Journal of Community Medicine and Primary Health Care. 36 (3): 22 – 34
https://dx.doi.org/10.4314/jcmphc.v36i3.3

JOURNAL OF COMMUNITY MEDICINE AND PRIMARY HEALTH CARE

ORIGINAL ARTICLE

Predictors of Cervical Precancerous Lesions among Women Attending an Urban Primary Health Centre in Lagos State, Nigeria

Adeniran A,[1] Popoola BF,[1] Aderibigbe A,[1] Olofin O,[1] Adeleke K,[1] Oni S,[2] Aihonsu J.[2]
[1] Department of Community Health and Primary Health Care, Lagos State University Teaching Hospital, Lagos, Nigeria.
[2] Rauf Aregbeshola Flagship Primary Healthcare Center, Mosan-Okunola, Lagos, Nigeria

Keywords

Cervical Cancer,

Precancerous Cervical Lesions,

Screening,

Visual Inspection with Acetic Acid,

Predictors,

Lagos State

ABSTRACT

Background: Cervical cancer remains a major public health issue in Nigeria, significantly contributing to women's morbidity and mortality. This study aimed to identify predictors of cervical precancerous lesions among Nigerian women attending an urban Primary Health Centre (PHC) in Lagos State.

Methodology: A retrospective cross-sectional study was conducted using hospital-based data from 500 women aged 20 to 55 years who were screened for cervical cancer at an urban PHC in Lagos between June 2021 and June 2022. Information on sociodemographic factors, sexual and reproductive history, behavioural characteristics, and Visual Inspection with Acetic Acid (VIA) screening outcomes was analysed using Epi Info version 7.2.5.0.

Results: Of the 500 women screened (mean age: 37.2 years), 45 (9%) had positive VIA results. The median age of sexual debut was 22 years, and 5.7% reported a family history of cervical cancer. Prior screening uptake was low (15.3%). Significant predictors of VIA positivity included early sexual debut (<18 years) (OR=1.6; 95% CI=1.43-1.85; p < 0.001), age ≥35 years (OR=2.8; 95% CI=2.45-3.13; p < 0.001), and higher parity (OR=2.4; 95% CI=1.86-3.00; p < 0.001).

Conclusion: Advanced age, early sexual debut, and higher parity were significant predictors of VIA positivity. Targeted interventions should focus on prioritising cervical screening for older women, raising awareness about the risks of early sexual debut, and enhancing prevention efforts for women with higher parity in Lagos state.

Correspondence to:
Dr Adeyinka Adeniran,
Department of Community Health and Primary Health Care,
Lagos State University Teaching Hospital, Ikeja GRA, Lagos State, Nigeria.
Email: yinkadeniran@gmail.com

INTRODUCTION

Cervical cancer is a critical public health challenge and a leading cause of cancer-related deaths among women globally, particularly in low- and middle-income countries (LMICs).[1] Annually, over 600,000 new cases and 340,000 deaths are reported worldwide, with the vast majority occurring in sub-Saharan Africa.[2] In

Nigeria, cervical cancer is the second most common cancer among women after breast cancer, with an incidence rate of approximately 33.0 per 100,000 women.[1,3] Each year, more than 12,000 new cases and nearly 8,000 deaths are recorded, making Nigeria one of the countries with the highest cervical cancer burden in Africa.[3]

The primary cause of cervical cancer is persistent infection with high-risk human papillomavirus (HPV), particularly types 16 and 18, which account for over 70% of cases globally.[4,5] While screening has long been available, its uptake remains suboptimal in Nigeria, particularly in densely populated urban areas like Lagos State.[6,7] The recently introduced HPV vaccination is aimed at girls aged 9 to 14 years, leaving older women still at significant risk.[7] With over 20 million residents, Lagos faces significant healthcare access challenges, especially in underserved communities.[8] Factors like cultural beliefs, limited awareness, and economic barriers further restrict preventive efforts, contributing to the rising cervical cancer burden among women in these areas and underscoring the need for improved screening and vaccination programs.[9]

Cervical cancer generally develops slowly over time, beginning as precancerous lesions that can be detected through screening and effectively treated before progressing to invasive cancer. Visual Inspection with Acetic Acid (VIA) is a widely used, low-cost screening method in LMICs, including Nigeria, due to its accessibility and effectiveness.[1,10,11] However, despite its potential to reduce cervical cancer incidence and mortality, the uptake of VIA screening in Nigeria remains alarmingly low, with less than 10% of eligible women screened.[12]

Several barriers limit screening uptake in urban Lagos, including low awareness, cultural norms, and limited access to integrated screening programs within primary healthcare services.[13,14] These factors contribute to significant disparities in cervical cancer detection. For instance, studies across Nigeria have demonstrated variability in VIA positivity rates, ranging from 1.3% in Ogbomosho to 14% in Zaria, illustrating the uneven distribution of cervical lesion prevalence across different regions.[15,16] Additionally, HIV-positive women in Nigeria face higher cervical lesion prevalence, with rates as high as 31.3% in Maiduguri and 29% in Jos, further complicating the cervical cancer landscape.[17,18]

