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## **A study on cervical cancer using Pap smear as a preliminary diagnostic screening test with clinical and possible histopathological correlation**

**Madhavi B, Rubiya Khatoon, Suguna, Radhika K and Keerthana**

**Abstract**

A total of 3100 pap smear tests done on women who attended the Gynecological outpatient ward between the years 2018 to till date in Mamata Academy of medical sciences and MNR medical college Sangareddy, and were analyzed to find out the role of risk factors (non cytogenetic) in cervical carcinogenesis. Each woman under investigation had a clinical history, gynecological examination and pap smear. A cervical biopsy was also taken in possible cases for histopathology. The frequency of cervical cancer was found to be about 6.5% in the present study. The study revealed high parity and early marriage as predominant non- cytogenetic factors in cervical carcinogenesis.

**Keywords:** Cervical carcinoma; Pap smear; parity; risk factors

**Introduction**

Since the introduction of the Pap smear by George Papanicolaou, cervical cytology has become the main diagnostic tool to detect cervical cancer. Nowadays cervical cytology is not only used for the detection of overt cancer cells, but also for finding precursor lesions of cervical cancer—that is, cervical intraepithelial lesions grades I–III (CIN) <sup>[1, 2, 3]</sup>. Cervical cancer is the third most common cancer and the fourth leading cause of cancer death in women worldwide.<sup>4</sup>

Principally, cervical cytology can be used for the detection of cervical cancer and its precursor lesions, in indicative cervical smears or in population based screening; for the management of women with abnormal cytology; and to detect residual or recurrent cervical lesions after treatment<sup>1</sup>—A Pap test screens for cancer or a precancerous condition; it is not used to diagnose a condition. Pap smear is known as one of the effective methods to detect the cervical cancer; A large group of women are reluctant to go for gynecological check-up for Pap screening because of various reasons. Lack of awareness of risk factors and symptoms for cancer may leads to late diagnosis and poor prognosis. The main purpose of this study is to determine the level of knowledge about cervical cancer and Pap smear and the factors influencing the Pap test screening among women. Knowledge about the significance of Pap smear in detecting pre-cancerous and cancerous cervical lesions is important in the prevention, early detection and cure. In addition, inadequate knowledge was introduced as the most important barrier to screening test from the perspective of women. Therefore, we suggest that health education and health promotion studies as interdisciplinary and targeted interventions should be implemented to improve the women's knowledge.

In 2009, the American College of Obstetricians and Gynecologists recommended beginning cervical cancer screening at age 21 previously <sup>[1]</sup>; they had recommended beginning screening 3 years after first sexual intercourse or by age 21, whichever occurred first <sup>[2]</sup>. In our country due to low resources for screening, national recommendations are to start screening at 30 years of age. Women who are 30 years and above should undergo a Pap test once in every 3 years until the age of 65 years. If this test is combined with HPV test, then the duration of screening can be increased to 5 years. The Pap test, yields optimum results, if scheduled between 10 to 20 days of the menstrual cycle. The woman should not be menstruating at the time of test.

**Aims and Objectives**

The aim of the study is to determine the diagnosis of LSIL and HSIL and invasive cervical cancer by using Pap test as a major diagnostic tool and correlating the results of possible cases with histopathological reports after doing biopsy among the out patients visiting Gynecology department in 2 Medical institutes over a period of 3 years.

**Women who do not routinely require Pap test:**

1. Women aged below 21 years and above 65 years
2. Women who have undergone hysterectomy for benign condition

**Material and Methods**

The present study was conducted in the department of Pathology Mamata Academy of Medical Sciences, Bachupally, Hyderabad and MNR medical college Sangareddy. Pap testing done on patients who presented with the complaints of itching and burning sensation with excessive vaginal discharge, foul smelling vaginal discharge, post-coital bleeding, post-menopausal bleeding, history of pain in lower abdomen etc. and on per speculum examination with suspected cervical lesions, erosions or unhealthy cervix. The patients underwent gynecological examination & biopsy was taken in patients with ASCUS, LSIL and HSIL lesions

