|| ISSN(online): 2589-8698 || ISSN(print): 2589-868X ||
International Journal of Medical and Biomedical Studies
Available Online at www.ijmbs.info
PubMed (National Library of Medicine ID: 101738825)
Index Copernicus Value 2018: 75.71
Original Research Article
Volume 4, Issue 3; March: 2020; Page No. 130-137

EVALUATION OF PAP SMEARS BY CONVENTIONAL CYTOLOGY AND CORRELATION WITH CLINICAL AND HISTOPATHOLOGICAL FINDINGS

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Article Info: Received 20 February 2020; Accepted 21 March 2020
DOI: https://doi.org/10.32553/ijmbs.v4i3.1046
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Conflict of interest: No conflict of interest.

Abstract

Introduction: Cervical cancer is considered preventable, as majority of cancers are preceded by a long-standing precancerous lesion. This lesion may exist in the non-invasive stage for years and shed abnormal cells that can be detected on cytological examination.

Aims: The study was carried out with aim to evaluate cervical smears for epithelial abnormalities and study the relationship of cervical smear findings with clinical features like age, parity, vaginal discharge, lower abdominal pain, backache, postcoital bleeding, infertility, postmenopausal bleeding and also Correlate cervical smear findings with cervical biopsy.

Material and methods: All the pap smears received from the gynecology department from 2013 to 2015 were included in the study. In each case, personal information and clinical history were recorded. Correlation with histopathological findings was done in cases where cervical biopsy was available.

Results: The mean age of the women was 31 years. Normal pap smear was reported in 8.33%. The most common finding reported was inflammatory pap smear.(75%) Highest incidence of premalignant lesion (LSIL) was noted in women with parity 5 and above. The most common presenting complaint was discharge per vaginum which was present in 54 (39.13%) cases. Of the total 60 biopsies, 45 were reported as chronic cervicitis and 11 as LSIL, 2 as HSIL and 2 were normal.

Conclusion: This study establishes the importance of conventional cervical Pap smear test in cervical cancer screening for diagnosis of precancerous and cancerous lesions of cervix especially in India where majority of population is rural-based and belong to low socioeconomic group.

Introduction

Cervical cancer is common worldwide and ranks third among all malignancies for women. Eighty per cent of cancer cervix cases are seen in developing countries, where it is commonest cancer in women.[1] In 2008, an estimated 5,30,000 new cases were identified globally and 2,75,000 deaths were recorded. India had an age standardized incidence rate of 30.7/100,000 women in 2002, one-year prevalence of 101,583 and 5-year prevalence of 370,243 and 72,600 deaths in 2002.[2,3]

The risk factors for cervical cancer are related to both host and viral characteristics such as HPV exposure, viral oncogenicity, inefficiency of immune response, and presence of co-carcinogens.[4] The predisposing factors include – early age at marriage, coitus before18 years of age, delivery of the first baby before the age of 20 years, multiple sex partners, history of genital warts, high parity, use of oral contraceptives, race and religion (cancer cervix is rare in Muslims and Jews; circumcision may be a factor). Low socio-economic status and poor personal hygiene may be contributory factors.[5]

Persistent infection with high risk oncogenic HPVs (HPV 16 and HPV 18) is currently considered to be the single most important factor in cervical oncogenesis.[6] Tobacco specific carcinogens and polycyclic aromatase hydrocarbons can bind to and damage cellular DNA and may cooperate with HPV to produce malignant transformation.[7]Prenatal exposure to the diethylstilbestrol (DES) and development of the clear cell adenocarcinoma of the cervix is also observed.[8] Association of herpes simplex virus 2 (HSV-2) and *Chlamydia trachomatis* with cancer cervix is being investigated.[9] Epidemiological studies showed that diet deficient in fruits and vegetables and a low intake of β-carotene are associated with increased risk of cervical dysplasia.[10]

