Nigerian Medical Journal
NIGERIA MEDICAL ASSOCIATION
Print ISSN 0300-1652, E-ISSN 2229-774X

Original Research

Pre-cancerous cervical lesions among women in Bauchi: A cross-sectional study

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Abstract

Background: Cervical cancer is an important contributor to morbidity and mortality in low Human Development Index (HDI) countries where organized cervical cancer screening is often lacking. There is a paucity of data on the prevalence of cervical precancerous lesions in Bauchi, Nigeria.

Methodology: This cross-sectional study was carried out in selected hospitals in the 3 senatorial zones of Bauchi State. Sociodemographic and reproductive data were collected using a data collection tool, and cervical smears were collected and stained using a manual liquid-based cytology (LBC) method.

Results: Out of 458 women who underwent screening, 410 (89.5%) of the participants had a negative smear. Low-grade squamous intraepithelial lesions (LSIL) and Atypical squamous cells of undetermined significance (ASC-US) were the most common diagnostic categories of abnormal smears, together accounting for 78.9% of abnormal pap smear results. The chances of developing cervical precancerous lesions were higher in women <35 years ($p<0.05$). There was no statistically significant association between precancerous lesions and age at sexual debut or marital status ($p>0.05$).

Conclusion: There is a need to implement organized state-wide screening programmes within the state to improve detection rates of cervical pre-cancerous lesions and eventually a reduction in cervical cancer mortality and morbidity statistics in the country.

Keywords: Cervical; Cancer; Precancerous; Liquid-Based Cytology.

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How to cite: Aminu MB, Suleiman DE, Makama LD, Muhammad A, Misau YA, Yusuf AB, Gabi UI, Gumau SA, Albuhari AG, Audu BM. Pre-cancerous cervical lesions among women in Bauchi: A cross-sectional study. Niger Med J 2025; 66 (3):953-961.https://doi.org/10.71480/nmj.v66i3.718.

Quick Response Code:

Introduction

Cervical cancer is a significant contributor to the cancer burden in women, being the fourth most common cancer in women globally.[1] The significance of cervical cancer is even greater in countries with a low Human Development Index (HDI), where cervical cancer incidence is about threefold higher than in countries with a high HDI.[2] In 2022, more than 90% of mortality from cervical cancer occurred in low- and middle-income countries (LMICs).[1], Overall, the highest rates of cervical cancer incidence and mortality occur in sub-Saharan Africa (SSA), South-East Asia, and Central America [1,3] The regional variation in cervical cancer statistics is partly due to the absence of effective cytological screening and treatment programs within the health systems of most LMICs. The high rate of poverty, low literacy levels, and gender inequity in these countries further intensifies the high burden of cervical cancer.

Despite being a highly preventable malignancy preceded by precursor lesions that can be prevented and treated, the burden of cervical cancer among women in Nigeria remains quite high. Cervical cancer incidence among women across Nigeria is only exceeded by breast cancer.[4] A few studies even revealed a higher burden of cervical cancer than breast cancer, exemplified by a hospital-based cancer registry publication in Bauchi, Nigeria [5] Cytological screening methods using the Papanicolaou (pap) smear have been a key strategy for reducing its incidence and mortality worldwide. However, Nigeria has lacked an organized cervical cancer screening program despite the high incidence of this condition in the country.[6]

The natural history of cervical cancer development has been well described. Most of the cervical cancer cases are preceded by high-risk Human papillomavirus (hrHPV) infection. [7,8] This infection induces a sequence of atypical changes in the cervical epithelial cells that progress from low-grade lesions, through high-grade lesions, and eventually culminate in invasive cervical cancer. Detecting atypical cervical epithelial cells before they develop into invasive disease is the key aim of cervical cancer screening programmes, as early detection has been proven to significantly reduce the incidence of invasive cervical cancers in the population.[9]

There are few studies on cervical precursor lesions in Bauchi, and where they exist, they are often single institution-based studies. This study aims to describe the prevalence of, and factors associated with cervical pre-cancerous lesions across the 3 senatorial zones of Bauchi State, Nigeria.

