

Research Article

# A Retrospective Analysis of Cervical Cytology Using Pap Smear among Symptomatic Women Attending Gynaecology OPD in a Secondary Care Hospital in Northern India

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## I N F O

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## A B S T R A C T

**Background:** Cervical cancer is the second leading cause of cancer deaths among women in India. It develops well-defined premalignant lesions before the development of invasive lesions, and hence, early diagnosis and treatment may prevent progression to advanced stages. Papanicolaou (Pap) smear examination is a useful screening tool for cervical cancer. However, it is resource-intensive and requires skilled manpower. In routine outpatient settings in tertiary care facilities, Pap smear examination is conducted among symptomatic women. Analysis of such data may provide useful information regarding premalignant lesions, but there is a paucity of data from secondary care health facilities, which cater to rural women who are at a higher risk of carcinoma cervix.

**Objective:** To study the pattern of Pap smear abnormalities and identification of high-risk lesions among symptomatic women attending a secondary care hospital in a rural area.

**Methods:** We performed a retrospective analysis of records of Pap smear results from January 2013 to May 2018, from a secondary care hospital in northern India. The data were analysed and age-wise cytological patterns were reported as percentages.

**Results:** A total of 393 Pap smear examinations were performed during the study period. Results were available for 355 smears. The commonest abnormality was inflammation (83.6%). The prevalence of cervical epithelial abnormalities was 4.2%, including atypical squamous cell of undetermined significance (ASCUS) (0.8%), high-grade squamous intraepithelial lesion (HSIL) (0.3%), and squamous cell metaplasia (2.9%).

**Conclusion:** Abnormal cytology is common among symptomatic women. Linkages between district hospitals and medical colleges may improve screening.

**Keywords:** Cervical Cancer, Pap Smear, Cytology, Rural, Symptomatic, Screening

## Introduction

Globally, cervical cancer is the fourth most commonly diagnosed cancer among women, and it is especially common in low- and middle-income countries (LMICs).<sup>1</sup> Although the data from the population-based cancer registries in India indicate a steady decline in carcinoma cervix incidence over the last two decades, it is the third most common cancer in the country. With 123,907 new cases in the year 2020, it is the second leading cause of cancer deaths among women with a mortality rate of 9.1%, as per GLOBOCAN 2020.<sup>2,3</sup>

Worldwide, the disability-adjusted life years (DALY) lost in 2019 due to carcinoma cervix were 210 per 100,000. In low and middle-income countries (LMICs) like India, DALY lost were nearly 1.5 times higher than the high-income countries.<sup>4</sup> Most of this is attributed to poor screening programmes.<sup>5</sup>

Cervical cancer has well-defined premalignant lesions before the development of invasive lesions.<sup>6</sup> The objective of cervical cancer screening, therefore, is the detection of these premalignant lesions before they progress to invasive cervical cancer. Early diagnosis and treatment prevent up to 80% of cervical cancers in developed countries. Since the introduction of Pap smear and other cytological tests, they have become the key methods to identify the abnormalities in cervical smears, further leading to subsequent appropriate treatment,<sup>7</sup> but these tests require skilled human resources to interpret histologically. The Non-Communicable Disease Control Programme in India recommends population-based screening for cervical cancer in all women aged more than 30 years with the use of visual inspection with acetic acid (VIA) using Lugol's iodine.<sup>8</sup> However, the same has not been implemented in many places due to poor infrastructure and lack of manpower. In this scenario, screening of symptomatic women may be a viable option. As a part of routine care, women presenting with symptoms suggestive of carcinoma cervix are screened using a Pap smear. The pattern of Pap smear abnormalities among symptomatic women has been reported in previous studies, however, most of these studies are from tertiary care centres.<sup>9-11</sup> There is limited information from secondary care health facilities, which cater to rural areas, where the magnitude of cervical cancer is reportedly higher. Hence, we conducted this study with the objective of analysing the pattern of Pap smear abnormalities and identification of high-risk lesions among symptomatic women attending a secondary care hospital in a rural area of Haryana.

