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Comparative study between visual inspection of cervix with acetic acid and pap smear for cervical cancer screening in tribal area of Chhattisgarh

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Abstract
Background: Cervical cancer ranks as the second most common cancer among women in India. Incidence is 6-29% approximately of all cancer in India.
Objective: The objective of this study is to compare the Sensitivity, Specificity, Positive Predictive Value, Negative Predictive Value and Accuracy of VIA and Pap smear.
Method: This was a comparative study done between May 2019 to April 2020. Patients screened from the Gynaecological OPD from the department of Obstetrics and Gynaecology, GMC Ambikapur, Chhattisgarh. Firstly Pap smear was taken followed by VIA was performed with 3-5% acetic acid. Pap smear positive patients are called back for biopsy.
Results: In this study total 200 patients have participated, VIA positive in 35 patients(17.5%) and Pap smear positive in 17 patients(3.5%).Out of 17 patients, five were positive for carcinoma cervix(2.5%), seven cases of ASCUS(3.5%), two cases of LSIL(1%), three cases of HSIL(1.5%), patients with NILM were 98(49%).
Conclusion: This study shown that VIA is more sensitive than Pap smear. VIA is easy, low cost and treatment can be administered in the same sitting. By this study we recommended that VIA can be used to screen for cervical cancer in rural areas where Pap smear is difficult and expensive.

Keywords: VIA, visual inspection with acetic acid, Pap smear, cervical cancer

Introduction
Cervical cancer ranks as the second most common cancer in women in India. More women die from cervical cancer every year in India than everywhere else in the world. In India incidence is 6-29% approximately. There is significant reduction in carcinoma cervix and mortality with implementation of screening programme [1].
In comparision with pap smear, VIA is an alternative low cost screening technology which makes the results immediately available. Visual inspection of cervix following acetic acid application is an effective method for detecting the preinvasive lesion of cervix, as well as it is good alternative to cytological screening for cervical cancer in poor resources setting [3].
VIA based screening method reduced the prevalence of cervical cancer in many developed countries. According to different studies cervical cancer is high among rural population [2].
Every year in India, 122,844 women are diagnosed with cervical cancer and 67,477 die from the disease [4]. Indian women are affected by it physically, psychosocially and financially. Not just the women, but her family and the society also suffer [5].

Aims and Objectives
1. To screen patients between 21-60 years by pap smear and VIA for cervical cancer.
2. Compare the Sensitivity, Specificity, Positive Predictive Value, Negative Predictive Value and Accuracy of visual inspection using acetic acid (VIA) with the pap smear.

Material and Methods
This study was comparative study conducted in 200 women of age group of 21-60 years over a period of one year. Patients were recruited from gynaecological out patient department, Government medical college, Ambikapur from May 2019 to April 2020.

An informed consent was obtained from the patients for their willingness to participate in the study.

Inclusion criteria

- Early marriage
- Early pregnancy
- Sexual activity at early age
- Multiple sexual partners
- Multiparity
- Presence of sexually transmitted disease
- Abnormal uterine bleeding

Exclusion criteria

- Unmarried women
- Pregnant women
- Women with active bleeding per vaginum
- Invasive carcinoma cervix

Complete history regarding white discharge per vaginum, post coital bleeding, menstrual and contraception history was obtained. Per speculum examination of cervix and vagina was performed. Firstly a pap smear was taken with ayre's spatula was evaluated by Bethesda system following the pap smear, VIA was performed with 3-5% acetic acid. In this procedure 3-5% acetic acid was applied to the cervix with a cotton swab and left for 60 second after that cervix was visually examined with naked eye and lamp, coagulation results in aceto white area which is caused by acetic acid which caused coagulation of nuclear protein of neoplastic cells, this was considered as positive and the area where absence of aceto white considered as negative. The patients who reported normal on screening tests were called for annually follow up. Patients who were positive at either of screening test are treated accordingly to the grade of disease. Patients with positive pap smear report were called back for biopsy.

Results

Table 1: Distribution of patients according to Age, Duration of marriage and parity

Age (in years)	Number of patients	%
20-30 years	05	2.5%
31-40 years	40	20%
41-50 years	130	65%
51-60 years	25	12.5%
Duration of marriage		
<10 years	35	17.5%
10-20 years	55	27.5%
>20 years	110	55%
Parity		
<3	60	30%
>3	140	70%

In this study total 200 women have participated. Socio demographic characteristic of the patients show that they were aged between 41-50 years (65%) mostly.
All the patients were married, mostly are married for >20 years (55%). 60 patients (30%) were multiparous, while 140 patients (70%) were grandmultiparous.

Table 2: Histopathology findings of pap smear and VIA

Pap smear findings	Number of patients	%
NILM	98	49%
Inflamatory smear	85	42.5%
ASCUS	07	3.5%
LSIL	02	1%
HSIL	03	1.5%
Ca Cx	05	2.5%
Total	200	

VIA	Number of patients	%
Positive	35	17.5%
Negative	165	82.5%
Total	200	

35 patients (17.5%) are VIA positive and 17 patients (8.5%) are pap ssmear positive. Out of 17 patients, (2.5%)5 patients were positive for carcinoma of cervix.7 cases (3.5%) of ASCUS, 2 cases (1%) of LSIL and 3 cases (1.5%) of HSIL. Patients with negative for intraepithelial lesion or malignancy (NILM) were 98(49%).