Materials and Methods

Study Design: This was a cross-sectional study among reproductive-aged women who consented to cervical cancer screening in 3 selected health facilities, each within the 3 senatorial zones of Bauchi state, Nigeria.

Study population: A total of 458 women (18-65 years) were screened across the 3 institutions (Abubakar Tafawa Balewa University Teaching Hospital, Bauchi; General Hospital, Ningi, and General Hospital, Azare). These institutions were purposely selected as they represented the largest hospitals that provide reproductive care services within the 6-7 local government areas in each of the 3 zones in the state. The participants who met the inclusion criteria were consecutively sampled in a non-randomised manner as they presented to the family planning and gynaecological units of the 3 selected institutions, until the desired sample size was reached.

Sample size determination: The minimum sample size for the study was calculated using the formula below:

$$n = \frac{Z^2 pq}{}$$

d^2

This gave a result of n=244 and was subsequently adjusted to 500 to improve the power of the study.

Data collection and cytological evaluation: An electronic data collection tool (Kobo Collect) was used to obtain demographic and reproductive data. Pap smear collection was performed by doctors and midwives who were part of the research team and trained specifically on pap smear collection using the brush and LBC kits. The sample collections were carried out at the clinic in accordance with routine standard procedures. The patient was placed in lithotomy position on an examination table, and the trained service provider performed a digital examination followed by a Cusco speculum examination to aid visualization of the cervix before using a cytobrush (rotated 360 degrees) to delicately sample cells from the cervical mucosa. The collected specimens with the cytobrush were inserted into an accompanying liquid-based cytology fluid that contains 95% alcohol. These specimens were labelled with unique identifiers reflecting individual and study area characteristics. The specimens were processed manually in the laboratory and stained according to the Papanicolaou method and in accordance with the laboratory standard operating procedures (SOP). Smears were examined microscopically by 2 independent pathologists and classified in accordance with the Bethesda System for reporting of cervical cytology (2014). Discordance in their initial assessments was resolved by consensus diagnosis between the 2 pathologists.

The results were categorised as: Inadequate; Negative for intraepithelial lesion or malignancy (NILM); Atypical squamous cells of undetermined significance (ASCUS); Low-grade squamous intraepithelial lesion (LSIL); Atypical cells cannot rule out HSIL (ASC-H); High-grade squamous intraepithelial lesions (HSIL); Squamous cell carcinoma (SCC).

Statistical analysis: De-identified data from data collection forms were entered into Excel worksheets and exported into SPSS version 21 for data analysis. Baseline characteristics were presented using frequencies and percentages. Bivariate and multivariate logistic regression analysis was performed to determine factors associated with cervical intraepithelial lesions. Crude and adjusted odds ratios (AOR) at 95% CI were presented with a p-value threshold of $P<0.05$ set for statistical significance.

Ethical Approval: Ethical approval was received from the Bauchi State Health Research and Ethics Committee (HREC Nos: BSMOH/REC/047/2022).

Inclusion Criteria: Female participants aged 18 to 65 years and women who have not been screened within the last 3 years.

Exclusion Criteria: Women who have had a Pap smear screening within the past three years; Pregnant women at the time of the study and Women who have undergone a hysterectomy

Results

Sociodemographic and reproductive characteristics of participants

The mean (±standard deviation) age of participants was 35.5 ± 9.8 years. About half (50%) of the participants were aged 35 years and above. The majority of the respondents were Muslims (87.8%) and housewives (48.5%). About 30% of participants had no formal education, and 23.8% of their spouses also had no formal education. An overwhelming majority (87.1%) of the participants were married, with an average of 16.2 ± 10.5 years. The average age of sexual debut was 18.2 ± 3.5 years. The majority of the women were multiparous, with 40.2% of them having had at least 5 deliveries (Table 1).