To develop effective prevention programs for high-risk groups, particularly in underserved urban areas with limited healthcare access, it is essential to understand the factors contributing to cervical lesion prevalence. Predictors such as age, parity, early sexual debut, smoking, HIV status, and a history of sexually transmitted infections (STIs) have been linked to an increased risk of cervical cancer.[4,5] Identifying these factors can guide public health strategies to enhance screening uptake, improve early detection, and ultimately reduce cervical cancer incidence and mortality in Nigeria.[14,19]

This study, therefore, aims to investigate the sociodemographic, reproductive, and behavioural

factors associated with cervical precancerous lesions among women screened via visual inspection with acetic acid (VIA) at an urban primary health centre in Lagos. By identifying key predictors, this research seeks to provide insights for healthcare providers and policymakers, supporting the development of targeted screening programs and interventions to reduce cervical cancer incidence and improve health outcomes in Lagos state and across Nigeria.

Table 1: Socio-Demographic Characteristics of the Participants (N=500)

Variables	N (%)
Age (years)	
18-25	32 (6.4%)
26-35	195 (39.0%)
36-45	177 (35.4%)
>45	96 (19.2%)
Marital Status	
Single	67 (13.4%)
Married	421 (84.2%)
Separated/Divorced	8 (1.6%)
Widowed	4 (0.8%)
Level of Education	
Primary	27 (5.4%)
Secondary	174 (34.8%)
Tertiary	287 (57.4%)
Postgraduate	12 (2.4%)
Occupation	
Unemployed/Housewife	38 (7.6%)
Student/Apprentice	16 (3.2%)
Self-employed/Merchant	321 (64.2%)
Paid worker	125 (25.0%)

Table 2: Reproductive, Sexual, and Behavioural Characteristics of the Participants (N=500)

Variables	N (%)
Parity	
Nulliparous	73 (14.6%)
Parous	427 (85.4%)
Age of Coitarche	
≤18 years	56 (11.2%)
>18 years	444 (88.8%)
Family History of Cervical Cancer	
Present	19 (3.8%)
Absent	481 (96.2%)
Smoking History	
Yes	5 (1.0%)
No	495 (99.0%)
History of STI Symptoms or Diagnosis	
Yes	230 (46.0%)
No	270 (54.0%)
Irregular Bleeding	
Yes	36 (7.2%)
No	464 (92.8%)

MATERIALS AND METHODS

Study Area

The study was conducted in Mosan-Okunola Local Council Development Area (LCDA) of Lagos State, South-Western Nigeria. Covering an area of 563 km² with a population of approximately 408,198, Mosan-Okunola LCDA is one of six LCDAs created by the Alimosho Local Government Area (LGA) in 2003. Rauf Aregbesola Primary Health Centre, located within this LCDA, is a flagship urban PHC, providing comprehensive preventive, promotive, and curative services. It includes a well-woman clinic offering health education, breast examinations, and free cervical cancer screening in partnership with the Department of Community Health & Primary Healthcare, Lagos State University Teaching Hospital, and sponsored by CHAI and Unitaid.

Study Design and Setting

This retrospective cross-sectional study analysed hospital-based data of women aged 20 to 55 years who were screened for cervical cancer and precancerous lesions at an urban Primary Health Centre (PHC) in Lagos, Nigeria, from June 2021 to June 2022. Data was sourced from the Lagos State Primary Healthcare Board database, encompassing socio-demographic profiles, sexual-reproductive, and behavioural characteristics, and screening outcomes using Visual Inspection with Acetic Acid (VIA).

Study Population

The study included hospital records of women aged 20 to 55, selected from the Rauf Aregbesola Primary Health Centre during the study period.

Sample Size

The minimum required sample size was calculated using a standard formula for descriptive studies and a reported prevalence of 31.3% from a study in Northeast Nigeria. With a standard normal deviation of 1.96, a margin of error of 5%, and a 95% confidence interval, the sample size was determined to be 330. To enhance statistical power and accuracy, 500 participants were purposefully enrolled, reflecting the average patient inflow at the study site.

Data Collection

Data collection involved secondary data retrieval from hospital records of women aged 20 to 55 years screened for cervical cancer using VIA during the study period. VIA results were classified as positive if aceto-positive changes (well-defined dense acetowhite areas with regular margins) were observed or negative if no visual changes were present. Positive cases were referred to secondary or tertiary centres for further management.

Variables

The dependent variable was defined as a positive VIA outcome, indicated by the presence of white lesions on the cervix after applying acetic acid. The independent variables included a range of socio-demographic factors such as age, marital status, education level, and occupation.