Table 3: Distribution of patients according to Age, VIA, LSIL, HSIL, Ca Cx

Age	No. of patients	VIA	ASCUS	LSIL/HSIL	Ca Cx
20-30 years	05	00	00	00	00
31-40 years	40	05	02	00	01
41-50 years	130	10	02	02	01
51-60 years	25	20	03	03	03
Total	200	35	07	05	05

Mostly women belong to age group of 41-50 years of age, where five women presents with abnormal pap smear followed by nine patients with abnormal pap were seen in age group of 51-60 years. VIA positive seen in total 35 patients where mostly positive patients belongs to age group 51-60 years.

Table 4: Duration of marriage

Duration of marriage	No. of patients	VIA	ASCUS	LSIL/HSIL	Ca Cx
<10years	35	07	01	00	00
10-20 years	55	15	04	02	01
>20 years	110	13	02	03	04
Total	200	35	07	05	05

Nine patients with abnormal pap reported in the duration of marriage >20 years while abnormal VIA reported in 15 patients, which belongs to 10-20 years of marriage group.

Table 5: According to the parity

Parity	No. of patients	VIA	ASCUS	LSIL/HSIL	Ca Cx
<3	60	10	04	01	02
>3	140	25	03	04	03
Total	200	35	07	05	05

Here VIA is more positive in >3 parity, similarly pap smear is also more positive in >3 parity.

Table 6: Sensitivity and Specificity of Pap smear

	Histology biopsy positive	Histology biopsy negative	Total
Pap smear positive	10	00	10
Pap smear negative	07	176	183
Total	17	176	193

Sensitivity – TP/TP+FN, 10/17×100 = 58.82%
Specificity – TN/TN+FP, 176/176×100 = 100%
PPV – TP/TP+FP, 10/10×100 = 100%
NPV – TN/TN+FN, 176/183×100 = 96.17%
Accuracy – TP+TN/TP+TN+FP+FN = 96.37%

Table 7: Sensitivity and Specificity of VIA

	Histology biopsy positive	Histology biopsy negative	Total
VIA positive	12	23	35
VIA negative	04	161	165
Total	16	184	200

Sensitivity – 12/16×100 = 75%
Specificity – 161/184×100 = 87.5%
PPV – 12/35×100 = 34.28%
NPV – 161/165×100 = 97.57%
Accuracy – 12+161/12+161+23+4 = 86.5%

Discussion

In this study comparission was made between VIA test with Pap smear to detect cervical precancerous lesion at the tribal area of Chhattisgarh. Here 200 women have participated, out of 200, mostly women belong to age group of 41-50 years of age which is 65%.According to Divya *et al*. who show that there was an increased incidence of precancerous lesion in the age group of 41-50 years reflecting cervical cancer has a long latent phase of progression [6].

Here 17.5% of women investigated were positive per VIA testing, similarly Garni *et al*. had 14.1% VIA positive women [7]. Sensitivity of VIA in this study is 75% and specificity is 87.5%.Sritipsukho and Thaweekul found in a systemic review with meta-analysis of cervical screening a pooled sensitivity of 71.8% and specificity of 79.4% of VIA compared to colposcopy results as gold standard.[8]Pap smear showed a better specificity as compared with VIA.(100% and 87.5% respectively).In our study accuracy of pap smear(96.37%) is higher than VIA(86.5%). similarly PPV of Pap smear is better than VIA(100% and 34.28% respectively), but NPV of VIA is better compared with Pap smear(97.57% and 96.17% respectively)

The PPV ranged from 5-20% and the NPV ranged from 92-99% (Sankaranarayana *et al*. 2005) [1]. Therefore the Sensitivity, Specificity, PPV, NPV of VIA test in the present study is comparable to other studies and is reasonable to implement for a screening programme. The American Society revealed that women with three or more fullterm pregnancies have an increased risk of developing cervical cancer [9].

Based on the result of this study, we can conclude that VIA test is an appropriate screening test to screen the precancerous lesion of the cervix. It is simple, sustainable and cost – effective method for cervical cancer screening in Government setup at rural areas. The results are obtained almost instantly and there is no need to wait for results as in Pap smear, which require skilled staff. In our experience this reduces the number of patients who would otherwise be lost to follow up. A single visit examination is considered ideal in rural setup, where patients may not turn for further follow up.

Conclusion

This study has shown VIA is more sensitive than Pap smear. Accuracy of VIA is 86.5%, VIA is easy, low cost and treatment can be administered at the same sitting. By this study we recommend that VIA can be used to screen for cervical cancer in rural area where the access to Pap smear is difficult and expensive. But, standard screening tool for cervical cancer is Pap smear, which helps in reducing the cervical cancer and its mortality.

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