

## Original Research Article

**Cytomorphological Spectrum of Cervical Pap Smears abnormalities in a Tertiary Care Centre, Karnataka India**Krishna MC<sup>1</sup>, Harish SG<sup>2</sup><sup>1</sup>Associate Professor, <sup>2</sup>Professor, Department of Pathology, Shridevi Institute of Medical Sciences & Research Hospital, Tumkur, Karnataka 572106, India.**Corresponding Author:**Krishna MC, Associate Professor,  
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**Abstract**

*Introduction:* Uterine cervical screening by Papanicolaou method using cervical smears is an important diagnostic tool in the field of public health. Procedure wise uterine cervical screening is an easy, cost effective mean to detect the premalignant and malignant lesions of Uterine Cervix at the earliest in the community at large. Among the uterine cervical lesions, the cervical intra-epithelial neoplasia (CIN) and cervical cancer are still remain the major health problems for women during the reproductive period in developing and developed countries. *Aim:* To study the spectrum and frequencies of cytomorphological changes that encountered in Cervical smears by Papanicolaou method in accordance with Bethesda system of classification 2014. *Material & Methods:* This is a retrospective study comprising of analysis of 4634 cervical PAP smears examined as a part of hospital based screening programme during the period from January 2015 to December 2018 in the Cytology division of Pathology department, at Shridevi Institute of Medical Sciences and Research hospital, Tumkur, a tertiary care hospital. However the case sheets, pathological slides and reports were reviewed. *Results:* The overall frequency of epithelial cell abnormalities in the present study is 5.2%. The atypical squamous cell of undetermined significance (ASC-US), Low-grade squamous intraepithelial lesion (LSIL), High-grade squamous intraepithelial lesions (HSIL) and carcinoma cervix were 0.8%, 3.1%, 1.2% and 0.1% respectively. *Discussion:* Uterine cervical cancer is the fourth leading cause of death among females in the world and it is the second commonest in India. The cytomorphological changes mainly includes atypical squamous cell of undetermined significance (ASC-US), Low-grade squamous intraepithelial lesion (LSIL), High-grade squamous intraepithelial lesions (HSIL) and carcinoma cervix. *Conclusion:* Pap smear screening is a simple, safe, useful diagnostic tool for early diagnosis and to detect cervical intraepithelial lesions at the earliest. The aim of cervical cancer screening programme is to detect the precursor cervical lesions and not frank cancer cervix. Hence it is desirable to promote easy pap screening test before 40 years of age. As the resources concerning to cytology based activities are less in Indian settings, the WHO recommendation of once in a

life time cervical screening between 35 and 40 years of age is more appropriate to identify the high risk women for carcinoma cervix.

**Keywords:** Bethesda system; Epithelial cell abnormalities; ASCUS; LSIL; HSIL.

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## Introduction

Cervical cancer is the major cause of death among women in developing countries. Uterine cervical cancer is the fourth leading cause of death in the world and it is the second commonest in India among females. Globally, uterine cervical cancers accounts for 15% of all cancers in females.<sup>1</sup> Current data from the National Cancer Registry Program (NCRP) indicates that the most common sites of cancer among women are the breasts and the cervix. Cancer cervix has been the most important cancer among women in the past two decades. In 2007, National cancer registry of India estimated number of new cases more than 1,26,000 new cases occur each year,<sup>3</sup> with five-year survival rate of about 48 percent.<sup>2</sup>

The three screening modalities in early detection of premalignant and malignant lesions of cervix are cytology, visual inspection, and HPV testing. In cytology procedure the cells are scraped from the squamo-columnar junction of the uterine cervix i.e., ectocervix and smearing of scrapes done using glass slide later staining of fixed smears and subjected for reading by a trained cytologist.<sup>4</sup>

Greek scientist Georgia's N. Papanicolaou developed a special type of staining in the year 1950's for the early detection of cervical lesions. Then afterwards it is named as Pap smear test which is of extremely important and accordingly in the prognosis of cervical cancer. Pap smear examination is a relatively inexpensive method and cheap. Hence it can be widely used for mass screening programmes.<sup>5</sup>

In the last 50 years several cervical studies have done in different countries that have shown the role of the Pap smear in the early detection of premalignant and malignant lesions of uterine cervix. Hence it is considered as a cancer screening tool for the uterine cervix in most of the developing countries.<sup>6</sup>

