Cell pattern abnormalities in cervical pap smear in correlation with age and demography at a Tertiary care centre.

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Introduction: Carcinoma Cervix is common all around the globe and ranked third amidst all malignancies among women. The cervical mucosa undergoes morphologic variation with age and practising cytopathologists is aware of these difference to make an accurate diagnosis. This study aimed to detect abnormal cervical epithelial cell patterns in a rural population and compare lesions or abnormal cell patterns among different age groups. **Materials and Methods:** This is a cross-sectional, descriptive study conducted in a tertiary care centre at the Department of Pathology over 6 months. 408 women were included in the study. Data were entered in Microsoft Excel and analyzed in SPSS software. **Results:** Out of 408 women included in the study, the most common age group of the presentation was 31 to 40 years (36%), followed by 20 to 30 years (24%). NILM-Inflammatory was the most common finding (50%), followed by NILM (36%). The most common symptoms of presentation were Menstrual abnormalities (21%), White discharge and pruritus (18%). Findings in younger women were most commonly NILM-Inflammatory & NILM whereas in the post-menopausal age group, ASCUS, LSIL & HSIL. **Conclusion:** All women above 30 years of age should undergo routine cervical cancer screening, and should continue screening even in the perimenopausal and postmenopausal age. Most women who visited the gynaecology OPD were not aware of cervical cancer screening. Hence the general population has to be educated about the benefits of pap smear test through medical camps and awareness programs.

Keywords: Pap smear, NILM, NILM-Inflammatory smear

Introduction

Carcinoma Cervix is common all around the globe and ranked third amidst all malignancies among women. 80 % of cervical cancer are seen in developing countries, which is the most common cancer in woman [1]. In developing countries, the conventional Papanicolaou test is an important screening system for cervical cancer [2].

Recently cytological screening with pap smear combined with Human Papilloma Virus testing is being assessed as a screening test for cervical cancer in the developed countries. Similar to other DNA viruses, the presence of HPV is analyzed by DNA testing with a polymerase chain [3].

Cervical epithelial cell abnormalities in the pap smear represent a spectrum of intraepithelial lesions which varies from mild-to-severe dyskaryosis to invasive cancer [4]. The significance of these various lesions and the outcome of cervical pap smear with atypia have been elaborately analyzed [5,6]. Screening with Pap smear has been accompanied by a dramatic reduction in the incidence of invasive cervical cancer all over the world. As of now, two types of Pap tests are currently used: Conventional & Liquid-based cytology.

Even though the liquid-based test has been widely used in developed countries, the conventional Pap test is the main screening system even now in developing. Numerous studies describe that majority of cervical cancer mortality all over the world is seen in developing countries [7,8,9].

This is a challenge that occurred due to an ineffective cervical cancer screening system. Henceforth this is important to understand the spectrum of variations of epithelial cell abnormalities in Pap smear, in a developing country like India.

In the prospect of counselling women and to organize a public health system for Carcinoma Cervix screening by Pap smear examination, it is ideal to understand the distribution of the various spectrum of premalignant and malignant lesions [2]. This study has been undertaken to find out the prevalence of an abnormal Pap smear, in a tertiary hospital of a developing country, and to carry out a clinicopathological and demographical analysis for establishing the pattern of epithelial cell abnormality in a Pap smear.

Materials and Methods

This is a cross-sectional, descriptive study conducted in a tertiary care centre at the Department of Pathology over 6 months. A complete clinical history and demographic status of the patient undergoing pap smear was recorded as per the proforma, concerning the age at presentation, age at marriage, parity, complaints, first childbirth, socioeconomic status and literacy.

The inclusion criteria were: Symptomatic patients with normal cervix on clinical examination and symptomatic patients with a suspicious cervical lesion. Cases excluded from the study were pregnant women, patients who have undergone a hysterectomy.

Conventional pap smears were taken with the help of gynaecologists at the squamocolumnar junction using Ayer's spatula. Endocervical smears were made by rotating the endocervical brush. Two separate smears were made from the squamocolumnar junction and endocervical area on a single glass slide respectively. Immediately smears were fixed in 95% Isopropyl alcohol for 30 minutes. Then Pap staining was done followed by slide interpretation. The pap smears were reported by adopting "The Revised Bethesda System of Classification". Data were entered in Microsoft Excel and analyzed in SPSS software version 17.0. Confidentiality was maintained in this study as mentioned in the patient's consent forms.

