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# Pap Smear versus Colposcopy for Diagnosis of Precancerous Lesions of Cervix

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## Abstract

**Background:** This study aimed to compare the conventional Pap smear and Colposcopy for diagnosis of premalignant lesions of cervix by correlating the histopathological findings of abnormal cytology.

**Material and Methods**: The criteria for inclusion of patients with unhealthy cervix were: persistent vaginal discharge, post-coital bleeding, abnormal vaginal bleeding or irregular menstrual cycle, pain in lower abdomen, abnormal findings on per-speculum examination, and women who have undergone supra-cervical hysterectomy. Women more than 65 years of age, or who have been previously screened completely, or undergone complete hysterectomy were excluded from the study. Clinical history and demographic data was collected for 35 patients admitted to the hospital. Sensitivity, specificity, positive and negative predictive values of smear and colposcopy was analysed based on histopathological findings.

**Results**: Sensitivity, specificity, positive predictive value and negative predictive value of smear were 0.60, 0.84, 0.60, 0.84 respectively. Sensitivity, specificity, positive and negative predictive value of colposcopy was 0.86, 0.54, 0.76, 0.70 respectively. A statistically significant correlation was found between abnormal smear finding and histopathology, and abnormal colposcopy finding and histopathology.

**Conclusion:** Colposcopy when used with cytology together in patient of cervical lesion has a relatively higher chance of detecting premalignant and malignant lesion as compared to either procedure when performed alone.

**Keyword:** pap smear, colposcopy, premalignant cervical lesion, histopathology, sensitivity, specificity

## Introduction

According to the World Health Organization (WHO), cervical cancer is the second most common type of cancer among women's[1]. The main cause of cervical cancer is a sexually transmitted infection by human papillomaviruses[2]. The worldwide human papilloma virus prevalence in cervical cancer is 99.7%[3]. Cancer cervix has been considered preventable because it has a long pre-invasive state and availability of screening programs and treatment of pre invasive lesion is effective[1]. It has been well-established that well-organized screening by conventional cytology has substantially reduced the incidence of morbidity and mortality from cervical cancer in developed countries[1]. In

developed countries such as the USA, 85% of women had at least one Papanicolaou (PAP) test through their lifetime, but this rate is only 5% in the developing countries[4]. The goal of screening of carcinoma of cervix is to

diagnose and treat carcinoma cervix in early pre-invasive states make the disease ideal for screening procedures[1]. The PAP smear is a simple, safe, non-invasive and effective method for detection of precancerous and noncancerous changes in the cervix and vagina[5]. In 1925 Hinsellman 1st hypothesized visualization of cervical epithelium under the magnification. Colposcopy provides a unique method to study the benign and premalignant lesions[5]. It is a simple noninvasive procedure which helps in determining the location, size and extent of abnormal cervical lesions and serves for detecting the site for biopsies. Colposcopy is complementary to cytology[6]. Cytology (PAP smear) is the lab method while the colposcopy is the clinical method of detection[6]. The final diagnosis must be made on histopathological examination[6]. PAP smear were interpreted according to The New Bethesda System 2014[7].Histopathological slides were interpreted according to the WHO classification 2003[8].

**Aims**

- To compare the diagnostic accuracy of Pap smear versus colposcopy in premalignant lesions of cervix.
- Correlation of smear and colposcopy with histopathological analysis of colposcopy-directed biopsy.

**Methods**

This study was conducted in Department of Obstetrics and Gynaecology, SMS Medical College from June 2018 to June 2019. Clinical history and demographic data was collected for 35 patients selected for the study after applying inclusion and exclusion criteria.

**Inclusion criteria**

Persistent vaginal discharge

Post-coital bleeding

Abnormal vaginal bleeding or irregular menstrual cycle

Lower abdominal pain

Abnormal per-speculum examination

Women who have undergone supra-cervical hysterectomy

**Exclusion criteria**

Women more than 65 years of age

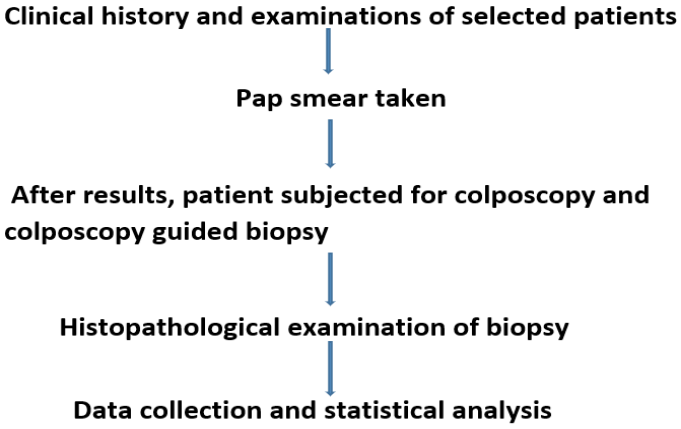
Who have been previously screened completely?

Undergone complete hysterectomy

Written and informed consent was taken from all the patients after a brief explanation of the procedure. A careful history including demographic data like age, socioeconomic status, education, parity, age at marriage of the patient, was taken. General examination and systemic examination was done. Information is noted on pre tested proforma. Prepared PAP smear slides were received fixed in 95% ethyl alcohol and ether. All the women were subjected to colposcopy and cervical biopsy. Biopsy specimens were received in 10% formalin fixative. The prepared PAP smears slides were then stained according to the conventional PAP technique and examined under a light microscope. The cytological interpretation of the smears was made according to the Bethesda system 2014.