According to The Bethesda System, these pre-invasive lesions are classified into two groups: Low grade Squamous Intraepithelial lesions (LSILs) and High grade Squamous Intraepithelial lesions (HSILs). Histologically diagnosed LSILs regress in 60% and persist in 30% and histologically diagnosed HSILs regress in 30% and persist in 60% of cases.[38]The available evidence suggests the existence of a sequence of events that in some leads to the progression to a full-blown invasive malignancy while some milder

forms regress spontaneously. Cancer of the cervix can be prevented by intercepting it at the preinvasive stage.[11,12,13]

Cervical cancer is considered preventable, as majority of cancers are preceded by a long-standing precancerous lesion. This lesion may exist in the non-invasive stage for years and shed abnormal cells that can be detected on cytological examination.[14]

The Papanicolaou (Pap) smear is one of the modern success stories in the field of preventive medicine which detects cervical smear in its early stage. The Pap test is a screening test performed using cells from the uterine cervix. The Pap test was introduced as a cervical screening test in 1943 by Dr. George Papanicolaou, on whom it is named.

The study was carried out with aim to – 1. Evaluate cervical smears for epithelial abnormalities like LSILS/CIN I and HSILs/ CIN II, CIN III and carcinoma.

2. Study the relationship of cervical smear findings with clinical features like age, parity, vaginal discharge, lower abdominal pain, backache, postcoital bleeding, infertility, postmenopausal bleeding.
3. Correlate cervical smear findings with cervical biopsy.

Material and methods

This study was a hospital-based study on the routine materials from the Department of Pathology, Government Medical College, Jammu over a period of two years in two parts –

(1) Retrospective study for a period of one year from October 2013 to September 2014.
(2) Prospective study for a period of one year from October 2014 to September 2015.
All the pap smears received from the gynecology department within this period were included in the study. In each case, personal information and clinical history like age, parity, relevant gynecological history (vaginal discharge, menstrual abnormalities, lower abdominal pain, backache, postcoital bleeding, infertility, postmenopausal bleeding etc.), HIV status, any previous treatment and physical examination along with evaluation of relevant investigations were carried out. The study was approved by the Institutional Ethics Committee.
Mode of evaluation of pap smears and cervical biopsies-
1. Conventional cytology by Papanicolaou staining.
2. Routine grossing and processed for hematoxylin and eosin staining.
Correlation with histopathological findings was done in cases where cervical biopsy was available.

Results

Out of a total of 228 cervical smears received during the two year period (October 2013 – September 2015), 19 (8.33%) cases were diagnosed as normal cervical smears,171 (75%) cases were diagnosed as inflammatory cervical smears(Figure1), 12(5.27%)were diagnosed as infection in smears, 1 (0.44%) case of atrophic smear,14 (6.14%) cases were diagnosed as LSIL and 11(4.82%) were inadequate for evaluation. Table 1

CLINICO-PATHOLOGICAL CORRELATION:

Age - The age-wise distribution of cases is shown in Table 2. Out of a total of 228 cervical smears, patients' age ranged from 18 – 77 years and mean age was 31.41 years. The patients were divided into different age groups as shown in Table 2. Maximum number of cases were in the age group of 21-30{127 (55.70%)}, followed by 31-40{54 (23.69%)}, and 41-50{30(13.16)}. Only 5 cases were more than 50 years of age.

Age-wise distribution of Pap smear findings in the present study is shown in the Table 3. There were 51 cases in the age group of 31 – 40 years. Out of these, 37 (72.55%) cases were diagnosed as inflammatory cervical smears, 3 (5.88%) cases showed organism as a finding and 5 (9.81%) cases were diagnosed as LSIL. There were 26 cases in the age group of 41–50 years. Out of these, 14 (53.85%) cases were diagnosed inflammatory cervical smears, 3 (11.53%) cases showed organism and 6 (23.08%) case were diagnosed as LSIL. Out of 2 cases in the age group of 51–60 years, 1 (50%) case was of inflammatory cervical smear and 1 (50%) case diagnosed as LSIL. Out of 2 cases in the age group 61–70 years, 1 case was diagnosed as inflammatory cervical smear and 1 cases as LSIL. There was only 1 case of atrophic smear which was in the age group of 71–80 years.

