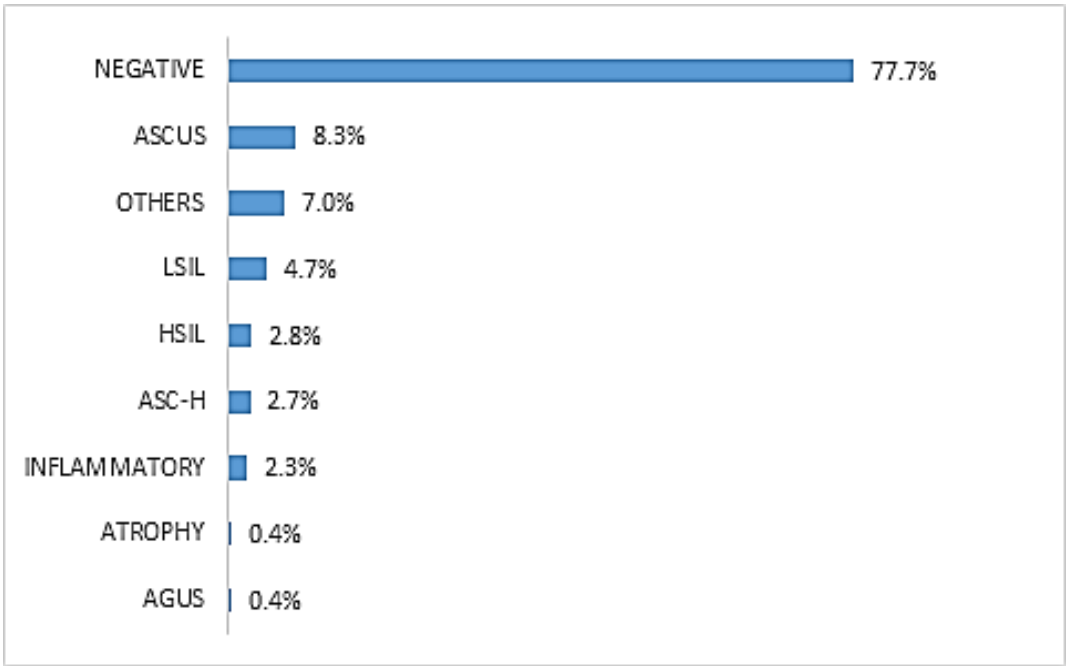

Figure 3 Showing frequency distribution of the cervical cytology reports analyzed.

Table 1. Showing frequencies of cervical smear results by age group

Cytology	Age Group								Total
	0-19	20-29	30-39	40-49	50-59	60-69	70-79	80+	
ASCUS	1	3	13	31	38	6	1	0	93
AGUS	0	0	0	0	3	1	0	0	4
ASC-H	0	1	2	10	14	2	1	0	30
HSIL	0	0	2	8	17	2	3	0	32
LSIL	0	3	10	22	14	3	1	0	53
NEGATIVE	4	70	243	364	149	29	12	2	873
INFLAMMATORY	0	5	6	9	6	0	0	0	26
ATROPHY	0	0	0	1	2	0	1	1	5
OTHERS	0	0	3	1	2	2	0	0	8
TOTAL	5	82	279	446	245	45	19	3	1124

Table 2. Shows comparison between those who screened at ≤ 35 years which is first recommended age for twice-in-a-life-time-screening and those who screened at > 35 years

Bethesda Classification of Cytology	Age (Years)		Total	X^2, P value
	≤ 35	>35		
ASCUS	10(10.8%)	83(89.2%)	93(100%)	X^2, 22.78, P value =0.004 LR=28.79, P<0.0001
AGUS	0(0.0%)	4(100%)	4(100%)	
ASC-H	2(6.7%)	28(93.3%)	30(100%)	
HSIL	1(3.1%)	31(96.9)	32(100%)	
LSIL	8(15.1%)	45(84.9%)	53(100%)	
NEGATIVE	199(22.8%)	674(77.2%)	873(100%)	
INFLAMMATORY	8(30.8)	18(69.2%)	26(100%)	
ATROPHY	0(0.0%)	5(100%)	5(100%)	
OTHERS	2(25.0%)	6(75.0%)	8(100%)	
Total	230(20.5%)	894(79.5%)	1124(100%)	1124

DISCUSSION

Opportunistic screening is currently often the major means of screening for cervical cancer in Nigeria. This implies seizing the opportunity of visit for other medical problems to screen for cervical cancer. Although less effective when compared to the organized screening approach, it is the only pragmatic approach in most low-and-middle income settings like Nigeria where organized, well-funded national screening programmes are yet to be implemented.[7] Several factors have contributed to the low uptake of cervical screening in low- and middle-income countries

like Nigeria, these includes poor information on the availability of services, poor risk perception of illness, poor referral rates from health workers, low socioeconomic status, poor health literacy, cultural barriers regarding the nature of testing, and anxiety over getting a positive result.

