



Prevalence and Patterns of Cervical Cytological Lesions among HIV-Positive Women in Machakos County Hospital Kenya

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Authors' contributions

This work was carried out in collaboration among all authors. Authors MOM and KCM designed the study, performed the statistical analysis, wrote the protocol, and wrote the first draft of the manuscript. Authors WGN and SGM managed the analyses of the study. Author TKK managed the literature searches and reporting of the slides. All authors read and approved the final manuscript.

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ABSTRACT

Background: Cervical cancer remains to be a major threat to health among women globally with highest incidences in the developing countries. Studies have showed that HIV-positive women are at higher risk of HPV infection which is the causative agent of cervical cancer. The aim of this study was to determine the prevalence of cervical cytological lesions among HIV infected women in Machakos county hospital Kenya.

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Study Design: Cross-sectional study.

Place and Duration of Study: Machakos County Hospital Comprehensive Care Centre and Machakos Cancer Care and Research Centre, between August 2020 and December 2020.

Methodology: A total of 400 women who were HIV-positive and attending the comprehensive care center at the facility were enrolled in this study. Cytological samples obtained using a cytobrush were processed using manual liquid based cytology technique. All smears were stained using the Papanicolaou staining method and examined microscopically for cervical cytological lesions. Chi-square test was performed to evaluate the association between cervical cytological lesions and the demographic variables.

Results: A total of 400 participants were enrolled in this study. 15 had unsatisfactory smears and thus excluded from analysis. The prevalence of cervical cytological lesions in this study was 30 out of 385 (7.8%). Of the cervical cytological lesions observed, Atypical Squamous Cells of Undetermined Significance (ASCUS) had the highest number of cases 9 (30%) while Atypical Squamous Cells cannot exclude High grade (ASC-H) had the least number of cases 2 (6.6%). Of all the demographic variables studied, none was found to have any statistical significant association with cervical cytological lesions.

Conclusion: The prevalence of cervical cytological lesions among HIV-positive women in this study was 7.8%. There was no statistical significance association between any of the demographic variables studied and cervical cytological lesions.

Keywords: Cervical cytological lesions; HIV-positive women; pap smear; cervical cancer.

1. INTRODUCTION

Cervical cancer remains to be a major threat to health among women globally with highest incidences been recorded in low and middle income countries. According to data by World Health Organization, cervical cancer was ranked the fourth most frequent cancer in women with an over 500,000 new cases in 2018 representing 6.6% of all female cancers. It was estimated that 90% of deaths from cervical cancer occurred in low and middle-income countries [1].

Precancerous cervical lesions and cervical cancer are considered to be more aggravated and progress rapidly in immunocompromised patients particularly those with HIV infection. Studies have indicated that HIV and HPV Persistence in immunosuppressed individuals pose increased risk of developing cervical dysplasia and invasive cervical carcinoma. Previous studies have indicated that women who are HIV positive are at increased risk of acquiring Human Papilloma Virus which is the causative agent of cervical cancer [2-3]. The natural history of HPV infection has a slow, 10–20 year progression to pre-cancer in immunocompetent women; however, women living with HIV progress more frequently and quickly to pre-cancer and cancer [4].

In the developing countries, cervical cancer rates are still high with the highest rates recorded in Eastern Africa. Kenya was ranked position 20

among the top 20 countries globally with the highest rates of cervical cancer in 2018 [1]. Current estimates indicate that every year 5250 women are diagnosed with cervical cancer in Kenya and 3286 die from the disease. Cervical cancer ranks as the second most frequent cancer among women in Kenya and the first most frequent cancer among women of the reproductive age [5].

2. MATERIALS AND METHODS

2.1 Study Site and Study Population

This study was carried out at Machakos county hospital at the Comprehensive Care Centre and Machakos Cancer Care and Research Centre. The population of the present study was composed of 400 HIV-positive women of 18 years and above attending Machakos county hospital Comprehensive Care Centre.

2.2 Data Collection and Laboratory Procedures

A total of four hundred HIV-positive women attending comprehensive care centre at the selected facility were recruited in the study between August - December 2020. Convenience sampling was used to recruit the study participants. A structured questionnaire was used to collect the demographic data including; age, marital status, history of tobacco smoking and

method of family planning used. Samples were collected using a cytobrush and the cytological material transferred with brushes into a formulated liquid fixative. Samples were then taken to Machakos Cancer care and research centre cytology laboratory and processed following manual liquid based cytology technique [6].