Pap smear is taken with a wooden Ayre’s spatula having U shaped openings on one side and a flat surface on another. The broad end is for vaginal sample collection and the narrow end is for cervical sample collection. The spatula is introduced into the cervix after visualizing the cervical os using a direct light source. The cytology specimens are obtained by rotating the spatula over the ectocervix after wiping away any mucus plug. A brush may be needed to sample the cervix of a post-menopausal woman where the squamocolumnar junction lies within the endocervical canal. The broom device should be rotated 360 degrees to remove cells from the region of the transformation zone, squamocolumnar junction and endocervical canal.

The material on the spatula or brush must be transferred immediately to a glass slide for conventional cytology. The glass slide must be fixed immediately with an appropriate fixative (95% alcohol) and the slides transported to the cytology laboratory in a container for processing together with the corresponding cytology request form.

All the slides are stained by conventional pap staining method. The main components are haematoxylin, a nuclear stain, OG-6, an acidic cytoplasmic stain, and EA (Eosin Azure) counterstain. On a well prepared specimen, the cell nuclei are crisp blue to black. Cells with high content of keratin are yellow, glycogen stains yellow as well. Superficial cells are orange to pink, and intermediate and parabasal cells are turquoise green to blue. Metaplastic cells often stain both green and pink at once.

Pap smears taken from 3100 patient’s age ranged from 20 to 80 years. Pap test performance was significantly higher in those who had higher knowledge about cervical cancer was the most important barrier of screening test from the perspective of women.

**Cervical cancer screening terminology**

Bethesda system (2001) has been used to describe Pap smear findings.

Terminology for Pap smear interpretation is discrete from terminology for biopsies (Histopathology) of the lower genital tract.

Cytology: LSIL, HSIL

Histopathology: CIN1, CIN2, CIN3, CIS

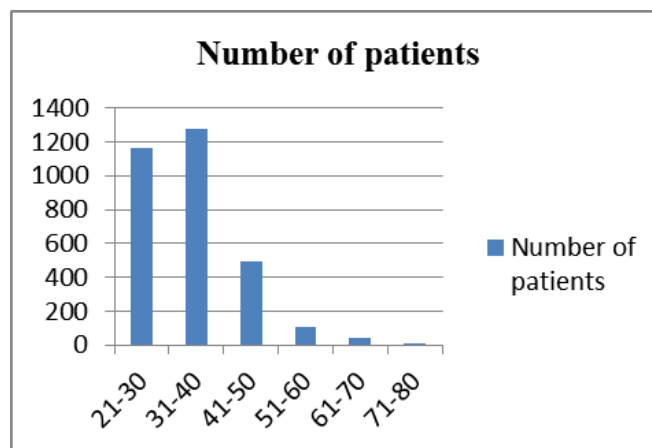
Cytological LSIL is not equivalent to histopathological CIN2 or CIN3.

Screening results were documented as negative, atypical squamous cells of undetermined significance (ASCUS), low-grade squamous intra epithelial lesion (LSIL), high-grade squamous intra epithelial lesion (HSIL), or suspicious for cancer and Invasive squamous cell carcinoma. Out of 4000 patients who visited gynecology department, 3100 Pap tests were done. In 202 patients abnormal PAP results were detected. Around 90% patients believed that treatment of precancerous lesions helped to prevent cervical cancer, but around 1000 patients had never been screened. 35% women among them were aware of the human papillomavirus (HPV) vaccine, and only 20% had received vaccination. Among 3100 patients screened, the prevalence of abnormal screening was 6.5%.