Furthermore, most opportunistic screening takes place in secondary and tertiary centres that are usually located in urban areas which further limits access for a significant proportion of women. While in countries where organized, fully funded screening programmes are implemented, they are usually domiciled in primary care facilities for easy access by the target screening population.

Our study shows increasing number of women coming for cervical cancer screening in our center from 2010, the trajectory suggests a rising awareness about the burdens of cervical cancer and the realization that early detection invariably means better treatment outcomes. Greater efforts are needed in awareness creation to sustain this momentum.

From the study, the age range at which women carried out this opportunistic testing was 33.6–56 years. This finding agrees with a study carried out at a primary care clinic in Ibadan, Nigeria, found the mean age for opportunistic testing was 30–51 years, suggesting that the target of screening women twice in their lifetime at 35 and 45 years falls within this age range and consistent with our data.

In our study, the prevalence of High Grade Squamous Intraepithelial Lesion (HSIL) is 2.8%, this finding is slightly lower than studies in Ghana which is within the same West African sub-region with Nigeria, which found a prevalence of 3.5%. Similarly, in a multicentre study by in South Africa, found an even lower prevalence of 1.8% High Grade Squamous Intraepithelial Lesion (HSIL) in the studied population. Another study from Cameroon conducted reveals a prevalence of 5.6%, which is twice as high as the prevalence found in this study. All these studies are consistent with recent global estimates which indicate a prevalence of high-grade intraepithelial lesions (HSIL) at 4.3% (confidence interval: 1.8-6.3%).

Similarities in the prevalence of cervical cancer and cervical dysplasia across these regions can be said to be because of similarities in the health care system, funds available for health, community health education, knowledge, and awareness of cervical cancer available to women, education and practise of safer sexual practices, and well-structured screening programs.

Our study also identified a significant association between abnormal cervical cytology and increasing age ($p < 0.01$). These findings are consistent with other studies in sub-Saharan Africa, such as those reported from Western Uganda and from Yaoundé, Cameroon.

WHO's global plan to combat cervical cancer identifies screening as an important tool in eliminating cervical cancer by the year 2030. Evidence has suggested that structured screening for cervical cancer is effective and can contribute significantly to the elimination of cervical cancer. It has been suggested that the structure of screening is an important factor to consider in the prevalence of precancerous lesions among different populations. Therefore, populations with poor

efforts geared towards prevention have a higher incidence of cervical abnormalities as opposed to populations with well-structured programs.

There are several national and international guidelines recommended by professional organisations for the screening of cervical cancer. For example, the Society of Gynaecology and Obstetrics of Nigeria (SOGON), has recommended HPV as the primary method of screening. Other methods like visual inspection with acetic acid (VIA) and cytology can be used in areas where HPV testing is absent. They recommend HPV or HPV/pap smear co-testing every five years from the age of 25 to 65 years, or a pap smear every three years. This means that a woman who starts screening using a pap smear at the age of 25 will screen about 13 times by the age of 65. Unfortunately, experience shows this to be unrealistic in our current settings.

Fortunately, a growing body of evidence supports the notion that screening women twice in their lifetime, at ages 35 and 45, can significantly reduce the burden of cervical cancer.[7] This aligns with our findings, which show that over 95% of women with high-grade intraepithelial lesions (HSIL) are above the age of 35. This presents a great opportunity to screen women who visit our health facilities for other services. Additionally, adopting a twice-in-a-lifetime screening approach will help mitigate the financial and logistical challenges associated with more frequent screenings every 3 to 5 years for both women and the payers of these services particularly in resource-limited settings.

While organized, publicly funded screening programs that invite eligible women are the most cost-effective way to reduce cervical cancer incidence, opportunistic screening should be maximized in the interim. Concurrently, vigorous advocacy for the implementation of an organized national screening program must continue.

Emerging evidence, like the findings from our study, along with the socioeconomic context of most low- and middle-income countries, supports the adoption of a twice-in-a-lifetime screening strategy. This could be implemented through either opportunistic or organized screening approaches. However, further research is needed to evaluate the cost-effectiveness and implementation strategies for these recommendations

CONCLUSION

Organized cervical cancer screening is the preferred approach. However, as advocacy for its implementation continues, opportunistic screening can be optimized by providing necessary human resources and facilities, and by enhancing the capacities of health workers to recommend cervical screening to eligible women

RECOMMENDATIONS

We recommend utilizing every opportunity to screen eligible women who visit our health facilities for other healthcare needs by raising awareness about cervical cancer screening. Women over 35 years of age should be particularly targeted, as most high-grade lesions are found in this age group.

