Cytomorphological Study of Cervical Smear and Its Correlation with Socio-Economic Status

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Abstract: *Pap smear was introduced in 1941 and is now the standard screening test for cervical cancer and other premalignant conditions. We conducted a study to evaluate the cytomorphological patterns of cervical smears and correlate it with socioeconomic status in the patients of a tertiary care institute of Maharashtra. Before the start of the study, we got permission from the institutional ethics committee. Written and informed consent was taken from all the patients after briefly explaining the procedure to be done. A pre designed case record form was used to collect the data. Inflammatory lesions were more common in the present study. LSIL was the most common amongst the epithelial cell abnormalities. Amongst the epithelial cell abnormalities, LSIL was found to be significantly associated with lower socio-economic status.*

Keywords: Cytology, Socioeconomic status, Pap smear

1. Introduction

The 20th century witnessed a drastic change in the mortality of cervical cancers across the world. The achievement is directly attributable to implementation of cervical cytology using Papanicolaou (Pap) stain[1]. Pap smear was introduced in 1941 and is now the standard screening test for cervical cancer and other premalignant conditions[2]. Pap smear also helps in detecting infections and other cervical abnormalities[3]. Due to its unique accessibility of cervix to direct visualization, cost effectiveness and ease of use, Pap smear is a part of regular screening programmes conducted in developing countries like India. Socio- economic status is one of the risk factors in the web of causation of cervical cancers and other infective diseases in cervix[4]. With this background, we conducted a study to evaluate the cytomorphological patterns of cervical smears and correlate it with socioeconomic status in the patients of a tertiary care institute of Maharashtra.

2. Materials and Methods

We conducted a cross sectional study on the cases visiting the department of Obstetrics and Gynecology of a tertiary care hospital in Maharashtra. The study was conducted from August 2015 to July 2017 and a total of 200 cases fulfilling the eligibility criteria were included in the study. Cervical cytology sample (smears) from women aged 20 to 70 years presenting with gynecological symptoms were included in the study. The smears which had unsatisfactory results, with no significant abnormality and pregnant women were excluded from the study.

Before the start of the study we got permission from the institutional ethics committee. Written and informed consent was taken from all the patients after briefly explaining the procedure to be done. A pre designed case record form consisting of demographic factors like age, age at marriage, parity, socioeconomic status and educational status and detailed gynecological examination along with cervical cytology findings was used as a data collection tool in this study. Socio economic status was classified according to B G Prasad classification as per the consumer price index of the study period[5,6].

After preliminary inspection of the cervix, Pap smear was taken using Ayre's spatula[7]. The squamo-columnar junction was scraped with Ayre's spatula by rotating full 360 degree. Spatula was withdrawn carefully. The cellular material was spread on slide in circular movement to cause uniform spread of cells on glass slide. The slide was immediately fixed by dipping in the jar containing equal parts of 95 % ethyl alcohol and ether and transported to the cytopathological laboratory and stained by Papanicolaou stain. The smears were reported by using the Bethesda System. The smears were categorized into different groups as non-specific infections, specific infections, other reactive changes and epithelial and glandular cell abnormalities[7–13]. The results of the Pap smear were correlated with histopathological findings of cervical biopsy wherever possible.

3. Statistical Analysis

The data was collected using EPI INFO 7.2. The qualitative variables were expressed in terms of percentage and difference between two proportions was analyzed using Chi-square test or Fisher Exact test. The quantitative variables were expressed in terms of mean and standard deviation. The trend was assessed using Chi-square for trend test. All the analysis was two tailed and the significance level was set at 0.05.

4. Results

We included 200 cases in our study.

Table 1: Demographic factors of the study cases

Demographic factors	Frequency	Percentage
Age group (years)		
21 to 30	27	13.50
31 to 40	81	40.50
41 to 50	63	31.50
51 to 60	20	10.00
61 to 70	9	4.50
Presenting complaints		
Discharge Per Vagina	51	25.50
Pain in lower abdomen	40	20.00
Bleeding Per Vagina	30	15.00
Post menopausal bleeding	20	10.00
Something coming out of vagina	15	7.50
Vulval itching	15	7.50
Burning sensation	15	7.50
Post coital bleeding	14	7.00
Socio economic status		
I (Upper class)	11	5.50
II (Upper middle class)	23	11.50
III (Middle class)	32	16.00
IV (Lower middle class)	82	41.00
V (Lower class)	52	26.00
Age at marriage (years)		
16 to 18	104	52.00
19 to 21	68	34.00
>21	28	14.00
Parity		
Nulligravida	5	2.50
Para 1	17	8.50
Para 2	69	34.50
Para 3	58	29.00
Para 4 and above	51	25.50