**Results:** Explanation about the results are given below the tables and charts

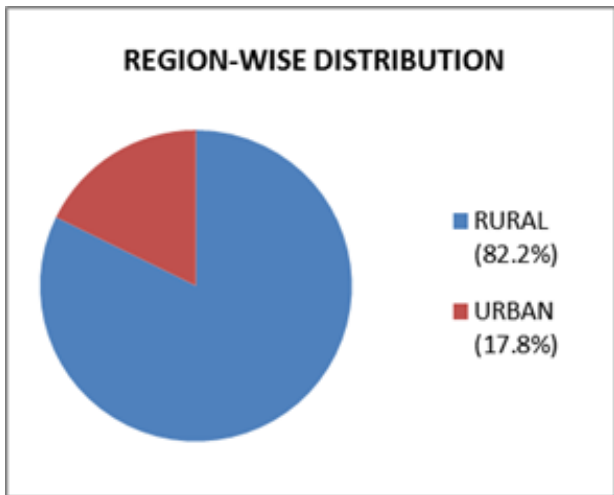
**Table 1:** Patients belonging to different age group.

S. No.	Age (in years)	Number of patients	Percentage frequency
1.	21-30	1165	37.6
2.	31-40	1280	41.3
3.	41-50	498	16.0
4.	51-60	108	3.5
5.	61-70	43	1.4
6.	71-80	06	0.2
	TOTAL	3100	100%



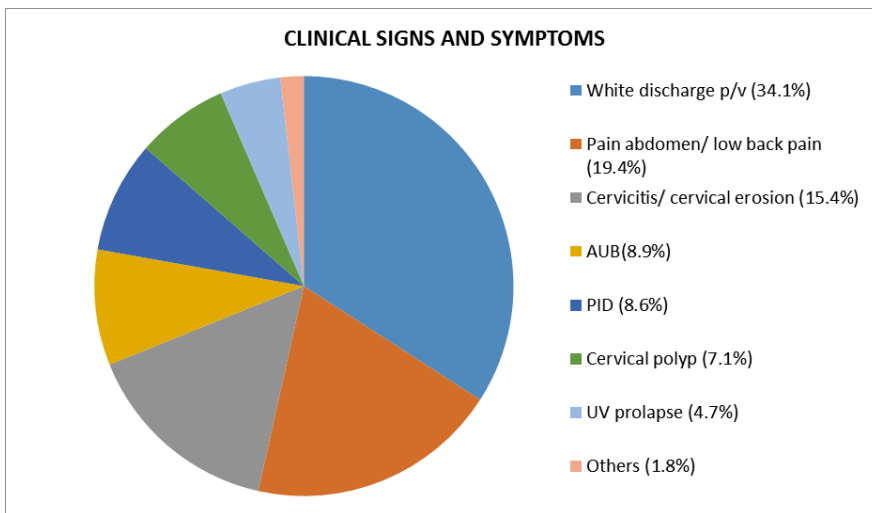
**Table 2:** Number of patients belonging to rural/urban background

S. No.	Area	Number of patients	Percentage
1.	Rural	2550	82.2%
2.	Urban	550	17.8%
	TOTAL	3100	100%



**Table 3:** Clinical History

S. No	Clinical Signs And Symptoms	No. Of Patients	Percentage
1.	White discharge p/v	2245	34.1
2.	Pain abdomen/ low back pain	1279	19.4
3.	Cervicitis/ cervical erosion	1016	15.4
4.	Abnormal uterine bleeding	586	8.9
5.	PID	564	8.6
6.	Cervical polyp	469	7.1
7.	UV prolapse	308	4.7
8.	Routine screening	53	0.8
9.	Post menopausal bleeding	29	0.5
10.	Infertility	13	0.19
11.	Ovarian cyst	11	0.15
12.	Post coital bleed	11	0.15
13.	Vaginal fibrosis	01	0.01



**Table 4.** Pap Smear Results

S. No.	Smears	No. of patients	percentage
1.	Normal Smears	275	8.9
2.	Inflammatory smears	2502	80.7
3.	Unsatisfactory smears	20	0.6
4.	Epithelial Cellular Changes		
	a) Atrophy / post menopausal smears	33	1.1
	b) Reactive cellular changes	68	2.2

S. No.	Smears	No. of patients	percentage
1.	Epithelial Cellular Abnormalities		
	a) LSIL	92	2.9
	b) HSIL	36	1.2
	c) ASCUS	59	1.9
	b) Carcinoma cervix	15	0.5
	Total	202	6.5%

