

" Screening for Precancerous Cervical Lesions by Visual Inspection with Acetic Acid at Marie Stopes International Toliara, Madagascar"**Screening for Precancerous Cervical Lesions by Visual Inspection with Acetic Acid at Marie Stopes International Toliara, Madagascar**

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Abstract

Introduction: Cervical cancer is a preventable and curable disease when the diagnosis is early. Since 2010, the Ministry of Public Health of Madagascar has recommended screening by visual inspection with acetic acid for all women who have had sexual intercourse. The aim of this study was to determine the screening outcomes for precancerous cervical lesions at MSI Toliara.

Methods: This was a cross-sectional study conducted from January 2021 to December 2021. All women who underwent a visual inspection with acetic acid test, regardless of the result, were included.

Results: During the study period, 229 women were screened and 38 tested positive (16.59%). Cryotherapy was performed in 73.68% of visual inspection with acetic acid positive cases. A statistically significant association was found between visual inspection with acetic acid positivity and age 35–45 years (7%; $p = 0.00$), married status (12.2%; $p = 0.04$), and low gravidity (pauci-gravid) (7%; $p = 0.04$).

Conclusion: We observed a low participation rate in screening in Toliara and a relatively high visual inspection with acetic acid positivity rate, supporting the need to expand visual inspection with acetic acid screening across public and private health centers in the region.

Keywords: Cervical cancer; Cryotherapy; Visual inspection with acetic acid; Toliara.

" Screening for Precancerous Cervical Lesions by Visual Inspection with Acetic Acid at Marie Stopes International Toliara, Madagascar"**Introduction**

Cervical cancer is a neoplastic tissue disorder resulting from excessive, abnormal, disorganized, and autonomous cellular proliferation originating at the squamocolumnar junction of the cervix [1,2]. It is a major public health problem, particularly in Africa where it is the most common cancer among women and a leading cause of female mortality [3]. In Madagascar, the incidence is estimated at 44.6 cases per 100,000 women per year [4]. In the only cancer care of Madagascar in 2009–2010, cervical cancer was the second most frequent cancer in women after breast cancer [5].

The majority of cervical cancers are diagnosed at advanced stage, despite the disease can be screened and curative treatment exist [6]. The screening is feasible because the natural history of cervical cancer is known and the location of cervix accessible: precursor lesions can evolve over 10–15 years before becoming invasive cancer. Three screening methods exist: HPV testing, cervical cytology (Pap smear), and visual inspection with acetic acid or Lugol's iodine. Application of acetic acid or Lugol's iodine allows detection of precancerous and cancerous cervical lesions with sensitivity comparable to that of cytology [7]. Visual inspection with acetic acid (VIA) is an effective, low-cost alternative particularly suitable for resource-limited settings.

In 2010, the Malagasy government launched a cancer control program that promotes free screening by VIA [8]. In Toliara, cervical cancer was the most frequent cancer, affecting 28% of cancer patients [9]. VIA screening has been available at the MSI center since 2016; nevertheless, between 2016 and 2020, among gynecologic cancers, cervical cancer was diagnosed at advanced stages in 75% of cases [10]. This study aims to describe VIA screening results at MSI Toliara and to identify factors associated with VIA positivity.

Methods

The study was conducted at the Marie Stopes International health center in the Tsenengeafokontany, Toliara District, Atsimo-Andrefana region, southern Madagascar. The center, established in 2007, provides primary care services including cervical screening and is the only facility in Toliara offering cryotherapy for treatment of precancerous cervical lesions.

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This cross-sectional study include all women who underwent a VIA test regardless of the result during January 2021 to December 2021. Women with macroscopic cervical lesions were excluded.

The variables collected included: sociodemographic parameters, reproductive history and sexually transmitted infections (STIs), contraceptive use and the existence of tobacco, the result of VIA and post-VIA management.

Data were collected from patient records, coded, entered into Word/Excel 2013, and analyzed using SPSS for Windows version 20.0. Statistical significance was set at $p < 0.05$. Confidentiality and anonymity were maintained through coded identifiers.

Results

A total of 229 women were included; 38 (16.59%) had a positive VIA test. Among VIA-positive women, 73.68% received cryotherapy. Mean age was 35.83 years and the most represented age group was [35-45[years. The test was mostly positive in the age group between 35-45 years or 7.0% ($p=0.00$). The majority of patients who tested positive came from urban areas (11, 8%). For marital status, married women are more positive than 12.2% ($p=0.04$).