Colposcopy-directed biopsies were processed, histopathological slides prepared and stained with hematoxylin and eosin and examined under a light microscope. Biopsy results were categorized as chronic cervicitis, cervical intraepithelial neoplasia I (CIN I), CIN II, CIN III, carcinoma in situ, squamous cell carcinoma (SCC) and adenocarcinoma according to WHO.

Statistical analysis was carried out by for calculating sensitivity, specificity and positive and negative predictive value (NPV) of PAP smear, colposcopy, and histopathological examination.




## Results

Total Histopathology n=35

Abnormal histopathology (n = 25)

Normal (n = 10)

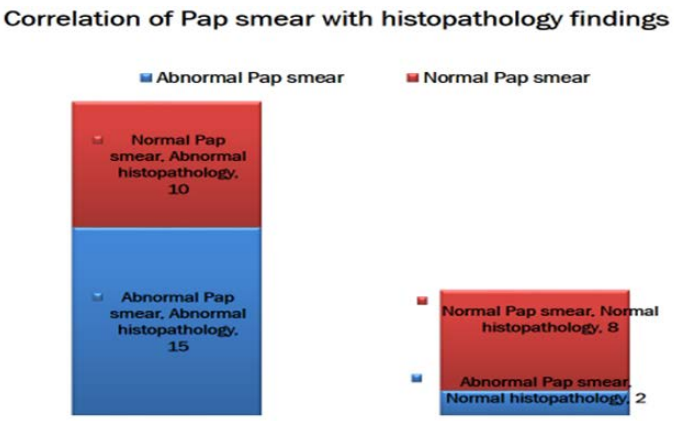
Table 1:

| Baseline characteristics of study subjects | Abnormal histopathology | Normal histopathology | P-value |
|---|---|---|---|
| Distribution of patients | | | |
| Rural | 19 | 3 | 0.01 |
| Urban | 6 | 7 | |
| SES | | | |
| Lower | 18 | 2 | < 0.01 |
| Middle | 7 | 8 | |
| Occupation | | | |
| Service | 5 | 3 | 0.5 |
| Housewives | 20 | 7 | |
| Age at menarche | | | |
| ≤ 12 | 15 | 4 | 0.3 |
| > 12 | 10 | 6 | |
| Age of first coitus | | | |
| ≤ 18 | 19 | 3 | 0.01 |
| > 18 | 6 | 7 | |
| Age of first conception | | | |
| ≤ 21 | 19 | 3 | 0.01 |
| > 21 | 6 | 7 | |
| Number of sexual partners | | | |
| Single | 2 | 7 | < 0.01 |
| Multiple | 23 | 3 | |

Table 2:

| Clinical presentation of study subjects | Abnormal histopathology | Normal histopathology | P-value |
|---|---|---|---|
| Discharge per vaginum | | | |
| Yes | 14 | 6 | 0.8 |
| No | 11 | 4 | |
| Post-coital bleeding | | | |
| Yes | 20 | 2 | < 0.01 |
| No | 5 | 8 | |
| Excessive irregular bleeding PV | | | |
| Yes | 15 | 4 | 0.3 |
| No | 10 | 6 | |
| Per-speculum examination | | | |
| Abnormal | 20 | 5 | 0.08 |
| Normal | 5 | 5 | |

Figure 1:




**Pap smear: Poor sensitivity, good specificity**

Odds Ratio 0.16 (95% CI, 0.03 – 0.95; P=0.03)

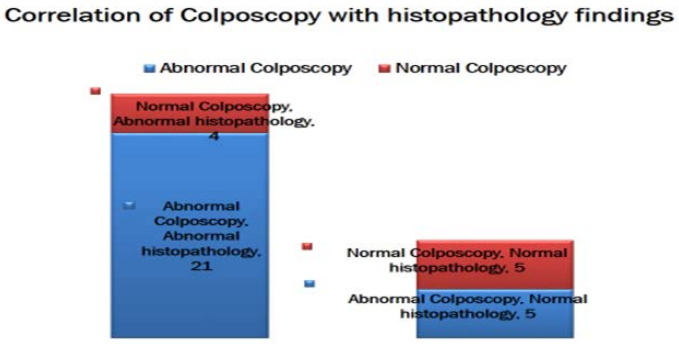
Sensitivity = 0.60 Specificity = 0.80

Positive predictive value = 0.88

Negative predictive value = 0.44

84% chance of abnormal Pap smear findings in pre-invasive lesions with true population effect between 97% and 5%. This result is statistically significant

Figure 2:




**Colposcopy: Good sensitivity, poor specificity**

Odds Ratio 0.19 (95% CI, 0.03 – 0.98; P=0.04)

Sensitivity = 0.84 Specificity = 0.50

Positive predictive value = 0.80

Negative predictive value = 0.56

81% chance of abnormal colposcopy findings in pre-invasive lesions with true population effect between 97% and 2%. This result is statistically significant

**Conclusion**

Colposcopy has good sensitivity but Pap smear have good specificity. Colposcopy when used with Pap smear together in patient of cervical lesion, is more accurate in detecting premalignant and malignant lesion as compared to either procedure when performed alone.

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