Parity – Table 4 shows the parity distribution of cases in the present study. Out of a total of 78 cases , 19 (24.35%) cases were of para1, 29 (37.18%) cases were para2, 12 (15.39%) cases were para3, 10 (12.82%) cases were seen para4 and 8 (10.26%) cases were para≥5. Maximum number of cases were of para2 (37.18%). We found history of parity in only 78 cases out of 217 satisfactory smears from the record available.

Table 5 shows the parity-wise distribution of Pap smear findings. There were 19 cases of para1. Among these, 17 (89.47%) cases were diagnosed as inflammatory cervical smears and 2 (10.53%) cases showed features of Bacterial vaginosis(Figure 2). There were 29 cases of para2. Among these, 3 (10.34%) cases were normal, 24 (82.76%) cases diagnosed as inflammatory cervical smear and 2 (6.90%) cases were of Bacterial vaginosis. There were 12 cases of para2. Among these, 2 (16.67%) cases were normal, 8 (66.67%) cases showed inflammatory cervical smear and 2 (16.67%) cases showed features of Bacterial vaginosis. There were 10 cases of para4. Among these, 6 (60.00%) cases were diagnosed as inflammatory cervical smear, 1

(10.00%) case showed features of Bacterial vaginosis, 1 (10.00%) case was of atrophic smear and 2 (20.00%) cases were of LSIL(Figure3). There were 8 cases of para>5. Among these, 6 (75.00%) cases showed inflammatory cervical smear and 2 (25.00%) cases were of LSIL.

Highest incidence of premalignant lesion (LSIL)was noted in women with parity 5 and above. Henceforth, it is obvious that multi-parity is a significant risk factor for carcinoma cervix.

Table 6 shows the distribution of cases according to the chief complaints. Discharge per vaginum was the most common chief complaint present in [54/138 or 39.13%] followed by pain lower abdomen [52/138 or 37.68%] and menstrual abnormalities [22/138 or 15.94%]. Bleeding per vaginum was present in 10 cases (7.25%).

Discharge per vaginum –

The most common presenting complaint was discharge per vaginum which was present in 54 (39.13%) cases. Table 6 shows distribution of Pap smear findings in the cases having discharge per vaginum. 6 (11.11%) cases showed normal Pap smear, 36 (66.66%) cases showed inflammatory Pap smears, 1 (1.85%) case was of Bacterial vaginosis, 2 (3.70%) cases were of *Trichomonas vaginalis* and 9 (16.67%) cases were of LSIL. Maximum number of cases was inflammatory followed by LSIL.

Pain lower abdomen –

History of pain lower abdomen was present in 52 (37.68%) cases. Table 8 shows distribution of Pap smear findings in the cases having pain lower abdomen. 5 (9.62%) cases showed normal Pap smear, 41 (78.85%) cases were of inflammatory Pap smear, 1 (1.92%) case showed features of Bacterial vaginosis, 2 (3.85%) cases were of *Trichomonas vaginalis* and 3 (5.76%) cases were diagnosed as LSIL. Maximum number of cases as inflammatory followed by LSIL.

Menstrual abnormalities: These include menorrhagia, polymenorrhea and metromenorrhagia. Menstrual abnormalities were present in 22 (15.94%) cases. Table 9 shows distribution of Pap smear findings in the cases having menstrual abnormalities. Out of 22 cases, 1 (4.55%) case was of normal cervical smear, 16 (72.72%) cases were inflammatory Pap smears, 1 case was of *Trichomonas vaginalis* and 4 (18.18%) cases were of LSIL.

Bleeding per vaginum– Bleeding per vaginum was the chief complaint in 10 cases (7.25%). Table 10 shows distribution of Pap smear findings in the cases having pain lower abdomen. 8 (80.00%) cases were inflammatory Pap smears, 1 (10.00%) case was of Bacterial vaginosis, and 1 (10.00%) case was of LSIL.

Maximum number of cases was inflammatory.