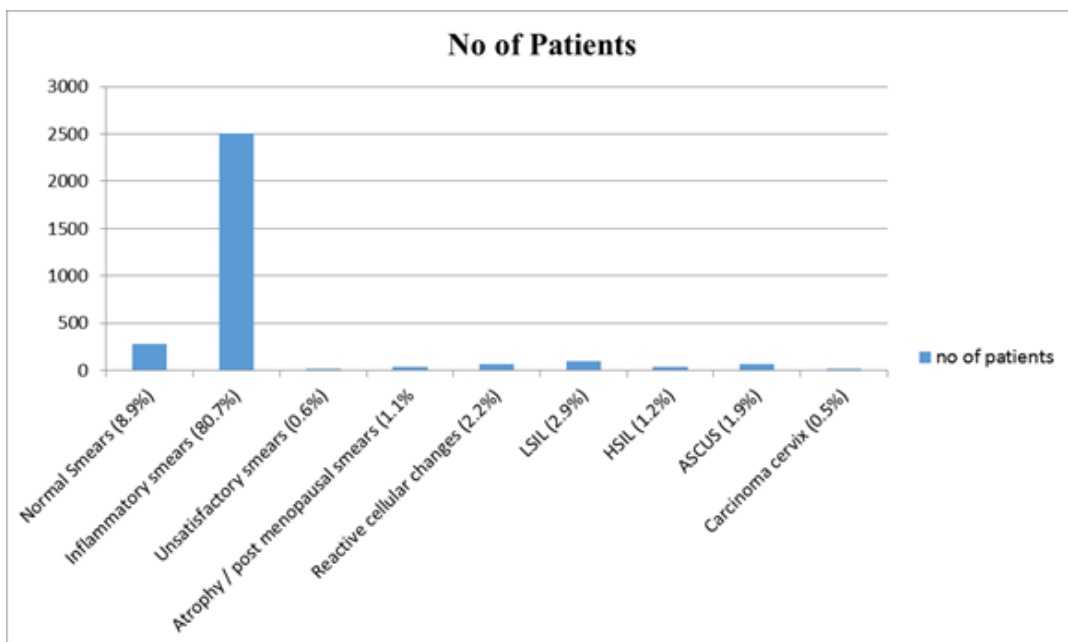
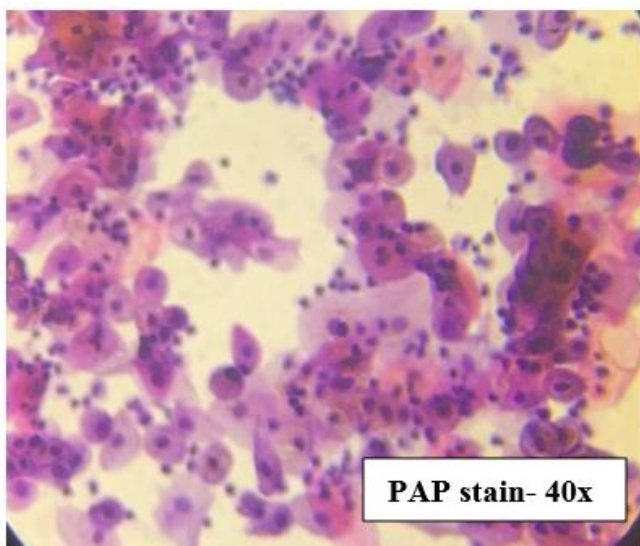
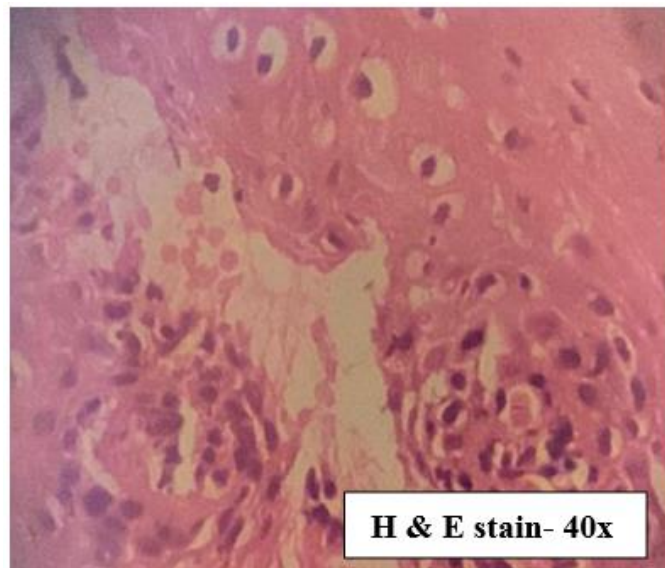