The mean age of the study subjects was 41.08 ± 10.32 years. The most common presenting compliant was discharge per vagina (25.50%), majority of the subjects belonged to lower middle and middle class and majority of them was multigravida. The mean age at marriage was 18.71 ± 2.19 years.
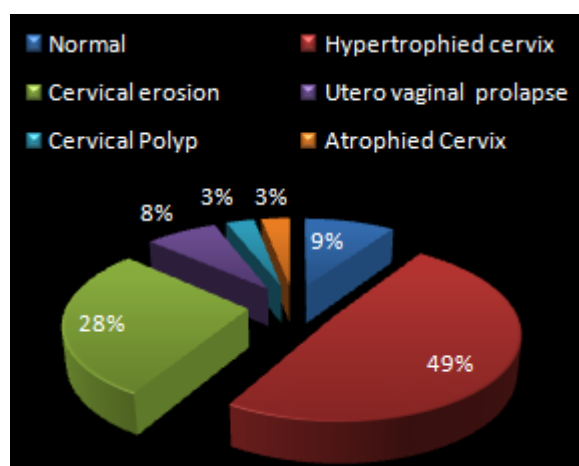

Figure 2: Distribution of study subjects based on the findings of per speculum examination

In our study, the most common finding on per speculum examination was hypertrophied cervix (49.00%), followed by cervical erosion (28.00%). Normal cervix was seen in 9.50% cases.

Table 3: Distribution of the study subjects based on Papsmear findings

Serial no	Diagnosis	Number	Percentage
1	NILM	156	78.00 (out of 200)
a	Non-specific inflammation	30	15.00
b	Specific organisms		
i	Trichomonasvaginalis	22	11.00
ii	Fungal organisms morphologically consistent with candida	18	9.00
iii	Shift in flora suggestive of bacterial vaginosis	16	8.00
iv	Cellular changes consistent with Herpes simplex virus	2	1.00
v	Bacteria morphologically consistent with actinomyces	1	0.50
vi	Tuberculosis	1	0.50
c	Reactive cellular changes		
i	Inflammation	57	28.50
ii	Atrophy	8	4.00
iii	Intra uterine device	1	0.50
2	Epithelial cell abnormalities	44	22 (out of 200)
a	ASCUS	1	0.50
b	LSIL	31	15.50
c	HSIL	5	2.50
d	SCC	4	2.00
e	AGC	3	1.50

Negative for intraepithelial lesion or malignancy (NILM) were 156 (78%), out of which 30 cases (15%) were of non-specific inflammation, 22 cases (11%) were of trichomonasvaginalis, 18 cases (9%) were of fungal vaginitis, 16 cases (8%) were of bacterial vaginosis, 2 cases (1%) were of herpes simplex virus, 1 case (0.5%) each were of actinomyces and tuberculosis. 57 cases (28.5%) were of reactive cellular changes with inflammation. Atrophic vaginitis was seen in 8 cases (4%).
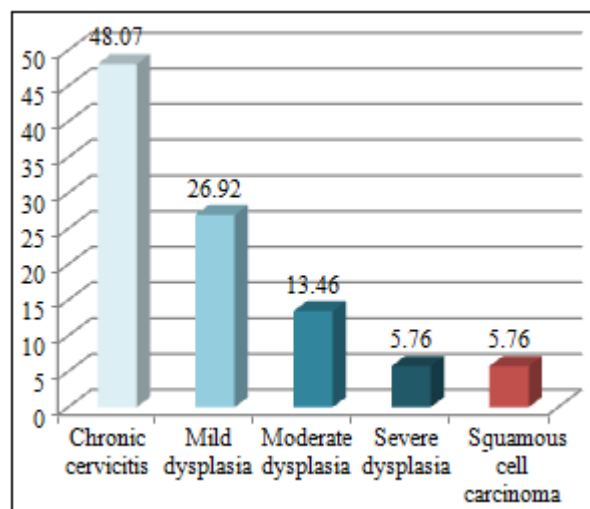

Figure 4: Distribution according to histopathological findings (n=52)

Changes due to intrauterine contraceptive device were seen in 1 case (0.5%). Epithelial cell abnormalities cases found in the study were low grade squamous intraepithelial lesion (LSIL) 31 (15.5%) cases, high grade squamous intraepithelial lesion (HSIL) 5 (2.5%) and squamous cell carcinoma was seen in 4 (2%) cases. Atypical glandular cells (AGC) were seen in 3 (1.5%) cases and atypical squamous cells of undetermined significance were seen in 1 (0.5%) case.

Table 5: Distribution of cytological abnormalities according to socio economic status

Socio economic status	NILM		ASCUS		LSIL		HSIL		SCC		AGC	
	No^r	%	No^r	%	No^r	%	No^r	%	No^r	%	No^r	%
I (Upper class)	11	7.05	0	0	0	0	0	0	0	0	0	0
II (Upper middle class)	23	14.74	0	0	0	0	0	0	0	0	0	0
III (Middle class)	30	19.23	0	0	2	6.45	0	0	0	0	0	0
IV (Lower middle class)	59	37.82	1	100.00	14	45.16	4	80.00	3	75.00	1	33.34
V (Lower class)	33	21.15	0	0	15	48.38	1	20.00	1	25.00	2	66.66
P value	<0.001		0.8566		0.0002		0.4317		0.4557		0.2213	

The proportion of NILM and LSIL significantly increased as the socio economic status decreased (p<0.05). But, there was no significant trend in case of ASCUS, HSIL, SCC, AGC (p>0.05).

