Research Article

Abnormal and Unsatisfactory Conventional Cytological Examination of HPV Related Cervical Cancers in Nigeria

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Abstract | Papanicolaou smear is a conventional cytological examination for the screening of cervical cancer. However, the routine test is known and prone to significant error rate. This study examines the prevalence of abnormal and unsatisfactory Pap smear among women attending Federal Medical Center Birnin Kebbi. The study was a retrospective review of all Conventional Papanicolaou smear registry data of women who underwent a cytological examination at the cytology unit of the FMC Birnin Kebbi spanning a period of 10 years (2009-2019). The study used a hospital-based archive that covers the entire Kebbi State without any well-defined population to collects data on all Pap smear cases presenting to the hospital for possible diagnosis of cervical cancer. Descriptive and summary statistics and cross-tabulation were used to describe the data using the Statistical Package for Social Sciences. Out of the 92 women who had cervical cytology by Pap smear during the period under review, 22 had abnormal pap smears, a prevalence rate of (23.9%); 7/92 (7.6%) were low-grade squamous intraepithelial lesion while 12/92 (13.0%) were high-grade squamous intraepithelial lesion. Five women (3.3%) had atypical squamous cell of undetermined significance. The unsatisfactory pap smears were seen in 18/92 (19.6%) cases; six cases were seen in women aged 18 - 30 years. Four (4) cases each seen in 31-40, 41-50 and 51-60 years. The major source of unsatisfactory pap smears was poor fixation 10(55.6%) and obscured blood 4(22.2%). The high percentage of abnormal Pap smear call for an increasing awareness campaign in the study population. There is a need for improving sample handling and processing by trained persons due to a high rate of unsatisfactory Pap smear reported in this study. The study population needs to be sensitized to make better utilization of the facilities at histochemistry unit of FMC Birnin Kebbi.

Introduction

Human papillomavirus (HPV) is a sexually transmitted infectious disease that is endemic around the world. The virus is the principal cause of cervical cancer in women and infects both the cutaneous and mucosal epithelial cells causing skin warts and cervical cancer respectively.[1][2][3] HPV that affects the mucosal epithelium is characterized based on epidemiological correlation with cervical cancer.[3] HPV

related cervical cancers account for 15.8% of the population around the world and 19.9% in West Africa. An estimated 90% of the global burden of cervical cancers caused by HPV occurs in developing countries.[4] In Nigeria, cervical cancer is the most common after breast cancer among women and the second most frequent cancer among women between 15 and 44 years of age. [4][5]. Current estimates indicate, 14,550 new cases of cervical cancer are diagnosed every year in the country and 9,659 die from the disease.[5]

The Pap smear test is the conventional cytological examination for the screening of cervical cancer in developing countries. The clinical manifestation of the cervix observed during Pap smear test ranges from normal (clear), abnormal (benign cellular changes, Atypical Squamous cell of undetermined significance, High-Grade Squamous Intraepithelial Lesion, and Low-Grade Squamous Intraepithelial Lesion), and unsatisfactory (unclear) pap smear screening.[6] The unsatisfactory result may be due to sample handling, preparation of results, and analysis. The most satisfactory acceptable unsatisfactory Pap smears tests range from 1% to 2% of all Pap test under consideration.[7]

In the last decades, Pap smear screening has significantly reduced the rates of cervical cancer in developing countries.[4,7] In Nigeria, about 3.5% of women in the general population are estimated to harbour cervical HPV-16/18 infection at a given time, based on HPV detection tests in cervical samples.[2,3] Despite its success rate in truncating HPV disease progression into invasive cancer, studies reporting abnormal and unsatisfactory Pap smear test are under-reported in this part of the country.[1] This study provides an up to date data on Pap smears among women attending the Federal Medical Center (FMC) Birnin Kebbi in Kebbi State. The study documented the prevalence of abnormal and unsatisfactory pap smears and provides baseline data for the design of proper strategies to reduce HPV infection among women in the state.

Materials and Method

Study area
The study was conducted at the Federal Medical Center Birnin Kebbi. The hospital is a tertiary health facility in Kebbi State. The hospital has a bed capacity of over 300 and offering medical training for medical doctors, nurses and other health professionals. There are sixteen (16) departments and units in the clinical Directorate in the hospital. The study was carried out using data from the histochemistry unit of the Pathology Department of the FMC Birnin Kebbi.

Study Design and Sampling
The study was a retrospective review of all Pap smear registry data of women who underwent a cytological examination at the cytology unit of the FMC Birnin Kebbi spanning a period of 10 years (2009-2019). The study used a hospital-based archive that covers the entire Kebbi State without any well-defined population. The cytology unit collects data on all Pap smear cases presenting to the hospital for possible diagnosis of cervical cancer. Pap smear was taken using the conventional method for cervical cytology in all the patients. The data sources are often from either woman regular visits to the various clinics and wards of admission or by referral to the unit from within or outside the hospital. A special folder is created within the unit to abstract needed information. Other relevant patient's information was extracted from the medical folders of each client.

