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Original Research Article

A Study on Spectrum of Cytological Patterns in Cervical Pap Smear and Its Clinicodemographic Correlation at A Tertiary Care Centre

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Abstract:

Background and Objectives: Cancer of the cervix is an increasing health problem and an important cause of mortality in women worldwide. This study has been undertaken to find out the prevalence of an abnormal Pap smear in a tertiary care centre.

Aim of the Study: To evaluate women for non-neoplastic and neoplastic lesions using the Pap smear test and to investigate for the surveillance for clinical and demographic correlation.

Methods: This was a retrospective and prospective study conducted in the Department of Pathology, HIMS, Hassan from 2012 to July 2022. A total of 3390 women were included in the study. Data were entered in Microsoft Excel and analyzed in SPSS software.

Results: Out of 3390 women included in the study, majority women were in the age group of 35- 45 years (41.9%). Most cases (53%) were from rural area. Majority of the patients were asymptomatic (52.6%), followed by menstrual abnormalities (16.1%) and white discharge (13.7%). NILM-Inflammatory was the most common finding (61.5%), followed by NILM (17.7%). ASCUS, AGUS, ASC-H, LSIL and HSIL were detected in 3.9%, 0.6%, 0.7%, 3.2% and 2.1% respectively. SCC was reported in 1.1% of the study population. NILM, NILM-Inflammatory, ASCUS, AGUS, LSIL, ASC-H and HSIL were more common in the premenopausal age group. Atrophy and SCC were more common in the postmenopausal age group.

Conclusion: Pap smear screening procedure is a simple, economical, useful and safe tool in detecting precancerous cervical epithelial lesions. Educational programs and medical camps should be conducted in the community to create awareness about the cervical cancer and its prevention by periodic pap smear examination.

Keywords: Cervical pap smear, Bethesda system, cervical lesions.

Introduction

Cancer of the cervix is an increasing health problem and an important cause of mortality in women worldwide. According to the World Cancer statistics, >80% of all the cervical cancer cases are found in developing countries because prevention programs are either non-existent or poorly implemented.

Many studies describe that the majority of cervical cancer mortality and the burden of cervical cancer is still high in developing countries like India. [1] Cervical cancer is a preventable disease due to the long preinvasive stage. [2] Early cervical epithelial changes can be identified by a Pap smear test, which is the primary screening test for detection of precancerous cervical intraepithelial neoplasia and the early stage of invasive cervical cancer. [3] The Pap smear testing is a very useful, simple, economical, non-invasive, safe diagnostic tool for detecting precancerous cervical epithelial lesions. It is a globally accepted screening procedure and has an excellent specificity of around 95% and a sensitivity of 44%–78%, but awareness within the community about the Pap smear test is very low [4]. A Pap screening done in association with an HPV DNA test increases the sensitivity for early detection of precancerous lesions. [5]. Two types of Pap tests currently being used are Conventional & Liquid-based cytology. Liquid-based test has been widely used in developed countries but the main screening system even now in developing countries is the conventional Pap test. [6] According to the American Cancer Society (2012), the Pap smear test is a routine cancer screening method that should be done every 3 years and Pap smear with the HPV DNA test is recommended as a screening method every 5 years. [7]

The provision of performing periodic examinations and prompt follow-up is essential to reduce the morbidity and mortality in women. This study has been undertaken to find out the prevalence of an

abnormal Pap smear in a tertiary care centre and to carry out a demographical and clinicopathological analysis to establish the pattern of cytomorphologic features in a Pap smear.

Materials and Methods

This was a retrospective and prospective study conducted in the Department of Pathology, HIMS, and Hassan from 2012 to July 2022. A total of 3390 pap smears received from OBG department to the cytology laboratory during the study period were included in the study.

Clinical history and demographic status of the patient undergoing pap smear were recorded. Conventional pap smears for routine screening taken by gynaecologists at the squamocolumnar junction using Ayer's spatula and endocervical smears by rotating the endocervical brush on two separate glass slides respectively was fixed immediately in 95% Isopropyl alcohol and was stained by Papanicolaou's method in cytology laboratory. The pap smears were interpreted and reported according to the new Bethesda System for Reporting Cervical Cytology 2014.The system broadly divides lesions into those negative for intraepithelial neoplasia and epithelial cell abnormalities (ECA) that include squamous and glandular cells.

Data were entered in Microsoft Excel and analyzed in SPSS software. Bivariate correlation were calculated for different age group and abnormal cytological findings and p value ≤ 0.05 was considered as clinically significant.

Results

A total of 3390 women were included in the present study. Maximum women (1421 cases, 41.9%) were in the age group of 35-45 years followed by 25-35 years (780 cases, 23%). (**Table 1**)

Table 1: Age Distribution

Age group		
	Frequency	Percentage
<25	123	3.6
25 - 35	780	23.0
35 - 45	1421	41.9
45 - 55	655	19.3
55 - 65	297	8.8
>65	114	3.4
Total	3390	100.0

Of these 3390 women, 1798 (53%) cases were from rural area and 1592 (47%) cases were from urban area. Most women belonged to rural communities because the government runs the cervical cancer screening awareness program in rural areas (**Table 2**).