5. Discussion

The Papanicolaou (Pap) test is a screening test performed using cells from the uterine cervix. The test is simple, quick and painless. By cervical screening, incidence and prevalence of cervical cancer and related mortality and morbidity can be reduced. The incidence of cervical cancer has been reduced to more than 50% in developed countries in past 30 years because of widespread screening, whereas in developing countries there is high burden especially in underserved population due to lack of screening and health care infrastructure[13]. With this background, we conducted a cross sectional study on subjects attending the Gynaecology outpatient department with symptoms at a tertiary care hospital of Maharashtra. The age groups of 20 to 70 years were included in our study.

The most common symptom was discharge per vaginum which was among 25.5% of the patients in our study. Similar results were inferred by studies conducted by Bal et al, Ashmita D et al[14], Gupta K et al[15], Patel J et al[16], BishtM et al[17], Nandwani RR et al[18] and AliSS et al[19] with varied proportion of the patients having discharge per vaginum from 26.90% to 73.7% .

Table showing comparison of NLIM of the present study with other studies

Study	Non specific	TV	Candida	BV	HSV	Actinomyces	Reactive changes with inflammation	Atrophy
Ranabhat K et al[20]	--	0.45	1	7.6	--	--	2.5	--
BalahaM et al[21]	46.29				--	--	--	--
Bal M et al[22]	71.3	0.3	--	2.7	--	--	27.42	--
Despande JD et al[23]	29.03	11.29	6.99	19.89	--	--	27.42	--
Sarma U et al[24]	--	11.56	10.05	59.80	--	--	10.55	6.03
Kalyani R et al[25]	68.88	2.11	2.03	9.81	0.08	0.08	--	--
Chaitanya K et al[26]	79.38	5.36	6.27	--	0.03	--	8.02	--
Present study	15.00	11.00	9.00	8.00	1.00	0.50	28.50	4.00

Table showing comparison of epithelial cell abnormalities of the present study with other studies

Study	ECA	ASCUS	ASC-H	LSIL	HSIL	SCC	AGC	ADC
Sarma U et al[24]	27	11.11	-	29.63	29.63	29.63	--	--
Bukhari MK et al[27]	102	9.80	-	45	21.8	13.7	3.9	-
Bal M et al[22]	15	6.66	-	53.33	13.33	20.00	-	-
RanaS et al[28]	42	28.57	19.04	19.04	23.04	9.52	-	-
Gaur BS et al[29]	186	43.01	-	39.78	6.45	3.22	6.45	1.07
Kalyani R et al[25]	38	47.36	10.52	7.89	13.15	13.15	7.89	-
Nandwani RR et al[30]	719	27.53	-	19.74	21.14	26.56	3.33	1.66
Present study	44	2.27	-	70.45	11.36	9.09	6.81	-

The results of epithelial cell abnormalities found in the present study were comparable with the other studies like Patel J et al[16], BalM et al[22], RanaS et al[28], Verma I et al[31] . The epithelial cell abnormalities in the present study were ASCUS (2.27%), LSIL (70.45%), HSIL (11.36%), SCC (9.09%) and AGC (6.81%). The most common lesion found in our study was LSIL followed by HSIL and SCC which indicates significantly higher prevalence of premalignant condition of cervical cancer among the population of our area.

In present study, maximum 82 (41%) cases belonged to class IV (lower middle). 52 (26%) cases were from class V (lower). 32 (16%) cases were from class III (middle). 23 (11.5%) cases were from class II (upper middle). 11 (5.5%) cases belonged to class I (upper).The proportion of NILM and LSIL significantly increased as the socio-economic class decreased (p<0.05). So, we can interpret that the inflammatory lesions and the precursors of the cervical cancer are more likely to be seen with lower socio-economic groups.

TadeseS et al[32] in their study concluded that showed various socioeconomic and cultural vulnerabilities that expose women to cervical cancer and the challenges encountered by cervical cancer patients after their diagnosis and addressing this issue largely lies in strengthening primary and secondary preventive mechanisms. Lee M et al[33] in their study found that socioeconomic disparities influenced participation of women in screening programmes, and women with lower educational levels and lower household income were less likely to be screened and concluded that socioeconomic status remains an important factor in reducing compliance with cancer screening. RanaS et al[28] stated that the need of an hour is an effective screening programme that is based on available resources and is readily available to the low socio-economic and disadvantaged sections of our society.

6. Conclusions

Inflammatory lesions were more common in the present study. LSIL was the most common amongst the epithelial cell abnormalities. Amongst the epithelial cell abnormalities, LSIL was found to be significantly associated lower socio-economic status. Awareness and education programs should be formulated and implemented about cervical cancer and Pap smear screening. Since the goal of any screening programme should be to pick up majority of the precursor lesions and not frank cancers, it is desirable to initiate Pap smear screening in women from lower socioeconomic status before the 40 years of age.

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