

**COMMUNITY BASED EARLY DETECTION OF CARCINOMA CERVIX BY VARIOUS SCREENING METHODS AND COMPARING THEIR EFFICACY**Hari Pavithra Reddy N<sup>1</sup>, Pradeep S<sup>2</sup>, Linge Gowda Krishna<sup>3</sup>, Shailaja N<sup>4</sup>, Shyamasundara Bhat<sup>5</sup>**HOW TO CITE THIS ARTICLE:**

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**ABSTRACT:** Background Ca cervix is the most common cancer among women in developing countries. In developed countries, screening is done by Pap smear which is resulting in drastic decrease in ca cervix which is not so in developing countries due to various reasons. So visual inspection of cervix can be cost effective screening procedure if its efficacy is proved in low resource countries. **OBJECTIVE:** To determine which screening method is efficient in detecting premalignant & malignant lesions of ca cervix in resource poor settings. **METHODS:** Pap smear was done in all 600 women, along with this VIA in 200 women, VILI in 200 women was done. Either pap or VIA or VILI positive cases were selected for colposcopy followed by biopsy if positive findings were there on colposcopy. 10% of either screening negative cases were subjected for biopsy to know false negative rate from each group. Main outcome measures: comparison of all three screening methods (pap smear, VIA, VILI) in terms of sensitivity, specificity, PPV, NPV in comparison with gold standard colposcopic guided cervical biopsy. **RESULTS:** The aided visual inspection has more PPV than pap smear, The sensitivity of all three screening methods were comparable. The specificity & NPV of pap smear were high. **CONCLUSION:** So the aided visual inspection can be used as screening method in detection of premalignant and malignant lesions of cervix in place of papsmear especially in rural setting.

**KEYWORDS:** Screening of ca cervix, papsmear, VIA, VILI, colposcopy.

**INTRODUCTION:** Carcinoma cervix is the most common cancer among women in developing countries including India.<sup>1</sup> Worldwide 4 lakhs new cases are identified every year. 80% of these cases are found in the developing world. It is more prevalent among women living in poor conditions with low income and insufficient education.

Carcinoma cervix develops slowly over 10 years from a pre-cancerous condition which is readily detectable by screening and is treatable. Therefore cervical cancer can be prevented by detecting pre-cancerous lesions and treating it in correct time.<sup>2</sup>

In developing countries Pap smear has its limitation as a screening procedure as 60% of population resides in rural areas, where there is lack of awareness, trained persons, lab facilities with financial constraints.

Visual inspection of cervix can be a cost effective screening procedure, if its efficacy is proved.<sup>3,4,5</sup>

This study attempts to know the efficacy of various screening methods and which screening methods are suitable in rural areas and in low resource settings like India.

Low cost, easy application and immediate results can make visual inspection of cervix a useful screening test in developing countries like India.

