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A Study of cytopathological pattern of cervical papanicolaou smear among post menopausal women

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Abstract

Background: Cancer of Cervix cancer remains one of the most frequent malignancies in women worldwide, particularly in developing countries. Early detection through cervical pap smear screening can significantly reduce incidence and mortality rates.

Aim: To evaluate the cytopathological patterns in cervical Pap smears of post-menopausal women and classify the observed cytopathological abnormalities based on the Bethesda system for reporting cervical cytology, 2014.

Materials and Methods: A retrospective study during one year of study period was conducted on cytology of cervical pap smears of 450 post-menopausal women at the Department of Pathology, GMERS Medical College and Hospital, Sola, Ahmadabad. The rapid Papanicolaou staining technique was used for staining all the cervical pap smears as per Papanicolaou stain kit instruction. Cervical pap smears were examined under light microscopy and lesions were classified according to the Bethesda system for reporting cervical cytology, 2014.

Results: Out of 450 post menopausal women, 232(51.56%) cases were categorized in Negative for intraepithelial lesion or malignancy (NILM), 104(23.11%) cases were categorized in Inflammatory Lesions, 39(8.66%) cases were categorized in Atrophy changes, 34(7.55%) cases were categorized into Epithelial Cell Abnormality.

Conclusion: The cervical pap smears test is simple, effective, noninvasive and less expensive procedure to detect pre-invasive cervical epithelial lesion. Cervical pap smear screenings are crucial for early detection and prevention of cervical cancer in postmenopausal women. Regular screenings and increased awareness are necessary to improve outcomes in post menopausal women.

Keywords: Postmenopausal women, cervical pap smear, cytopathological changes

Introduction

Cancer of Cervix is one of the most frequent malignancies noted in women all over the world. Nearly, 15% of malignancies diagnosed in women worldwide are cervical cancers with an estimated 440,000 new cases each year. Eighty percent of these occurrences have place in developing countries^[1].

The National Cancer Registry Program of India estimates that approximately 100,000 women in India develop cervical cancer annually^[2]. For most women, cervical cancer is a preventable disease^[3]. Fortunately, cervical cancer's natural course allows for early detection of the disease during a curable pre-invasive stage by screening and early care, halting its growth into a potentially fatal condition^[4]. One of the finest screening methods is PAP smear^[5].

Although the incidence of cervical cancer has decreased notably in urban areas of India, it remains a critical issue in rural regions^[6]. Given that cervical cancer incidence peaks in India between the ages of 55 and 59, postmenopausal women have to be considered for Routine Pap smear screenings as Patients with carcinoma cervix are frequently referred to hospitals in the latter stages of the illness^[7]. It is noted that only 12% of women between the ages of 45 to 85 have a cervical checkup^[8]. When a successful screening program and treatment are accessible, the incidence of cervical cancer falls off significantly.

According to, there is a significant rate of squamous intraepithelial lesions of the cervix (SIL), particularly high-grade squamous intraepithelial lesions of the cervix (HSIL)^[9].

Nearly, 50% of clinically significant cervical dysplasia and 70% of cervical malignancies are caused by high-risk human papilloma virus (hrHPV), which is a major risk factor for the

development of cervical dysplasia and cervical cancer^[10]. Cervical cancer incidence and death have dramatically decreased since Pap smear screening for cervical cancer was introduced into clinical practice in the 1960s in United State by Dr. George^[11]. In women 30 years of age and above, co-testing for hrHPV has become standard, complementing the sensitivity of the Pap smear for detection of cervical dysplasia and cancer. According to Indian standards, women at age 21-29 years should have pap smear every 3 years. Other test include Visual Inspection with Acetic Acid(VIA) recommended for women age 30-49 years and HPV testing was done in 30-65 years age group every 5 years^[12]. The present study was done to study the cytopathological patterns of cervical Pap smears in post-menopausal female patients and classify the cytopathological abnormalities using the Bethesda system for reporting cervical cytology, 2014^[13].

Materials and Methods

A retrospective 1 year study was conducted on cervical pap smears of 450 post menopausal women at the Department of Pathology, GMERS Medical College and Hospital, sola, Ahmadabad.