All the smears were stained using the Papanicolaou staining method. Screening of the Pap smears was done by the principal investigator followed by a review by a certified Clinical cytologist. All abnormal smears were reviewed by a board certified pathologist. The Bethesda system 2014 for reporting cervical cytology was used for reporting all the cytological abnormalities observed during examination and reporting.

2.3 Statistical Analysis

Statistical analysis was performed with the statistical package for the social science system (SPSS version 18). Variables were presented as absolute numbers and percentages. Nominal categorical data between the groups was compared using Chi-squared test as appropriate with a *P*-value < 0.05 considered statistically significant at 95% confidence interval.

3. RESULTS

A total of 400 women were enrolled in this study. Out of the 400 participants, 355 (88.8%) were Negative for intraepithelial lesion or malignancy, 30 (7.5%) had abnormal Pap smear findings while 15 (3.8) had unsatisfactory smears for evaluation as shown in Table 1.

The 15 participants whose smears were unsatisfactory for evaluation were excluded from the analysis in calculating the prevalence. The prevalence of cervical cytology lesions in this study was 30 out of 385 (7.8%) as shown in Fig. 1.

Of those with abnormal Pap smear findings, 9 (30%) women had Atypical Squamous Cells of Undetermined Significance (ASCUS), 8 (26.7%) had High Grade Squamous Intraepithelial lesion (HSIL), 6 (20%) had Low Grade Squamous Intraepithelial Lesion (LSIL), 5 (16.7%) had Atypical Glandular Cells (AGC) and 2 (6.6%) had Atypical Squamous Cells cannot exclude HSIL (ASC-H). Figure 2 shows the Bethesda classification of the cervical cytological lesions.

Table 1. Pap smear findings

Pap smear findings	Frequency	Percent
NILM	355	88.8
Abnormal Pap smear	30	7.5
Unsatisfactory smear	15	3.8
Total	400	100

The age bracket 40-49 had the highest cases of abnormal cytological findings (n=15, 15%) while those aged 60 years and above had the smallest number (n=1, 3.3%). There was no statistical significant association between age and abnormal Pap smear findings (*p* value = 0.732). Table 2 presents a cross-tabulation of age vs cervical cytological lesions.

According to the marital status, single women had the highest number of abnormal Pap smear findings (n=9, 30%) while those divorced had the smallest number (n=1, 3.3%). Table 3 shows a cross-tabulation of marital status vs cervical cytological lesions.

Out of the 400 participants included in this study, 9 (2.3%) had history of tobacco smoking while 391 (97.7%) didn't have any history of tobacco smoking in their life time. There was no statistical significant association between tobacco smoking and cervical cytological lesions (*P* value = 0.106). Table 4 shows a cross-tabulation of tobacco smoking vs cervical cytological lesions.

In regards to the method of family planning, condom was the most common used method (n=179, 44.8%) while Intra uterine contraceptive device (IUCD) was the least used (n=14, 3.5%) as shown in Table 5. Of all the factors studied, none was found to have any statistical significant association with abnormal Pap smear findings.

4. DISCUSSION

The current study has shown that the prevalence of cervical cytological lesions among HIV positive women in Machakos county hospital, Kenya is 7.8% which is comparable to 6% as documented in a study done by Ononogbu et al in Nigeria [7]. This prevalence is also comparable to 6.3% documented in another study done in Northern Uganda in 2016 [8]. The prevalence documented in the current study is slightly higher than 4.3% as documented in a previous study done by Mutuku et al. in 2017 [9].

However, this prevalence is lower than the one documented in previous studies conducted in

Kenya and Africa. In a study done by Memiah et al to determine the prevalence and risk factors associated with precancerous cervical cancer lesions among HIV-infected women, the prevalence of abnormal cervical cytology was documented to be 26.7% [10]. In another study by McKenzie et al, the prevalence of cervical squamous intraepithelial lesions among HIV-positive women on antiretroviral therapy in Kenya was found to be 46% [11].