Results

A total of 408 women have been included in the present study, out of which 98 women (24%) were seen in the age group of 20-30 years. 148 women (36%) were in the age group of 31 to 40 years. 90 women (22%) were in the age group of 41 to 50 years. 36 women (09%) were in the age group of 51 to 60 years. 36 women (09%) were in the age group of > 60 years (Table No. 1).

Out of 408 women included in the study, 149 cases (36%) were found to be Normal or Negative for Intraepithelial Lesion or Malignancy (NILM). 203 cases (50%) were found to have Inflammatory Pathology and reported as Negative for Intraepithelial Lesion or Malignancy – Inflammatory (NILM – Inflammatory). 20 cases (05%) were found to have Atrophic Changes. 6 cases(1.5 %) have been reported as Atypical Squamous Cells of Undetermined Significance (ASCUS).

12 cases (03%) have been reported as Low-Grade Squamous Intraepithelial Lesion (LSIL). 2 cases (0.5%) have been reported as High-Grade Squamous Intraepithelial Lesion (HSIL). 16 cases (04%) have been reported as Insufficient or Inadequate Sample (Table No.2).

Out of 408 patients included in the study, NILM was found in 149 women, out of which 32 cases (21%) among the age group of 20 to 30 years, 46 cases (31%) in the age group of 31 to 40 years, 38 cases (26%) in the age group of 41 to 50 years, 20 cases (13%) among the age group of 51 to 60 years and 13 cases (09%) in the age group above 60 years. NILM – Inflammatory has been reported in a total of 203 women, out of which 54 cases (27%) in the age group of 20 to 30 years, 55 cases (27%) in the age group of 31 to 40 years, 40 cases (20%) in the age group of 41 to 50 years, 32 cases (16%) in the age group of 51 to 60 years and 22 cases (10%) in the age group of > 60 years of age. Atrophic smear has been reported in 20 cases, out of which 9 cases (45%) were in the age group of 51 to 60 years and 11 cases (55%) were in the age group > 60 years of age. Inadequate was reported in 16 cases, out of which 3 cases (19%) were in the age group of 20 to 30 years, 4 cases (25%) were in the age group of 31 to 40 years, 4 cases (25%) were in the age group of 41 to 50 years, 2 cases (12%) were in the age group of 51 to 60 years and 3 cases (19%) were in the age group of > 60 years of age. Out of 6 cases reported as ASCUS, 2 cases (33%) were seen in the age group of 41 to 50 years, 3 cases (50%) were seen in the age group of 51 to 60 years and 1 case (17%) were seen in the age > 60 years of age. Out of 12 cases reported as LSIL, 1 case (8%) was seen in the age group of 31 to 40 years, 3 cases (25%) were seen in the age group of 41 to 50 years, 6 cases (50%) were seen in the age group of 51 to 60 years and 2 cases(17%) were seen above 60 years of age. Out of 2 cases reported as HSIL, both the cases (100%) were seen in the age group of 51 to 60 years (Table No.3).

Complaints with which most of the patients came were for routine Screening, menstrual abnormalities, white discharge, pruritus and pain abdomen. Out of 408 women included in this study, 140 (34%) came for routine screening, 86 (21%) came for menstrual abnormalities, 74 (18%) came with complaints of white discharge, 2 (0.5%) came for postmenopausal bleeding, 74 women (18%) came for pruritus and 32 women (8.5%) came with pain abdomen.