Analysis of Histopathological features of cervical biopsies: Out of 217 cervical Pap smears, 60 corresponding biopsies were received in the department. Out of these 60 biopsies, 45 biopsies were diagnosed as chronic cervicitis (Figure 4)and 11 were diagnosed as LSIL(Figure 5), 2 were diagnosed as HSIL, and 2 were normal. Table 11 shows the distribution of cases according to cervical biopsies.

HISTO-CYTOLOGICAL CORRELATION

Of the total 60 biopsies, 45 were reported as chronic cervicitis and 11 as LSIL, 2 as HSIL and 2 were normal. Of the 45 cases of chronic cervicitis, 42 were reported as inflammatory cervical smears in cytology and 3 as LSIL. Of 11 cases of LSIL, 7 was reported as inflammatory cervical smears and 4 as LSIL in cytology. Of 2 cases of HSIL, 1 were reported as LSIL on cytology and 1 as inflammatory smear on cytology. Two (2) smears were normal both on histology and cytology.

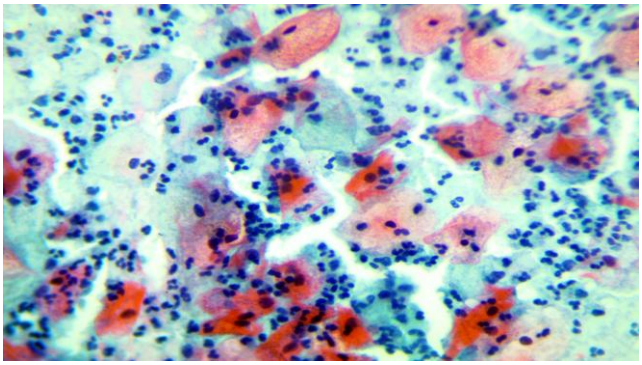

Figure 1: Inflammatory cervical smear (pap 400X)

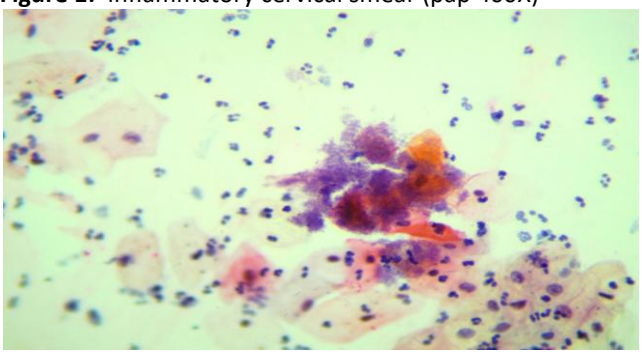

Figure 2: Bacterial vaginosis (pap 200x)

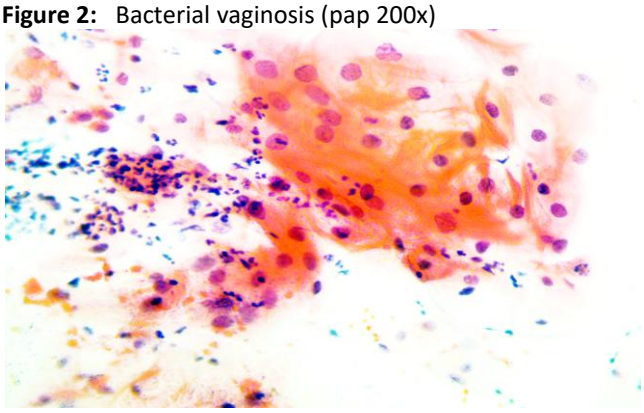

Figure 3: LSIL (pap 200X)

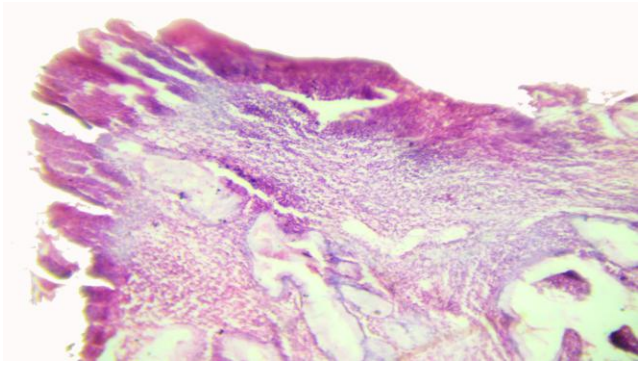

Figure 4: Chronic cervicitis (200X, H&E)