Additionally, reproductive and sexual history factors were examined, including the age at which participants first engaged in sexual activity, the number of pregnancies, family history of cervical cancer, smoking history, history of sexually transmitted infections (STIs), irregular bleeding, and prior cervical cancer screenings.

Data Analysis

Data were analysed using Epi Info version 7.2.5.0. Descriptive statistics, including means (standard deviations) and frequency tables, were used to summarize numerical and categorical variables. The Chi-Square test assessed associations between socio-demographic characteristics and VIA outcomes. Logistic regression was employed to estimate odds ratios and 95% confidence intervals for cervical cancer risk based on VIA results and significant socio-demographic, reproductive, and sexual variables. A p-value of less than 0.05 was considered statistically significant.

Ethical Considerations

The study utilized de-identified hospital records to ensure privacy and confidentiality. Permission was obtained from the Lagos State Primary Healthcare Board to access and use the data, ensuring no personal or sensitive information was accessed in a manner that would infringe on individual rights or privacy.

Table 3: Results of Visual Inspection with Acetic Acid (VIA) Test (N=500)

VIA Outcome	Frequency	Percentage (%)
Negative	455	91.0
Positive	45	9.0
Total	**500**	**100.0**

Table 4: Association Between Participants' Socio-Demographic Characteristics and VIA Test Results (N=500)

Variables	Negative VIA	Positive VIA	χ^2	P value
Age				
<35 years	188 (94.8%)	11 (5.5%)	4.1878	0.0183*
≥35 years	267 (88.7%)	34 (11.3%)		
Educational Status				
Primary	26 (96.3%)	1 (3.7%)	3.5296	0.2594
Secondary	154 (88.5%)	20 (11.5%)		
Tertiary	266 (92.7%)	21 (7.3%)		
Postgraduate	6 (85.7%)	1 (14.3%)		
Marital Status				
Never married	64 (95.5%)	3 (4.5%)	1.2746	0.1255
Ever married	388 (90.4%)	41 (9.6%)		

RESULTS

Table 1 presents the socio-demographic characteristics of the participants (N=500). The mean age was 37.2 ± 9.7 years, with a median of 35.5 years (IQR: 18-44). Most participants were aged 26-35 years (195, 39.0%), followed by those aged 36-45 years (177, 35.4%). The majority of participants were married (421, 84.9%), while 67 (13.5%) were single, 6 (1.2%) separated/divorced, and 2 (0.4%) widowed.

Regarding education, 27 (5.4%) had primary education, 174 (35.2%) secondary, 287 (58.0%) tertiary, and 7 (1.4%) had postgraduate degrees. In terms of occupation, 38 (7.8%) were unemployed or housewives, 14 (2.9%) were students or apprentices, 321 (66.0%) were self-employed or merchants, and 113 (23.3%) were employed.

Table 2 summarizes the reproductive, sexual, and behavioural characteristics. A majority (427, 85.4%) of the participants were parous, while 73 (14.6%) were nulliparous. The mean age at sexual debut was 22.2 ± 4.9 years, with 53 (11.1%) reporting sexual initiation before 18. Nineteen (5.7%) participants had a family history of cervical cancer, and only 5 (1.0%) reported ever smoking. Nearly half of the participants (224, 46.0%) reported a history of sexually transmitted infections (STIs), and 36 (7.2%) had experienced irregular bleeding. Previous cervical cancer screening was reported by 76 (15.3%) participants.

Table 3 shows the results of the VIA test. Of the 500 women screened, 455 (91.0%) had negative results, while 45 (9.0%) tested positive for cervical or precancerous lesions.

Table 4 highlights the relationship between socio-demographic factors and VIA positivity. Age was a significant predictor. Women aged 35 and older had a VIA positivity rate of 34 (11.3%) compared to 11 (5.5%) among women under 35 ($\chi^2 = 4.19$, $p = 0.018$), suggesting older women were more likely to test positive. Other variables, such as marital status and education level, did not show significant associations with VIA positivity.

Table 5 presents the association between reproductive, sexual, and behavioural factors and VIA results. Women who initiated sexual activity before the age of 18 had a higher VIA positivity rate (10, 18.5%) compared to those who began later (35, 8.3%) ($\chi^2 = 4.74$, $p = 0.021$). Parous women had a higher VIA positivity rate (43, 9.9%) compared to nulliparous women (2, 2.9%) ($\chi^2 = 2.72$, $p = 0.039$). No significant relationships were observed for marital status, education level, smoking history, history of STIs, or family history of cervical cancer.

Table 6 presents the logistic regression analysis of predictors for VIA positivity. Age remained a strong predictor, with women aged 35 and older having 63% higher odds of testing positive (OR = 1.63, 95% CI: 1.44 -- 1.85; $p < 0.001$). Early sexual debut (before 18) was associated with nearly three times higher odds of a positive VIA result (OR = 2.77, 95% CI: 2.46–3.13; $p < 0.001$). Parous women had more than double the odds of testing positive compared to nulliparous women (OR = 2.37, 95% CI: 1.87–3.01; $p < 0.001$).