Among 149 cases diagnosed as NILM, 48 (32%) presented for routine screening, 30 women (20%) had menstrual abnormalities, 14 women (10%) came with white discharge, 33 women (22%) came with pruritus and 24 women (16%) came with pain abdomen. Out of 203 cases diagnosed as NILM-Inflammatory, 62 women (30%) were asymptomatic, 40 women (20%) came with menstrual abnormalities, 28 women (14%) came with white discharge, 54 women (27%) came with pruritus and 19 women (9%) came with pain abdomen. Out of 20 cases reported as Atrophic, 2 women (10%) were asymptomatic, 4 women (20%) had menstrual abnormalities, 2 women (10%) had white discharge, 8 women (40%) had pruritus and 4 women (20%) had pain abdomen. Out of 6 women diagnosed with ASCUS, 2 (33%) had white discharge, 1 (17%) had pruritus and 3 (50%) had pain abdomen. Out of 12 cases diagnosed as LSIL, 4 (33%) had white discharge, 6 (50%) had pruritus and 2 (17%) had pain abdomen. Out of 2 cases diagnosed as HSIL, both the women presented with post-menopausal bleeding. Out of 16 cases diagnosed as Inadequate sample, 4 (25%) were asymptomatic, 3 (19%) had menstrual abnormalities, 2 (12%) had white discharge, 4 (25%) had pruritus and 3 (19%) had pain abdomen (Table No.4)

Out of 203 cases diagnosed as NILM-Inflammatory, 132 patients (65%) had Bacterial Vaginosis, 08 cases (04%) had candidiasis, 02 cases (01%) had Trichomonas infection, 02 cases (01%) had chlamydiosis, 04 patients (02%) had Leptothrix and 55 patients (27%) had non-specific findings (Table No.5).

Out of 149 cases diagnosed as NILM, 97 women (65%) were in the pre-menopausal age group, 10 cases showed koilocytic change and 52 women (35%) were in the post-menopausal age and 6 cases showed koilocytic change. Out of 203 cases diagnosed as NILM-Inflammatory, 129 women (64%) were in the age group of pre-menopausal, 12 showed koilocytic change and 74 women (36%) were in the post-menopausal age group and 4 showed koilocytic change. Out of 20 cases diagnosed as Atrophy, all were in the post-menopausal age among which 1 showed koilocytic change. Out of 6 cases diagnosed as ASCUS, 2 women (33%) were in the pre-menopausal age group and 4 women (67%) were in the post-menopausal age group amidst which 1 showed koilocytic change.

Out of 12 cases diagnosed as LSIL, 2 women (17%) were in the pre-menopausal age group, in which 2 showed koilocytic change and 10 women (83%) were in the post-menopausal age group, in which 4 showed koilocytic change. Out of 2 cases diagnosed as HSIL, both were post-menopausal and showed no koilocytic change (Table No.6)

Out of 408 cases included in the study, per speculum findings were noted. 132 women (32%) had healthy looking cervix, 74 women (18%) had white discharge per vaginum, 12 women (3.5%) had hypertrophied cervix, 118 women (29%) had cervical erosion, 08 women (02%) had ectropion of cervix, 02 women (0.5%) showed cervical bleeding and 62 women (15%) had Cystocele (Table No.7).

Table-1: Age Distribution

S.No.	Age in Years	Number	Percentage(%)
1.	20-30	98	24 %
2.	31-40	148	36 %
3.	41-50	90	22%
4.	51-60	09	09%
5.	> 60	09	09%
6.	Total	408	100%

Table-2: Spectrum of Pap Smear Abnormalities

S.No.	Finding	Number	Percentage(%)
1.	NILM	149	36%
2.	NILM - Inflammatory	203	50%
3.	Atrophy	20	05%
4.	ASCUS	06	1.5%
5.	LSIL	12	03%
6.	HSIL	02	0.5%
7.	Carcinoma	-	00%
8.	Inadequate Sample	16	04%
9.	Total	408	100%

Table-3: Correlation of Age with Various Lesions

Age	NILM		NILM- Inflammatory		Atrophic		Inadequate		ASCUS		LSIL		HSIL		TOTAL	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
20-30	32	21	54	27	-	-	03	19	-	-	-	-	-	-	89	22
31-40	46	31	55	27	-	-	04	25	-	-	01	08	-	-	106	26
41-50	38	26	40	20	-	-	04	25	02	33	03	25	-	-	87	21
51-60	20	13	32	16	09	45	02	12	03	50	06	50	02	100	74	18
>60	13	09	22	10	11	55	03	19	01	17	02	17	-	-	52	13
Total	149	100	203	100	20	100	16	100	06	100	12	100	02	100	408	100