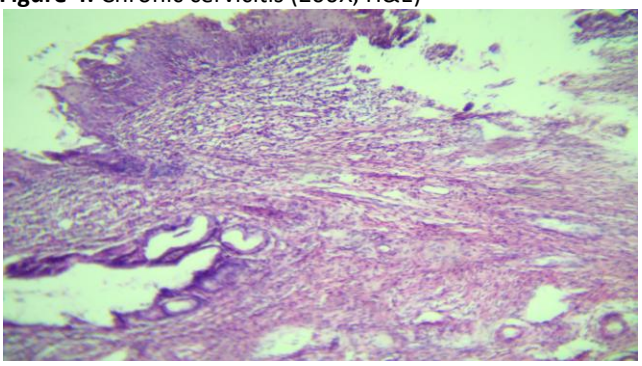

Figure 5: LSIL (H&E, 200X)

Table 1: Distribution of cases according to Pap smear findings (N=228)

Pap smear findings		No.	%
Normal cervical smear		19	8.33
Inflammatory cervical smear		171	75.00
Organisms	*Bacterial vaginosis*	10	4.39
	Trichomonas vaginalis	2	0.88
Atrophic smear		1	0.44
LSIL		14	6.14
Inadequate for evaluation		11	4.82
Total		**228**	**100.00**

Table 2: Age-wise distribution of cases (N=228)

Age group (in years)	No.	%
10 - 20	12	5.26
21 - 30	127	55.70
31 - 40	54	23.69
41 - 50	30	13.16
51 - 60	2	0.88
61 – 70	2	0.88
71 – 80	1	0.43
TOTAL	228	100

Mean age ± Standard deviation (Range) = 31.42 ± 9.38 (18 – 77) years

Table 3: Age-wise distribution of Pap smear findings (n=217)

Age group (in years)	Normal		Inflammatory		Organisms				Atrophic		LSIL		Total (%)
					B. vaginosis		*T. vaginalis*						
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	
10 -20 (n=11)	1	9.09	9	81.82	1	9.09	0	0	0	0	0	0	11 (100.0)
21 – 30 (n=124)	9	7.26	109	87.9	5	4.03	0	0	0	0	1	0.81	124 (100.0)
31 – 40 (n=51)	6	11.76	37	72.55	2	3.92	1	1.96	0	0	5	9.81	51 (100.0)
41 – 50 (n=26)	3	11.53	14	53.85	2	7.69	1	3.85	0	0	6	23.08	26 (100.0)
51-60 (n=2)	0	0	1	50.00	0	0	0	0	0	0	1	50.00	2 (100.0)
61-70 (n=2)	0	0	1	50	0	0	0	0	0	0	1	50.00	2 (100.0)
71-80 (n=1)	0	0	0	0	0	0	0	0	1	100.0	0	0	1(100)
Total	**19**		**171**		**10**		**2**		**1**		**14**		**217**

Table 4: Parity distribution of cases in the present study (n=78)

PARITY	No.	%age
Para1	19	24.35
Para2	29	37.18
Para3	12	15.39
Para4	10	12.82
Para>5	8	10.26
Total	78	100.00

Table 5: Parity-wise distribution of Pap smear findings (n=78)

Parity	Normal		Inflammatory		Organisms				Atrophic		LSIL		Total (100.0)
					B. vaginosis		*T. vaginalis*						
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%	
Para 1 (n=19)	0	0	17	89.47	2	10.53	0	0	0	0	0	0	19 (100.0)
Para 2 (n=29)	3	10.34	24	82.76	2	6.90	0	0	0	0	0	0	29 (100.0)
Para 3 (n=12)	2	16.67	8	66.66	2	16.67	0	0	0	0	0	0	12 (100.0)
Para 4 (n=10)	0	0	6	60.00	0	0	1	10.00	1	10.00	2	20.00	10 (100.0)
Para >5 (n=8)	0	0	6	75.00	0	0	0	0	0	0	2	25.00	8 (100.0)
Total	5		61		6		1		1		4		78

Table 6: Distribution of cases according to chief complaints

Clinical features	No.	%
Discharge per vaginum	54	39.13
Pain lower abdomen	52	37.68
Menstrual abnormalities	22	15.94
Bleeding per vaginum	10	7.25

Significant history is available in only 138 cases in the records.