Study period: This study has duration of 1 year starting from 1st January 2023 to 31st December 2023.

Sample size: This study included a sample size of 450 post menopausal women.

Inclusion criteria

- All post-menopausal women aged over 45 years, who attending at outdoor patient in the Department of Obstetrics and Gynaecology, GMERS Medical College and Hospital, Sola, Ahmadabad.
- All Post-menopausal women aged over 45 years with chief complaints of discharge, dyspareunia, vaginal itching, postmenopausal bleeding and something coming out from vagina were included in the study.

Exclusion criteria

Post-menopausal women who refused to give consent and age less than 45 years were excluded.

Procedure

- Informed consent was taken prior to the procedure of cervical smear collection. The cervical smears were collected in OPD by Obstetrics and Gynaecology Department, GMERS Medical College and Hospital, Sola, Ahmadabad.
- Two smears (one labeled as cervical and other labeled as endocervical) were prepared on a clean two glass slide with the help of Modified Ayre's spatula/endocervical brush by transferring the material and immediately fixed by 95% ethyl alcohol for at least 15 minutes by Obstetrics and Gynaecology Department, GMERS Medical College and Hospital, Sola, Ahmadabad.
- These cervical pap smears were received at the Department of Pathology, GMERS Medical College and Hospital, Sola, Ahmadabad along with a completely filled cytology requisition form.
- Rapid Papanicolaou staining technique was used for staining all the cervical pap smears according to Papanicolaou stain kit instruction.
- All Cervical pap Smears were examined under light microscopy and lesions were classified according to the Bethesda system for reporting cervical cytology, 2014.
- Total 450 samples of cervical pap smear were studied in 1 year study period.
- Obtained Data were tabulated and Analyse in Descriptive Statistics using Microsoft Excel 2019.

Results

In the present study, a total 450 cases of cervical Pap smears of post-menopausal women above 45 years of age were analyse retrospectively during the study period.

Table 1 shows that study participants were distributed according to age group. The minimum age was 45 and the maximum was 86 years. The mean age of the participant was 51.49± 8.22 years. The majority of women, belongs to the age group of 45-54 (70.67%) years followed by 55-64 (17.78%) years, 65-74(8.89%) years, 75-85 (2.44%) years and only one case (0.22%) in more than 85 years.

Figure 1 shows that study participants were distributed in percentage according to age group.

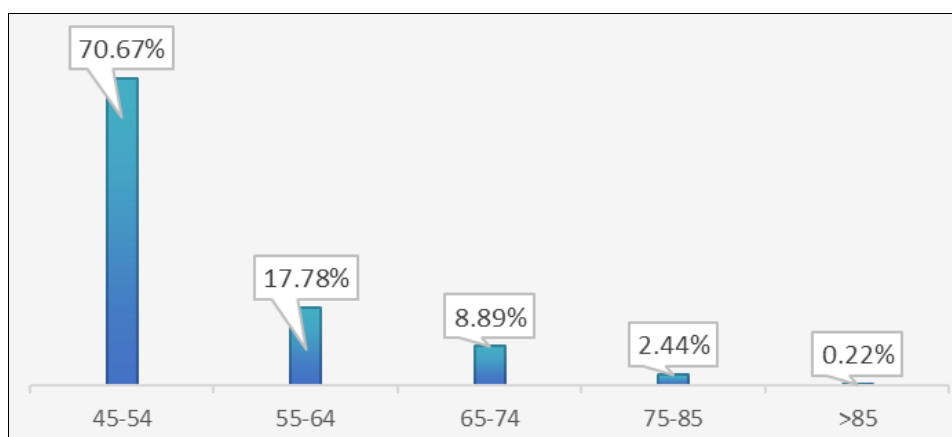


Fig 1: Distribution of study participants according to Age group(N=450)