Table 2: Study population

	Number	**Percentage**
Rural	1798	53.0
Urban	1592	47.0
Total	3390	100.0

Majority of the patients who came for routine screening were asymptomatic. Common complaints of the patients were menstrual abnormalities, white discharge, pruritus, pain abdomen and postmenopausal bleeding. Distribution of clinical symptoms is shown in **Table 3**.

Table 3: Distribution of clinical symptoms

Clinical symptoms	**Number**	**Percentage**
Asymptomatic	1782	52.6
Menstrual abnormalities	547	16.1
White discharge	466	13.7
Postmenopausal bleeding	57	1.7
Pruritus	146	4.3
Pain abdomen	392	11.6
Total	3390	100.0

Out of 3390 women, 601 cases (17.7%) were found to be Normal or Negative for Intraepithelial Lesion or Malignancy (NILM), 2086 cases (61.5%) were found to have Inflammatory Pathology and were reported as Negative for Intraepithelial Lesion or Malignancy – Inflammatory (NILM – Inflammatory). Atrophic changes was seen in 163 cases (4.8%) and 147 cases (4.3%) were reported as

unsatisfactory smear. The main reason for unsatisfactory smears was inadequate squamous component or obscuring inflammation.

Out of 3390 cases, 393 cases (11.6%) showed ECA. Of these 393 cases, Atypical Squamous Cells of Undetermined Significance (ASCUS) was reported in 131 cases (3.9%). Twenty cases (0.6%) were reported as Atypical Glandular Cells of Undetermined Significance (AGUS), 108 cases (3.2%) as Low-Grade Squamous Intraepithelial Lesion (LSIL), 72 cases (2.1%) as High-Grade Squamous Intraepithelial Lesion (HSIL), 24 cases (0.7) as Atypical Squamous Cells, cannot exclude High grade squamous intraepithelial lesion (ASC-H) and 38 cases (1.1%) as Squamous Cell Carcinoma (SCC).

Out of 2086 cases diagnosed as NILM-Inflammatory, 58 patients (2.8%) had bacterial vaginosis, 26 cases (1.2%) had candidiasis, 12 cases (0.6%) had trichomonas vaginalis infection, 37 patients (1.8%) had reactive changes and 1953 patients (93.6%) had non-specific findings (Table 4).

Table 4: Spectrum of Pap smear Abnormalities

Pap smear findings	Number	Percentage
AGUS	20	0.6
ASC-H	24	0.7
ASCUS	131	3.9
Atrophic smear	163	4.8
Bacterial vaginosis	58	1.7
Candidiasis	26	0.8
HSIL	72	2.1
Inflammatory smear (non-specific)	1953	57.6
LSIL	108	3.2
NILM	601	17.7
Reactive changes	37	1.1
SCC	38	1.1
Trichomonas vaginalis	12	0.4
Unsatisfactory smear	147	4.3
Total	3390	100.0

In this study, most women (271 cases, 45.1%) with NILM belonged to the age group of 35 to 45 years. Out of 2086 women reported as NILM-Inflammatory, most women (960 cases, 46%) were in the age group of 35 to 45 years. Majority of atrophic smears (68 cases, 41.7%) were reported in the age group of 55-65 years. Most women (53 cases, 40.5%) with ASCUS and 11 cases (55%) reported as AGUS belonged to the age group of 35 to 45 years. Out of 108 cases reported as LSIL, majority of the women (38 cases, 35.2%) belonged to the age group of 45 to 55 years followed by 28 cases (25.9%) in the age group of 35 to 45 years. Most women (24 cases, 33.3%) reported as HSIL were in the age group of 45 to 55 years followed by 20 cases (27.8%) in the age group of 55-65 years. Majority of ASC-H smears (10 cases, 41.7%) were reported in the age group of 35 to 45 years. Out of 38 cases reported as SCC, most women (14 cases, 36.9%) were in the age group of 55-65 years followed by 11 cases (28.9%) of >65 years of age. The correlation of pap smear findings with the age group had a very high significance with the p value of <0.001 (**Table 5**).