Table 7: Distribution of Pap smear findings according to discharge per vaginum (n=54)

Clinical feature	Normal		Inflammatory		Organisms				Atrophic		LSIL	
					B. vaginosis		*T. vaginalis*					
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Discharge per vaginum (n=54)	6	11.11	36	66.66	1	1.85	2	3.70	0	0	9	16.67

Table 8: Distribution of Pap smear findings according to pain lower abdomen (n=52)

Clinical feature	Normal		Inflammatory		Organisms				Atrophic		LSIL	
					B. vaginosis		*T. vaginalis*					
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Pain lower abdomen (n=52)	5	9.62	41	78.85	1	1.92	2	3.85	0	0	3	5.76

Table 9: Distribution of Pap smear findings according to menstrual abnormalities (n=22)

Clinical feature	Normal		Inflammatory		Organisms				Atrophic		LSIL	
					B. vaginosis		*T. vaginalis*					
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Menstrual abnormalities (n=22)	1	4.55	16	72.72	1	4.55	0	0	0	0	4	18.18

Table 10: Distribution of Pap smear findings according to bleeding per vaginum (n=10)

Clinical feature	Normal		Inflammatory		Organisms				Atrophic		LSIL	
					B. vaginosis		*T. vaginalis*					
	No.	%	No.	%	No.	%	No.	%	No.	%	No.	%
Per vaginum bleeding (n=10)	0	0	8	80.00	1	10.00	0	0	0	0	1	10.00

Table 11: Distribution of cases according to cervical biopsies

DIAGNOSIS	No.	%
Normal	2	3.33%
Chronic cervicitis	45	75%
LSIL	11	18.34%
HSIL	2	3.33%
TOTAL	**60**	**100**

Table 12: Histo-cytological correlation

Diagnosis	Cytology	Histology
Chronic cervicitis/Inflammatory cervical smear 45	50	45
LSIL/HSIL	8	13
Total	58	58

Discussion

The clinicopathological study of 228 cervical smears establishes the spectrum of hospital based lesions of cervix seen in India. It also establishes the importance of cervical cancer screening by cervical Pap smears. The cervical Pap smear screening is useful for developing countries like India where majority of population is rural and belong to low socioeconomic status and cannot afford universal screening and newer techniques like liquid based cytology, automated scanning devices, computer assisted microscopy, digital colposcopy with automated image analysis, human papilloma virus testing ,molecular markers and HPV vaccine.

Using conventional cytology, a definite diagnosis could be reached in 217 of the total 228 cases. The cytology diagnosis of cancer cervix and precursor lesions {LSIL/HSIL} has to be confirmed by histopathology which is considered gold standard. Based on the cyto-histology correlation, conventional cervical smear test is not sufficiently sensitive in reliably detecting cervical intraepithelial neoplasia.[15,16] A median analysis of European studies has shown that the median sensitivity of conventional cytology in only 50%, but with marked variation in sensitivity in different national settings.[17] It is because of this low sensitivity and specificity of cervical Pap smears, newer techniques for cervical cancer screening were introduced.