Table 1: Sociodemographic and reproductive characteristics of participants

Variables	Frequency	Percentage	Mean and SD
Age (years)			35.5 ± 9.8
15-24	52	11.4	
25-34	177	38.6	
35 and above	229	50.0	
Age of Sexual Debut (years)			18.2 ± 3.5
10-17	206	45.0	
18 and above	252	55.0	
Marital status			
Married	399	87.1	
Divorced	26	5.7	
Not married	6	1.3	
Widowed	27	5.9	
Duration of Marriage (years)			16.2 ± 10.5
0-10	160	34.9	
11-20	157	34.3	
21 and above	141	30.8	
Religion			
Christianity	56	12.2	
Islam	402	87.8	
Educational Level			
No formal education	135	29.5	
Primary	122	26.6	
Secondary	149	32.5	
University/Equivalent	52	11.4	
Employment Status			
Business/Trading	80	17.5	
Civil servant	41	9.0	
Employed	54	11.8	

Housewife	222	48.5
Student	19	4.1
Unemployed	42	9.2
Husband's Educational Level		
No formal education	109	23.8
Primary	25	5.5
Secondary	97	21.2
University/Equivalent	227	49.6
Number of Children Delivered		
None	46	10.0
One	51	11.1
Two	63	13.8
Three	55	12.0
Four	59	12.9
Five and above	184	40.2
Number of Miscarriages		
None	222	48.5
One	124	27.1
Two	61	13.3
Three	30	6.6
Four	10	2.2
Five and above	11	2.4

Prevalence of Precancerous Cervical Lesions

Of the 458 women who had Pap smear screening over the study period, 410 participants (89.5%) were negative for intraepithelial lesion or malignancy, while 19 had abnormal pap smears. Twenty-nine (6.3%) had no pap smear results due to inadequate smears, mainly from extremely low cellularity. The low cellularity mainly stemmed from faulty collection procedures using the cervical brush. Unforeseen mishaps in sample packaging and transport also accounted for a minority of the inadequate specimens. Low-grade squamous intraepithelial lesions (LSIL) and Atypical squamous cells of undetermined significance (ASC-US) were the most common diagnostic category of abnormal smears, together accounting for 15 (78.9%) out of the total of 19 abnormal pap smear results. The distribution of pap smear results is presented in **Table 2**. Overall, cervical precancerous lesions account for about 4% of the total women screened.

Table 2: Prevalence of cytological diagnosis of cervical precancerous lesions (N=458)

Cytological diagnoses	Frequency	Percentage
NILM	410	89.5
Inflammatory	1	0.2
LSIL	8	1.8
ASCUS	7	1.6
ASC-H	1	0.2
HSIL	2	0.4
Inadequate	29	6.3%
Total	458	100.0

Factors associated with cervical precancerous lesions

Bivariate and multivariate logistic regression analyses were done to elicit associations between sociodemographic and reproductive characteristics and cervical precancerous lesions. According to **Table 3**, the risk of developing any cervical precancerous lesion decreased within the age group >35 years (AOR 0.51, 95% CI:0.08-3.50, p <0.05).

Table 3: Associations of cervical precancerous lesions with some sociodemographic and reproductive factors

Variables			COR (95%)	AOR (95%)
	Positive	Negative		
Age (years)				
15-24	4	48	1.00	1.00
25-34	4	173	3.60 (0.87, 14.95)	1.67 (0.37, 7.69)
35 and above	10	219	1.83 (0.55, 6.06)	0.51 (0.08, 3.50)
Marital status				
Married	16	383	1.00	1.00
Not married	2	57	1.19 (0.27, 5.31)	0.98 (0.18, 5.26)
Educational Level				
No formal education	6	129	1.00	1.00
Primary	5	117	0.42 (0.05, 3.59)	0.60 (0.15, 2.41)
Secondary	6	143	0.46 (0.05, 4.03)	0.40 (0.09, 1.87)
University/Equivalent	1	51	0.47 (0.06, 3.98)	1.59 (0.18, 14.00)