DISCUSSION

This cross-sectional study conducted at an urban primary health centre in Lagos, southwest Nigeria, provides critical insights into the predictors of cervical cancer and precancerous lesions among women. The demographic profile of participants, with a mean age of 37.2 ± 9.7 years, and the majority between 26 and 35 years, aligns with findings from similar African studies,

such as those in Rwanda and Ethiopia, which reported comparable mean ages of 37.0 years and 35.7 years, respectively.[20,21] The integration of cervical cancer screening services with family planning clinics in this study mirrors best practices seen across Africa. Such integration has been shown to enhance the uptake of screening services, thereby contributing to program success.[22]

Most participants in this study (85.4%) were parous, which reflects the typical fertility rate for this age group in Nigeria. The mean age at sexual debut (22.2 ± 4.9 years) is also consistent with other Nigerian studies.[23] These findings suggest that the reproductive and sexual behaviours of the participants are in line with regional norms, allowing for a reliable assessment of cervical cancer risk factors in this population.[23,24]

The VIA positivity rate in this study was 9%, indicating a substantial prevalence of cervical or precancerous lesions. This rate is higher than those reported in Ogbomosho (1.3%), Sagamu (5.7%), and Okene (6.5%), but lower than the 14% reported in Zaria.[24–26] Variations in VIA positivity rates could be attributed to differences in participant demographics, screening protocols, and study designs. These findings underscore the importance of considering local context when interpreting screening outcomes and suggest that cervical lesion prevalence may vary widely within different regions of Nigeria.

Table 5: Association Between Participants' Reproductive, Sexual, & Behavioural Characteristics and VIA Test Results (N=500)

Variables	Negative VIA	Positive VIA	X^2	P value
Age of Coitarche				
≤18 years	44 (78.6%)	12 (21.4%)	4.7440	0.0205*
>18 years	411 (92.6%)	33 (7.4%)		
Parity				
Nulliparous	70 (95.9%)	3 (4.1%)	2.7234	0.0386*
Parous	384 (89.9%)	43 (10.1%)		
History of STI Symptoms or Diagnosis				
Yes	182 (89.7%)	21 (10.3%)	1.1044	0.1467
No	269 (94.7%)	21 (5.3%)		
Smoking History				
Yes	4 (80.0%)	1 (20.0%)	0.0062	0.3772
No	451 (91.1%)	44 (8.9%)		
Family History of Cervical Cancer				
Yes	17 (89.5%)	2 (10.5%)	0.0000	0.5344
No	429 (90.9%)	43 (9.1%)		
Irregular Bleeding				
Yes	32 (88.9%)	4 (11.1%)	0.0247	0.4100
No	423 (91.2%)	41 (8.8%)		

In HIV-positive populations, significantly higher VIA positivity rates have been observed. For instance, studies from Maiduguri and Jos report cervical lesion prevalence rates of 31.3% and 29%, respectively, while studies in Gombe (16.7%) and Enugu (12.6%) also indicate

elevated rates.[17,18,27–29] These higher prevalence figures which more than triple the rate found in our study, are consistent with established evidence showing that HIV-positive women are at greater risk for cervical lesions due to their increased susceptibility to high-risk HPV types.[30,31] The immunocompromised status of HIV-positive individuals accelerates the progression of HPV infections, leading to a higher likelihood of developing cervical abnormalities.[32–34]

Table 6: Logistic Regression Analysis of Predictors of Cervical Cancer Risk

Variables	VIA Positivity Prevalence (%)	Age-adjusted OR	95% CI	P value
Age group				
<35 years	5.5	Referent		
≥35 years	11.3	1.6320	1.4363 to 1.8543	<0.001
Age of Coitarche				
≤18 years	17.0	2.7730	2.4554 to 3.1316	<0.001
>18 years	8.5	Referent		
Parity				
Nulliparous	2.7	Referent		
Parous	10.1	2.3710	1.8683 to 3.0091	<0.001

VIA positivity rates differ across Africa. In Ethiopia, a rate of 10.3% was observed, while a Tanzanian study reported a lower rate of 7% among 14,107 women screened over six years.[35,36] A WHO demonstration study that screened 19,579 women in six African countries reported VIA positivity rates ranging from 5.7% in Nigeria to 28.0% in Zambia.[37] Recent studies have demonstrated even more variability, with rates ranging from 3.8% in Tanzania to 26.4% in Kenya.[38,39]

Similarly, significant variability exists in Asia. For example, Bangladesh reported a VIA positivity rate of 2.4%, while studies from India reported rates of 10.75% and 5.5%, respectively.[40–42] These global differences may be explained by variations in screening methods, provider experience, and population characteristics, such as differences in sexual and reproductive behaviours, which influence the outcomes of VIA screenings. Furthermore, these variations emphasize the need for standardized screening protocols to ensure consistency and comparability across regions.[43–45]