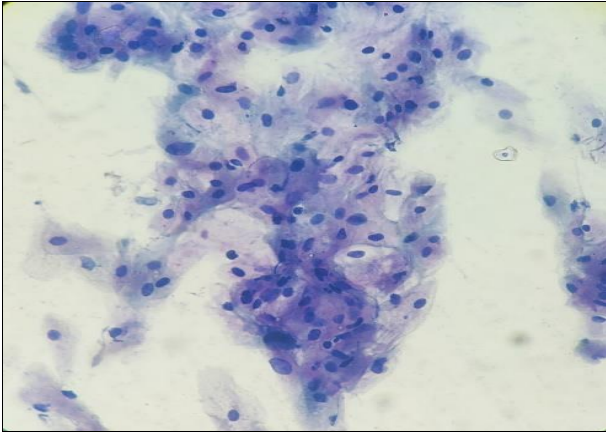


Fig 2: ASC-US (40x)

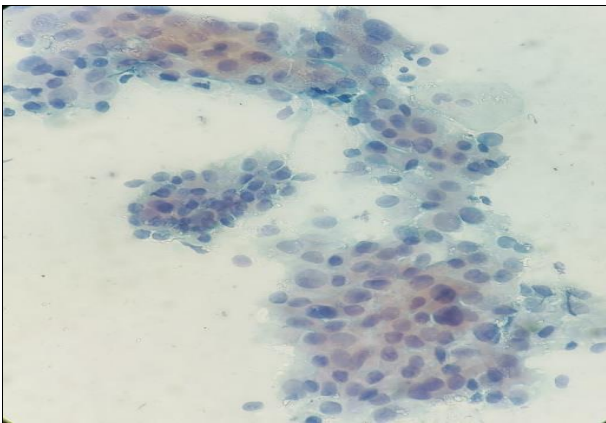


Fig 3: LSIL (40x)

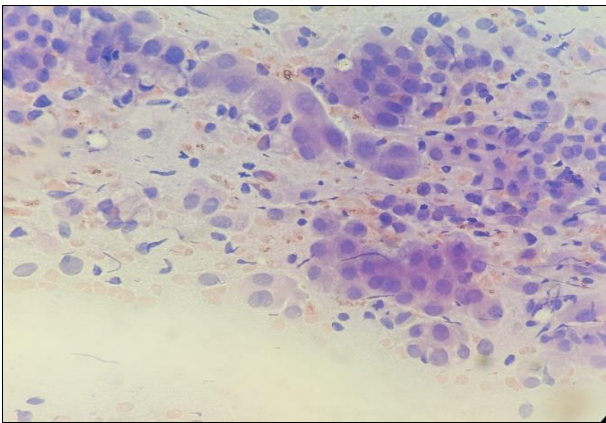


Fig 4: HSIL (40x)

Table 2 shows that out of 450 post menopausal women, 234 (52%) cases were presented with chief complain of white discharge followed by 73 (16.22%) cases were presented with abdominal pain, 68 (15.11%) cases were presented with something coming out PV, 54 (12%) cases were presented with Post menopausal bleeding and 21 (4.67%) cases were presented with Dyspareunia.

Cytopathological cervical pap smear findings were categorized into Negative for Intraepithelial Lesion or Malignancy (NILM), Inflammatory lesions, Atrophy changes and Epithelial cell abnormalities by using the Bethesda system for reporting cervical cytology, 2014.

Table 3 shows that out of 450 post menopausal women, 232 (51.56%) case were reported as NILM and followed by 39 (8.67%) cases were atrophy changes and 41 (9.11%) cases were unsatisfactory.

Out of 104 (23.11%) cases were reported as Inflammatory lesions, 43 (9.56%) cases were reported as Reactive Cellular Changes followed by 21 (4.67%) cases were Trichomonas Vaginalis, only 1 (0.22%) case was Candida and 39 (8.67%) cases were Bacterial Vaginosis.

Out of 34(7.55%) cases of Epithelial cell abnormalities, 7 (1.56%) cases were reported as ASCUS(Atypical Squamous Cells Of Undetermined Significance) followed by 5 (1.11%) cases were ASC-H(Atypical Squamous Cells -Cannot Exclude HSIL), 12 (2.67%) cases were LSIL(Low Grade Squamous Intraepithelial Lesion), 9 (2.00%) cases were HSIL(High Grade Squamous Intraepithelial Lesion) and Only 1 (0.22%) case of AGC-NOS (Atypical Glandular Cells-Not Otherwise Specified) was reported in the present study.