Though the method is easy to perform but it has

its own several limitations, such as low sensitivity, low predictive value, high false-negative rates, and subjective interpretation as one-third of women who progressed to cervical cancer had a normal Pap smear.<sup>7</sup>

Unlike most other malignancies, cancer of cervix is readily preventable when effective screening programmes are conducted to detect and treat its precursor lesions. Since the introduction of Pap test, a dramatic reduction has been observed in the incidence and mortality of invasive cervical cancer worldwide.<sup>8</sup> Cancer cervix is considered to be an ideal gynaecological malignancy for screening as it meets both test and disease criteria for screening. It has a long latent phase during which it can be detected as identifiable and treatable premalignant lesions which precede the invasive disease and the benefit of conducting screening for carcinoma cervix exceeds the cost involved.<sup>9</sup>

## Materials and Methods

### Study design

This is a retrospective study conducted at the Cytology division of Pathology Department from January 2015 to December 2018. A total of 4634 cervical Pap smears were reviewed for epithelial cell abnormalities statistically. The Pap smear specimens were collected at Department of Gynaecology. These specimens were received by Cytopathology division.

The smears were collected by using Ayer's spatula and cervical brush after exposing the uterine cervix by Cusco's speculum. The samples were smeared on prelabelled glass slides were fixed with spray of equal amount of ether and 95% ethanol. Then these slides are stained by Papanicolaou stain and reviewed by cytologists.

The data was reviewed from records over a period of 4 years. An analysis of clinical data pertaining to

the patients history which include age, menstrual history, marital, obstetric, educational history as well as presenting complaints. All the data were tabulated and analysed.

### Analysis

The smears were categorised from different age groups and results were compared for different cytomorphological changes encountered in the cervical Pap smears. Reports were further grouped according to the 2014 Bethesda system of classification. The cervical lesions are morphologically broadly divided into two categories, i.e., Negative for intraepithelial neoplasia (NILM) and Epithelial cell abnormalities which includes both squamous and glandular cells.

The squamous epithelial cell abnormalities were further grouped into:

1. Atypical Squamous cells
  - a. ASC of Undetermined significance (ASC-US)
  - b. ASC cannot exclude high grade squamous intraepithelial lesions (ASC-H)
2. Squamous intraepithelial lesion (SIL)
  - a. Low-grade squamous intraepithelial lesion (LSIL)
  - b. High-grade squamous intraepithelial lesion (HSIL)

The glandular cell abnormalities were grouped into-

1. Atypical endocervical cells not otherwise specified,
2. Atypical endometrial cells not otherwise specified,
3. Atypical glandular cells not otherwise specified,

The malignancy was termed as squamous cell carcinoma.

### Inclusion criteria

Patients presenting with complaints of pain abdomen, inter menstrual and post coital bleeding, vaginal discharge and backache,

### Exclusion criteria

Unsatisfactory Pap smears are excluded from the study.

### Results

A total of 4634 cases were analysed from the records available in the Department of Pathology, Gynaecology and Statistical departments, pertained to patients who underwent Pap screening for evaluation of cervical lesions. The cases were tabulated on age wise basis. The maximum cases belongs to the age group between 30–39 years (48.57%) followed by 40–49 (29.39%) years of age mainly covering prime reproductive ages (Table 1).

**Table 1:** Age wise distribution of cases.

Age in Years	No. of cases	Percentage
Below 20	6	0.12
20–29	682	14.71
30–39	2251	48.57
40–49	1362	29.39
50–59	331	7.14
60 and above	2	0.04
<b>Total</b>	<b>4634</b>	<b>100.00</b>

On the basis of adequacy of the material, the Pap smears were grouped into satisfactory and unsatisfactory or inadequate smears. Out of 4634 smears, 4395 are satisfactory smears which accounts for 94.9% and 239 unsatisfactory or inadequate smears which accounts for 5.1%. This grouping of smears into satisfactory and unsatisfactory category

indicates that the technical skills involved in sample collection, preparation of smears and also smear staining technique. This also signifies good quality screening of cervical lesions. The cytological smear was reported as satisfactory in 94.9% of cases. The percentage of unsatisfactory smears is 5.1% (Table 2)