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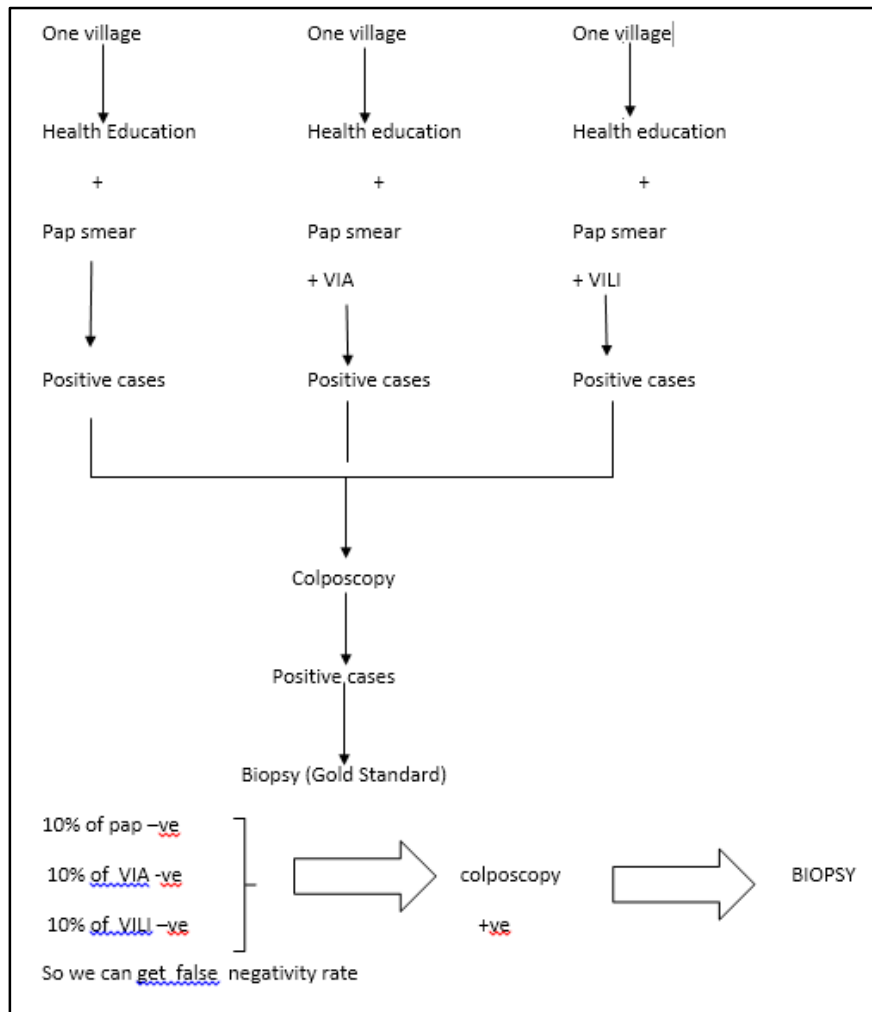
**MATERIALS & METHODS:** Study was done by camp approach in selected three villages (Which were selected on prevalence basis according to district statistics) nearby PESIMSR (Peoples education society and institute of medical sciences and research), KUPPAM for one to one and half year from October 2010 to April 2012 among 600 women (200 from each village)

As incidence being 132000 new cases annually in India, 75000 being mortality the sample size selected to draw the results is found adequate including the dropouts and verification bias.

**Inclusion Criteria: Sexually Active Women:** (That is all women about 25 years of age or marital life > 3 years whichever is earlier.) 25-65yrs age.

### Exclusion Criteria:

- Unmarried women.
- Women with frank invasive cancer cervix (with visible growth).
- Women with bleeding per vaginum.
- Pregnancy (for social cause).



**Fig. 1**

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The recruited women were categorized into 3 groups. All three groups were given health education. Along with health education screening was done with pap smear in first group, in second group both pap smear and VIA (visual inspection with acetic acid), in third group both papsmear and VILI (Visual inspection with lugols iodine) was done.

All women having positive screening and 10% of negative cases (to know the false negative rates) were submitted for colposcopy. If colposcopy is positive, biopsy was taken from suspicious areas and sent for histopathology at PESIMSR.

Pap smear was considered positive if it showed ASC-H/LSIL/HSIL. COLPOSCOPY was considered as positive when Reid's modified index score is >2.

Margin	Indistinct acetowhite, flocculated or feathered margins, angular jagged lesions, satellite lesions that extend beyond the TZ zone	Regular lesions with smooth straight outlines	Rolled, peeling edges
Color	Shiny, snow white color, indistinct acetowhitening	Shiny gray (Intermediate shade)	Dull oyster white (dense opaque white)
Vessels	Fine caliber vessels, poorly formed patterns	Absent vessels	Punctations, mosaicism
Iodine	+ve/ minor negativity	Partial uptake	-ve

Table 1: Reids modified index score

Reids index: >2 is considered as positive on colposcopy.