Ethical consideration
The ethical approval was obtained from the Hospital Ethical Committee (FMC/BK/HP/043/P/517/VOL. II). Consent was obtained from the administrative body and hospital staffs, and all data collected were kept confidentially.

Statistical Analysis
The data from histochemistry unit were exported and recorded in Microsoft Excel (2013) and analyzed using the Statistical Package for Social Sciences (SPSS) Version 21. (IBM Inc., Chicago, IL, USA). Descriptive and summary statistics and cross-tabulation were used to describe the data about the relevant variable.

Interpretation of the Result
The results were interpreted as, normal when no cell changes were found on the cervix. Abnormal changes mean minor (low-grade) or serious (high-grade) were found in the cervix and likely caused by HPV, and/or changes in the cervix but not clear if it is related to HPV. The unsatisfactory results mean sample could not be well-reviewed to give a report.[1][6]

Results and Discussion

During the period under review, 92 conventional Pap smear test were retrieved from the archives.

These numbers were routine pap smears performed as a screening test for cervical cancer primarily caused by HPV between 2009 - 2019. The age of the women ranges between 18 -72 years. Of these numbers, there were 26/92 (28.3%) normal pap smear cases, 22 (23.9%) abnormal pap smears, and 18/92(19.6%) unsatisfactory pap smears cases, **Table 1**. The most frequent abnormality was HSIL observed in 12/92 (13.0%) cases, then LSIL in 7/92 (7.6%) cases, followed by ASCUS in 3/92 (3.3%) cases, respectively.

Table 1: *Frequency distribution of pap smear analysis in Kebbi State, n= 92.*

	Frequency	Percent %
Normal	26	28.3
ASCUS	3	3.3
HSIL	12	13.0
LSIL	7	7.6
Inflammation	26	28.3
Unsatisfactory	18	19.6
Total	92	100.0

Table 2 shows the frequency and percentages of the abnormal and unsatisfactory pap smear according to age distribution. Of the 12 cases of high-grade abnormal smears (HSIL), 5 (5.4%) cases were observed in women in the age group 18-30, 4 (4.3%) cases between 31-40 years of age and none in 51 years and above. While the least (1/22) was seen in respondents within 51-60 years and above. Similarly, the highest unsatisfactory pap smears 6 (6.5%) were seen in women aged 18 - 30 years. Twelve 4(4.3%) cases each recorded in 31-40, 41-50 and 51-60 years. None was recorded in women aged 60 years and above, **Table 2**. The pooled percentage of abnormal and unsatisfactory pap smears was 40/92 (43.5%), **Table 2**.

Table 3 summarizes Year-to year causes and categorization of unsatisfactory Pap smear during the study period. The primary causes of unsatisfactory smears vary according to the year of screening with the highest percentage recorded in the year 2010 5/18(27.8%), followed by 2011 and 2018 3/18(16.7%). The major source of unsatisfactory pap smears was poor fixation 10/18(55.6%) cases, followed by obscured

Table 2: *Frequency of abnormal and unsatisfactory pap smear test based on age at FMC Birnin Kebbi.*

Age Range	Abnomal Diagnosis			Inflammation	Unsatisfactory	Normal
	ASCUS	HSIL	LSIL			
18-30	0.0	5(5.4%)	1(1.1%)	6(6.5%)	6(6.5%)	12(13.0%)
31-40	1(1.1%)	4(4.3%)	2(2.2%)	10(10.9)	4(4.3%)	3(3.3%)
41-50	1(1.1%)	3(3.3%)	3(3.3%)	8(8.7%)	4(4.3%)	4(4.3%)4
51-60	0.0	0.0	1(1.1%)	2(2.2%)	4(4.3%)	7(7.6%)
60+	1(1.1%)	0.0	0.0	0.0	0.0	0.0

Table 3: *Year-to-year causes and categorization of unsatisfactory Pap smear.*

Year	Causes					Total (%)
	Severe Inflammation	Obscured blood	Poor fixation	Scanty cells	Thick smear	
2009	0	0	1	0	0	1(5.5%)
2010	0	0	3	1	1	5(27.8%)
2011	1	0	2	0	0	3(16.7%)
2012	0	0	0	0	0	0.0
2013	0	1	0	1	0	2(11.1%)
2014	0	1	1	0	0	2(11.1%)
2015	0	0	0	0	0	0.0
2016	0	1	1	0	0	2(11.1%)
2017	0	1	2	0	0	3(16.7%)
2018	0	0	0	0	0	0.0
2019	0	0	0	0	0	0.0
Total	1(5.5%)	4(22.2%)	10(55.6%)	2(11.1%)	1(5.5%)	18 (100%)

blood 4/18(22.2%), then Scanty cells recorded in 2/18(11.1%) cases, severe inflammation and thick smear in 1/18 (5.5%) cases each, **Table 3**.