**Table 2:** Cytological Adequacy of smears

Sl. No.	Type of smear	Numbers	Percentage
1	Satisfactory	4395	94.9
2	Unsatisfactory	239	5.1

The categorisation of cytomorphological changes of cervical lesions were done as per the criteria mentioned in Bethesda system of Cervical smear reporting. Out of 4395 satisfactory smear cases, 4109 cases (93.4%) were diagnosed as Negative for intraepithelial neoplasia (NILM) which comprises of both normal and inflammatory cervical lesions. The percentage of women with abnormal cervical cytology in our study was 5.4%. The epithelial cell abnormalities accounts for 286 (5.4%) cases which includes both squamous and glandular cells. The epithelial abnormalities which includes Atypical squamous cell of

undetermined significance (ASCUS-0.8%), Low-grade squamous intraepithelial lesion (LSIL-3.1%), High-grade squamous intraepithelial lesion (HSIL-1.2%), Atypical glandular cell of Undetermined significance (AGUS-0.2%) and carcinoma (0.1%) (Table 3).

The common presenting complaints of these patients noted in the study group were mainly white discharge, pain abdomen, irregularities in the menstruation such as polymenorrhagia, oligomenorrhagia, bleeding per vagina, inter menstrual bleeding and post coital bleeding, low back ache (Table 4).

**Table 3:** Cytological diagnosis- Categorization of smears

Cytological Diagnosis	No. of cases	Percentage (%)
<b>I. Negative for Intra epithelial lesion (NILM)</b>	4109	93.4
Normal	647	
Inflammatory	3511	
<b>II. Epithelial cell abnormalities</b>		
<b>A. Squamous cell abnormalities</b>	<b>286</b>	<b>6.5</b>
a) Atypical Squamous cells		
ASC of Undetermined significance (ASC-US)	49	
ASC cannot exclude high grade squamous intraepithelial lesions (ASC-H)	35	
b) Squamous intraepithelial lesion (SIL)		
LSIL	141	
HSIL	53	
<b>B. Glandular cell abnormalities</b>		
Atypical glandular cells not otherwise specified,	09	
Squamous cell Carcinoma	02	

**Table 4:** Showing Clinical presentation of cases

Clinical features	Percentage (%)
White discharge	67
Pain abdomen	17
Inter menstrual bleeding	05
Postmenopausal bleeding	04
Post-coital bleeding	03
Back ache	02
Dysuria	02

## Discussion

Cytological smears interpretation is more of subjective. The smears were reviewed for cytological

examination with clinical data. On review of 4395 satisfactory cytological Pap smears 4158 cases (94.6%) were diagnosed as NILM which comprises of both normal and inflammatory cervical lesions.

The epithelial abnormalities were seen in 237 (5.4%) cases which includes Atypical squamous cell of undetermined significance (ASCUS-0.8%), Low-grade squamous intraepithelial lesion (LSIL-3.1%), High-grade squamous intraepithelial lesion (HSIL-1.2%), Atypical glandular cell of Undetermined significance (AGUS-0.2%) and carcinoma (0.1%).

The epithelial abnormalities were found in 5.4% of 4395 satisfactory smears cases. Among these lesions Low grade SILs (LSIL) and Atypical squamous cells-undetermined significance (ASC-S)

were diagnosed more frequently as compared to the other epithelial abnormalities.

The incidence of various epithelial cell abnormalities of cervical lesions of present study has been compared with studies from other regions of India and studies from abroad. The epithelial cell abnormality varies from 1.39% to 13.12%. ASCUS ranges from 0.23 to 9.8%, LSIL ranges from 0.21 to 8.33%, HSIL ranges from 0.16 to 21.8% and carcinoma ranges from 0.06 to 13.7%. The results are tabulated in Table 5.