In a study done in Rwanda by Kayumba et al, the prevalence of abnormal cervical cytology among HIV positive women was found to be 20% [12]. A study done in Southern Ethiopia to determine the prevalence of precancerous cervical cancer

lesion among HIV-infected women documented a prevalence of 22.1% [13]. In another study by Liu et al, the prevalence of cervical squamous intraepithelial lesions among HIV-infected women in Dar es Salaam, Tanzania was reported to be 8.7% [14]. In other studies done in North-Central Nigeria, Swaziland and South Africa, the prevalence of abnormal cervical cytology among HIV positive women was found to be 12.2%, 22.9% and 19.6% respectively [15-17]. Early initiation and adherence to antiretroviral therapy may have contributed to the low prevalence of abnormal cervical cytology recorded in this study as all women enrolled in this study were on antiretroviral therapy.

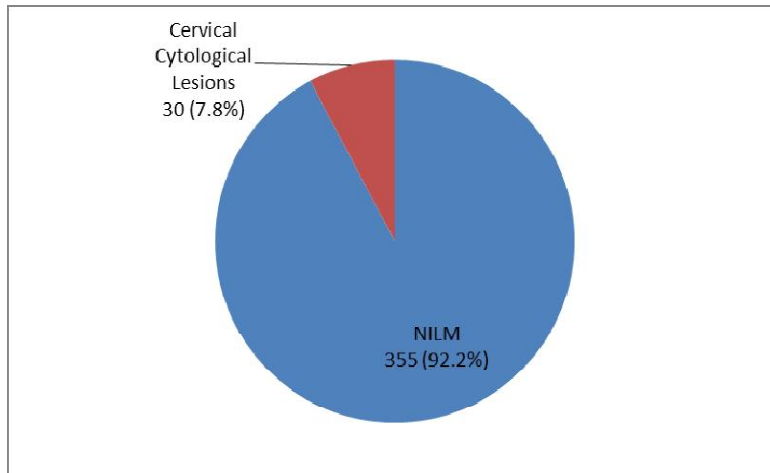


Fig. 1. Prevalence of cervical cytological lesions

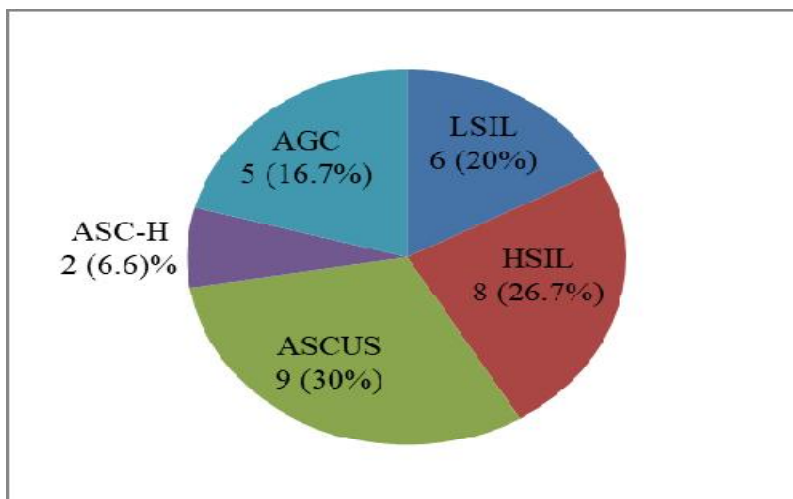


Fig. 2. Bethesda classification of the cervical cytological lesions

Table 2. Comparison of age and pap smear findings

Pap smear findings					
Age (years)	Total number (%)	NILM (%)	Abnormal smear (%)	Unsatisfactory smear (%)	P-value
20-29	32(8)	29 (8.2)	2(6.7)	1(6.7)	0.732
30-39	111 (27.8)	102 (28.7)	7 (23.3)	2 (13.3)	
40-49	148 (37)	126 (35.5)	15 (50)	7 (46.7)	
50-59	98 (24.5)	88 (24.8)	5 (16.7)	5 (33.3)	
60 and above	11 (2.8)	10 (2.8)	1 (3.3)	0 (0)	
Total	400 (100)	355 (100)	30 (100)	15 (100)	