Table1: Majority of the females in the present study belonged to age group 31-40 (41.3%). Table 2: According to the area distribution, out of the 3100 patients, 82.2% population resides in the rural areas. Table 3: Most of the women report to hospital with complaints of white discharge per vagina (34.1%) followed by low back pain (19.4%). On speculum examination 15.4% were found to have erosion of cervical lips. Table 4: A total of 202 cases showed epithelial cell abnormalities (6.5%) of which majority were LSIL (2.9%) followed by HSIL (1.2%), ASCUS (1.9%) and

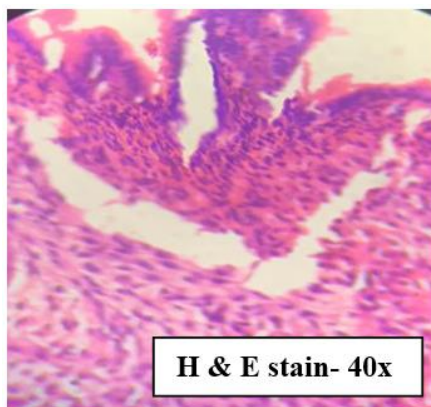
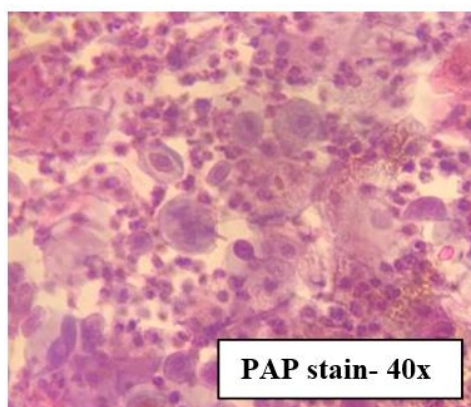
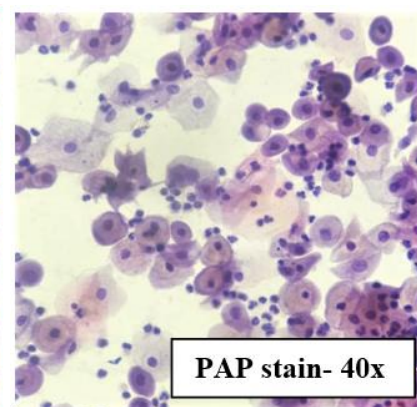
carcinoma cervix (0.5%)  
 Out of the 202 patients, 32 did not come for follow up (15.8%). Remaining patients were correlated on histopathology and the results were in accordance with our Pap smear results. Out of the 92 patients who were reported as LSIL, 36 patients (39%) recovered with treatment with their subsequent pap smears coming negative of intraepithelial lesions. 20 patients were referred to a higher centre (9.9%)



40x: A cluster of LSIL cells with Nuclear Enlargement and hyperchromatism



CIN-1 Cells with Koilocytic changes Nuclear Enlargement and hyperchromatism

**Epithelium and the cells show loss of polarity****Dysplastic cells involving the full thickness of the epithelium****CIN 111****HSIL****H & E stain- 40x****PAP stain- 40x****PAP stain- 40x**