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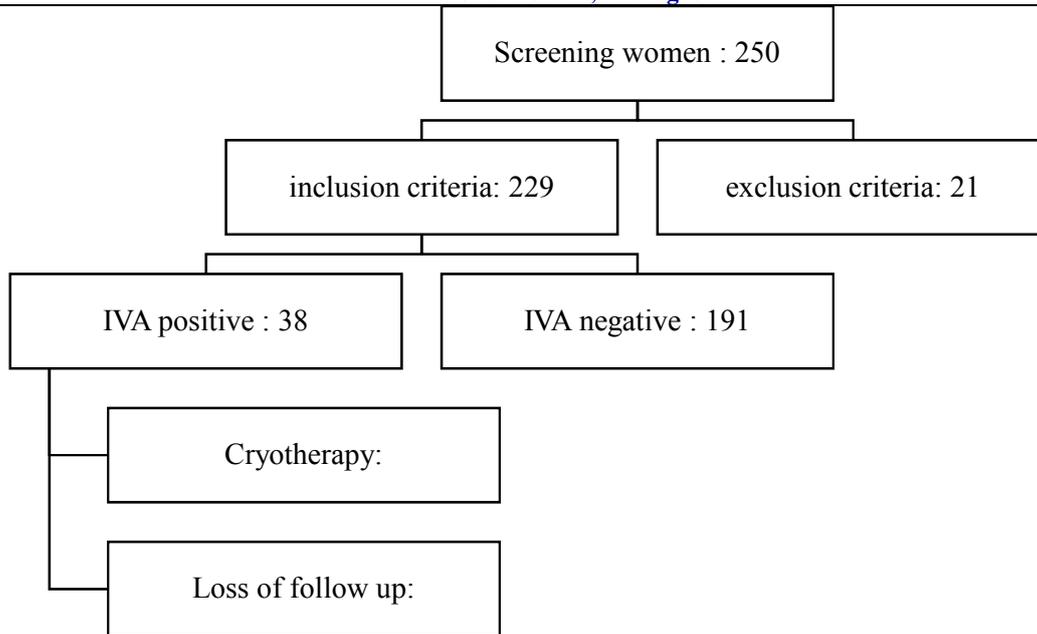


Figure 1 : Study population flow chart.

Table 1 : Relation with socio-demographic profile and VIA test

Socio-demographic profile	Negative VIA (%)	Positive VIA (%)	Total (%)	p
Age (years)				
15 to 25	40 (17.5)	6 (2.6)	46 (20.1)	0.000
25 to 35	54 (23.6)	11 (4.8)	65 (28.4)	
35 to 45	54 (23.6)	16 (7.0)	70 (30.6)	
45 to 55	33 (14.4)	5 (2.2)	38 (16.6)	
≥55	10 (4.4)	0 (0.0)	10 (4.4)	
Residence				
Rural	51 (22.3)	11 (4.8)	62 (27.1)	NS*
Urban	140 (61.1)	27 (11.8)	167 (72.9)	
Marital satus				
Maried	118 (51.5)	28 (12.2)	146 (63.8)	0.04
Single	66 (28.8)	7 (3.1)	73 (31.9)	
Multiple partner	7 (3.1)	3 (1.3)	10 (4.4)	

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Profession				
Primary sector	5 (2.2)	4 (1.7)	9 (3.9)	NS*
Secondary sector	33 (14.4)	9 (3.9)	42 (18.3)	
Tertiary sector	47 (20.5)	11 (4.8)	58 (25.3)	
Student	38 (16.6)	4 (1.7)	42 (18.3)	
Unemployed	68 (29.7)	10 (4.4)	78 (34.1)	
Education				
Illiterate	2 (0.9)	0 (0.0)	2 (0.9)	NS*
Primary	19 (8.3)	7 (3.1)	26 (11.4)	
Secondary	96 (41.9)	20 (8.7)	116 (50.7)	
Higher education	74 (32.3)	11 (4.8)	85 (37.1)	
Age of 1st sexual intercourse (years)				
≤ 15	27 (11.8)	7 (3.1)	34 (14.8)	NS*
15- 22	152 (66.4)	27 (11.8)	179 (78.2)	
≥ 22	12 (5.2)	4 (1.7)	16 (7.0)	

*NS :Not significant

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Table 2 : Relation with socio-demographic profiles and VIA test (next)