Table 3. Comparison of Marital status and Pap smear findings

Pap smear findings					
Marital Status	Total number (%)	NILM (%)	Abnormal smear (%)	Unsatisfactory smear (%)	P-value
Single	100 (25)	90 (25.4)	9 (30)	1 (6.7)	0.408
Married	197 (49.3)	170 (47.9)	16 (53.3)	11 (73.3)	
Divorced	39 (9.8)	37 (10.4)	1 (3.3)	1 (6.7)	
Widowed	64 (16)	58 (16.3)	4 (13.3)	2 (13.3)	
Total	400 (100)	355 (100)	30 (100)	15 (100)	

Table 4. Comparison of Tobacco Smoking and Pap smear findings

Pap smear findings					
History of Tobacco smoking	Total number (%)	NILM (%)	Abnormal smear(%)	Unsatisfactory smear (%)	P-value
Yes	9 (2.3)	6 (1.7)	2 (6.7)	1 (6.7)	0.106
No	391 (97.7)	349 (98.3)	28 (93.3)	14 (93.3)	
Total	400 (100)	355 (100)	30 (100)	15 (100)	

Table 5. Comparison of Family planning Methods and Pap smear findings

Pap smear findings					
Family Planning Method	Total number (%)	NILM (%)	Abnormal smear (%)	Unsatisfactory smear (%)	P-value
Natural	68 (17)	61 (17.2)	4 (13.3)	3 (20)	0.921
Condom	179 (44.8)	158 (44.5)	15 (50)	6 (40)	
Injection	70 (17.5)	61 (17.2)	6 (20)	3 (20)	
Pill	30 (7.5)	26 (7.3)	2 (6.7)	2 (13.3)	
IUCD	14 (3.5)	13 (3.7)	0 (0)	1 (6.7)	
Implant	39 (9.7)	36 (10.1)	3 (10)	0 (0)	
Total	400 (100)	355 (100)	30 (100)	15 (100)	

In the current study, age was found not to have any statistical significant association with the prevalence of cervical cytological lesions. This agrees with other previous studies which found age not to have any statistically significant association with abnormal cervical cytology [9,12,13,16]. However, the age bracket 40-49 had the highest cases of abnormal Pap smear findings in this study.

In this study, there was no statistical significant association between method of family planning and abnormal cervical cytology. This contradicts with another study done in Australia which documented that prolonged use of hormonal contraceptive was associated with high risk of developing cervical cancer [18]. McKenzie et al in his study showed that less regular condom use was associated with increased chances of squamous intraepithelial lesions [11]. In a study by Roura et al, use of oral contraceptives for over 15 years was associated with increased risk of developing cervical intraepithelial lesions [19]. In another study by Loopik et al, women who used intrauterine device had an increased risk of developing cervical intraepithelial neoplasia than those who used oral contraceptives [20].

The current study has showed that tobacco smoking did not have any statistical significance association with abnormal Pap smear findings. This contradicts previous studies which have indicated that prolonged cigarette smoking contributed to development of cervical lesions [21-22]. Matsumoto et al showed that prolonged tobacco smoking interferes with regression of cervical precursor lesions and thus increasing the risk of persistent cervical abnormalities among young women [23]. In a study by Jiang et al, there was increased risk of deaths from cervical cancer among women who were smokers compared to non-smokers [24]. However, in this study, only a small number of women (n=9) were identified as smokers and this could be the reason as to why we were not able to find any association between tobacco smoking and abnormal cervical cytology.

5. CONCLUSION

In this study, we have shown that the prevalence of cervical cytological lesions among HIV positive women visiting the comprehensive care center at Machakos county hospital was 7.8%. Of the demographic variables studied in this study; age, marital status, tobacco smoking and family planning methods, none was found to have any

statistical significant association with cervical cytological lesions.

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CONSENT AND ETHICAL

The study was approved by the Kenyatta University Research and Ethical Review Committee (Protocol Number: PKU/2066/11213). Witten informed consent was sought from all patients who agreed to participate in this study before obtaining samples for screening. All procedures were explained to the patients and clarifications made in a language they could understand.

COMPETING INTERESTS

Authors have declared that no competing interests exist.

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