Table 4 shows that All Post menopausal women presented with chief complain were compared with the cervical pap smears cytopathological findings by using the Bethesda system for reporting cervical cytology, 2014.

Out of total 64 post menopausal women presented with chief complain of Abdominal pain, 58 (91%) cases were reported as NILM(Negative for Intraepithelial Lesion or Malignancy) followed by 6 (9%) cases were Bacterial Vaginosis.

Out of total 21 post menopausal women presented with chief complain of Dyspareunia all were (100%) reported as Trichomonas Vaginalis in cervical pap smears.

Out of total 47 post menopausal women presented with chief complain of postmenopausal bleeding, 8 (17%) cases were reported as NILM(Negative for Intraepithelial Lesion or Malignancy) followed by 4 (9%) cases were reactive cellular changes, 1 (2%) cases were Atrophy changes and rest were show epithelial cell abnormalities like 7 (15%) cases as ASCUS(Atypical Squamous Cells Of Undetermined Significance) followed by 5 (11%) cases as ASC-H (Atypical Squamous Cells -Cannot Exclude HSIL),12 (26%) cases as LSIL(Low Grade Squamous Intraepithelial Lesion), 9 (19%) cases as HSIL(High Grade Squamous Intraepithelial Lesion) and 1 (2%) case as AGS-NOS (Atypical Glandular Cells-Not Otherwise Specified) noted on cervical pap smears.

Out of total 62 post menopausal women presented with chief complain of something coming out of vagina in which 6(10%) cases were reported as NILM (Negative for Intraepithelial Lesion or Malignancy) followed by 17 (27%) cases were reactive cellular changes, 1(2%) case was Bacterial Vaginosis and 38(61%) cases were Atrophy changes on cervical pap smears. Out of total 215 post menopausal women presented with chief complain of white discharge, 160 (74%) cases were reported by NILM (Negative for Intraepithelial Lesion or Malignancy) followed by 22 (10%) cases were reactive cellular changes, 32 (15%) cases were Bacterial Vaginosis and only 1 (0.5%) case was candida on cervical pap smear.

Table 5 shows that Age group wise distribution of Post menopausal women were compared with epithelial cell abnormalities on cervical PAP smears.

Out of 34 post menopausal women of epithelial cell abnormalities, 20 (58.82%) cases were belonged to 45-54 years of age group in which 5 cases were reported as ASCUS(Atypical Squamous Cells Of Undetermined Significance) followed by 3 cases were reported as ASC-H(Atypical Squamous Cells -Cannot Exclude HSIL), 6 cases were reported as LSIL(Low Grade Squamous Intraepithelial Lesion) and 5 cases were reported as HSIL(High Grade Squamous Intraepithelial Lesion)and only

one case was reported as AGC-NOS on cervical pap smears. Out of 34 post menopausal women of epithelial cell abnormalities, 7 (20.59%) cases were belonged to 55-64 years of age group in which 2 cases were reported as ASCUS (Atypical Squamous Cells Of Undetermined Significance) followed by one case was reported as ASC-H (Atypical Squamous Cells -Cannot Exclude HSIL), 3 cases were reported as LSIL (Low Grade Squamous Intraepithelial Lesion) and only one case was reported as HSIL (High Grade Squamous Intraepithelial Lesion) on cervical pap smears.

Out of 34 post menopausal women of epithelial cell abnormalities, 4 (11.76%) cases were belonged to 65-74 years age group in which one case was reported as ASC-H (Atypical Squamous Cells -Cannot Exclude HSIL) followed by one case was reported as LSIL (Low Grade Squamous Intraepithelial Lesion) and 2 cases were reported as HSIL (High Grade Squamous Intraepithelial Lesion) on cervical pap smears.

Out of 34 post menopausal women of epithelial cell abnormalities, 3 (8.82%) cases were belonged to 75-85 years in which 2 cases were reported as LSIL (Low Grade

Squamous Intraepithelial Lesion) and only one was reported as HSIL (High Grade Squamous Intraepithelial Lesion) on cervical pap smears.