Socio-demographic profiles	Negative VIA (%)	Positive VIA (%)	Total (%)	p
Gravidity				
Zero	29 (12.7)	4 (1.7)	33 (14.4)	0.04
1	30 (13.1)	4 (1.7)	34 (14.8)	
< 2	76 (33.2)	16 (7.0)	92 (40.2)	
2 - 3	39 (17.0)	8 (3.5)	47 (20.5)	
≥ 3	17 (7.4)	6 (2.6)	23 (10.0)	
Parity				
Zero	60 (26.2)	11 (4.8)	71 (31.0)	
1	38 (16.6)	7 (3.1)	45 (19.7)	
2 – 3	57 (24.9)	10 (4.4)	67 (29.3)	
4 – 5	28 (12.2)	6 (2.6)	34 (14.8)	
≥ 6	8 (3.5)	4 (1.7)	12 (5.2)	
Abortion				
Yes	123 (53.7)	28 (12.22)	151 (65.9)	0.04
Not	68 (29.7)	10 (4.4)	78 (34.1)	
Sexually transmissible infections				
Yes	97 (42.4)	13 (5.7)	110 (48.0)	NS*
Not	94 (41.1)	25 (10.9)	119 (52.0)	
Contraception				
Yes	111 (48.5)	24 (10.5)	135 (59.0)	NS*
Not	80 (34.9)	14 (6.1)	94 (41.0)	
Smoking				
Yes	17 (7.4)	3 (1.3)	20 (8.7)	NS*
Not	174 (76.0)	35 (15.3)	209 (91.3)	

* not significant

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Discussion

This study estimated the screening uptake and factors associated with VIA positivity among women in Toliara. Screening participation was low, with only 229 women screened over one year, despite MSI Toliara being the sole center offering VIA in the area until December 2022. Low screening rate may reflect inadequately tailored messaging, poor information dissemination, or sociocultural barriers.

The VIA positivity rate was 16.59%. Comparable studies report variable VIA positivity: 22.7% in Atsinanana region of Madagascar in 2015 [8], 20.4% in Sikasso (Mali) [11], while other studies reported lower rates at 1.3% to 4.5% [12-14]. The high positivity of VIA test in our study is linked to MSI center is the only screening center in Toliara or because many women were already symptomatic when they underwent the screening.

Among women with VIA positive test, 73.68% underwent cryotherapy. Low proportion of cryotherapy has been reported elsewhere: 1.5% treated in Mali in 2008 [15], 32.7% in Sikasso in 2021 [11], and 10.7% in Ethiopia in 2019 [16]. In our cohort, 26.32% of women with VIA positive test were lost to follow-up. The high cost of cryotherapy (approximately 200,000 Ariary \approx €40) and fear of treatment may also contribute to loss to follow-up. Effectively, in our study, 34.1% of women were unemployed.

VIA positivity was most frequent in the 35–45 year age group (7.0%, $p = 0.00$). Our research is similar to that of Diarra S, where the 25-34 age group is the most represented (26.30%) ($p = 0.003$) [16]. A link between age and the IVA test was also observed by Fentie AM et al; women aged ≥ 45 years had a higher probability of a positive IVA test result compared to those aged ≤ 24 years [18]. The probability of having a positive IVA test between 35-40 years old could be explained by the fact that this is the predominant age group in our study.

Regarding marital status, the IVA test was most frequently positive in married women (12.2%), followed by single women (3.1%) and then women with multiple partners (1.2%). Our results are statistically significant ($p=0.04$). In Ethiopia, Fentie AM et al. found in 2020 that marital status was significantly associated with the rate of a positive IVA test result ($p=0.05$) [18]. Being single was also found to be a predictive factor for having cervical lesions according to the IVA test.

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Women who had two or more sexual partners in their lifetime were significantly associated with cervical lesions [18,19]. According to the literature, a high number of sexual partners throughout life doubles the relative risk if the number of partners exceeds four for both the woman and her spouse [20]. In our study, married women presented with more lesions; this could be explained by the fact that these women were sexually active.

No significant association was found between education level and VIA positivity in this study. This corroborates the results of Traore S, where there was no statistically significant difference between women with a positive IVA and those with a negative IVA and education level [21]. However, Baldur-Felskov et al., in Tanzania in 2012, found that the increased risk of a positive IVA test was observed in women with no formal education and those who had attended primary school compared to women who had pursued secondary or university studies [22]. In Kampala, Uganda in 2012, Busingye et al. reported that well-educated women were more likely to be screened than their less-educated counterparts [23].