**Table 5:** Showing prevalence of Epithelial cell abnormalities in different studies of India and comparative studies

Sl. No.	Studies	ASCUS	ASC-H	LSIL	HSIL	Carcinoma
1	Radhika Rajesh <sup>10</sup>	13.12	3.61	2.59	2.77	3.48
2	Bhavika <sup>11</sup>	1.2	2.8	12.4	5	2.4
3	Umarani <sup>12</sup>	4.17	-	1.67	0.64	0.28
4	Safia Rana <sup>13</sup>	-	1.96	1.31	1.63	0.68
5	Bal <i>et al.</i> <sup>14</sup>	5	0.3	2.7	0.3	5
6	Saha <i>et al.</i> <sup>15</sup>	10.3	2.6	3.5	2.1	6
7	Patel <i>et al.</i> <sup>16</sup>	12.98	1.66	8.33	2.66	7
8	Gupta S <i>et al.</i> <sup>17</sup>	5.64	3.36	1	0.34	-
9	Present study	5.4	0.8	3.1	1.2	0.1

In study evaluated by Radhika Rajesh<sup>10</sup> *et al.* reported that they identified ASCUS in 13.12%, ASC-H in 3.61%, LSIL in 2.59%, HSIL-2.77%, and carcinoma in 3.48% which are at the higher side of various epithelial abnormalities as compared with other studies. Gupta S *et al.*<sup>17</sup> reported that they identified ASCUS in 5.64%, ASC-H in 3.36%, LSIL in 1.0%, HSIL-0.34%, and carcinoma in 9% which are at the lower side of various epithelial abnormalities except incidence of carcinoma of cervix. the present study is almost has similar findings of study conducted by Bal *et al* which has identified ASCUS in 5%, ASC-H in 0.3%, LSIL in 2.7%, HSIL-0.3%, and carcinoma in 5%. The study evaluated by Bukhari

MH<sup>21</sup> *et al.* from Pakistan reported ASCUS-9.8% and carcinoma of cervix-3.9% which are at the upper side as compared with studies from other countries. The study evaluated by Unal Osagoglu<sup>22</sup> *et al.* from Turkey reported ASCUS at 0.3%, HSIL at 0.008% and carcinoma of cervix at 0.001%, which is the lowest rates as compared with other studies. The present study is compared with the results of other countries and the results are in between the lowest and higher side (Table 6).

The Pap smear test is a cheap and easily applied screening test. The early diagnosis of cervical cancer can be made by routine Pap smear testing,

**Table 6:** Showing prevalence of epithelial abnormalities in different regions of World and comparison with the present study.

Sl. No.	Studies	Region	ASCUS	ASC-H	LSIL	HSIL	Carcinoma
1	Mulay <i>et al.</i> <sup>18</sup>	Mauritius	1.39	0.64	0.21	0.16	0.06
2	Ranabhat <i>et al.</i> <sup>19</sup>	Nepal	1.7	0.23	0.34	0.68	0.23
3	Ayesha ahmed <sup>20</sup>	Saudi arabia	0.48	0.06	0.19	0.37	0.05
4	Bukhari MH <sup>21</sup>	Pakistan	9.8	3.9	45	21.5	3.9
5	Unal Osagoglu <sup>22</sup>	Turkey	0.3	0.02	0.02	0.008	0.001
6	Present study	Karnataka	5.4	0.8	3.1	1.2	0.1

and thus the incidence of cervical cancer and death rates related to cancer- cervix can be minimized. It is very important to create public awareness about the importance of Pap smear at appropriate intervals in the prevention and early diagnosis of

cervical cancer. Health education should become more widespread and the importance of cervical screening programs and regular check-ups should be emphasized more often on this issue in all the media.

## Conclusion

Cancer cervix is the major public health problem for women in India. Pap smear examination for screening cervical cancer is a simple, safe, cost effective, useful diagnostic tool for early diagnosis and to detect various cervical intraepithelial morphological lesions. The main goal of any public health screening programme is to detect the precursor cervical lesions very early so as to take preventive aspect and not frank cancer cervix. Hence Pap smear examination is really a desirable diagnostic tool before 40 years of age and also to promote Pap screening. In Indian settings, as the resources are less it is easy to adopt Pap test which is the safest procedure to screen cervical lesions once in a life time. Our study reveals the wide range of cervical epithelial cell abnormalities present in the community. The findings provided in our study emphasizes the need for a cervical screening program to estimate the actual magnitude of cervical epithelial cell abnormalities and also to identify females who are 'at risk' and to prevent further mortality from cervical cancer.

## Ethical clearance

The study was presented before ethical committee and ethical clearance was granted.

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