DECLARATIONS

Study Limitations

The main limitation to our study is missing and incomplete data on other risk factors for cervical cancer because these data were not

collected prospectively. However, the sample size is sufficient to power our analysis.

Acknowledgements
We want to acknowledge the faculty and staff of Department of Obstetrics & Gynaecology and the Department of Morbid Anatomy & Histopathology for their support.

Funding source
None.

Conflict of Interests
None

RERERENCES

1. Sung H, Ferlay J, Siegel RL, Laversanne M, Soerjomataram I, Jemal A, Bray F. Global Cancer Statistics 2020: GLOBOCAN Estimates of Incidence and Mortality Worldwide for 36 Cancers in 185 Countries. CA Cancer J Clin. 2021;71(3):209-249.
2. Perehudoff K, Vermandere H, Williams A, Bautista-Arredondo S, De Paepe E, Dias S, Gama A, Keygnaert I, Longatto-Filho A, Ortiz J, Padalko E. Universal cervical cancer control through a right to health lens: refocusing national policy and programmes on underserved women. BMC international health and human rights. 2020; 20:1-9.
3. Ginsburg O, Bray F, Coleman MP, Vanderpuye V, Eniu A, Kotha SR, Sarker M, Huong TT, Allemani C, Dvaladze A, Gralow J. The global burden of women's cancers: a grand challenge in global health. The Lancet. 2017:25;389(10071):847-60.
4. Working IA. Group on the evaluation of carcinogenic risks to humans. Human papillomaviruses. IARC Monogr Eval Carcinog Risks Hum. 2007; 90:1-636.
5. Bruni L, Albero G, Serrano B, Mena M, Collado JJ, Gómez D, et al. ICO/IARC Information Centre on HPV and Cancer (HPV Information Centre). Human Papillomavirus and Related Diseases in Nigeria. Summary Report 22 October 2021. Available at https://hpvcentre.net/statistics/reports/NGA.pdf. (Accessed 3/02/2022)
6. Jedy-Agba E, Joko WY, Liu B, Buziba NG, Borok M, Korir A, Masamba L, Manraj SS, Finesse A, Wabinga H, Somdyala N. Trends in cervical cancer incidence in sub-Saharan Africa. British journal of cancer. 2020 :7;123(1):148-54.
7. Musa J, Achenbach CJ, Evans CT, Jordan N, Daru PH, Silas O, Sagay AS, Anorlu R, Mehta SD, Wehbe F, Simon MA. HIV status, age at cervical Cancer screening and cervical cytology outcomes in an opportunistic screening setting in Nigeria: a 10-year Cross sectional data analysis. Infectious Agents and Cancer. 2019 ;14(1):1-2.
8. Eguzo K, Ramsden VR, Ekanem U, Olatunbosun O, Walker V, Mpofu C. Review of cancer control policy in Nigeria and comparison with selected African countries: Implications for future policy making. Ibom Medical Journal. 2020:1;13(1):1-1.
9. Federal Democratic Republic of Nigeria Ministry of Health. Nigeria National Cancer Control Plan 2018 –2022 Available at https://www.iccpportal.org/system/files/plans/NCCP_Final%20%5B1%5D.pdf (Accessed 03/02/2022)
10. World Health Organisation. Global strategy to accelerate the elimination of

cervical cancer as a public health problem and its associated goals and targets for the period 2020 – 2030. United Nations Gen Assem. 2020. Available at https://www.who.int/publications/i/item/9789240014107(Accessed 03/02/2022)