## Materials and Methods

The study was conducted at Sub-District Hospital (SDH) in Ballabgarh block of district Faridabad, Haryana. It was a secondary care hospital with an in-patient facility for 60 patients. The hospital functioned as a joint collaboration between the Government of Haryana, and the All India Institute of Medical Sciences (AIIMS), New Delhi. The

hospital functioned as a joint collaboration between the Government of Haryana, and the All India Institute of Medical Sciences (AIIMS), New Delhi. The hospital provided services to Ballabgarh town with a population of around 2,10,000, and nearby areas of district Palwal. It also catered to the health needs of nearly 100,000 persons residing in 28 villages of Ballabgarh block of district Faridabad. Every day around 1000 patients (nearly 700 in the morning shift and 300 in the afternoon clinics) visited the Out-Patient Department (OPD) of various specialities (including General Medicine, Surgery, Paediatrics, Obstetrics & Gynaecology, Orthopaedics, Ophthalmology and ENT) in the hospital. On average, 50-60 women attended the Gynaecology OPD, which was headed by a qualified gynaecologist, a Senior Resident (SR) of the Department of Obstetrics & Gynaecology. The SR was assisted by two Junior Residents of the same department.<sup>12</sup>

In the OPD, all women who presented with a history of discharge per vagina, or post-coital bleeding, or unexplained bleeding per vagina were routinely prescribed Pap smears. After obtaining consent, a per speculum examination was done, followed by a Pap smear. A 360° sample was collected by a trained gynaecologist, using an Ayres wooden spatula. Cellular material was immediately transferred to a clean glass slide and fixed using 95% ethanol.<sup>13</sup>

The SDH, being a secondary care hospital did not have a facility for histopathological examination. Therefore, the samples were transported on the same day to AIIMS, New Delhi, which was nearly 40 km from the SDH. Staining and testing were done at the Department of Pathology, AIIMS. Pap smears were conventional smears and were reported using the revised Bethesda System of 2001.<sup>14</sup>

The reports were received at SDH within a week, and records were maintained. For the purpose of this study, we performed a retrospective analysis of records of Pap smear results from January 2013 to May 2018. A total of 398 samples for Pap smear tests were collected during the study period. Samples found to be insufficient for reporting, or those with missing details were excluded. The clinical and sociodemographic information was collected from the records. Histopathological reports of the patients were reviewed and recorded. Data were entered in Microsoft Excel version 2010. Analysis was done using STATA version 12 (College Station, Texas, USA).

## Ethical Concerns

Informed consent was obtained from the participants. Personal identification information was delinked before data entry and was kept confidential. The patients did not have to bear any cost for the test as it was provided free of cost to all patients. The patients who had abnormal findings on Pap smear were managed accordingly (infections and inflammation) or were further referred to AIIMS (pre-malignant or metaplasia), as appropriate.

## Results

Out of the 398 samples, 38 (9.5%) samples could not be reported as these samples were insufficient. Data were missing for another five samples. Thus, the results of 355 Pap smear tests were analysed.

The mean (SD) age of women screened by Pap smear was 39.6 (9.9) years. The majority (72.3%) of participants were in the age group of 31-50 years (40.7% in the age group of 31-40 years), while 4.2% of the women were aged more than 60 years (Table 1).

**Table 1. Distribution of Women as per their Ages**

Age Group (Years)	Number	Percentage
20-30	76	21.2
31-40	144	40.7
41-50	112	31.6
51-60	8	2.3
> 60	15	4.2
Total	355	100

Normal Pap smear result was reported in 37 (10.4%) women. The most common abnormality was inflammation as this was reported in 297 (83.6%) women. Squamous cell metaplasia was reported in 11 (3.1%) women. High-grade squamous intraepithelial lesion (HSIL) and atypical squamous cell of undetermined significance (ASCUS) were reported in one (0.3%) and three (0.9%) women, respectively. Table 2 shows the age-wise distribution of the interpretation of cervical cytology. Inflammation was the most common abnormality across all age groups. ASCUS was reported in a relatively younger age group. Out of three women who had ASCUS, one was in the age group of 20-30 years, while two were in the age group of 31-40 years. One lesion of HSIL was reported, and it was in the age group of 41-50 years. Squamous metaplasia was

reported more in the younger age group (20-30 years), followed by 41-50 years.

## Discussion

Cancer of the uterine cervix is one of the leading malignancies seen in Indian women. An effective screening programme aimed at specific age groups is critical for detecting precancerous conditions before they progress to invasive cancers. Cervical cytology by Pap smear is currently the most widely used and the most effective cancer screening modality in settings with adequate resources. The data obtained from the hospital records can provide useful information about the efficiency of Pap smear as a screening test.<sup>15</sup>

In our study, the maximum percentage of women (40.7%) were in the age group of 31-40 years. This is similar to the age group reported in other studies in India where the majority of women were in this age group.<sup>16-18</sup> The mean age of women in our study was 39.6 years, which is similar to the mean age reported by Verma et al. in Himachal Pradesh and Garg et al. in Uttar Pradesh.<sup>19,20</sup>

In our study, 9.5% of the sample could not be reported as these were insufficient samples. This is slightly higher than the 6.5% inadequate samples reported in the study conducted in Lucknow, Uttar Pradesh by Sachan et al.<sup>21</sup> However, it is better than the study conducted by Gupta et al. in Chandigarh, in which 10.5% of conventional Pap smears were reported to be inadequate or unsatisfactory.<sup>22</sup>

