Research Article

Assessment of Cervical Cancer Screening Activities Using IVA/IVL Visual Inspection Methods in the Gynaecology and Obstetrics Department at the "Major Moussa Diakité" Reference Health Center (CSREF) in Kati, Mali

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Abstract

Introduction: According to recent data from the Mali Cancer Registry, cervical cancer is the second most common cancer in women, with a frequency of 22.80%.

Objective: To evaluate the results of cervical cancer screening activities using visual inspection methods with acetic acid and lugol (IVA – IVL) at the Kati Reference Health Centre.

Methods: This was a descriptive, cross-sectional, and analytical study over a three-year period. We included all women who tested positive for VIA and/or IVL, and/or who had a biopsy performed during the study period.

Results: In total, we collected 941 women screened for cervical cancer, including 64 cases of biopsies performed. The mean age of patients was 48.15 years ± 20.08 years with extremes of 16 and 80 years. They were married in 79.7% of cases, multiparous in 56.3% of cases and not premenopausal in 51.6% of cases. We observed 11% of precancerous lesions with a predominance of 9.4% for mild dysplasias and 23.4% for invasive cancers. The most common cancerous histological type was squamous cell carcinoma (20.3%).

Conclusion: IVA/IVL visual inspection of the cervix is also effective in detecting precancerous and cancerous lesions of the cervix, hence the need for a screening program for each country.

Keywords: IVA/IVL; Precancerous Lesions; Cervical Cancer; Histology

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Introduction

Cervical cancer is a tissue neoformation due to excessive, abnormal, uncontrolled and autonomic cell proliferation, destroying the cervix with local and distant invasion [1]. The two most common histological forms of cancer are squamous or squamous cell carcinoma (85-90%) and adenocarcinoma (10-15%) [2].

Globally, cervical cancer is the fourth most common cancer in women with an estimated 604,000 new cases in 2020. Of the 342,000 cervical cancer deaths in 2020, about 90% occurred in low- and middle-income countries [3]. According to the most recent data in sub-Saharan Africa, 75,000 new cases and nearly 50,000 deaths per year, further favoured by HPV infection [4]. It is currently well established that the human papillomavirus (HPV) is the main pathogen of cervical cancer. Other sexual and non-sexual factors are involved as cofactors in the progression of HPV infection to cervical cancer [5]. High incidences are observed in Africa with rates exceeding 50 per 100,000 women, and age-standardized mortality rates sometimes exceeding 40 per 100,000 women. In Burkina Faso there were 1230 new cases with 838 deaths; in Côte d'Ivoire 1601 new cases with 1095 deaths and in Mali 1491 new cases with 1010 deaths per year in 2008 [6]. According to recent data from the Mali Cancer Registry, cervical cancer is the second most common cancer in women, with a frequency of 22.80% [7]. In our countries, almost half of all cancers are undiagnosed, or are already incurable at the time of diagnosis. This is unfortunate for an organ that is so accessible to exploration and treatment [8]. The natural history of cervical cancers and access to the disease is that it develops for 10 to 15 years before the cancer develops. Several names have been given to the cervix «easy», making it easy to detect and treat this condition. Indeed, it is enshrined in the different classifications: dysplasia, intraepithelial neoplasia (I.C.N.), low- and high-grade precancerous lesions. In addition, studies reported from the early eighties that simple observation with speculum and especially the application of lugol and acetic acid made it possible to detect precancerous and operable cancerous lesions of the cervix with a sensitivity comparable if not better than that of the Pap smear [8]. To evaluate the practice of this cervical cancer screening activity using visual inspection methods at the Kati reference health center, we initiated this work with the following specific objectives: to determine the frequency of lesions detected by visual inspection methods with acetic acid (IVA) and lugol (IVL); describe the sociodemographic profile of women screened for cervical cancer; Describe the histological type of precancerous and cancerous lesions of the cervix in women who test positive for visual tests and suspected cases of cancer.

Materials and Methods

The study took place in the obstetrics and gynaecology department of the «Major Moussa DIAKITE» reference health center in Kati. It is a 2nd level reference structure located in the Koulikoro region, 3rd military region of Mali.

The Kati circle is one of the largest health districts in the Koulikoro region (2nd administrative region of Mali). It has an area of 9,636 km^2 and a population of 710,545 inhabitants in 2020 with a density of 70 inhabitants/km^2 [9].

This was a descriptive and analytical cross-sectional study that ran from January 1, 2020 to December 31, 2022. It concerned sexually active women who came for a consultation for cervical cancer screening at the CS Ref in Kati. We used as inclusion criteria all women who tested positive for VIA and/or IVL, and/or in whom a biopsy was performed. Any other situation to the contrary was excluded in this study. Screening was done by visual inspection after smearing the cervix with 5% acetic acid and lugol, suspected cases of cancer were directly biopsied.