In our study, no significant association was observed between occupation and the IVA test result. A study conducted in Bamako in 2005 reported a positive association between unemployed women and a positive test result; unemployed women were 1.25 times more likely to have histological abnormalities than employed women [21]. A low socioeconomic status is a risk factor for cervical cancer due to malnutrition resulting from a lack of protective elements in food that help reduce cancer incidence (carotenoids, vitamin C, vitamins A and E). These elements act as effective intracellular antioxidants, preventing potential DNA damage [24].

Age at first sexual intercourse was not associated with VIA positivity in our study consistent with the results of Traore's study in Bamako in 2005 [21]. This may reflect a later median age at sexual debut (15–22 years) among participants. Early sexual initiation is a recognized risk factor for cervical cancer due to increased vulnerability of the transformation zone during puberty. Fentie AM et al., in Addis Ababa in 2020, found that women who began sexual intercourse before the age of 16 are approximately three times more likely to have cervical lesions according to the VIA test than other women [18]. Deksisset al proved that early initiation of sexual intercourse increased the risk of a positive VAI by 2.2 [19].

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The women with a positive IVA test were mostly those with lowfertility (7.0%). The relationship between gravidity and a positive IVA test was statistically significant ($p=0.04$). Our result differs from that of a study conducted in Mali by Samake , which showed no relationship between gravidity and a positive IVA test [13]. This could be explained by the fact that these women had sexual intercourse with multiple partners without having children.

Nulliparous women were the most represented (4.8%) among patients with a positive IVA test. After nulliparous women, the most represented group was women with few pregnancies (4.4%), followed by primiparous women (3.1%), multiparous women (2.6%), and grand multiparous women (1.7%). The relationship between parity and a positive IVA test was not statistically significant in this result. Our result is identical to that of Baldur-Felskov et al., in Kampala Uganda in 2012, and of Busingye [22,23]. In other studies, parity was linked to a positive IVA test. Multiparity was associated with a risk of having a positive IVA test [25, 26]. Regarding multiparity (five or more full-term pregnancies), the hormonal changes occurring during pregnancy could promote and accelerate cervical carcinogenesis.

Women who had an abortion were more affected (12.2%) than women who had not. A relationship between a positive VIA and abortion ($p=0.04$) was observed in our study. Abortion is described as a risk factor for cervical cancer, which could explain this result. Publications by Parazzini in 1989 suggest an increased risk of up to four times compared to other women [27].

History of sexually transmitted infections were more likely to have a positive IVA test but STI did not influence the IVA test result.

Our results are consistent with those of Deksissa et al. [19]. In contrast, a South Ethiopian study reported a high risk of a positive IVA test in individuals with a history of sexually transmitted infections [28]. Sexually transmitted infections weaken the genital mucosa and can thus promote the implantation of human papillomaviruses (HPV) and the development of cervical cancer. In our study, women with no history of sexually transmitted infections were more likely to have a positive IVA test than others. Further research would be desirable to identify the risk factors for cervical cancer in the city of Toliara.

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Women using contraception had a higher number of positive IVA tests than others. However, the result was not statistically significant, consistent with the findings of Samake OM in Mali in 2011 [13]. Contraception is not directly risk factor to cervical cancer but it can induced microtrauma in the cervix which provides entry points for HPV.

In our study, among women with a positive IVA test (16.6%), 1.3% were smokers. No association was found between smoking and the IVA test, consistent with the results of Derby et al. [16]. A meta-analysis showed that smokers were at higher risk of developing cervical cancer, with a relative risk of 1.6 [29]. In France, the proportion of cervical cancer attributable to smoking was 23% in 2006 [29].

Women with HPV are at higher risk of high-grade cervical intraepithelial lesions if they smoke via the concentration of nicotine metabolites in cervical tissue. Smoking also weakens the immune response, increasing the risk of persistent infection. Smokers have twice the risk of cervical cancer. In fact, the number of cigarettes smoked daily is correlated with disease severity [30].

Our knowledge, it is the first study to evaluate VIA screening among women in the southwest region of Madagascar. Few women were getting screened at the region's only IVA screening center. Toliara has the appropriate treatment for precancerous lesions. Limitations include its monocentric study design so the results cannot to be generalized by the population. Incomplete data on duration of contraceptive use, and lack of histopathology (biopsy) data due to resource constraints are so the limitations of the study.

Conclusion

A high VIA positivity rate was observed. Women aged 15–25 years, married women, and pauci-gravid women were at higher risk of a positive VIA test in this series. Cryotherapy is available but remains costly for low-income populations. Enhanced community sensitization and improved access to screening are essential to reduce cervical cancer mortality.

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