Table 5: Correlation of Age with Pap smear findings

Pap smear findings * Age group									
			Age group (years)						Total
			<25	25 - 35	35 – 45	45 - 55	55 - 65	>65	
Pap smear findings	AGUS	Count	01	00	11	07	01	00	20
		%	0.8%	0.0%	0.8%	1.1%	0.3%	0.0%	0.6%
	ASC-H	Count	00	02	10	04	07	01	24
		%	0.0%	0.3%	0.7%	0.6%	2.4%	0.9%	0.7%
	ASCUS	Count	01	16	53	30	27	04	131
		%	0.8%	2.1%	3.7%	4.6%	9.1%	3.5%	3.9%
	Atrophic smear	Count	00	00	00	39	68	56	163
		%	0.0%	0.0%	0.0%	6.0%	22.9%	49.1%	4.8%
	Bacterial vagi-nosis	Count	01	17	26	13	01	00	58
		%	0.8%	2.2%	1.8%	2.0%	0.3%	0.0%	1.7%

	Candida	Count	02	05	16	01	01	01	26
		%	1.6%	0.6%	1.1%	0.2%	0.3%	0.9%	0.8%
	HSIL	Count	00	03	18	24	20	07	72
		%	0.0%	0.4%	1.3%	3.7%	6.7%	6.1%	2.1%
	Inflammatory smear (non-specific)	Count	98	571	895	319	57	13	1953
		%	79.7%	73.2%	63.0%	48.7%	19.2%	11.4%	57.6%
	LSIL	Count	00	12	28	38	23	07	108
		%	0.0%	1.5%	2.0%	5.8%	7.7%	6.1%	3.2%
	NILM	Count	16	118	271	126	60	10	601
		%	13.0%	15.1%	19.1%	19.2%	20.2%	8.8%	17.7%
	reactive changes	Count	01	05	15	10	04	02	37
		%	0.8%	0.6%	1.1%	1.5%	1.3%	1.8%	1.1%
	SCC	Count	00	02	04	07	14	11	38
		%	0.0%	0.3%	0.3%	1.1%	4.7%	9.6%	1.1%
	Trichomonas vaginalis	Count	00	03	08	01	00	00	12
		%	0.0%	0.4%	0.6%	0.2%	0.0%	0.0%	0.4%
	Unsatisfactory smear	Count	03	26	66	36	14	02	147
		%	2.4%	3.3%	4.6%	5.5%	4.7%	1.7%	4.3%
Total		Count	123	780	1421	655	297	114	3390
		%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%	100.0%
a. X2=1237.645 p<0.001 vhs									

Among 601 cases diagnosed as NILM, most women (442 cases, 73.5%) were asymptomatic and had come for routine screening. Pruritus was the main complaint in women reported with atrophic smear (89 cases, 54.6%).

Menstrual abnormalities was the main complaint in women diagnosed with ASCUS (42 cases, 32.1%), AGUS (10 cases, 50%) and ASC-H (12 cases, 50%). Out of 108 cases diagnosed as LSIL, 46 women (42.6%) presented with white discharge, followed by 37 women (34.3%) with menstrual abnormalities and 11 women (10.1%) with postmenopausal bleeding.

Major complaint in women diagnosed with HSIL was menstrual abnormalities (29 cases, 40.3%) followed by 23 women (31.9%) who came with white discharge and 19 women (26.4%) had postmenopausal bleeding. Out of 38 cases diagnosed as SCC, 15 women (39.5%) presented with postmenopausal bleeding, 15 (39.5%) had white discharge and 08 women (21%) had menstrual abnormalities. (Table 6)

Table 6: Correlation of Clinical symptoms with Pap smear findings

Pap smear findings * Clinical symptoms									
			Clinical symptoms						To-tal
			Asympto-matic	Menstrual abnormali-ties	White dis-charge	Pruri-tus	Pain abdo-men	Postmeno-pausal bleed-ing	
Pap smear find-ings	AGUS	Cou nt	02	10	06	00	02	00	20
		%	10%	50%	30%	0.0%	10%	0.0%	100 %
	ASC-H	Cou nt	00	12	06	00	01	05	24
		%	0.0%	50%	25%	0.0%	4.2%	20.8%	100 %
	ASCUS	Cou nt	23	42	36	01	27	02	131
		%	17.6%	32.1%	27.5%	0.7%	20.6%	1.5%	100 %
	Atrophic smear	Cou nt	44	00	24	89	06	00	163
		%	27%	0.0%	14.7%	54.6%	3.7%	0.0%	100 %
	Bacterial	Cou	19	02	26	11	00	00	58

	vaginosis	nt							
		%	32.8%	3.4%	44.8%	19%	0.0%	0.0%	100 %
	Candida	Count	02	00	16	08	00	00	26
		%	7.7%	0.0%	61.5%	30.8%	0.0%	0.0%	100 %
	HSIL	Count	00	29	23	00	01	19	72
		%	0.0%	40.3%	31.9%	0.0%	1.4%	26.4%	100 %
	Inflammatory smear (non-specific)	Count	1183	286	198	33	253	00	1953
		%	60.6%	14.6%	10.1%	1.7%	13%	0.0%	100 %
	LSIL	Count	00	37	46	00	14	11	108
		%	0.0%	34.3%	42.6%	0.0%	13%	10.1%	100 %
	NILM	Count	442	69	31	01	58	00	601
		%	73.5%	11.5%	5.2%	0.2%	9.6%	0.0%	100 %
	Reactive changes	Count	06	11	12	00	08	00	37
		%	16.2%	29.7%	32.4%	0.0%	21.7%	0.0%	100 %
	SCC	Count	00	08	15	00	00	15	38
		%	0.0%	21%	39.5%	0.0%	0.0%	39.5%	100 %
	Trichomonas vaginalis	Count	06	00	05	00	01	00	12
		%	50%	0.0%	41.7%	0.0%	8.3%	0.0%	100 %
	Unsatisfactory smear	Count	55	41	22	03	21	05	147
		%	37.4%	27.9%	15%	2.0%	14.3%	3.4%	100 %
Total		Count	1782	547	466	146	392	57	3390

The correlation of pap smear findings with the place had a very high significance with the p value of <0.001 and is shown in Table 7.