We found that inflammatory lesions were seen in 83.6% of cases. Similar results were obtained by Ranabhat et al. in their study in Nepal.<sup>23</sup> Tejeswini and Premalatha also reported nearly 80% of inflammatory lesions in their study.<sup>24</sup> Bamanikar et al. found the prevalence of inflammatory lesions to be 71.9%.<sup>10</sup> This is higher than that reported by studies done in a rural hospital in Himachal Pradesh and in a tertiary care hospital in Hyderabad (49.1%).<sup>19,25</sup>

**Table 2. Age-wise Distribution of the Interpretation of Cervical Cytology**

Age Group (Years)	Number of Women	Normal n (%)	Microbiological Infection n (%)	Inflammation n (%)	ASCUS* n (%)	HSIL** n (%)	Squamous Metaplasia n (%)
20-30	76	6 (7.9)	0 (0.0)	65 (85.5)	1 (1.3)	0 (0.0)	4 (5.3)
31-40	144	17 (11.8)	2 (1.4)	121 (84.0)	2 (1.4)	0 (0.0)	2 (1.4)
41-50	112	10 (8.9)	3 (2.7)	95 (84.8)	0 (0.0)	1 (0.9)	3 (2.7)
51-60	8	1 (12.5)	0 (0.0)	6 (75.0)	0 (0.0)	0 (0.0)	1 (12.5)
> 60	15	1 (6.7)	1 (6.7)	12 (80.0)	0 (0.0)	0 (0.0)	1 (6.7)
Total	355	37 (10.4)	6 (1.7)	297 (83.6)	3 (0.9)	1 (0.3)	11 (3.1)

\*ASCUS: Atypical Squamous Cell of Undetermined Significance

\*\* HSIL: High-grade Squamous Intraepithelial Neoplasia

Studies have indicated that women with persistent inflammation should be appropriately treated, as it may lead to an increased risk of development of cervical intraepithelial lesions. A repeat Pap smear should be taken after proper antibiotic treatment.<sup>26</sup>

ASCUS, which refers to abnormal cytologic changes that are suggestive of the squamous Intraepithelial Lesion (SIL) but are qualitatively and quantitatively less than those of a definitive SIL diagnosis, was reported in 0.9% of women in our study. This is similar to the findings of the study conducted by Verma et al. in rural Himachal.<sup>19</sup> Sachan et al. and Vedavathi et al. reported a higher prevalence of 2.9% and 4.0% respectively.<sup>16,21</sup> This could be due to the difference in the study settings and socio-demographic profile of the participants. In our study, HSIL was reported in one smear (0.3%), age-group being 41-50 years. A similar age distribution of HSIL was reported by Sachan et al.<sup>21</sup>

We found that the presence of ASCUS and squamous metaplasia was higher in the younger age group which is in contrast to other studies. In Nigeria, the prevalence was reported to be higher in the elderly age group.<sup>27</sup> Similar results were also obtained by Tejeswini and Premalatha in Gujarat,<sup>24</sup> and Mulay et al. in Hyderabad<sup>25</sup>. A study by Khasnabish et al. in Tripura found a higher prevalence (17.7%) of abnormal epithelial cells in Pap smears.<sup>28</sup> This higher prevalence may be due to socio-cultural and geographical differences in the pattern of cancer and precancerous lesions.

Studies conducted in developed countries showed that the prevalence of premalignant and malignant cells in Pap smears was around 0.6% which is less than that observed in the current study. Similarly, inflammatory lesions were found in 0.1% of total Pap smears.<sup>29</sup> These differences may be due to cultural variations, age of the women, incidence of infections, awareness about screening, and the presence or absence of cervical screening programmes.

Our study is one of the few studies that reported results of Pap smears at the secondary care level. The strengths of this study include sample collection by trained gynaecologists. This addresses the major limitation of Pap smear i.e. poor quality of sample which is reflected in a lower rejection rate. Since it was a retrospective analysis, the study was limited by the non-availability of data regarding the symptoms. Another limitation was the lack of information about the risk factors causing abnormal cytology.

In India, a vast majority of symptomatic women attend district hospitals. Although these district-level hospitals have trained gynaecologists, however, facilities for histopathology are lacking. In recent times, many new medical colleges are being established. A liaison between the district hospital and medical college can significantly improve the screening by Pap smear.

## Conclusion

Pap smear testing is a simple and economical tool for detecting precancerous cervical epithelial lesions, particularly among symptomatic women. Since secondary care hospitals lack the facility for histopathology, linkages between district hospitals and medical colleges can improve the screening.

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