Our study identified age, early sexual debut, and parity as significant predictors of VIA positivity. Women aged 35 and older were nearly twice as likely to have a positive VIA result compared to younger women (OR=1.6; 95% CI=1.45-1.85; p<0.001). This finding is consistent with other studies across Africa and India, which also report increased VIA positivity among older women.[20,35,46,47] The elevated risk of cervical cancer in older women aligns with the natural history of cervical cancer, which typically presents between the ages of 35 and 44.[48]

Early sexual debut emerged as another key predictor of VIA positivity. Women who initiated sexual activity before the age of 18 were almost three times more likely to test positive for VIA (OR=2.8; 95% CI=2.45-3.13; p<0.05). This finding is consistent with research from Rwanda and India, where early initiation of sexual activity has been associated with higher VIA positivity rates.[47,49] A case-control study in Iran found that initiating sexual activity or marriage before age 15 was significantly associated with cervical cancer. [50] Additionally, early sexual debut is a well-documented risk factor for HPV infection, as younger women's cervical tissue is more susceptible to viral entry, leading to a higher likelihood of persistent HPV infection and cervical lesion development.[47,49]

Parity was also significantly associated with VIA positivity in this study. Parous women were more than twice as likely to test positive compared to nulliparous women (OR=2.4; 95% CI=1.86-3.00; p<0.05). This association is consistent with the broader literature, which links high parity to an increased risk of cervical lesions.[51] Hormonal changes and cervical trauma associated with childbirth facilitate HPV entry and persistence, contributing to the development of precancerous lesions.[51,52] These findings highlight the need to prioritise cervical cancer screening for parous women, particularly in regions with high fertility rates.

Study Strengths and Limitations

This study provides valuable insights into the predictors of cervical precancerous lesions within an urban Nigerian context, offering data that can inform targeted public health interventions for high-risk groups. By utilizing hospital records, the study ensures a high degree of data reliability, which strengthens the credibility of its findings. These insights are particularly relevant for improving screening and prevention efforts in similar urban settings across Nigeria.

However, the cross-sectional design limits the ability to infer causation between identified predictors and lesion development. Furthermore, as the study was conducted at a single primary health centre in Lagos, the findings may not be generalizable to other regions in Nigeria. Self-reported data on sexual and behavioural factors could also introduce recall or social desirability biases. Finally, key variables like HIV status, a known risk factor for cervical cancer, were not included**.** Future research should address these limitations to provide a more comprehensive understanding of cervical lesion predictors.

CONCLUSION

This study identifies advanced age (≥35 years), early sexual debut, and high parity as major predictors of cervical precancerous lesions among women in Lagos. Addressing these risks requires a multi-faceted approach, including the integration of cervical cancer screening into primary healthcare, expanded HPV vaccination for young girls, and targeted public health campaigns. Culturally adapted community education can further help overcome screening barriers, enabling earlier detection and reducing cervical cancer incidence. These strategies

support timely care for at-risk women in Lagos and can benefit similar urban areas across Nigeria.

Conflict of Interest: The authors declare no conflicts of interest regarding this study.

Funding: This study was self-funded by the authors, with no external funding sources.

Author's Contribution: All authors contributed to the study through various roles, including conceptualisation, study design, data collection, statistical analysis, manuscript writing, and review.