Well differentiated Keratinized squamous cell carcinoma

**Discussion**

Cervical cancer is the third most common gynecological malignancy in women and is the fourth leading cause of cancer death in women worldwide. [1] The primary cause of this cancer is infection with human papillomavirus. [2] Since the cervical cancer is usually asymptomatic in the early stages, screening is important in the early stages. [3] This cancer is one of the few cancers that can be easily detected at pre-malignancy phase. [4] Screening for cervical cancer which is known as the Pap test is an effective method for early detection of cervical cancer. [5, 6, 7, 8]. The Papanicolaou method, or Pap test— is the study of normal and disease-altered, spontaneously exfoliated, or mechanically dislodged cells for the detection and diagnosis of various infections, abnormal hormonal activities, and precancerous or cancerous lesions. According to some qualitative studies, there are a number of barriers for Pap smear screening participation such as a lack of awareness, inappropriate beliefs, the fear of being diagnosed with cervical cancer, abdominal pain after Pap smear, and an uncomfortable feeling during the test [9-10, 11, 19]. Fear of cancer detection, sense of annoyance, and lack of health expert's recommendation are presented as the most important barriers to performing Pap test. [13, 124, 15, 19]. Some other most important factors for Pap tests screening include doctor's advice and recommendations, and increasing the awareness to the patients about the regular check-up and methods for early diagnosis of the cervical cancer and their risk factors, understanding the seriousness of cancer, and prescribing them for cost-effective and easy access pap test [16].

Epidemiological studies have shown the high risk Human PapillomaVirus (HPV) to be the most important risk factor and are present in 99.7% of the invasive cervical cancer worldwide [17, 20] Young age, early marriage, multiple sexual partners, Chlamydial endocervicitis, intercourse without barrier contraceptives. Sex with a partner that has penile warts. Chlamydial trachomatis infection became a co-factor for the establishment of HPV infection Poor genital hygiene, history of abortions, high parity, tobacco and oral contraceptive use; cigarette smoking doubles a woman's risk of getting cervical cancer. Race, low socio economic status have also been identified as significant risk factors for the development of CaCx [18, 20]. Explaining about the benefits of

doing Pap test at the community level by health care workers increases the awareness in the public regarding the prevention and early detection of cervical cancer. Pap smears can be an effective tool for reducing the incidence of cervical cancer and the associated mortality. For example, a cervical cancer screening program was launched in Taiwan in 1995 that included annual Pap test reimbursement; this decreased the incidence of invasive cancer by 47.8% in 1995–2006 [22].

Women of high parity irrespective of the age (with three or more children) and older women beyond 40 years of age should be screened at least once in their lifetime to detect any onset of premalignant lesion in the cervix. A previous study has also specified single lifetime screening in women between 41 and 50 years of age, but we feel that if high risk cases as defined above are screened once in their lifetime, a large number of SIL and carcinoma cervix cases could be detected early, the treatment of which would save many precious lives. [21]

In our study, most of the abnormal cytology was detected in patients in the age group between 30 and 60 years which is similar to the study done by Pushp Lata et al [24]. 82.2% population resides in the rural areas. Our findings were consistent with the reports of Kour P et al [23]. Majority of our patients presented to the outpatient dept of gynecology with complaints of white discharge per vaginum. This is in accordance to the study conducted by Pushp Lata et al. Cervical erosion was present in 15.4% which is also similar to the above study (19.21%). Total abnormal smears amounted to 8.47% in the study by Pushp Lata et al but our study showed the incidence to be only 6.5%. In our study the incidence of unsatisfactory smears was only 0.6% due to better technique and well trained technicians as compared to Pushp Lata et al study which had an unsatisfactory report rate of 6.42%.

**Conclusion**

Knowledge about Pap smear and cervical cancer is very important to successfully conduct cervical cancer screening. In addition, inadequate knowledge was introduced as the most important barrier to screening test from the perspective of women. Therefore it is very essential to implement health education and health promotion measures at the rural level

to improve the women's health and to prevent cervical cancer.

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