Cervical precancerous and cancerous lesions screening using Pap smear test at Provincial Referral Hospital of Bukavu, Eastern DR Congo: profile and recommendations to stakeholders

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Abstract

Introduction: Cervical cancer is a health concern worldwide. The South Kivu Province in the Eastern DR Congo is facing many cases of this disease but poorly screened and reported. The objective of this was to determine the prevalence of cell abnormalities at cervical cytology in a tertiary teaching Hospital in Bukavu and their association with common risk factors of cervical cancer$

Methods: A cross sectional study was conducted on 142 women attending the Provincial Referral Hospital of Bukavu (HPGRB) from February to December 2021. Quantitative variables were described by their median following their asymmetric distributions and the qualitative variables in absolute and relative frequencies. Then the Chi-square test was used for the comparison of proportion.

Results

Forty-five per cent of the participants had between three and five children. Twenty-two (15.5%) of the 142 patients reported to have two or more sexual partners and 17.5% reported the use of hormonal contraception.

The prevalence of cell abnormalities at cervical cytology was 17 % of which Low- Grade Squamous Intraepithelial Lesion (LSIL) was the most representative (12.9%).

There was no statistically significant association between the common cervical risk factors and the occurrence of cell abnormalities.

Conclusion

Cervical Pre (cancerous lesions are frequent in South Kivu province. The Pap smear test remains an early and affordable screening method and constitutes a secondary prevention strategy in women of 18 years and older in a low-income country such as DR Congo where vaccination against HPV is still hypothetic

Introduction

Cervical cancer is a health concern worldwide. About 604,000 new cases of uterine cervical cancer are reported in 2020 in the world of which 342,000 persons die of this disease[1]

Eighty to eighty-five of these cervical cancer cases occur in low-income countries[2, 3]. This is due to the fact that in developing countries, patients go health facilities late and the diagnosis is made at an advanced stage.

However, in high- income countries such as United Sates of America and Europe, the incidence rate is about 6 to 10 per 100,000 women per year[2, 3] and the number of deaths due to cervical cancer is 10 times less high than in low-income countries. The difference is explained by the occurrence of the major risk factors the time of screening. Human Papilloma Virus infection has been identified as the most

important risk factor. Many other risk factors has been found to be prominent in low-income countries such as early age of first sexual intercourse, many lifetime sexual partners [4], the number of childbirths, the long term hormonal contraception [5, 6]and tobacco smoking[7].

In Africa, the cervical cancer is the second cause of death in women with an incidence rate of 25 per 100,000 women per year and is increased up to 35 per 100,000 women per year in Sub-Saharan Africa[8]

In the other side, the cervical cytology by Pap smear test is one of the current available and recommended methods in cervical cancer screening. Others methods includes liquid-based cytology; HPV DNA testing using the conventional PCR method or hybrid capture; and biomarkers of molecular pathways in cervical carcinogenesis, such as early proteins (E6 and E7) mRNA detection and p16 cell-cycle protein levels.

Among all these screening methods, the Pap smear test has the advantage to be the oldest but also the most effective and cheapest screening methods of cervical cancer in low-income countries[9].

In Democratic Republic of the Congo, we know next to nothing about this concern.

Some studies conducted in Kinshasa in the west of the country have found that the prevalence of (pre)cancerous lesions among women in different neighborhoods of Kinshasa is about 4% with HPV infection and HIV infection as associated risk factors[10].

In eastern DR Congo, where people are facing high rate of HIV infection and unwanted pregnancies at a young age witnessing an early sexual intercourse probably because of the frequent armed-conflicts in region, very few studies have been conducted.