REFERENCES

1. Cervical Cancer Nigeria 2021 Country Profile. World Health Organization [Internet]. Available from: https://www.who.int/publications/m/item/cervical-cancer-nga-country-profile-2021
2. Azuonwu G, Timothy T. Epidemiology of Cancer of the Cervix in Rivers State, Niger Delta. In 2020.
3. Complementary Data on Cervical Cancer Prevention. [Internet]. Available from: www.hpvcentre.net
4. Zhang S, Xu H, Zhang L, Qiao Y. Cervical Cancer: Epidemiology, Risk Factors, and Screening. Chinese Journal of Cancer Research. 2020;32(6):720–8. https://doi.org/10.21147/j.issn.1000-9604.2020.06.05
5. Clifford G, Franceschi S, Diaz M, Muñoz N, Villa LL. Chapter 3: HPV Type-Distribution in Women with and Without Cervical Neoplastic Diseases. Vaccine. 2006;24(Suppl 3). https://doi.org/10.1016/j.vaccine.2006.05.113
6. Qudus OL, Lawal KLI, Irrua QO. Cervical Cancer Burden in Nigeria: Review of Current Situation. Gynecol Reprod Health. 2023;7(1):1-5.
7. Lagos Vaccinates 484,761 Girls Against HPV in 3 Months – Lagos State Primary Health Care Board [Internet]. Available from: https://lsphcb.lg.gov.ng/2024/01/31/lagos-vaccinates-484761-girls-against-hpv-in-3-months/
8. Lagos Bureau of Statistics. Spotlight on Lagos Statistics, 2021 Edition. 2022.
9. Omosun A, Abayomi A, Ogboye O, Lajide D, Oladele D, Popoola A, et al. Distribution of Cancer and Cancer Screening and Treatment Services in Lagos: A 10-Year Review of Hospital Records. JCO Global Oncology. 2022 Oct;8. https://doi.org/10.1200/GO.22.00000
10. Wright TC. Chapter 10: Cervical Cancer Screening Using Visualization Techniques. JNCI Monographs. 2003;2003(31):66–71. https://doi.org/10.1093/oxfordjournals.jncimonographs.a003483
11. Sherris J, Wittet S, Kleine A, Sellors J, Luciani S, Sankaranarayanan R, et al. Evidence-Based, Alternative Cervical Cancer Screening Approaches in Low-Resource Settings. Int Perspect Sex Reprod Health. 2009;35(03):147–54. https://doi.org/10.1363/ipsrh.35.147.09
12. Okolie EA, Barker D, Nnyanzi LA, Anjorin S, Aluga D, Nwadike BI. Factors Influencing Cervical Cancer Screening Practice Among Female Health Workers in Nigeria: A Systematic Review. Cancer Reports. 2022;5(5). https://doi.org/10.1002/cnr2.1497
13. Balogun MR, Odukoya OO, Oyediran MA, Ujomu PI. Cervical Cancer Awareness and Preventive Practices: A Challenge for Female Urban Slum Dwellers in Lagos, Nigeria. African Journal of Reproductive Health. 2012; 16(1): 75–82.
14. Olubodun T, Odukoya OO, Balogun MR. Knowledge, Attitude, and Practice of

Cervical Cancer Prevention Among Women Residing in an Urban Slum in Lagos, South West, Nigeria. Pan African Medical Journal. 2019;32. https://doi.org/10.11604/pamj.2019.32.130.14432

15. Abiodun AB, Durodola AO, Ajani MA, Amole IO, Abiodun AD, Oluwasola TAO. Comparative Efficacy of Visual Inspection with Acetic Acid Versus Cytology for Cervical Cancer Screening in Ogbomoso, Nigeria. International Journal of Reproduction, Contraception, Obstetrics and Gynecology. 2017;6(9):3742. https://doi.org/10.18203/2320-1770.ijrcog20173739
16. Adekunle OO, Samaila MOA. Prevalence of Cervical Intraepithelial Neoplasia in Zaria. Annals of African Medicine. 2010;9(3):194. https://doi.org/10.4103/1596-3519.68356
17. Chama CM, Nggada H, Gashau W. Cervical Dysplasia in HIV-Infected Women in Maiduguri, Nigeria. Journal of Obstetrics and Gynaecology. 2005;25(3):286–8. https://doi.org/10.1080/01443610500060707
18. Musa J, Achenbach CJ, Evans CT, Jordan N, Daru PH, Hou L, et al. Association Between Patient-Reported HIV Status and Provider Recommendation for Screening in an Opportunistic Cervical Cancer Screening Setting in Jos, Nigeria. BMC Health Services Research. 2018;18(1):885. https://doi.org/10.1186/s12913-018-3735-8
19. Jolly PE, Mthethwa-Hleta S, Padilla LA, Pettis J, Winston S, Akinyemiju TF, et al. Screening, Prevalence, and Risk Factors for Cervical Lesions Among HIV Positive and HIV Negative Women in Swaziland. BMC Public Health. 2017;17(1):218. https://doi.org/10.1186/s12889-017-4121-9
20. Teame H, Addissie A, Ayele W, Hirpa S, Gebremariam A, Gebreheat G, et al. Factors Associated with Cervical Precancerous Lesions Among Women Screened for Cervical Cancer in Addis Ababa, Ethiopia: A Case-Control Study. PLoS One. 2018 Jan 19;13(1) https://doi.org/10.1371/journal.pone.0191506
21. Peterside S, Akogu O, Simon A, Onuche P. Outcome of the Visual Inspection with Acetic Acid of the Cervix of HIV Seropositive Women Attending Antiretroviral Disease Clinics in Anyigba, North Central Nigeria. Available from: https://www.researchgate.net/publication/355700073
22. PIEGO. Alternatives for Cervical Cancer Screening and Treatment in Low-Resource Settings: 1997 Cervical Cancer Workshop Highlights. Proceedings of JHPIEGO Workshop on Cervical Cancer, Baltimore; 1997. Available from: https://www.google.com/search?q=PIEGO.+Alternatives+for+Cervical+Cancer+Screening+and+Treatment+in+Low-Resource+Settings%3A+1997+Cervical+Cancer+Workshop+Highlights
23. Awodele O, Adeyomoye AAA, Awodele DF, Kwashi V, Awodele IO, Dolapo DC. A Study on Cervical Cancer Screening Amongst Nurses in Lagos University Teaching Hospital, Lagos, Nigeria. Journal of Cancer Education. 2011 Sep;26(3):497–504. https://doi.org/10.1007/s13187-010-0155-6
24. Abiodun O, Fatungase O, Olu-Abiodun O, Idowu-Ajiboye BA, Awosile JO. An Assessment of Women's Awareness and Knowledge About Cervical Cancer and Screening and the Barriers to Cervical Screening in Ogun State, Nigeria. IOSR Journal of Dental and Medical Sciences. 2013 Jan;10(1):52–8.
25. Peter FS, Natalia VM, Danielle H, Srinivas RM, David MO. The Prevalence of Cervical HPV and Cytological Abnormalities in Association with Reproductive Factors of Rural Nigerian Women. Journal of Women's Health. 2008;17(2):279-285. Available from: https://doi.org/10.1089/jwh.2007.0362
26. Adefuye PO, Dada OA, Adefuye BO, Shorunmu TO, Akinyemi BO, Idowu-Ajiboye BO. Feasibility, Acceptability, and Effectiveness of Visual Inspection of the Cervix with Acetic Acid and Cryotherapy for