The result was considered positive for IVA and/or IVL in the presence of acidophilic areas in the form of bleaching and/or iodo-negative, mustard yellow or saffron yellow zones in the transformation zone of the cervix reaching the squamocolumnar junction. Suspicious areas were biopsied for pathological examination and cryotherapy. When the result is considered negative, the woman is reassured and a one-year appointment is given for a new check-up. Suspected cancer cases were directly biopsied without the application of acetic acid and lugol.

We used Word 2013 and SPSS 25.0 for analysis and data entry. The statistical test used is PERSON'S KHI^2 to compare our results with P less than 0.05 considered significant.

Results
Frequency

During the study period, we screened nine hundred and forty-one (941) women for cervical cancer. Of these, we performed sixty-four (64) cases of biopsies, a frequency of 6.8% (64/941). The VIA positivity was 41 cases, representing a frequency of 4.3%

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of women screened (41/941) and 64.1% of biopsies performed (41/64). IVLpositivity was 55 cases, or 5.8% of the total number of women screened (55/941) and 85.9% of biopsy cases performed (55/64). IVA/IVL visual tests were not performed in cases of suspected cervical cancer: 9 cases or 0.9% of all women screened (9/941) and 14.1% of biopsies performed (9/64).

Socio-demographic aspects

Socio-demographic characteristics	Number of employees (N = 64)	Percentage (%)
Age		
[16-25]	05	07,8
[26-35]	13	20,3
[36-45]	19	29,7
[46-55]	13	20,3
[56-65]	05	07,8
[66-75]	04	06,3
>75	05	07,8
Marital status		
Bride	51	79,7
Bachelor	01	01,6
Divorcee	02	03,1
Widow	10	15,6
Parity		
Nulliparous	06	9,4
Primiparus	1	1,6
Pauciparous	8	12,5
Multiparous	36	56,3
Large multiparous	13	20,3

Table 1: Sociodemographic characteristics of patients.
The mean age was 48.15 ± 20.08 with the extremes ranging from 16 to 80 years.

Histological results of biopsies performed in screened women

Histological findings	Number of employees (N = 64)	Percentage (%)
Cervicitis	42	65,6
Condyloma	1	1,6
LIEBG*	5	7,8
LIEHG**	1	1,6
Adenocarcinoma	2	3,1
Squamous cell carcinoma	13	20,3

Table 2: Distribution of Patients by Histological Findings.
LIEBG*: low-grade intraepithelial lesion,
LIEHG**: high-grade intraepithelial lesion.

Histology	Marital status				Total
	Bride	Bachelor	Divorcee	Widow	
Cervicitis	32 (76,2%)	1 (2,4%)	2 (4,8%)	7(16,7%)	42
Condyloma	1 (100%)	0 (0%)	0 (0%)	0 (0%)	1
LIEBG	5 (100%)	0 (0%)	0 (0%)	0 (0%)	5
LIEHG	1 (100%)	0 (0%)	0 (0%)	0 (0%)	1
Adenocarcinoma	2 (100%)	0 (0%)	0 (0%)	0 (0%)	2
Squamous cell carcinoma	10 (76,9%)	0 (0%)	0 (0%)	3(23,1%)	13
Total	51 (79,7%)	1 (1,6%)	2 (3,1%)	10(15,6%)	64

Table 3: Relationship between histological findings and marital status.
Chi 2:4.01 DDL:15 P:0.9.

Histology	Non-Menopause	Menopause	Total
Cervicitis	21(50%)	21 (50%)	42
Condyloma	0 (0%)	1 (100%)	1
LIEBG	4 (80%)	1 (20%)	5
LIEHG	1(100%)	0 (0%)	1
Adenocarcinoma	2 (100%)	0 (0%)	2
Squamous cell carcinoma	5 (38,5%)	8 (61,5%)	13
Total	33(51,6%)	31 (48,4%)	64

Table 4: Relationship between histological findings and period of genital activity.
Chi2: 6.43 DDL:5P:0.2

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Histology	IVA		Total
	Positive VIA	Negative IVA	
Cervicitis	25 (59,5%)	17 (40,5%)	42 (100%)
Condyloma	0 (0%)	1 (100%)	1(100%)
LIEBG	4 (80%)	1 (20%)	5 (100%)
LIEHG	1 (100%)	0 (0%)	1 (100%)
Adenocarcinoma	1 (50%)	1 (50%)	2 (100%)
Squamous cell carcinoma	10 (76,9%)	3 (23,1%)	13 (100%)
Total	41 (64,1%)	23 (35,9%)	64 (100%)

Table 5: Relationship Between Histological and IVA Findings.