Table 1: Distribution of study participants according to Age group

Age group (in years)	No.	%
45-54	318	70.67%
55-64	80	17.78%
65-74	40	8.89%
75-85	11	2.44%
>85	1	0.22%
Total	450	100%

Table 2: Distribution of study participants according to Presenting Chief Complain

Chief Complain	No.	%
Abdominal pain	73	16.22%
White Discharge	234	52.00%
Something Coming out per vagina	68	15.11%
Post-Menopausal Bleeding	54	12.00%
Dyspareurenia	21	4.67%
Total	450	100%

Table 3: Cytopathological findings of cervical PAP smear examination

Lesion	No	%
Unsatisfactory	41	9.11%
NILM	232	51.56%
Inflammatory lesion	104	23.11%
Inflammation associated with Reactive Cellular Changes	43	9.56%
Inflammation associated with Trichomonas vaginalis	21	4.67%
Inflammation associated with Candida	1	0.22%
Inflammation associated with Bacterial Vaginosis	39	8.67%
Atrophy	39	8.66%
Epithelial cell abnormalities	34	7.55%
Squamous Cell Abnormalities	33	7.33%
ASCUS	7	1.56%
ASC-H	5	1.11%
LSIL	12	2.67%
HSIL	9	2.00%
Glandular Cell Abnormalities: AGC-NOS	1	0.22%
Total	450	100%

Table 4: Distribution of study participants according to Presenting chief Complaints with Cytopathological findings

Clinical complaint	NILM	Inflammatory Lesions				Atrophy Changes	Squamous Cell Abnormalities				Glandular Cell Abnormality AGC-NOS	Total
		Reactive Changes	Bacterial Vaginosis	Candida	Trichomonas Vaginalis		ASC-US	ASC-H	LSIL	HSIL		
Abdominal pain	58 (91%)	-	6 (9%)	-	-	-	-	-	-	-	-	64
Dyspare neuria	-	-	-	-	21 (100%)	-	-	-	-	-	-	21
Post menopausal bleeding	8 (17%)	4 (9%)	-	-	-	1 (2%)	7 (15%)	5 (11%)	12 (26%)	9 (19%)	1 (2%)	47
Something coming out Per vagina	6 (10%)	17 (27%)	1 (2%)	-	-	38 (61%)	-	-	-	-	-	62
White discharge	160 (74%)	22 (10%)	32 (15%)	1 (0.5%)	-	-	-	-	-	-	-	215
Total	232	43	39	1	21	39	7	5	12	9	1	409

Table 5: Distribution of study participants according to Age wise Epithelial cell abnormalities

Age Group (in years)	Cytopathological Reporting Category						
	Squamous Cell Abnormalities				Glandular Cell Abnormalities	Total no. of Cases	
	ASC-US	ASC-H	LSIL	HSIL	AGC-NOS	N	%
45-54	5	3	6	5	1	20	58.82%
55-64	2	1	3	1	-	7	20.59%
65-74	-	1	1	2	-	4	11.76%
75-85	-	-	2	1	-	3	8.82%
TOTAL	7	5	12	9	1	34	100%