Table 7: Correlation of Pap smear findings with place

Pap smear findings * Place					
			Place		Total
			Rural	Urban	
Pap smear findings	NILM	Count	314	287	601
		%	17.5%	18.0%	17.7%
	Inflammatory smear (non-specific)	Count	905	1048	1953
		%	50.3%	65.8%	57.6%
	Atrophic smear	Count	139	24	163
		%	7.7%	1.5%	4.8%
	LSIL	Count	94	14	108
		%	5.2%	0.9%	3.2%
	Unsatisfactory smear	Count	79	68	147
		%	4.4%	4.3%	4.3%

	HSIL	Count	66	06	72
		%	3.7%	0.4%	2.1%
	ASCUS	Count	79	52	131
		%	4.4%	3.3%	3.9%
	SCC	Count	35	03	38
		%	1.9%	0.2%	1.1%
	Reactive changes	Count	18	19	37
		%	1.0%	1.2%	1.1%
	Bacterial vaginosis	Count	23	35	58
		%	1.3%	2.2%	1.7%
	AGUS	Count	13	07	20
		%	0.7%	0.4%	0.6%
	ASC-H	Count	15	09	24
		%	0.8%	0.6%	0.7%
	Trichomonas vaginalis	Count	06	06	12
		%	0.3%	0.4%	0.4%
	Candida	Count	12	14	26
		%	0.7%	0.9%	0.8%
Total		Count	1798	1592	3390
		%	100.0%	100.0%	100.0%
a. X2=229.707 p<0.001 vhs					

The correlation of pap smear findings with the age group in rural area had a very high significance with the p value of <0.001 (**Table 8**)

Table 8: Correlation of Age with Pap smear findings in rural area

Pap smear findings * Age group										
Place				Age group (years)						Total
				<25	25 - 35	35 - 45	45 - 55	55 - 65	>65	
Rural	Pap smear findings	NILM	Count	05	39	137	73	50	10	314
			%	20.8%	15.2%	19.8%	16.0%	19.6%	8.9%	17.5%
		Inflammatory smear (non-specific)	Count	16	184	425	225	43	12	905
			%	66.7%	71.6%	61.3%	49.2%	16.9%	10.7%	50.3%
		Atrophic smear	Count	00	00	02	29	56	52	139
			%	0.0%	0.0%	0.3%	6.3%	22.0%	46.4%	7.7%
		LSIL	Count	00	07	22	35	23	07	94
			%	0.0%	2.7%	3.2%	7.7%	9.0%	6.3%	5.2%
		Unsatisfactory smear	Count	02	09	28	22	13	05	79
			%	8.3%	3.5%	4.0%	4.8%	5.1%	4.5%	4.4%
		HSIL	Count	00	03	15	22	19	07	66
			%	0.0%	1.2%	2.2%	4.8%	7.5%	6.3%	3.7%
		ASCUS	Count	00	04	27	20	24	04	79
			%	0.0%	1.6%	3.9%	4.4%	9.4%	3.6%	4.4%
		SCC	Count	00	01	03	06	14	11	35
			%	0.0%	0.4%	0.4%	1.3%	5.5%	9.8%	1.9%
		Reactive changes	Count	00	00	04	08	04	02	18
			%	0.0%	0.0%	0.6%	1.8%	1.6%	1.8%	1.0%
		Bacterial vaginosis	Count	00	06	10	06	01	00	23
			%	0.0%	2.3%	1.4%	1.3%	0.4%	0.0%	1.3%

		AGUS	Count	00	00	06	06	01	00	13
			%	0.0%	0.0%	0.9%	1.3%	0.4%	0.0%	0.7%
		ASC-H	Count	00	01	04	03	06	01	15
			%	0.0%	0.4%	0.6%	0.7%	2.4%	0.9%	0.8%
		Trichomonas vaginalis	Count	00	01	04	01	00	00	6
			%	0.0%	0.4%	0.6%	0.2%	0.0%	0.0%	0.3%
		Candida	Count	01	02	06	01	01	01	12
			%	4.2%	0.8%	0.9%	0.2%	0.4%	0.9%	0.7%
	Total		Count	24	257	693	457	255	112	1798
			%	100.0 %	100.0 %	100.0 %	100.0 %	100.0 %	100.0 %	100.0 %
a. X2=668.76 p<0.001 vhs										

The correlation of pap smear findings with the age group in urban area had a very high significance with the p value of <0.001 (**Table 9**)