Chi2: 4.37 DDL:5P:0.4

Histology	IVL			Total
	IVL positive	IVL Negative	Suspicion of cancer	
Cervicitis	38 (90,5%)	3 (7,1%)	1 (2,4%)	42 (100%)
Condyloma	1 (100%)	0 (100%)	0 (0%)	1 (100%)
LIEBG	4 (80%)	1 (20%)	0 (0%)	5 (100%)
LIEHG	1 (100%)	0 (0%)	0 (0%)	1 (100%)
Adenocarcinoma	2 (100%)	0 (0%)	0 (0%)	2 (100%)
Squamous cell carcinoma	9 (69,2%)	4 (30,8%)	0 (0%)	13 (100%)
Total	55 (85,9%)	8 (12,5%)	1 (1,6%)	64 (100%)

Table 6: Relationship Between Histological and IVL Findings.

Chi2: 6.32 DDL:10P:0.7.

Discussion

For more than two decades, systematic screening for precancerous and cancerous lesions of the cervix has been part of routine activities in several health facilities in Mali. This activity really started in our department at the Kati referral health center in 2017 after the joint organization with an association called «les combattantes du cancer», a mass screening campaign for cervical cancer. Thus, during a period of three (03) years, we screened nine hundred and forty-one (941) women for cervical cancer. All these women have been screened exclusively by the midwives who are routinely assigned to this activity. Of these screened women, we performed sixty-four (64) cases of biopsies for a frequency of 6.8% (64/941). According to the WHO, the cervical cancer screening rate in low-resource countries is around 5% compared to 40% to 50% in developed countries [10]. The low rate of cervical cancer screening in our resource-limited countries is due, on the one hand, to the policy of popularizing this simple technique, the visual test, and on the other hand, to the adherence of the population and health care providers to the prevention of cervical cancer. VIA positivity was obtained in 41 women, i.e. 4.3% of the women screened (41/941) and 64.1% of the biopsies performed (41/64). While IVL positivity was obtained in 55 women, i.e. a frequency of 5.8% of women screened and (55/941) and 85.9% of biopsies performed (55/64).

The difference between the IVA and IVL test could be explained by the fact that the staining of the cervix with lugol in mahogany sprig in the squamous epithelium and the absence of staining in the columnar epithelium for a normal cervix is better appreciated by health workers in general, especially for a beginner because of the presence of glycogen. In case of cervical involvement, there is no discoloration of the cervix in contact with lugol in the squamocolumnar junction zone [8]. Unlike acetic acid, the presence of protein in the event of invasion of the cervix taking the appearance of bleaching or acidophilic areas is often poorly appreciated by providers and especially when the time of one minute before reading the test is not observed. The high frequency of IVL-positive t-at the expense of IVA has been observed in other studies such as; Tegueté I., *et al*. in Mali [11]; From 2001-2004, out of a total of 7917 women screened, the VIA positivity was 804 cases compared to the IVL 968 cases. In the same 2005-2008 study; out of a total of 10123 women screened, the VIA positivity was 460 cases compared to IVL 576 cases. HORO Appollinaire., *et al*. in Côte d'Ivoire [12] had reported 5.8% VIA positivity and 8.6% IVL positivity. In Angola, Muwong had found a positivity rate of 6.6% for VIA and 5.3% for IVL out of a population of 8851 women [12]; T Traoré in Mali [13] reported 14.6% VIA/IVL positivity. The differences in positivity between these different studies could be explained by the sample size on the one hand and the methodologies used in each of these studies on the other. IVA/IVL vision tests were not performed in some women because these were highly suspected cases of cervical cancer. We performed a simple biopsy in these women, which represented a frequency of 0.9% of all women screened (9/941) and 14.1% of biopsies performed (9/64).Thus, in the same way as our series, T Traoré in Mali [13] reported that visual screening was not performed in 12 patients (3.6%) for lesions suggestive of invasive cervical cancer. Unlike the Malagasy study, screening was not carried out in about forty women for the following reasons: impossibility of examination (n = 17); menstruation (n = 6); history of

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total hysterectomy (n = 5); vesicovaginal fistula (n = 4), pregnancy (n = 4) and suspected case of vulvar cancer (n = 4) [13].

Socio-demographic characteristics

The general characteristics studied in this study involved sixty-four women who screened positive and/or had a biopsy performed (see Table 1; N = 64).

More than half of our series, 57.8% were between the ages of 16 and 45.