Paluku et al. in Goma, the capital city of North Kivu Province, near Bukavu city, has conducted a study on massive single visit cervical pre-cancer and cancer screening. His findings have highlighted that the prevalence of precancerous lesions was 2.34% and the prevalence of squamous cell carcinoma 0.93% [11]. Recently, a study conducted at Panzi Hospital in South Kivu Province has assessed the sensitivity and predictive value of the HPV test associated with uterine cervical-smear in screening for intraepithelial neoplasia of the cervix in our environment [12]. In their study, the prevalence of cell abnormalities was 14.7% versus 82.8% of normal cervical uterine smear. This study has then focused on the sensitivity of HPV test but did not deeply explore the role of the Pap smear test in the detection of cervical precancerous lesions. Moreover, they did not assess the association of common cervical cancerous risk factors and the observed cell abnormalities.

Considering this particular situation of the Eastern DR Congo where there is no organized screening cervical cancer in addition to the existence of sexual abuse due to armed conflicts and the previously described health concerns, studies focusing on cervical cytology and risk factors of cervical (pre-)cancerous lesions especially in South Kivu province are scarce.

This study aimed to describe the cervical cytology profile of patients attending the Provincial referral hospital of Bukavu. Specifically, this study aims to determine the prevalence of cell abnormalities at

cervical cytology in a tertiary teaching Hospital in Bukavu and their association with common risk factors of cervical cancer. Since this tertiary hospital receives patients from South and neighbors from North-Kivu and Western Rwanda and Burundi, two border countries, this study constitutes a baseline study for future large-scale studies in order to enhance and promote cervical cancer screening policies and will then allow to call for more preventive actions by stakeholders.

Methods

Study design setting and participants

From February to July 2021, we conducted a cross-sectional study on cervical precancerous and cancerous lesions screening by using the screen and treat strategy. A total of 142 women older than 17 years who attended the Department of Gynecology of the Provincial Referral Hospital of Bukavu and who freely accepted a Pap smear test were screened. Exclusion criteria were pregnancy, severe gynecological bleeding, and previous hysterectomy and age 18 years.

Data collection and variables settings.

Before proceeding to sample collection, participants were asked about some common risk factors of the cervical cancer including the age the first sexual intercourse, the number of sexual partners, the number of pregnancies and the use of hormonal contraception. Then the Pap smear samples were collected by Gynecologists and directly sent to the Department of Pathology for Papanicolaou test [13]stain after what two trained pathologists read the slides independently..

On cytology, a Papanicolaou smear test was set according to the 2014 Bethesda System[14]. Women with Cell abnormalities including atypical squamous cells of undetermined significance **(ASCUS),** atypical squamous cells, cannot rule out high-grade lesion **(ASC-H)**, Low- Grade Squamous Intraepithelial Lesion (LSIL**)** and High-Grade Intraepithelial Lesion **(HSIL)** were considered to have precancerous and cancerous lesions (HSIL/carcinoma in situ) while women with NILM (negative for intraepithelial lesion and malignancy) or inflammation were considered to be free of cancer.

Ethics approval and consent to participate

The protocol of this this study received approval by the Catholic University of Bukavu Ethics committee. Informed consent was obtained from all subjects and all methods were performed in accordance with the relevant guidelines and regulations (Declaration of Helsinki)[15]

Data analysis

We used the Excel program for data entry. The data were then exported to Epi info 7 and SPSS 25 for processing and analysis.

The quantitative variables were described by their median following their asymmetric distributions and the qualitative variables in absolute and relative frequencies. The Chi-square test was used for the comparison of proportions.

Results

III.1 Socio-demographic and behavior-related characteristics of the patients

A total of 142 patients were included in this study. The participant's age ranged from 18 and 80 years old with the median age of 37.5 years. More than 56% got their first sexual intercourse before the age of 16 years. Forty-five per cent of the participants had between three and five children (table 1).

Twenty-two (15.5%) of the 142 patients reported to have two or more sexual partners and 17.5% reported the use of hormonal contraception (table 2).

III.2 Cytology results in light of the 2014 Bethesda System

More than the half of the study population had a non-neoplastic cervicitis (56.1%) of which non-specific inflammation was prominent. The prevalence of cell abnormalities at cervical cytology was 17 % of which Low- Grade Squamous Intraepithelial Lesion (LSIL) was the most representative (12.9%) (table3).