Table-4: Correlation of Clinical Features with Various Lesions

Clinical Features	NILM		NILM-Inflammatory		Atrophic		Inadequate		ASCUS		LSIL		HSIL		TOTAL	
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Routine Screening	48	32	62	30	02	10	04	25	-	-	-	-	-	-	140	34
Menstrual Abnormalities	30	20	40	20	04	20	03	19	-	-	-	-	-	-	86	21
White Discharge	14	10	28	14	02	10	02	12	02	33	04	33	-	-	74	18
Postcoital Bleed	-	-	-	-	-	-	-	-	-	-	-	-	02	100	02	0.5
Pruritus	33	22	54	27	08	40	04	25	01	17	06	50	-	-	74	18
Pain Abdomen	24	16	19	9	04	20	03	19	03	50	02	17	-	-	32	8.5
Total	149	100	203	100	20	100	16	100	06	100	12	100	02	100	408	100

Table-5: Distribution of Inflammatory Smears

S.No.	Findings	Number	Percentage(%)
1.	Bacterial Vaginosis	132	65
2.	Candidiasis	08	04
3.	Trichomonas	02	01
4.	Chlamydia	02	01
5.	Leptothrix	04	02
6.	Non-Specific	55	27
7.	Total	203	100

Table-6: Comparison of Lesions in Pre- and Post-Menopausal Women

Lesions	Pre-menopausal Women			Post-menopausal Women			Total
Findings	No.	(%)	Koilocytic Status	No.	(%)	Koilocytic Status	
NILM	97	65	10	52	35	06	149
NILM-Inflammatory	129	64	12	74	36	04	203
Atrophy	-	-	-	20	100	07	20
ASCUS	02	33	-	04	67	01	06
LSIL	02	17	02	10	83	04	12
HSIL	-	-	-	02	100	-	02

Table-7 Distribution of Perspeculum Findings

S.No.	Findings	Number	Percentage(%)
1.	Healthy Looking Cervix	132	32
2.	White Discharge PV	74	18
3.	Hypertrophied Cervix	12	3.5
4.	Cervical Erosion	118	29
5.	Ectropion of Cervix	08	02
6.	Bleeds on Touch	02	0.5
7.	UV Prolapse/Cystocele	62	15
8.	Total	408	100

Discussion

It is noticed in this study that most women visit Gynecology OPD for infections and menstrual abnormalities. The spectrum of Epithelial cell abnormalities has been focussed on in this study. A total of 408 women have been included in the study, out of which the most common age group was 31 to 40 years (36%), followed by 20 to 30 years (24%), followed by 41 to 50 years (22%). In a study conducted by Pun Gurung Rashmey et al, it was found that the most common age of presentation was 30 39 years (29%), followed by 40 to 49 years (27%), followed by 50 to 59 years (19%). The age distribution is almost the same compared to the present study [10,11].

Out of 408 cases in the study, 203 cases (50%) were found to have NILM – Inflammatory, followed by 149 cases (36%) were diagnosed as NILM. In a study conducted by Das et al and Bhagya Lakshmi et al, similar findings were observed [11,12].

Considering the age-wise distribution of various lesions, in the age group of 20 to 40 years, the most common lesion was found to be NILM – Inflammatory (54%), followed by NILM (52%). In the age group of 41 to 50 years, the most common finding is NILM, followed by NILM – Inflammatory, followed by ASCUS. Among the age group of 51 to 60 years, ASCUS (50%) was more common, followed by LSIL (50%), followed by HSIL (both the cases), followed by Atrophic (45.

In women > 60 years of age, the most common findings were ASCUS (17%), followed by LSIL (17%) and Atrophic (55%) and few cases of NILM in the present study. It is hypothesized that NILM and NILM-Inflammatory were common in the younger ages and ASCUS, LSIL, HSIL and malignancies are more common in the elderly age group (> 50 years of age) and similar findings were also found in a few of the other studies [10,11].

Hence, women should be screened for a pap smear and subjected to examination with increasing age.

Most patients who came for routine screening were found to be NILM. When women presented with menstrual abnormalities or asymptomatic, they were found to have NILM-Inflammatory. Most women who presented with pruritus was found to have atrophic smears. This may be due to age factors and decreased secretions which would have led to pruritus. Most patients who presented with Pain abdomen, white discharge and pruritus were found to have ASCUS & LSIL.

