



CYTOLOGICAL PATTERNS OF CERVICAL PAP SMEARS AND IT'S UTILITY IN EARLY DETECTION OF CERVICAL CANCER

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ABSTRACT **INTRODUCTION:** Carcinoma cervix is the 2nd most common cancer in females in the world, while it is the leading cause of morbidity and mortality in developing countries like India. It is estimated that in India 1,22,844 new cases occurs each year due to lack of proper screening facilities or lack of awareness. Cervical cytology by PAP is an effective means of screening as carcinoma cervix is a preventable disease due to long pre invasive stage, early detection and treatment. Objective of our study is to study the frequency of various inflammatory and epithelial abnormalities in a female, to study premalignant and malignant lesions in relation to age, parity, presenting complaint, per speculum examination and histological correlation whenever possible. **METHODOLOGY:** This is a retrospective study of 1099 cervical smears, screened by conventional PAP smear method and reported based on Bethesda system 2014, at our institute over a period of 10months (January- October,2021). **RESULTS:** In this study, age of women ranged from 18 to 87 years, prominent complaints among the participants was abdominal pain. Out of 1099smears, (8.22%) was found to be unsatisfactory, NILM (90.71%), ASCUS(0.45%), LSIL(0.10%), HSIL(0.20%), Squamous Cell Carcinoma(0.10%) and Aadenocarcinoma (0.20%).56 PAP smears were followed by histological examination. **CONCLUSION:** Cervical cytology is simple, noninvasive, cost effective and sensitive tool for early detection of premalignant and malignant lesions of cervix and helps the clinician in effective management of these cases. It should be established as a routine screening procedure to reduce the treatment burden, morbidity and mortality.

KEYWORDS : PAP smear, Cervical cytology, Screening test, Bethesda

INTRODUCTION:

Cervical cancer represent significant health problem and leading cause of morbidity and mortality among the women globally [1][2][3]. According to World Health Organization (WHO), it ranks as the second most common cancer in females [4]. Global report published by WHO in 2022, shows that around 660,000 women were diagnosed with carcinoma cervix and 350,000 died from it [5].

Cervical cancer is more often preceded by a long phase of changes which takes 15-16 year to develop invasive cancer. So, earlier detection and treatment of these cellular changes can prevent progression to cancer [4]. The 5-year survival rate of cervical cancer when detected at the earliest stage is approximately 92% [1].

Papanicolaou (PAP) smears remain the cornerstone of mass cervical cancer screening program. It is used as screening as well as diagnostic tool [1] [5]. Well organized cytology based screening program have drastically reduced the incidence and mortality of cervical cancer. However variations in screening practices have led to differences in the frequency of cervical cancer. To address these inconsistencies, The Bethesda System for reporting cervical cytology was developed as a uniform system of terminology, providing clear guidelines for clinical management [5].

AIM:

This study aims to analyze the pattern of various cervical smear abnormalities, determine the frequency of premalignant and malignant lesion of cervix and to study the clinic-pathological aspect of various cervical lesions.

MATERIALS AND METHODS:

This retrospective cross-sectional study was conducted on conventional cervical smears processed and reported in the pathology department of tertiary care hospital, South Gujarat region, India; over a period of 10 month from January 2021 to October 2021. The study included all non pregnant women who underwent PAP testing during this period who presented to gynecological outpatient department with various gynecological complains. Relevant clinical details were recorded. PAP smears were obtained from the squamocolumnar junction (from ectocervix and endocervix) using Ayre's spatula. The

material obtained was quickly smeared on a clear glass slide and these smears were immediately fixed in 95% ethyl alcohol. In pathology lab, the slides were stained with pap stain and examined under light microscope. Cytological interpretation of the smears was conducted according to The Bethesda System of Reporting Cervical Cytology-2014. [6]

RESULT:

A total of 1099 cases were analyzed based on age of the patient, parity, presenting complain, per-speculum examination findings and cytological findings as per The Bethesda System of Reporting Cervical Cytology-2014. [6] The result provides insight into the magnitude of the problem in the region and also guides us about how we have to strengthen the cervical cancer screening programmers and raise awareness among general public.

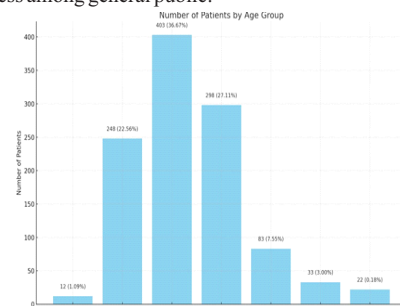


Chart 1: Distribution of patient by Age

The majority of patients were in the age group of 31-40 years (403 cases, 36.67%), followed by 41-50 years (298 cases, 27.11%) with a mean age of 38.25 year.

Pap smear findings were also compared with final histological diagnosis on cervical biopsy.

Most women in the study were multiparous. Of the 1099 patients, 431(39.22%) had parity of 2, followed by 326(29.66%) had parity of 3. There were 47(4.28%) nulliparous patient.