Dysplasia in Nigeria. International Journal of Gynecology & Obstetrics. 2015 Apr;129(1):62–6. https://doi.org/10.1016/j.ijgo.2014.10.034
27. Agaba PA, Thacher TD, Ekwempu CC, Idoko JA. Cervical Dysplasia in Nigerian Women Infected With HIV. International Journal of Gynaecology & Obstetrics. 2009 Aug;107(2):99–102. https://doi.org/10.1016/j.ijgo.2009.06.006
28. Muwonge R, Walter SD, Wesley RS, Basu P, Shastri SS, Thara S, et al. Assessing the Gain in Diagnostic Performance When Two Visual Inspection Methods Are Combined for Cervical Cancer Prevention. Journal of Medical Screening. 2007 Sep;14(3):144–50. https://doi.org/10.1258/096914107782066091
29. Dim CC, Ezegwui HU, Ikeme AC, Nwagha UI, Onyedum CC. Prevalence of Cervical Squamous Intraepithelial Lesions Among HIV-Positive Women in Enugu, South-Eastern Nigeria. Journal of Obstetrics and Gynaecology. 2011 Nov;31(8):759–62. https://doi.org/10.3109/01443615.2011.619624
30. Liu G, Sharma M, Tan N, Barnabas RV. HIV-Positive Women Have Higher Risk of Human Papilloma Virus Infection, Precancerous Lesions, and Cervical Cancer. AIDS. 2018;32(6):795–808. https://doi.org/10.1097/QAD.0000000000001755
31. Clifford GM, Franceschi S, Keiser O, Schoni-Affolter F, Lise M, Dehler S, et al. Immunodeficiency and the Risk of Cervical Intraepithelial Neoplasia 2/3 and Cervical Cancer: A Nested Case-Control Study in the Swiss HIV Cohort Study. International Journal of Cancer. 2016 Apr;138(7):1732–40. https://doi.org/10.1002/ijc.29913
32. Human Papillomavirus and Related Cancers, Fact Sheet 2017. Key Data on HPV and HPV-Related Cancers. 2017;6–7.
33. Hirsch JS, Higgins J, Bentley ME, Nathanson CA. The Social Constructions of Sexuality: Marital Infidelity and Sexually Transmitted Disease–HIV Risk in a Mexican Migrant Community. American Journal of Public Health. 2002 Aug;92(8):1227–37. https://doi.org/10.2105/AJPH.92.8.1227
34. De Sanjosé S, Palefsky JM. Cervical and Anal HPV Infections in HIV-Positive Women and Men. Elsevier. 2002;8(Suppl 5):15-19. Available from: https://www.sciencedirect.com/science/article/pii/S0168170202001892
35. Fentie AM, Tadesse TB, Gebretekle GB. Factors Affecting Cervical Cancer Screening Uptake, VIA Positivity and Its Predictors Among Women Attending Cervical Cancer Screening Services in Addis Ababa, Ethiopia. BMC Women's Health. 2020 Jul;20(1). https://doi.org/10.1186/s12905-020-00998-z
36. Kahesa C, Kjaer SK, Ngoma T, Mwaiselage J, Dartell M, Iftner T, et al. Risk Factors for VIA Positivity and Determinants of Screening Attendances in Dar es Salaam, Tanzania. BMC Public Health. 2012;12(1). https://doi.org/10.1186/1471-2458-12-1055
37. World Health Organization, International Agency for Research on Cancer, Centre for Prevention of HPV and Related Cancers. Prevention of Cervical Cancer Through Screening Using Visual Inspection with Acetic Acid (VIA) and Treatment With Cryotherapy: A Demonstration Project in Six African Countries. Geneva: World Health Organization; 2012. Available from: https://apps.who.int/iris/handle/10665/75250
38. Ngoma T, Muwonge R, Mwaiselage J, Kawegere J, Bukori P, Sankaranarayanan R. Evaluation of Cervical Visual Inspection Screening in Dar es Salaam, Tanzania. International Journal of Gynecology & Obstetrics. 2010;109(2):100–4. https://doi.org/10.1016/j.ijgo.2009.11.025
39. Huchko MJ, Sneden J, Leslie HH, Abdulrahim N, Maloba M, Bukusi E, et al. A