Table 9: Correlation of Age with Pap smear findings in urban area

Pap smear findings * Age group										
Place				Age group (years)						Total
				<25	25 - 35	35 - 45	45 - 55	55 – 65	>65	
Urban	Pap smear findings	NILM	Count	11	79	134	53	10	00	287
			%	11.1%	15.1%	18.4%	26.8%	23.8%	0.0%	18.0%
		Inflammatory smear (non-specific)	Count	82	387	470	94	14	01	1048
			%	82.8%	74.0%	64.6%	47.5%	33.3%	50.0%	65.8%
		Atrophic smear	Count	00	01	00	10	12	01	24
			%	0.0%	0.2%	0.0%	5.1%	28.6%	50.0%	1.5%
		LSIL	Count	00	05	06	03	00	00	14
			%	0.0%	1.0%	0.8%	1.5%	0.0%	0.0%	0.9%
		Unsatisfactory smear	Count	01	16	36	14	01	00	68
			%	1.0%	3.1%	4.9%	7.1%	2.4%	0.0%	4.3%
		HSIL	Count	00	00	03	02	01	00	06
			%	0.0%	0.0%	0.4%	1.0%	2.4%	0.0%	0.4%
		ASCUS	Count	01	12	26	10	03	00	52
			%	1.0%	2.3%	3.6%	5.1%	7.1%	0.0%	3.3%
		SCC	Count	00	01	01	01	00	00	03
			%	0.0%	0.2%	0.1%	0.5%	0.0%	0.0%	0.2%
		Reactive changes	Count	01	05	11	02	00	00	19
			%	1.0%	1.0%	1.5%	1.0%	0.0%	0.0%	1.2%
		Bacterial vaginosis	Count	01	11	16	07	00	00	35
			%	1.0%	2.1%	2.2%	3.5%	0.0%	0.0%	2.2%
		AGUS	Count	01	00	05	01	00	00	07
			%	1.0%	0.0%	0.7%	0.5%	0.0%	0.0%	0.4%
		ASC-H	Coun	00	01	06	01	01	00	09

			t							
			%	0.0%	0.2%	0.8%	0.5%	2.4%	0.0%	0.6%
		Trichomonas vaginalis	Count	00	02	04	00	00	00	06
			%	0.0%	0.4%	0.5%	0.0%	0.0%	0.0%	0.4%
		Candida	Count	01	03	10	00	00	00	14
			%	1.0%	0.6%	1.4%	0.0%	0.0%	0.0%	0.9%
	Total		Count	99	523	728	198	42	02	1592
			%	100.0 %	100.0 %	100.0 %	100.0 %	100.0 %	100.0 %	100.0 %
. X2=361.36 p<0.001 vhs										

Out of 131 cases diagnosed as ASCUS, 86 women (65.6%) were in the pre-menopausal age group and 45 women (34.4%) were in the postmenopausal age group.

Out of 20 cases diagnosed as AGUS, 16 women (80%) were in the pre-menopausal age group and 04 women (20%) were in the postmenopausal age group. Out of 24 cases diagnosed as ASC-H, 15 women (62.5%) were in the pre-menopausal age group and 09 women (37.5%) were in the post-menopausal age group. Out of 108 cases diagnosed as LSIL, 63 women (58.3%) were in the pre-menopausal age group and 45 women (41.7%) were in the post-menopausal age group.

Out of 72 cases diagnosed as HSIL, 40 women (55.6%) were in the pre-menopausal age group and 32 women (44.4%) were in the post-menopausal age group. Out of 38 cases diagnosed as SCC, 09 women (23.7%) were in the pre-menopausal age group and 29 women (76.3%) were in the post-menopausal age group. The correlation of pap smear findings in pre- and post- menopausal women had a very high significance with the p value of <0.001 (Table 10)

Table 10: Correlation of Pap smear findings in Pre- and Post-Menopausal women

Pap smear findings * Pre- and Post-Menopausal women					
			Pre-menopausal	Post-menopausal	Total
Pap smear findings	NILM	Count	481	120	601
		%	17.4%	19.1%	17.7%
	Inflammatory smear (non-specific)	Count	1805	148	1953
		%	65.4%	23.5%	57.6%
	Atrophic smear	Count	14	149	163
		%	0.5%	23.7%	4.8%
	LSIL	Count	63	45	108
		%	2.3%	7.2%	3.2%
	Unsatisfactory smear	Count	114	33	147
		%	4.1%	5.2%	4.3%
	HSIL	Count	40	32	72
		%	1.4%	5.1%	2.1%
	ASCUS	Count	86	45	131
		%	3.1%	7.2%	3.9%
	SCC	Count	09	29	38
		%	0.3%	4.6%	1.1%
	Reactive changes	Count	27	10	37
		%	1.0%	1.6%	1.1%
	Bacterial vaginosis	Count	55	03	58
		%	2.0%	0.5%	1.7%
	AGUS	Count	16	04	20
		%	0.6%	0.6%	0.6%
	ASC-H	Count	15	09	24
		%	0.5%	1.4%	0.7%
	Trichomonas vaginalis	Count	12	00	12
		%	0.4%	0.0%	0.4%
	Candida	Count	24	02	26
		%	0.9%	0.3%	0.8%