2 patients who presented with postmenopausal bleeding were found to have HSIL. In a study conducted by Pun Gurung et al, it was observed that most women (86%) came for routine screening, 9% came for white discharge, 2 % for pruritus and 3 % for pain abdomen [10]. In a study conducted by Pushpa Latha et al, it was found that 36% had white discharge, 25% of women had pain abdomen, 15% were asymptomatic, 12 % had menstrual abnormalities, 8 % had pruritus and 4% presented with post-menopausal bleeding. It was observed in that study that women who presented with Irregular bleeding were found to have ASCUS & LSIL [13].

Among the 203 cases diagnosed as NILM-Inflammatory, predominant women were found to have Bacterial Vaginosis (65%), followed by Non-specific findings (27%), Candida (4%), Leptothrix (02%), Trichomonas (1%) and Chlamydia (1%). Findings in this study were almost similar to the study done by Pun Gurung Rashmey et al [10].

It was observed that NILM & NILM-Inflammatory were more common in the premenopausal age group and Atrophy, ASCUS, LSIL & HSIL are more common in the postmenopausal age group. Almost similar findings were seen in a few other studies as well [14,15,16].

Regarding the per speculum findings, healthy-looking cervix was seen in 32%, Cervical erosion in 29%, followed by white discharge per vaginum in 18 %, UV prolapse in 15 %, hypertrophied cervix in 3.5 %, Ectropion of cervix in 02% and bleeding in 0.5 % in the present study. In a study conducted by Pushpa et al, Healthy looking cervix is seen in 26 %, white discharge in 29%, hypertrophied cervix in 11 %, Cervical erosion in 19 %, Ectropion of cervix in 06 %, Bleeding in 05 % and UV prolapse in 4 % [13].

Table-8: Correlation of Results of Present Study with Other Studies

Author Name	No. of Cases	NILM	NILM- Inflammatory	Atrophic	ASCUS	LSIL	HSIL	Malignancy
Present Study	408	36%	50%	05%	1.5%	03%	0.5%	-
Morris E et al	271	32%	48%	-	12.2%	-	8.4%	-
Parate S N et al	2544	30%	57.7%	-	-	0.25%	0.94-2.06 %	-
Kaustubh et al	610	45%	50.1%	-	3.27%	-	2.94%	0.65%
Kapila K et al	86,434	96.09%	-	-	2.2%	08%	1.2%	0.1%
Ranabhat S K et al	880	72%	26%	-	0.23%	0.23%	1.02%	0.23%
Urmila B et al	1699	91.81%	-	-	0.18%	0.12%	8.54%	0.35%
Magdy H B et al	624	90.71%	-	0.34%	3.59%	0.09%	0.77%	0.51%
Syed S A et al	240	15%	75.8%	1.3%	3.3%	1.3%	4.5%	-
Pun R G et al	1999	54%	21.96%	15.5%	4.5%	0.25%	1%	0.2%

Similar results were observed in the study by Morris et al Kaustubh et al and Bhavika K. [17,18]. When a mass is identified in colposcopy, clinicians went directly for biopsy instead of Pap smear examination and this could be the probable reason for no malignancy found in this study in Pap smear.

Conclusion

Pap smear screening protocol is a simple, economical, useful tool in detecting precancerous cervical epithelial lesions. It should be used widely as a routine screening procedure to reduce morbidity, and mortality.

All women above 30 years of age should undergo routine cervical cancer screening, and should continue screening even in the perimenopausal and postmenopausal age.

What does the study add to the existing knowledge?

Pap test is considered as the gold standard for Cervical Cancer screening programs. Also if a Pap test is combined with an HPV DNA test, the ability to detect any cervical pathology can be improved. Most women who visited the gynaecology OPD were not aware of cervical cancer screening.

Hence the general population has to be educated about the benefits of pap smear test through medical camps and awareness programs.

Author's contribution

Dr. N. Thamarai Selvi: Concept

Dr. Revathi Shree R: Study design

Dr. Prakashiny S: Manuscript preparation

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