11. Bruni L, Diaz M, Barrionuevo-Rosas L, Herrero R, Bray F, Bosch X, et al. Global estimates of human papillomavirus vaccination coverage by region and income level: a pooled analysis. Lancet Glob Health. 2016;4(7): e453-63.
12. Spayne J, Hesketh T. Estimate of global human papillomavirus vaccination coverage: analysis of country-level indicators. BMJ Open. 2021; 11:52016
13. Canfell K. Towards the global elimination of cervical cancer. Papillomavirus Res. 2019; 8:100170
14. Canfell K, Kim JJ, Brisson M, Keane A, Simms KT, Caruana M, et al. Mortality impact of achieving WHO cervical cancer elimination targets: a comparative modelling analysis in 78 low-income and lower-middle-income countries. Lancet. 2020; 395:591–603
15. Yimer NB, Mohammed MA, Solomon K, Tadese M, Grutzmacher S, Meikena HK, et al. Cervical cancer screening uptake in Sub-Saharan Africa: a systematic review and meta-analysis. Public Health. 2021;195: 105–111
16. Lott BE, Trejo MJ, Baum C, McClelland DJ, Adsul P, Madhivanan P, et al. Interventions to increase uptake of cervical screening in sub-Saharan Africa: A scoping review using the integrated behavioral model. BMC Public Health.2020;20(1):654.
17. Anttila A, Nieminen P. Cervical cancer screening programme in Finland. Eur J Cancer. 2000; 36:2209–14
18. Anyasi HI, Foss AM. A comparative analysis of cervical cancer prevention between Nigeria and Nordic countries that have experienced a decline in cervical cancer incidence. Int Health. 2021; 4:307–17
19. Aishat Mosuro O, Ajayi I, Ademola Odukogbe A-T, Oladeni Adeniji A, Oluwasola O, Martha-Alice Ladipo M, et al. Prevalence of Cervical Dysplasia and Associated Risk Factors among Women Presenting at a Primary Care Clinic in Nigeria. J Basic Clin Reprod Sci.2015; 4:70-79.
20. Handlogten KS, Molitor RJ, Roeker LE, Narla NP, Bachman MJ, Quayson S, et al. Cervical cancer screening in Ghana, West Africa: Prevalence of abnormal cytology and challenges for expanding screening. Int J Gynecol Pathol. 2014; 33:197–202
21. Fonn S, Bloch B, Mabina M, Carpenter S, Cronje H, Maise C, Bennun M, Du Toit G, De Jonge E, Manana I, Lindeque G. Prevalence of pre-cancerous lesions and cervical cancer in South Africa-a multicentre study. South African Medical Journal. 2002;92(2):148-56.).
22. Tagne Simo R, Mbock CV, Nwabo Kamdje AH, Djoko Nono AG, Nangue C, Telefo PB. Cervical Precancerous Lesions and Associated Factors Among Women Screened in Two Hospitals in the City of Douala, Cameroon. Cureus. 2023 Jul 17;15(7):e41993. doi: 10.7759/cureus.41993. PMID: 37593257; PMCID: PMC10427886.
23. Javanbakht, Z., Kamravamanesh, M., Rasulehvandi, R. et al. Global Prevalence of Cervical Dysplasia: A Systematic Review and Meta-Analysis. Indian J Gynecol Oncolog 21, 62 (2023).

https://doi.org/10.1007/s40944-023-00741-5)

24. Tebeu PM, Sando Z, Ndoumba A, Sandjong I, Mawech-Fauceglia P, et al. (2013) Prevalence and Geographical Distribution of Precancerous Lesions of the Uterine Cervix in Cameroon. J Cytol Histol 4: 183. doi: 10.4172/2157 7099.1000183
25. LaVigne AW, Triedman SA, Randall TC, Trimble EL, Viswanathan AN. Cervical cancer in low- and middle-income countries: Addressing barriers to radiotherapy delivery. Gynecol Oncol Rep. 2017; 22:16-20.
26. Ssedyabane F, Niyonzima N, Nambi Najjuma J, Birungi A, Atwine R, Tusubira D, Randall TC, Castro CM, Lee H, Ngonzi J. Prevalence of cervical intraepithelial lesions and associated factors among women attending a cervical cancer clinic in Western Uganda; results based on Pap smear cytology. SAGE Open Medicine. 2024 May;12:20503121241252265.
27. Isa Modibbo F, Dareng E, Bamisaye P, Jedy-Agba E, Adewole A, Oyeneyin L, et al. Qualitative study of barriers to cervical cancer screening among Nigerian women. BMJ open. 2016 1;6(1): e008533
28. Mema SC, Yang H, Vaska M, Elnitsky S, Jiang Z. Integrated cancer screening performance indicators: A systematic review. PloS one. 2016;11(8): e0161187
29. Ezechi OC, Okusanya BO, Aimakhu CO, Adesina OA, Ohihoin AG, Usman HA, et al. Society of obstetrics and gynecology of Nigeria – Clinical practice guidelines: Guidelines for the prevention of cervical cancer. Trop J Obstet Gynaecol 2019; 36:161-164
30. Johnson LG, Armstrong A, Joyce CM, Teitelman AM, Buttenheim AM. Implementation strategies to improve cervical cancer prevention in sub-Saharan Africa: A systematic review. Implement Sci.2018;13(1):1-8.