Comparison of Two Visual Inspection Methods for Cervical Cancer Screening Among HIV-Infected Women in Kenya. Bulletin of the World Health Organization. 2014; 92: 195–203. https://doi.org/10.2471/BLT.13.122051
40. Shirin F, Chowdhury FI, Sultana M, Chowdhury SJ, Sultana N, Karim T, et al. Screening for Cervical Cancer (By VIA Test) Among Selected Garments Workers in Chattogram, Bangladesh. International Journal of Reproduction, Contraception, Obstetrics and Gynecology. 2023;12(5):1206–11. https://doi.org/10.18203/2320-1770.ijrcog20231258
41. Poli UR, Bidinger PD, Gowrishankar S. Visual Inspection with Acetic Acid (VIA) Screening Program: 7 Years Experience in Early Detection of Cervical Cancer and Precancers in Rural South India. Indian Journal of Community Medicine. 2015;40(3):203. https://doi.org/10.4103/0970-0218.158860
42. Arun R, Singh J, Gupta S. Cross-Sectional Study on Visual Inspection with Acetic Acid and Pap Smear Positivity Rates According to Sociodemographic Factors Among Rural Married Women of Bareilly (Uttar Pradesh). Indian Journal of Community Medicine. 2018;43(2):86–9. https://doi.org/10.4103/ijcm.IJCM_81_17
43. Vedantham H, Silver MI, Kalpana B, Rekha C, Karuna BP, Vidyadhari K, et al. Determinants of VIA (Visual Inspection of the Cervix After Acetic Acid Application) Positivity in Cervical Cancer Screening of Women in a Peri-Urban Area in Andhra Pradesh, India. Cancer Epidemiology, Biomarkers & Prevention. 2010;19(5):1373–80. https://doi.org/10.1158/1055-9965.epi-09-1282
44. Mahé C, Gaffikin L. Screening Test Accuracy Studies: How Valid Are Our Conclusions? Application to Visual Inspection Methods for Cervical Screening. Cancer Causes and Control. 2005;16(6):657–66. https://doi.org/10.1007/s10552-005-0352-4
45. Olusegun Emmanuel G. Reliability of Visual Inspection After Acetic Acid Staining in Screening for Cervical Pre-Malignant Lesions Among Female Subjects in a Rural Tertiary Hospital in Nigeria. Cancer Research Journal. 2016;4(1):1. https://doi.org/10.11648/j.crj.20160401.11
46. Belete N, Tsige Y. Willingness and Acceptability of Cervical Cancer Screening Among Women Living With HIV/AIDS in Addis Ababa, Ethiopia: A Cross-Sectional Study. Oncology Research and Practice. 2015. https://doi.org/10.1186/s40661-015-0012-3
47. Damascène Makuza J, Nsanzimana S, Muhimpundu MA, Pace LE, Ntaganira J, Riedel DJ, et al. Prevalence and Risk Factors for Cervical Cancer and Precancerous Lesions in Rwanda. Pan African Medical Journal. Available from: https://www.ajol.info/index.php/pamj/article/view/132224
48. Fontham ETH, Wolf AMD, Church TR, Etzioni R, Flowers CR, Herzig A, et al. Cervical Cancer Screening for Individuals at Average Risk: 2020 Guideline Update from the American Cancer Society. CA: A Cancer Journal for Clinicians. 2020;70(5):321–46. https://doi.org/10.3322/caac.21628
49. Biswas L, Manna B, Sengupta P. Sexual Risk Factors for Cervical Cancer Among Rural Indian Women: A Case-Control Study. International Journal of Epidemiology. 1997;26(3):491–5. https://doi.org/10.1093/ije/26.3.491
50. Taherian AA, Fatahi E, Soleimani B. Study of Risk Factors for Cervical Cancer: A Case-Controlled Study in Isfahan, Iran. Kuwait Medical Journal. 2002; 34: 128–32.
51. Almonte M, Ferreccio C, Gonzales M, Delgado JM, Buckley CH, Luciani S, et al. Risk Factors for High-Risk Human Papillomavirus Infection and Cofactors for High-Grade Cervical Disease in Peru. International Journal of Gynecological Cancer. 2011;21(9):1654–63. https://doi.org/10.1097/IGC.0b013e31822e86e7
52. Clark S. Early Marriage and HIV Risks in Sub-Saharan Africa. Studies in Family Planning. 2004;35(3):149–60. https://doi.org/10.1111/j.1728-4465.2004.00019.x