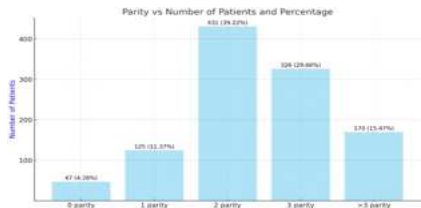


Chart: 2 Distribution of patient by Parity

Table 1 : Distribution of patients according to presenting symptoms.

Presenting symptom	Number of patients
Pain in abdomen	336(30.57%)
Irregular bleeding per vagina	279(25.38%)
White discharge	181(16.46%)
Asymptomatic	129(11.73%)
Something coming out from vagina	115(10.46%)
Frequent micturition	68(6.18%)
Vulval Itching	25(2.27%)
Post menstrual bleed	16(1.46%)
Post-coital bleed	3(0.27%)
Other	31(2.82%)

Abdominal pain was the most common presenting symptoms, observed in 336(30.57%) patients, followed by irregular vagina bleeding in 279(25.38%) patients and white discharge per-vagina in 181(16.46%)patients.

Table 2: Distribution of patient according to per speculum examination

Sign	Number of patients
Healthy vagina and cervix	663(60.32%)
Hypertrophied cervix	133(12.10%)
Cervical erosion	120(10.92%)
Prolapse	112(10.19%)
Discharge present per vagina	56(5.09%)
Cervix bleed on touch	11(1.0%)
Other	45(4.09%)

The majority of patients 663(60.32%) had a normal per speculum examination, followed by hypertrophied cervix in 133(12.10%) patients. Cervical erosion and prolapse was observed in 120(10.92%) and 112(10.19%)patient respectively.

Table 3: Distribution of epithelial lesions on cytology according to Bethesda system (2014)

Diagnosis according to TBSRCC-2014	Number of cases
Unsatisfactory	91(8.22%)
Negative for Intraepithelial Lesion or Malignancy (NILM)	997(90.71%)
Atypical Squamous cell of undetermined Significance ASC-US	5(0.45%)
Atypical Squamous cell cannot exclude High-grade Squamous Intraepithelial Lesions (ASC-H)	0
Low-grade Squamous Intraepithelial Lesions (LSIL)	1(0.10%)
High-grade Squamous Intraepithelial Lesions (HSIL)	2(0.20%)
Squamous Cell Carcinoma (SCC)	1(0.10%)
Adenocarcinoma	2(0.20%)
Total	1099 (100%)

Table 4: Distribution of NILM lesion

Non neoplastic lesions of cervix	Number of cases (%)
Nonspecific Inflammatory smears	487
Bacterial Vaginosis	104
Atrophy	44
Candida	34
Metaplastic changes	6
Trichomonas Vaginalis	6

The histopathological correlation of cervical cytology findings is crucial for validating the accuracy of cytological screening methods and for guiding clinical management. Table 5: presents the distribution of various histopathological diagnoses associated with cytological findings according to The Bethesda System for Reporting Cervical Cytology (2014).

Table 5: Correlation of cytological findings with histopathological diagnosis on cervical biopsy

Diagnosis	Cervicitis	Hypertrophy	Metaplasia	CIN 1	CIN 2	CIN3 /CIS	SCC	Adeno-carcinoma
Unsatisfactory	07	08						
NILM	20	10	03	01		01		
ASC-US				02				
LSIL				01				
HSIL					01			
SCC							01	
Adenocarcinoma								01

IMAGES:

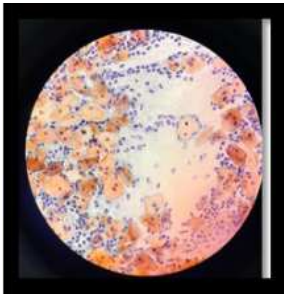


Figure 1: NILM-Bacterial vaginosis + Trichomonas Vaginalis, PAPstain, 40X

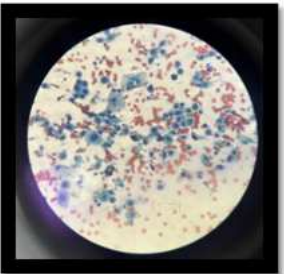


Figure 2: LSIL, PAP stain, 40X

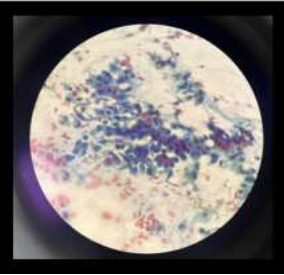


Figure 3: HSIL, PAP stain, 40X

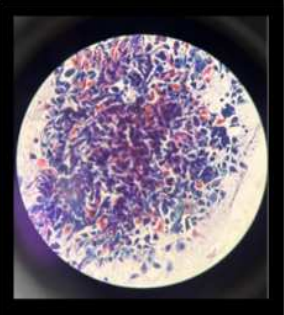


Figure 4: SCC, PAP stain, 40X

DISCUSSION:

A regular screening program is an effective method to detect cervical cancer in its early stages, such as dysplasia, thereby reducing morbidity and mortality in the community. Cytology remains the most effective and practical method for cervical cancer screening. It is simple, relatively inexpensive, reliable, time-efficient, and easily applicable.^[1]

In the present study, total 1099 cervical pap smears from non pregnant women over 18 years of age attending tertiary care hospital in South Gujarat region were evaluated. Patients were evaluated based on age, parity, presenting complaint and per speculum examination.