Total	Count	2761	629	3390
	%	100.0%	100.0%	100.0%
a. x2=925.277 p<0.001 vhs				

Out of 393 epithelial abnormality cases, per speculum findings were noted. 203 women (51.6%) had healthy looking cervix, 24 women (6.1%) had white discharge per vaginum, 22 women (5.6%) had hypertrophied cervix, 35 women (8.9%) had congested cervix, 81 women (20.6%) had cervical erosion, 05 women (1.3%) had ectropion of cervix, 05 women (1.3%) had UV prolapse and 18 women (4.6%) showed cervical bleeding.

Discussion

A total of 3390 women were included in the study, out of which the most common age group was 35 to 45 years (41.9%), followed by 25-35 years (23%), followed by 45 to 55 years (19.3%) which was almost similar to the studies conducted by Selvi NT et al6 and Sachan PL et al.8 In a study conducted by Pun Gurung Rashmey et al9, it was found that the most common age of presentation was 30-39 years (29%), followed by 40-49 years (27%), followed by 50- 59 years (19%).

Most women with epithelial cell abnormalities had three or more children indicating multiparity (>3) to be a significant risk factor for cervical carcinoma. The similar finding was seen in a study conducted by Sachan PL et al. [8]

Out of 3390 women, 53% of the cases were from rural area and 47% of them were from urban area which was almost similar to the study conducted by Sachan PL et al. [8]

In our study 52.6% cases were asymptomatic and had come for routine screening, 16.1% women had menstrual abnormalities followed by 13.7% women had white discharge per vagina which was almost similar to the study conducted by Selvi NT et al6. A study conducted by Pun Gurung et al, [9] most women (86%) came for routine screening followed by 9% of women came for white discharge. A study by Sachan PL et al. [8] had white vaginal discharge as the major complaint. Most women who presented with pruritus had atrophic smears. This may be due to age factors and decreased secretions leading to pruritus. Most patients who presented with menstrual abnormalities, white discharge, pain abdomen and postmenopausal bleeding were found to have ECA.

In our study, out of 3390 cases, 61.5% were found to have NILM – Inflammatory, followed by 17.7% were diagnosed as NILM which was similar to the studies conducted by Selvi NT et al [6], Das et al [10] and Bhagya Lakshmi et al [11]. A study by Sachan PL et al [8] reported most cases as NILM followed by NILM-Inflammatory. The studies by Bhutia K et al [12] and Barouti E et al [13] reported that women with persistent inflammation should be treated with appropriate antibiotics; otherwise, the chance of development of cervical intraepithelial lesions increases. A repeat Pap smear should be taken after proper antibiotic treatment.

Our study had an unsatisfactory report rate of 4.3% which was almost similar to the study conducted by Vaghela et al [14]. The study by Sachan PL et al [8] had the report rate of 6.4% which might have been due to dryness of the smear or improper training of personnel or a technical error.

Our study had 11.6% reporting rate of ECA out of 3390 cases. The result was comparable to the studies performed by Al Eyd et al [15], Patel et al [16] and Sarma et al [17] where the ECA detection rates were 9.05%, 12.60%, and 11.95% respectively.

In our study, the ASCUS was found in 3.9% of screened women, AGUS in 0.6%, LSIL in 3.2%, ASC-H in 0.7% and HSIL in 2.1% of cases. Sachan PL et al [8] reported ASCUS in 2.9% of cases, LSIL in 5.09%, and HSIL in 0.48% of screened women. The study done by Verma et al18 found ASCUS in 1%, LSIL in 5.5%, and HSIL in 2.5% of their screened women. Padmini et al [19] reported ASCUS (8%), LSIL (5%) and HSIL (3%) in women screened with the Pap smear test. Higher numbers of LSIL (8.6%) and HSIL (3.8%) lesions were found in a study by Nayani and Hendre [20]. The Indian studies showed high prevalence of cytological abnormality and the reason might be due to cultural differences, age of the individuals, incidence of related infections, awareness about screening, and the presence or absence of cervical screening programs in different parts of the country. [8]

There was significant correlation of pap smear findings with the age group. Most women reported as NILM (45.1%) and NILM – Inflammatory (46%) were seen in the age group of 35-45 years. Majority of women reported as atrophic smear were in the age group of 55-65 years (41.7%). Maximum cases of ASCUS (40.5%), AGUS (55%) and ASC-H (41.7%) were reported in the age group of 35-45 years similar to the study conducted by Gupta et al. [21] Majority of the women reported as LSIL belonged to the age group of 45 to 55 years (35.2%) followed by 35 to 45 years (25.9%). Most women reported as HSIL were in the age group of 45 to 55 years (33.3%) followed by 55-65 years (27.8%).