**Method of Statistical Analysis:** Prospective observational study.

Chi-square/ Fisher Exact test has been used to find the significance of study parameters on categorical scale between two or more groups. Diagnostic statistics viz. Sensitivity, Specificity, PPV, NPV has been computed to find the correlation of screening tests. And also Mc Nemar's test, with the usual correction for continuity, to test for a statistically significant difference in the sensitivities and specificities between the two tests, even when the sensitivity and the specificity of the tests cannot be established, as the test compares only the discordant cells within each of the diseased and non-diseased groups.

**RESULTS: PAP SMEAR (TOTAL 600 cases)**

	Biopsy	
Papsmear	positive	Negative
Positive 63	35 (a)	28(b)
Negative 48	8 (c)	40(d)
111	43	68

Table 2

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50 out of 600 women 118 showed positive report (ASC-H 35, LSIL 67, HSIL 16). In them 17 were lost for follow-up, 38 showed normal findings and 63 had positive findings on colposcopy who were subjected for biopsy. Among 63 biopsy 35 had positive result, 28 showed negative for malignancy giving false positive rate that is 44.4%.

Among 482 negative cases 10% that is 48 cases were subjected for biopsy to know the false negative rate. In 48 papsmear normal cases 8 showed biopsy positive representing false negative rate of pap smear that is 16.7%

So in 63 cases of papsmear positive and 10% of negative cases (48) were compared with gold standard biopsy to know the efficacy in terms of sensitivity, specificity, PPV, NPV

The results were sensitivity 81.3%, specificity 58.8%, PPV 55.5%, NPV 83.3%.

### RESULTS OF VIA:

	Biopsy	
VIA	Positive	Negative
Positive 36	21 (a)	15(b)
Negative 13	4 (c)	9(d)
49	25	24

Table 3

In 200 women along with pap smear VIA was done and labeled as positive if Aceto White (AW) areas present if not negative. So out of 200 women 72 showed positive report, among them 24 had normal findings on colposcopy, 10 were lost for follow-up & 38 had positive findings on colposcopy who were subjected for biopsy. Among 38 biopsies 21 had positive result, 15 showed negative for malignancy giving false positive rate that is 41.6% and in 2 cases repeat biopsy was indicated.

Among 128 negative cases 10% that is 13 cases were subjected for biopsy to know the false negative rate. In 13 VIA negative cases 4 showed biopsy positive representing false negative rate of VIA as 30.7%.

So in 36 cases of VIA positive and 10% of negative cases (13) were compared with gold standard biopsy to know the efficacy in terms of sensitivity, specificity, PPV, NPV

The results were sensitivity 84%, specificity 37.5%, PPV 58.3%, NPV 69.2%

### RESULTS OF VILI:

	Biopsy	
VILI	Positive	Negative
positive 29	20 (a)	9(b)
negative 13	4(c)	9(d)
42	24	18

Table 4

In 200 women along with pap smear VILI was done and labeled as positive if iodine negative areas present if not negative. So out of 200 women 68 showed positive report, among them 16 were lost for follow-up, 22 had normal findings, 30 had positive findings on colposcopy who were

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subjected for biopsy. Among 30 biopsies 20 had positive result, nine showed negative for malignancy giving false positive rate that is 31% and in one case repeat biopsy was indicated.

Among 132 negative cases 10% that is 14 cases were subjected for biopsy to know the false negative rate. In 14 VILI negative cases 4 showed biopsy positive representing false negative rate of VILI as 30.4%

So in 27 cases of VILI positive and 10% of negative cases (14) were compared with gold standard biopsy to know the efficacy in terms of sensitivity, specificity, PPV, NPV.

The results were sensitivity 83.3%, specificity 50%, PPV 69.%, NPV 69.2%.

### COMPARISON BETWEEN DIFFERENT SCREENING METHODS:

	SENSITIVITY	SPECIFICITY	PPV	NPV
PAP	81.3%	58.8%	55.5%	83.3%
VIA	84%	37.5%	58.3%	69.2%
VILI	83.3%	50%	69%	69.2%

Table 5

Hence it was evident that PPV was high for VIA (58.3%) and VILI (69%) compared to Pap smear (55%) while sensitivity of all three screening procedures were comparable.

The specificity and NPV of Pap smear was found more compared to VIA & VILI.