This study examined and updated the prevalence of abnormal and unsatisfactory cytological examination at FMC Birnin Kebbi. During the ten years under study, the combined percentage of abnormal 22/92 and unsatisfactory 18/92 Pap smear test was 43.5.%. Though the percentage was alarming, only 92 patients were presented to the hospital for routine cervical cancer screening during the period under review. The dearth of presumptive patients indicates a low level of utilization/patronage of the facilities at histochemistry unit of FMC Birnin Kebbi by the generality of the populace in Kebbi state.

The percentage of abnormal Pap smear screening recorded in this study was 23.9%. The percentage is high compared to a similar study in Ido-Ekiti, southwest Nigeria (7%),[8] and among pregnant women attending antenatal clinic in Abakaliki (6.3%),[9] at General Hospital Minna among women attending gynaecology clinic (13.8%). Similarly, it is higher when compared in patients with chronic pelvic inflammatory disease in Zaria (14%),[10] and among women screened for HPV cervical abnormalities in Enugu (12.2%),[11] and slightly high in a study at FMC Jalingo (18.9%).[12] The observed prevalence is much lower than reported in UTHJ (36.6%) [13], and among commercial sex workers in Nigeria (33.3%)[14], and in women presenting with abnormal cytology in Lokoja, Nigeria (40%).[15] The higher prevalence reported in this study can be attributed to, (i) lack of awareness campaign which ought to include an organized screening policy that covers poor rural-urban communities and (ii) poverty that prevent these women from getting access to affordable health care services in the state.[11]

The percentage of unsatisfactory Pap smears in this study was only 19.6%. the percentage is too high when compared with 2.4% as reported in a study that reported Bethesda System for Cervical Cytology in Unhealthy Cervix. [7]

This showed that the error rate of unsatisfactory cervical cancer screening is very high compared to a satisfactory reference standard that ranges between 1% to 2%.[1][7] Despite, a routine conventional Pap smear test is known and prone to significant error rate. The

percentage is frightening when compared to similar studies using the conventional method.[16] Because the goal of screening for cervical cancers is to reduce the incidence by truncating the progression to invasive cancer. Thus, a high percentage of unsatisfactory pap smears screening increases the likelihood of misdiagnosis of women at risk of HPV related malignancies in the population.[17]

The pooled proportion of both abnormal and unsatisfactory cytological test was seen in the younger age group. The study observed a persistence decrease in Human Papilloma Virus infection-related cytological complications in women above 50 years of age. This correlates with findings in similar local studies demonstrating that abnormal cytological examinations contributed to approximately 12% of female cancers and most commonly occurs in women between the ages of 30 - 40 years.[5] This, however, is contrary to the findings showing an increasing proportion of abnormal cervical findings with increasing age.[5] Regardless of, the occurrence of both abnormal and unsatisfactory pap smears in any age group increases the risk of HPV infection transforming from precancerous to invasive cancers.[18]

The primary source of unsatisfactory cytological examination in this study was poor fixation insufficient cell samples and obscured blood. This result corroborates findings that reported scanty cellularity as one of the major cause of unsatisfactory Pap smears.[19,20] The rate of unsatisfactory cytological examinations observed could be attributed to the conventional approach of pap smear sample collection, preparation, and processing in histochemistry unit of the hospital instead of liquid-based cytology.[20] Thus, improved skills and trained personnel may reduce the rate of unsatisfactory cytological examination in the population.

Conclusion

The study provides data on abnormal and unsatisfactory cytological examination of cervical cancer screening at Federal Medical Center Birnin Kebbi in Kebbi State Nigeria. To the best of our knowledge, is the first-ever study reporting both abnormal and unsatisfactory Pap smear in Kebbi State Nigeria. The study reported a high percentage of both abnormal and unsatisfactory Pap smear among women in the study population. The major causes of unsatisfactory

examination observed in this study, was poor fixation and scanty cellularity, thus, the need for improving sample handling and processing by trained persons. There is also the need to examine women with a clinical diagnosis of unhealthy cervix to detect any pre-cancerous or invasive lesions.

Novelty Statement

To the best of the authors' knowledge, this study is the first to report unsatisfactory cytological examination of cervical cancer screening at Federal Medical Center Birnin Kebbi in Kebbi State Nigeria. The findings of the current study indicate that improved skills and trained personnel may reduce the rate of unsatisfactory cytological examination in the population.

Author's Contribution

MBD and BA conceive and design the study; ANM collected the data and interpreted the data. MBD and ANM analyzed the data assisted by BA, AY, and BGH, and MBD wrote the manuscript, supported by BA. All authors revised the paper before final submission.

Conflicts of interest
There are no conflicts of interest.

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