III.3 Bivariate associations between socio-demographic and behavioral characteristics and presence of cell abnormalities at Pap smear test

The table 4 summarizes the results of the bivariate association between socio-demographic, behavioral characteristics and presence of cell abnormalities. Almost 5% of women who had their first sexual intercourse at age≥16 years, 8 % of those who have had ≥6 pregnancies, 4.2% of women who have had two or more sexual partners and 3 % of those who have used hormonal contraception have developed cell abnormalities. But this association was not statistically significant.

Table.1 Socio-demographic characteristics of the study population

	N	%
Age of patients(years)		
N=142		
Median(Min-Max)	**37.5(18-80)**	
Age of first sexual intercourse(years)		
Median(Min-Max)	**15**(12-18)	
≤15 years	**98**	**69.0**
≥16 years	**44**	**31.0**
Employment		
N=142		
State employees	**10**	**7.0**
students	**18**	**12.7**
Businesswoman	**13**	**9.1**
Household	**89**	**62.7**
None	**12**	**8.5**
Number of pregnancies		
N=142		
0-5	**98**	**69.0**
≥6	**44**	**31.0**
Number childbirths		
0-5	**106**	**74.6**
≥6	**36**	**25.4**

Table 2: Behavior-related characteristics of the study population

	n	%
Number of sexual partners		
01	120	84.5
≥2	22	15.5
Use of hormonal contraception		
Yes	25	17.6
No	117	82.4

Table 3: Cytology results in light of the 2014 Bethesda System

	n	%
Normal cytology	38	26.8
Non-neoplastic cervicitis(n=80)		
Candida ssp	4	2,8
Nonspecific inflammation	76	53,3
Epithelial Cell abnormalities(24)		
ASCUS	3	2.1
LSIL	18	12.9
HSIL	3	2.1
Total	142	100

Table 4. Bivariate associations between socio-demographic and behavioral characteristics and presence of cell abnormalities at Pap smear test

	All(N=142)	Normal(n= 118)	Cell abnormalities(n=24)	*P Value*
Age of first sexual intercourse	n(%)	n(%)	
≤15 years	81(57)	17(12)	
≥16 years	37(26.1)	7(4.9)	0.833
Number of pregnancies			
	n(%)	n(%)	
0-5	85(60)	13(9)	0.084
≥6	33(23)	11(8)	
Number of sexual partners	n(%)	n(%)	
0-1	102(72)	18(12.6)	
≥ 2	16(11.2)	6(4.2)	0.158
Use of hormonal contraception	n(%)	n(%)	
Yes	21(14.7)	4(3)	
No	97(68.3)	20(14)	0.895

Discussion

This study described the profile of the cervical cytology of women attending a Provincial hospital in Bukavu using the Pap smear test. It performed the assessment of the prevalence and risk factors of (pre)cancerous lesions. To our knowledge, this health concern has not been addressed as such with the same settings before in South Kivu Province, a conflict affected province in the Eastern DR Congo.

The overall characteristics of this study are consistent with the literature[10,11].

The prevalence of cell abnormalities at cervical cytology in this study was 17 % of which Low- Grade Squamous Intraepithelial Lesion (LSIL) was the most representative (12.9%). This prevalence is the highest of the few previous findings by Hoyland et al., 2010 and Nyakio et al.,2021) in Eastern Democratic Republic of Congo which was 7% and 14.7 % in Bukavu city in the South Kivu province[12,16] and 2.3% in Goma city by Paluku et al., 2019 in the North Kivu Province[11]. Moreover, this prevalence is higher than the reported by Laga et al.,1992; Ali-Risasi et al., 2015 and Sangwa-L et al., 2006 in Kinshasa, the capital city of the DR Congo which varies from 3% to 5 %[17–19]This highest prevalence may be explained by the fact that the South Kivu Province has been facing armed conflict and sexual violence for decades and up to know this dramatic situation is yet to end.