Table 6: The Bethesda system 2014

Table 1. The 2014 Bethesda System	
SPECIMEN TYPE: <i>Indicate conventional smear (Pap smear) vs. liquid-based preparation vs. other</i>	
SPECIMEN ADEQUACY	
<input type="checkbox"/> Satisfactory for evaluation (<i>describe presence or absence of endocervical/transformation zone component and any other quality indicators, e.g., partially obscuring blood, inflammation, etc.</i>) <input type="checkbox"/> Unsatisfactory for evaluation . . . (<i>specify reason</i>) <input type="checkbox"/> Specimen rejected/not processed (<i>specify reason</i>) <input type="checkbox"/> Specimen processed and examined, but unsatisfactory for evaluation of epithelial abnormality because of (<i>specify reason</i>)	
GENERAL CATEGORIZATION (optional)	
<input type="checkbox"/> Negative for Intraepithelial Lesion or Malignancy <input type="checkbox"/> Other: See Interpretation/Result (<i>e.g., endometrial cells in a woman ≥45 years of age</i>) <input type="checkbox"/> Epithelial Cell Abnormality: See Interpretation/Result (<i>specify 'squamous' or 'glandular' as appropriate</i>)	
INTERPRETATION/RESULT	
NEGATIVE FOR INTRAEPITHELIAL LESION OR MALIGNANCY <i>(When there is no cellular evidence of neoplasia, state this in the General Categorization above and/or in the Interpretation/Result section of the report—whether or not there are organisms or other non-neoplastic findings)</i>	
Non-Neoplastic Findings (optional to report)	
<input type="checkbox"/> Non-neoplastic cellular variations <ul style="list-style-type: none"> <input type="checkbox"/> Squamous metaplasia <input type="checkbox"/> Keratotic changes <input type="checkbox"/> Tubal metaplasia <input type="checkbox"/> Atrophy <input type="checkbox"/> Pregnancy-associated changes <input type="checkbox"/> Reactive cellular changes associated with: <ul style="list-style-type: none"> ➢ Inflammation (includes typical repair) <ul style="list-style-type: none"> <input type="checkbox"/> Lymphocytic (follicular) cervicitis ➢ Radiation ➢ Intrauterine contraceptive device (IUD) <input type="checkbox"/> Glandular cells status post hysterectomy	
Organisms	
<input type="checkbox"/> <i>Trichomonas vaginalis</i> <input type="checkbox"/> Fungal organisms morphologically consistent with <i>Candida</i> spp. <input type="checkbox"/> Shift in flora suggestive of bacterial vaginosis <input type="checkbox"/> Bacteria morphologically consistent with <i>Actinomyces</i> spp. <input type="checkbox"/> Cellular changes consistent with herpes simplex virus <input type="checkbox"/> Cellular changes consistent with cytomegalovirus	
OTHER	
➢ Endometrial cells (<i>in a woman ≥45 years of age</i>) <i>(Specify if "negative for squamous intraepithelial lesion")</i>	
hesda 2014	Acta Cytologica 2015;59:121-132 DOI: 10.1159/000381842

Table 1 (continued)**EPITHELIAL CELL ABNORMALITIES****SQUAMOUS CELL**

- Atypical squamous cells
 - of undetermined significance (ASC-US)
 - cannot exclude HSIL (ASC-H)
- Low-grade squamous intraepithelial lesion (LSIL)
(encompassing: HPV/mild dysplasia/CIN 1)
- High-grade squamous intraepithelial lesion (HSIL)
(encompassing: moderate and severe dysplasia, CIS; CIN 2 and CIN 3)
 - with features suspicious for invasion (if invasion is suspected)
- Squamous cell carcinoma

GLANDULAR CELL

- Atypical
 - endocervical cells (NOS or specify in comments)
 - endometrial cells (NOS or specify in comments)
 - glandular cells (NOS or specify in comments)
- Atypical
 - endocervical cells, favor neoplastic
 - glandular cells, favor neoplastic
- Endocervical adenocarcinoma in situ
- Adenocarcinoma
 - endocervical
 - endometrial
 - extrauterine
 - not otherwise specified (NOS)

OTHER MALIGNANT NEOPLASMS: (specify)**ADJUNCTIVE TESTING**

Provide a brief description of the test method(s) and report the result so that it is easily understood by the clinician.

COMPUTER-ASSISTED INTERPRETATION OF CERVICAL CYTOLOGY

If case examined by an automated device, specify device and result.

EDUCATIONAL NOTES AND COMMENTS APPENDED TO CYTOLOGY REPORTS (optional)

Suggestions should be concise and consistent with clinical follow-up guidelines published by professional organizations (references to relevant publications may be included).

Discussion

Total 450 post menopausal women were studied for cervical Pap smears according to the Bethesda system for reporting cervical cytology, 2014 as in table 6 and the findings of the study were compared to other similar study findings conducted in India and in foreign countries. The comparative analysis of cytopathological findings from cervical Pap smears reported according to the Bethesda system for reporting cervical cytology, 2014 in postmenopausal women highlights several key observations and differences across various studies. It was noted that, In

India, the peak age for cervical cancer incidence is 55-59 years according to Pradhan study [14].