Age of Sexual Debut (years)				
Less than 18	14	269	1.00	1.00
18 and above	4	171	2.23 (0.72, 6.87)	3.16 (0.86, 11.58)
Employment Status				
Not a housewife	6	230	1.00	1.00
Housewife	12	210	0.46 (0.17, 1.24)	0.38 (0.11, 1.37)
Duration of Marriage (years)				
0-10	9	151	1.00	1.00
11-20	2	155	4.62 (0.98, 21.73)	6.14 (1.00, 37.62)
21 and above	7	134	1.14 (0.41, 3.15)	2.52 (0.40, 15.75)

Note: 1.00 = Reference category; COR: Crude Odds Ratio, AOR: Adjusted Odds Ratio

Discussion

The prevalence of cervical precancerous lesions in this study was 4%, lower than the figures obtained from other studies in Nigeria that ranged between 6 and 15%.[10–14] Variations in the sample population of these studies may account for some of these differences in prevalence, considering that many of these were either among HIV positive women, internally displaced women, or pregnant women attending antenatal clinics. In addition, one of these studies was based on visual inspection with acetic acid (VIA), rather than cervical cytology.[12] Our finding, however, closely agrees with a previous study among non-pregnant women in Zaria.[14] While most studies in Africa report higher prevalence, especially among HIV-infected women, a few studies, notably from Ghana and Cameroon, have reported relatively low prevalence of 3.1% and 3.3% respectively.[15,16]

LSIL and ASC-US were the most common diagnostic categories of cervical precancerous lesions in this study, and this finding is consistent with most previous studies in Nigeria.[10,14] ASC-US constituted 1.6% of cases in this study, which is lower than the 3.7% observed in an earlier study.[17] It is important to recognize that ASC-US is not a true pathological diagnosis but reflects limitations in both the diagnostic interpretation of cervical smear samples and the categorization of cervical abnormalities in the laboratory. Furthermore, cases categorized as ASC-US pose significant treatment challenges, as there is both a risk of over-treatment as well as progression to higher grade lesions. One possible approach to these cases will be to do hrHPV testing for all ASC-US cases, after which these may be reclassified as LSILor negative depending on the HPV testing results. The American Society for Colposcopy and Cervical Pathology (ASCCP) recommends that in women <25 years who are either ASC-US with hrHPV-positive, or ASC-US without any HPV testing, repeat cytology at 1 year should be the preferred next step. If the result is NILM/ASC-US/LSIL, another repeat cytology is needed in 1 year, after that if the result is negative, then routine age-based screening is resumed.

This study revealed that women >35 years are about 49% less likely to develop cervical precancerous lesions compared to women in the age group 15-24 years. This study contrasts with other studies where women in older age groups were more likely to develop precancerous lesions of the cervix [18,19]. Our study, however, agrees with that of Dabo et al in Cameroon, in which women aged 25-38 years were more likely to develop cervical precancerous lesions than those in the other age categories.[20] The higher occurrence of cervical precancerous lesions in the younger age group may be related to the earlier age of acquisition of HPV infection among the participants within our study.

Interestingly, our study did not reveal any statistically significant association between the age of coitarche and the occurrence of cervical precancerous lesions. There was also no statistically significant association with marital status, duration of marriage, or employment status. The lack of association with age of sexual debut contrasts with most studies in literature but may be explained by the relatively high average age of sexual debut of 18.2 ±3.5 years in our study. Ngwibite et al (Nigeria) and Wabo et al (Cameroon) also demonstrated a similar lack of relationship between cervical precancerous lesions and sexual debut in their study. [12,20]

Conclusion

Cervical precancerous lesions are not uncommon in Bauchi, Nigeria. There is a need to institutionalize organized screening programmes to allow for better early detection rates and appropriate management of abnormal cervical smears with a view to reducing the burden of cervical cancer in the country.

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