The mean age was 48.15 ± 20.08 with the extremes ranging from 16 to 80 years. They were married in 79.7% of cases, multiparous in 56.3% of cases with a parity greater than or equal to five and not menopausal in 51.6% of cases. These results are comparable to those of T Traoré in Mali [13] where the mean age was 45 ± 5 years with the extremes [21-70 years]; in this study the women screened were also mostly married (82.9%); housewife (71.3%) and multiparous (56.4%). These characteristics concerned all women screened by eye tests, regardless of the results of the visual tests, unlike ours where the inclusion criteria were only women screened positive by VIA/IVL and where a biopsy was performed. The analysis of the results of cervical cancer screening campaigns in Guinea Conakry allowed us to note a strong involvement of the 25-39 age group with proportions increasing from 32.7% in 2012 to 55% in 2013 [10]. The same trend has been reported in other African studies such as Côte d'Ivoire where the mean age of patients was 39.9 ± 10.5 years [12]. In a Gabonese study, women were mostly single (43%) and mainly civil servants (28%) [14]. This difference could be explained by the fact that our study involved sexually active women, the majority of whom were in the period of genital activity or childbearing.

Histological findings

Table II shows the histological findings in women who tested positive on IVA/IVL vision tests. Cervicitis dominated these histological findings and accounted for 4.5% (42/941) of women screened and 65.6% (42/64) of biopsies performed. The predominance of cervicitis in our study has also been reported by other authors such as Djim F in 2021 in Mali [15] who reported a predominance of 28.8% and that of Millogo FT 2003 in Burkina Faso [16]. This predominance of cervicitis in our studies would be related to the lack of mastery of the screening technique by healthcare providers. In our case, it was exclusively midwives who were even trained in the screening technique. These results call on screening providers to constantly retrain and collaborate internally to read certain screening results before performing the biopsy. For precancerous lesions, they accounted for 0.4% (7/941) of women screened and 11% (7/ 64) of biopsies performed. This prevalence of precancerous lesions observed in our study is much lower than that of many other African authors such as Traoré M in 2022 in Mali [17]; Djim F in 2021 in Mali [15]; Millogo FT 2003 in Burkina Faso [16] and Khaoula B in 2016 in Morocco [18] which recovered respectively 1.52%; 48.1%; 24.28% and 79%.

Cancerous lesions accounted for 1.6% (15/941) of women screened and 23.4% (15/64) of biopsies performed. The prevalence of cancerous lesions in our study is comparable to African authors such as Traoré M in 2022 Mali [17]; Djim F in 2021 Mali [15]; Millogo FT 2003 in Burkina Faso [16]; Khaoula B in 2016 Morocco [18] and N'guessan K., *et al*. in 2009 at Cocody University Hospital [19] reported 1.92%; 23.1%; 2.52%, 17% and 1.7% respectively. These differences in frequencies observed in the different studies are thought to be related to the methodologies used and the way in which the data were processed and analysed. Squamous cell carcinoma is the predominant cancerous histological type, invasiveness, mature and well-differentiated dominated the study and accounted for 20.3% of biopsies performed. Although rare, we diagnosed adenocarcinomas in 3.1% of the biopsies performed. This same observation is reported in world literature [2,8]. Edith Mpiga., *et al*. in Gabon in 2015; reported 5 squamous cell cancers (1.6%) and 4 precancerous lesions (1.3%) in the 309 women tested [14]. Several factors have been cited as contributing to the risk of precancerous and cancerous lesions of the cervix. These factors are also thought to promote human papillomavirus (HPV) infection through active sexuality [20]. Precancerous lesions were observed only in housewives (7/7 cases) and invasive cancers (12/15 cases) in the same women. However, there was no significant relationship between histological findings and marital status (P = 0.9). Precancerous lesions were mainly observed in premenopausal women (5/7 cases) and invasive cancers (7/15 cases) in the same population. It should be noted that more than half of our women included were in a period of genital activity (51.6%), i.e. not menopausal. We did not observe a significant relationship between histological findings and period of genital activity (P = 0.2). Although there was a difference in positivity between the IVA and IVL result at the expense of IVL, we did not observe a statistically significant relationship between histological and IVA findings (P = 0.4) and

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between histological and IVL findings (P = 0.7). This result could be explained by the fact that the vast majority of biopsies performed were cervicitis. This finding could further cast doubt on the quality of the inputs used (the lugol product and its storage in a smoked canister and compliance with the dilution of acetic acid at 5%) and or the competence of the health care providers who are in charge of this activity in the screening technique.

Conclusion

At the end of our study, it appears that cervical cancer is a common pathology. It occurs most often in young and multiparous women, in the midst of genital activity. Squamous cell carcinoma is the predominant histological cancerous type at the expense of adenocarcinomas. Visual inspection of the cervix by IVA/IVL is also effective in detecting precancerous and cancerous lesions of the cervix, hence the need for a screening program for each country.

Conflict of Interest

None.

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