The difference is also observed elsewhere in Sub-Saharan Africa where lower prevalence than the one found in this study has been reported and varied from 4% to 10%. These countries include Burkina Faso [20], Nigeria[21,22] , Kenya[23].

These differences may also be explained by the unavailability of the HPV vaccine in DRC despite the efforts of the Gavi vaccine alliance that aimed to vaccinate 30 millions of girls in Africa[11].

There was an association between the age of first sexual intercourse, the number of pregnancies, the number of sexual partners, the use of hormonal contraception and the occurrence of cell abnormalities but this was not statistically significant. This is consistent with findings in Kinshasa by **Ali-Risasi et al., 2015**[18] who did not find a statistically significant association between having three or more sexual partners and the occurrence of cell abnormalities among the study population. This may be explained by the small sample size in our study and calls for a large scale study in order to assess the relationship between these common risk factor and the occurrence of cervical cancer in the context of South Kivu Province. However, her findings has showed an association between the use of plants for vaginal care and the occurrence of pre (cancerous) lesions. In our study, we did not, however, assess this aspect. Since cultural behavior in Kinshasa and Bukavu in vaginal hygiene is almost similar, this aspect needs to be assessed in future studies.

Strengths and weakness of the study

This study has described the profile of cervical cytology using Pap smear test in a cervical (pre)cancerous screening purpose. It has estimated the prevalence of these lesions and the possible association with some known risk factors in a tertiary hospital that deserves almost the Eastern DR Congo. To our knowledge, this is the first time that such a profile is addressed in an armed-conflict affected province such as South Kivu using a simple, affordable and acceptable screening method.

However, this study have some limitations. The cross-sectional design of this study does not allow us to establish a cause-effect relationship between risk factors and cancerous lesions. Moreover, since this study has used hospital data, this may have caused selection bias. The small sample size may have impacted negatively on the prevalence of cell abnormalities. The Pap smear used to collect cytology data has been questioned by scientists because of the need for repetitive smears (due to the low sensitivity), the recall of patients for their results and the need for a laboratory with high human expertise.

Despite all this, this study constitute s a baseline for future studies. Thus, prospective studies addressing the prevalence and risk factors of cancerous lesions as well as those addressing attitudes and knowledge of women about cervical cancer are needed.

Conclusion

Cervical Pre (cancerous lesions are frequent in South Kivu province. The Pap smear test remains an early and recommended and affordable screening method in women of 18 years and older in a low-income

country such as DRC. Prevention actions based on a systematic Pap smear test in this category are encouraged since vaccination against HPV is still hypothetic in DRC.

Abbreviations

ASCUS
Atypical Squamous Cells of Undetermined Significance
DRC
Democratic Republic of the Congo
HSIL
High-Grade Intraepithelial Lesion
LSIL
Low- Grade Squamous Intraepithelial Lesion
Pap
Papanicolaou
WHO
World Health Organization

Declarations

Acknowledgments

Funding statement

Ethics approval

This study was approved by the Ethics committee of the Catholic University of Bukavu, DR Congo. Informed consent was obtained from all subjects and all methods were performed in accordance with the relevant guidelines and regulations (Declaration of Helsinki).

Consent for publication

Not applicable

Availability of data and materials

The datasets used and/or analyzed during the current study are available from the corresponding author on reasonable request

Competing interest

The authors declare that they have no competing interests

Authors' Contributions

DGM: designed the protocol of the study, participated to slide reading, collected data, performed data analyses , wrote the main manuscript and edited the final manuscript.

MKP and MML: supervised the study and MKP read the cytology slides

DGM,MKP,BKI,MJ,LM,EKB,CMS,KKC,MMJ,KBY,KB,MML contributed in data collection and the enrichment of the manuscript.

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