Out of 38 cases reported as SCC, 36.9% of cases were in the age group of 55-65 years followed by 28.9% of cases in >65 years of age.

It was observed that majority of women reported with NILM and NILM-Inflammatory were in the younger age group and most of the cytological abnormality was detected in the age group of 45 to 65 years. Similar findings were seen in the studies conducted by Selvi NT et al [6], Pun Gurung et al 9 and Das et al. [10] Precancerous cervical epithelial lesions were seen 5-10 years earlier to invasive cervical cancer. Women should be screened regularly for cervical lesions and subjected to pap smear examination at least once before the age of 45 years. [22,23]

It was observed that NILM, NILM-Inflammatory, ASCUS, AGUS, LSIL, ASC-H and HSIL were more common in the premenopausal age group.

Whereas, atrophy and SCC were more common in the postmenopausal age group. Studies by Selvi NT et al [6], Aytekin Tokmak et al [24], Akshatha C et al [25] and Misra JS et al [26] had ASCUS, LSIL & HSIL more common in the postmenopausal age group.

Table 11: Correlation of Present Study with Other Studies

Study	Sample size	NILM	NILM-Inflammatory	Atrophic	ASCUS	AGUS	ASC-H	LSIL	HSIL	SCC
Present study	3390	17.7 %	61.5%	4.8%	3.9%	0.6%	0.7%	3.2%	2.1%	1.1 %
Selvi NT. et al[6]	408	36%	50%	5.0%	1.5%	0.0%	0.0%	3.0%	0.5%	0.0 %
Pun R G et al[9]	1999	54%	21.9%	15.5%	4.5%	0.0%	0.0%	0.25 %	01%	0.2 %
Sachan PL et al[8]	1650	48.8 %	42.7%	0.0%	2.9%	0.0%	0.0%	5.1%	0.5%	0.0 %
Kanthimathy SD et al[27]	277	16.2 %	64.3%	0.0%	10.8%	0.7%	1.4%	2.9%	3.2%	0.0 %
Geethu G. Nair et al[28]	2028	56.8 %	20.4%	17.7%	0.15%	0.0%	0.0%	1.6%	0.5%	0.2 %
Ghimire P et al[29]	933	52.7 %	28.8%	2.6%	2.0%	0.8%	0.6%	4.3%	3.6%	0.9 %
Ranabhat S K et al[30]	880	72%	26%	0.0%	0.2%	0.0%	0.0%	0.2%	1.0%	0.2 %

Limitation: There was no histopathological correlation of ECA.

Conclusion

Pap smear screening procedure is a simple, economical, useful and safe tool in detecting precancerous cervical epithelial lesions. One has to implement routine cervical cancer screening in women above 30 years of age and to continue even in the perimenopausal and postmenopausal age group to reduce the morbidity and mortality of cervical cancer. The sensitivity to detect cervical epithelial lesions will increase when the gold standard pap smear testing is combined with the HPV DNA test. Educational programs and medical camps should be conducted in the community to create awareness about the cervical cancer and its prevention by periodic pap smear examination.

References

1. Ferlay J, Soerjomataram I, Dikshit R, Eser S, Mathers C, Rebelo M, et al. Cancer incidence and mortality worldwide: Sources, methods and major patterns in GLOBOCAN 2012. Int J Cancer 2015; 136:E359-86.
2. Bal MS, Goyal R, Suri AK, Mohi MK. Detection of abnormal cervical cytology in papanicolaou smears. J Cytol 2012; 29:45-7.
3. Ansari M, Mehdi G, Arif SH, Ansari H, Khan T. Smear patterns and spectrum of premalignant and malignant cervical epithelial lesions in postmenopausal Indian women: A hospital-based study. Diagn Cytopathol 2012; 40:976-83.
4. Sankaranarayanan R, Thara S, Sharma A, Roy C, Shastri S, Mahé C, et al. Accuracy of conventional cytology: Results from a multicentre screening study in India. J Med Screen 2004; 11:77-84.
5. Patel MM, Pandya AN, Modi J. Cervical pap smear study and its utility in cancer screening, to specify the strategy for cervical cancer control. Natl J Community Med 2011; 2:49-51.
6. Selvi NT, Shree R R, Prakashiny S. Cell pattern abnormalities in cervical pap smear in correlation with age and demography at a Tertiary care centre. Trop J Pathol Microbiol. 2021; 7(1):33-39.
7. Saslow D, Solomon D, Lawson HW, Killackey M, Kulasingam SL, Cain J, et al. American Cancer Society, American Society for Col-