The false positive rates of all three screening methods pap, VIA, VILI respectively 44.4%, 41.6%, 31%. The false negative rates of all three screening methods pap, VIA, VILI respectively 16.7%, 30.7%, 30.7%

So the aided visual inspection can be used as screening method in detection of premalignant and malignant lesions of cervix in place of papsmear especially in rural setting.

**DISCUSSION:** In present study the sensitivity of papsmear was found to be 81.3% which is comparable to other two studies Shankar Narayan<sup>6</sup> and Singh et al,<sup>4</sup> but it was high compared to Bhatla et al<sup>3</sup> and Goel et al<sup>4</sup> study.

The specificity of PAP smear was found to be 58.8% in present study which was low when compared to other studies<sup>4,6,7,8</sup>

Coming to PPV which was 55.5% in present study was comparable to Singh KN et al study, but it was low compared to Bhatla et al<sup>7</sup> and Goel et al.<sup>8</sup>

The NPV of present study was low (83.3%) compared to all other studies like Shankar Narayan<sup>6</sup> and Singh et al,<sup>4</sup> Bhatla et al<sup>7</sup> and Goel et al.<sup>8</sup>

This low NPV might be due to not treating the existing vaginal infection before performing PAP smear. This was because of fear of losing for follow up as our subjects belonged to rural set up. Here, the white discharge may come in the way of preparing thin smear and also obscuring the abnormal cells.

The use of acetic acid during visual examination of the cervix, termed visual inspection with acetic acid (VIA), has been advocated as an alternative screening method to PAP smear in developing countries.

In second village among 200 people VIA was done in addition to PAP smear. The sensitivity of VIA was found to be 84% in our study which is low comparable to other studies.<sup>4,6,7,8</sup> Specificity was

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37.5% which was comparable to Goel et al<sup>8</sup> study. But it was low compared to Shankar Narayan<sup>6</sup>, Singh et al<sup>4</sup> studies.

Sankaranarayan studied 3000 women in Kerala during 1996-1997. It was found that the performance of VIA was similar to cervical cytology. They also found the specificity to be low which was similar to our study.

The PPV of VIA was 58.3% in present study which was comparable to Goel et al<sup>8</sup> study but it was high compared to other three studies.<sup>4,6,7</sup>

Ghaemmaghama [Ghaemmaghama et al, 2004] in a study on 1200 eligible women with colposcopy as reference standard and using 4% acetic acid to perform VIA reported it as a feasible method of screening where cytopathology is limited.<sup>9</sup>

Belison [Belison et al 2001] in rural china on 1997 women performed VIA using colposcopy as the reference standard on all women. VIA had 71% sensitivity and 74% specificity. Specificity was low compared to cervical cytology as was also shown in the present study.<sup>10</sup>

Eftikhar [Eftikhar et al 2005] studied 100 VIA positive and 100 VIA negative subjects selected randomly. He used 5% acetic acid. Cytology, colposcopy and referral biopsy was done in all the subjects. The sensitivity and specificity were 95.7% and 44.1% respectively for VIA and 10% and 92% respectively for cytology. It was concluded that VIA could be used as an adjuvant to cervical cytology<sup>11</sup>

In third village among 200 women along with PAP smear VILI was also done. The sensitivity was found to be 83.3% and specificity 50% which was comparable to other study Quershi et al <sup>12</sup>; it was low compared to Sankarnarayan et al<sup>6</sup> study.

The PPV was 66.6% which was also comparable to Quershi et al but it was high when compared to Sankarnarayan et al. The NPV was 69.2% which was once again low compared to other studies.<sup>12, 6</sup>

**CONCLUSION:** Hence It was evident that PPV was high for VIA (58.3%) and VILI (69%) compared to Pap smear (55%) while sensitivity of all three screening procedures were comparable.

The specificity and NPV of Pap smear was found more compared to VIA & VILI.

Hence aided visual inspection of cervix with Acetic acid or lugols iodine can be used in place of Pap smear for screening of ca cervix in rural setup.

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