In present study, out of 450 post menopausal women most of were found in 45-54 (70.67%) years age group followed by 55-64(17.78%) age group, 65-74 (8.89%) age group, 75-85 (2.44%) years age group and more than 85 (0.22%) year. Similar findings was noted in study conducted by Suchitra K.N. *et al* [15] (N=198) in India where the most of women were from 45-54 years (54.54%) followed by 55-64(26.76%), 65-74 (12.13%) and more than 75 years (6.56%).

Most common chief complain across all studies is white discharge. In the present study, 52% of women reported this complaint, which correspond with Sakshi Agrawal (56%)^[16] and Bindu Singh Gaur^[17] (56.3%). This symptom's prevalence rating its significance as a clinical indicator in postmenopausal women. Other common symptoms, such as postmenopausal bleeding and something coming out per vagina (PV) are consistently reported across Sakshi Agrawal^[16] and Bindu Singh Gaur^[17], indicating their importance for clinical evaluation. The NILM (Negative for Intraepithelial Lesion or Malignancy) category shows 51.56% in the present study which is lower than Bindu Singh Gaur (71.4%)^[17] and Sakshi Agrawal (70%)^[16] but significantly higher than Suchitra K.N. (8.6%)^[15].

There is 31.7% of cases were reported as Inflammatory lesion in our study which is similar with Bindu Singh Gaur (21.5%)^[17] and Sakshi Agrawal^[16] (20%), but considerably lower than Suchitra K.N.'s (48.9%)^[15]. In the present study, Bacterial Vaginosis and infection due to *Trichomonas Vaginalis* was higher than the candida and this finding were similar with Srivastava *et al*^[18], Nikumbh *et al*^[11] and Arora *et al*^[19]. Out of 450 post menopausal women, 8.67% cases were reported atrophy changes and this finding with a study conducted by A Kannan *et al*. (10.3%)^[20].

In the present study, SIL (4.67%) were found higher than ASCUS (1.56%). Similar findings were seen in study conducted by Mishra J *et al*^[21] in India, where they found more frequency of SIL (15%) than ASCUS (2.4%) in postmenopausal women. Study conducted in USA by KIFF *et al*^[22], among 924 post-menopausal women, 27.7% cases were reported as ASCUS, 0.8% cases were reported as LSIL and no prevalence of HSIL and ASCUS-H. Another study conducted in Saudi A in Al-Baha^[23] observed high squamous intraepithelial lesion (HSIL) (1%); low grade squamous intraepithelial lesions (LSIL) in 27 cases (1.3%) in more than 45 years of age group the findings of these foreign studies is not similar as present study. This discrepancy in findings because of different study settings, geographic variation and racial factors of study population.

The age-wise distribution of epithelial cells abnormalities shows that the majority of squamous cell abnormalities and glandular cell abnormalities are found in the 45-54 age group (58.82%) followed by the 55-64 age group (20.59%) and least common found in 80-85 years age group (8.82%) in present study. This trend emphasizes the need for targeted screening in the earlier postmenopausal 45- 54 years age group to detect potential epithelial cell abnormalities early. Although cervical pap smear findings using the Bethesda system for reporting cervical cytology, 2014 and presenting complaints show some consistent patterns across above studies, differences in the distribution of age groups and the prevalence of particular lesions emphasize the significance of taking population-specific factors into account when designing cervical cancer screening programs. The current study emphasizes the importance of maintaining screening vigilance in order to successfully identify and manage cervical abnormalities in postmenopausal women.

Limitations of the study: Being a single-center study, it affects generalizability due to different demographics and limited sample size.

Conclusion

The cervical pap smears test is simple, effective, noninvasive and less expensive procedure to detect pre-

invasive cervical epithelial lesion. The study emphasizes the necessity of cervical Pap smear examination as a cervical cancer prevention strategy for postmenopausal women specially in 45-64 age group in which there is more risk of developing cervical carcinoma. So we need to encourage ongoing awareness and adherence to routine Pap smear examinations in 45-64 years age group of post menopausal women for early detection and prevention of cervical cancer.

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Nil.

Conflicts of interest

There are no conflicts of interest.

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