poscopy and Cervical Pathology, and American Society for Clinical Pathology screening guidelines for the prevention and early detection of cervical cancer. CA Cancer J Clin 2012; 62:147-72.
8. Sachan PL, Singh M, Patel ML, Sachan R. A study on cervical cancer screening using pap smear test and clinical correlation. Asia Pac J Oncol Nurs 2018; 5:337-41.
9. Pun RG, Shrestha J, Awale PJ, Chitrakar N, Jha R, Khadka SS. Cytological pattern of cervical pap smears. J Pathol Nep. 2018; 8; 1280-4.
10. Das D, Kar A, Rath S, Baliarsingh SK, Prusty D, Dash AK. Cytological pattern of Papanicolaou smears and detection of cervical cancers-An experience from a tertiary care centre of eastern zone of India. Oncol J India. 2018; 2; 258.
11. Atla BL, Uma P, Shamili M, Kumar SS. Cytological patterns of cervical pap smears with histopathological correlation. Int J Res Med Sci. 2015; 3(8)1911-6.
12. Bhutia K, Puri M, Gami N, Aggarwal K, Trivedi SS. Persistent inflammation on pap smear: Does it warrant evaluation? Indian J Cancer 2011; 48:220-2.
13. Barouti E, Farzaneh F, Sene A. The pathogenic microorganism in papanicolaou vaginal smears and correlation with inflammation. J Family Reproduct Health 2013; 7:23-7.
14. Vaghela BK, Vaghela VK, Santwani PM. Analysis of abnormal cervical cytology in papanicolaou smears at tertiary care center – A retrospective study. IJBAR 2014; 5:47-9.
15. Al Eyd GJ, Shaik RB. Rate of opportunistic pap smear screening and patterns of epithelial cell abnormalities in pap smears in Ajman, United Arab Emirates. Sultan Qaboos Univ Med J 2012; 12:473-8.
16. Patel MM, Pandya AN, Modi J. Cervical pap smear study and its utility in cancer screening, to specify the strategy for cervical cancer control. Natl J Community Med 2011; 2:49-51.
17. Sarma U, Mahanta J, Talukdar K. Pattern of abnormal cervical cytology in women attending a tertiary hospital. Int J Sci Res Publ 2012; 2:1-4.
18. Verma A, Verma S, Vashist S, Attri S, Singhal A. A study on cervical cancer screening in symptomatic women using pap smear in a tertiary care hospital in rural area of Himachal Pradesh, India. Middle East Fertil Soc J 2017; 22:39-42.
19. Padmini CP, Indira N, Chaitra R, Das P, Girish BC, Nanda KM, et al. Cytological and colposcopic evaluation of unhealthy cervix. J Evid Med Healthc 2015; 2:6920-7.
20. Nayani ZS, Hendre PC. Comparison and correlation of pap smear with colposcopy and histopathology in evaluation of cervix. J Evol Med Dent Sci 2015; 4:9236-47.
21. Gupta K, Malik NP, Sharma VK, Verma N, Gupta A. Prevalence of cervical dysplasia in Western Uttar Pradesh. J Cytol 2013; 30:257-62.
22. Shanmugham D, Vijay A, Rangaswamy T. Colposcopic evaluation of patient with persistant inflammatory papsmear. Sch J Appl Med Sci 2014; 2:1010-3.
23. Maleki A, Ahmadnia E, Avazeh A, Mazloomzadeh S, Molaei B, Jalilvand A, et al. Prevalence of abnormal papanicolaou test results and related factors among women living in Zanjan, Iran. Asian Pac J Cancer Prev 2015; 16:6935-9.
24. Aytekin Tokmak, Ali Irfan Guzel, Emre Ozgu, Murat Oz, Serap Akbay, Salim Erkaya, Tayfun Gungor. Clinical Significance of Atypical Squamous Cells of Undetermined Significance in Detecting Preinvasive Cervical Lesions in PostMenopausal Turkish Women. Asian Pac J Cancer Prev. 15(16)6639-6641
25. Akshatha C, Arul P, Shetty S. Prevalence and comparison of cervical cytology abnormalities in postmenopausal and elderly women- A experience from tertiary care hospital. J MedSoc 2017; 31:23-7.
26. Misra JS, Srivastava AN, Zaidi ZH. Cervical cytopathological changes associated with onset of menopause. J Mid-life Health. 2018; 9:180-4.
27. Kanthimathy SD, Kizhakkebhagam NG, Aravind S, Parambil NA, Therayangalath B, Nayanar SK. The spectrum of cytologic patterns in cervical smears of a high-risk group: Retrospective analysis of a cancer detection camp experience. Cancer Res Stat Treat 2020; 3:692-9.
28. Nair GG, Shamsuddin F, Narayanan T, Balan P. Cytopathological pattern of cervical pap smears - a study among population of North Malabar in Kerala. Indian J of Pathology and Oncology.2016; 3(4):552-7.
29. Ghimire P, Rawat D, Sinha K et al. Spectrum of cytological patterns in cervical PAP smears in a tertiary care center of Western region of Nepal. Nepal Journal of Medical Sciences 2019; 4(1):2-8.
30. Ranabhat SK, Shrestha R, Tiwari M. Analysis of abnormal epithelial lesions in cervical Pap smears in Mid-Western Nepal. J of Pathology of Nepal 2011; 1:30-3.