The majority of women were in the age group of 31 to 40 years (36.67 %) followed by 41 to 50 years (27.11%), with mean age of 38.25 year. Similar results were also found in studies conducted by Nidhi Singh et al.,^[1] Mehak Reyaz et al.,^[4] Umrani MK et al.,^[7] and Arul anne rose et al.^[8] These age groups were found to be more vulnerable for manifestations of cervical pathology in all these studies also.

A large proportion of patients were multiparous (80.4%), which aligns with other studies by Nidhi Singh et al.^[1] and Mehak Reyaz et al.^[4] High parity is known to be associated with cervical neoplasia, possibly due to hormonal effects on cervical epithelium or prolonged immunosuppression during multiple pregnancies.

The most common presenting complaint was abdominal pain which was found in 30.57 % patients followed by irregular bleeding Per Vagina in 25.38% and white discharge per vagina in 16.47 % patients. These findings are consistent with the result of other studies conducted by Nidhi Singh et al.^[1] Supriti Ghosh et al.^[10] and Pushp Lata Sachan et al.,^[11] Where these symptoms were also frequently reported among women undergoing cervical cancer screening.

In this study, 60.32% of patients had a normal per speculum examination, with hypertrophied cervix and cervical erosion being the next most common findings. These results highlight the importance of a thorough physical examination in identifying potential cervical abnormalities that may not be immediately apparent through symptoms alone.

The cytological evaluation of cervical smears according to The Bethesda System for Reporting Cervical Cytology (2014) revealed that the majority of cases (90.71%) were classified as Negative for Intraepithelial Lesion or Malignancy (NILM). The low incidence of atypical squamous cells of undetermined significance (ASC-US), low-grade squamous intraepithelial lesion (LSIL), high-grade squamous intraepithelial lesion (HSIL), squamous cell carcinoma (SCC), and adenocarcinoma in this study further underscores the importance of regular screening to detect such lesions early. Corresponding results of other studies are summarized in Table: 6

The study also found that the most common non-neoplastic lesion observed was nonspecific inflammatory smears, accounting for 44.33% of cases. This finding is in line with studies by Bhutia K et al., Gita Jayalakshmi et al., and Mehak Reyaz et al., which also reported a high prevalence of inflammatory lesions in cervical smears.

Among cases available for histopathological correlations, majority of NILM cases corresponded to chronic Cervicitis, hypertrophy and metaplasia upon biopsy. A small number of cases were identified as CIN 1, CIN 2, or even CIN 3/carcinoma in situ, highlighting the limitations of cytology in detecting all cases of cervical dysplasia. The presence of SCC and adenocarcinoma in the study emphasizes the necessity for continued vigilance and follow-up in women with suspicious findings on PAP smears.

Table 6: Comparison of cervical cytological cases categorized according to Bethesda system of reporting cervical cytology 2014 with other studies.

Diagnosis Type	Garima Malpani ^[5]	Umrani MK ^[7]	Manjitsingh Bal ^[9]	Vaddatti Tejeswini ^[13]	Ninder Kumar ^[14]	This study
NILM	6921cases (97.96%)	1164cases (82.08%)	273 cases (91%)	196 cases (93.33%)	771 cases (77.1%)	997cases (90.71 %)

ASC-US	30cases (0.42%)	69cases (4.87%)	1case (0.3%)	5 cases (2.38%)	44 cases (4.4%)	5cases (0.45%)
LSIL	40cases (0.57%)	23cases (1.62%)	8cases (2.7%)	-	-	1case (0.1%)
ASC-H	-	8cases (0.56%)	-	2 cases (0.95%)	7 cases (0.7%)	-
HSIL	38cases (0.54%)	9 cases (0.64%)	2 cases (0.3%)	3 cases (1.43%)	14 cases (1.4%)	2cases (0.2%)
Squamous cell carcinoma	34cases (0.48%)	4cases (0.28%)	3cases (1%)	1 case (0.48%)	4 cases (0.4%)	1case (0.1%)
Adeno-carcinoma	3cases (0.3%)	-	1case (0.3%)	-	-	2cases (0.2%)
Unsatisfactory	-	132(9%)	12cases (4.1%)	2 cases (0.95%)	121 cases (12.1%)	91 (8.2%)

CONCLUSION:

The findings of this study highlight the critical importance of regular cervical cancer screening programs in detecting early-stage lesions and preventing the progression to invasive cancer. The majority of the lesions detected were non-neoplastic, with a small percentage of premalignant and malignant lesions. The results underscore the effectiveness of the PAP smear as a screening tool, particularly in identifying pre malignant cases, and demonstrate the need for ongoing education and awareness campaigns to encourage women to participate in regular screening.

Given the high prevalence of cervical cancer globally, especially in low-resource settings, it is essential to strengthen screening programs and ensure that they are accessible to all women. This study contributes valuable data to the ongoing efforts to reduce the burden of cervical cancer through early detection and treatment.

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