Cytomorphological features:

In the present study, inflammatory cervical smear was the commonest diagnosis encountered in 171 cases out of 228 cases (75%). This was followed by normal cervical smear (19/228 or 8.33%), LSIL (14/228 or 6.14%), unsatisfactory smears (11/228 or 4.82%), microbial infection (12/228 or 5.27%) and atrophic smears (1/228 or 0.44%). Most of the patients in our study were symptomatic who attended gynecology clinic for some complaints and this could be the reason for inflammatory cervical smears being the commonest diagnosis encountered. Had it been the screening of general population/ random screening the incidence of different diagnosis encountered would have been different. The results of other studies also support this observation.[18]

The incidence of inflammatory cervical smears will vary depending upon which population is screened. If general population asymptomatic women are screened, then the incidence will be different and if women attending gynecology clinic for some complaints are subjected to this screening test, then the incidence will be different. In our study most of the patients had attended Gynecology clinic for some complaints and that may be the reason for such a high incidence of inflammatory smears. **Obaseki DE *et al*. (2013)** performed voluntary screening on asymptomatic patients and found 61.5% normal smears, 14.6% inflammatory smears, 16.2% abnormal epithelial lesions and 7.7% unsatisfactory smears.[19]

In our study, we found lower incidence of normal smears (19/228 or 8.33%) as most of the pati ents were attending gynecology clinic for some complaints and none of the patient was volunteer for cervical cancer screening. The results of other studies are higher as compared to our study.

In our study, the diagnosis of LSIL was in 14 cases out of total of 228 cases (6.14%). This establishes the importance of cervical Pap smears in diagnosing precancerous lesions of cervix. LSIL cases are followed up clinically and repeat Pap smear is done after one year. The study by **Mufti ST *et al*. (2014)** diagnosed LSIL in 2.2% cases.[20]

There was a single case of atrophic smear [1/228 or 0.44%] in our study and she was 77 years of age. The rate of atrophic smears was much less compared to the studies in the literature.[21] This could be because of less number of postmenopausal women in our study. Only five women were more than 50 years.

In the present study, we found 12 cases of infectious smears which included 10 cases of (4.39%) *Bacterial vaginosis* and 2 cases of (0.88%) *Trichomonas vaginalis*. **Narasimha *et al.*** (2014) studied the role of Pap smears in diagnosing cervico-vaginal infections and spectrum of infections. They found 50% infectious smears, 26.76% normal, 13.82% inflammatory, 5.43% neoplastic and 3.92% inadequate. Among the infective smears, *Bacterial vaginosis* was the most common (18.34%), followed by fungal infection (11.16%) and *Trichomonas vaginalis* (5.90%). Infection by Leptothrix, Herpes and Chlamydia was found in few cases(1.89%).[22]

Among infective smears, *Bacterial vaginosis* was the commonest infection in our study detected by the presence of Clue cells on cytological examination. The reporting of Bacterial vaginosis is important as it predisposes to postoperative infections, preterm delivery, chorioamnionitis, urinary tract infections, endometritis, and pelvic inflammatory disease. The reporting of Trichomonas is also important since they are associated

with adverse pregnancy outcomes, such as premature rupture of membranes, preterm-delivery, low birth weight as well as increased risk of HIV transmission.

Persistent inflammatory cervical smears can lead to chronic irritation and can be fertile soil for neoplastic transformation.

In our study, we found [11/228 or 4.82%] smears inadequate for evaluation. Criteria for labeling smear as inadequate was as per Bethesda guidelines. Inadequate Pap smear by definition is a specimen in which detection of cervical epithelial abnormality is impossible or uncertain. Inadequate smears may be caused by insufficient or unsuitable material sampled (vaginal cells, endocervical cells, insufficient cells, obscuring elements more than 75%) unlabelled specimens or by inadequate fixation/poor spreading of the material on the slide in the laboratory.

We did not encounter any case of invasive carcinoma in our study as most of the women in our study were in the age group of 20 –50 years. As per literature, there should have been some cases of carcinoma.

Clinicopathological correlation:

Age **–**In the present study women from all age groups were included because risk of cervical cancer increases from onset of sexual activity to elderly.

The mean age of women in our study was 31.42 years with a range of (18 – 77) years. Most of the women in our study were 20-40 years of age. This is because this was a hospital based study and not a volunteer screening of asymptomatic patients. Our observation is as per the literature also.[23]The study done by **Lavanya G *et al.*** (2011)found 55.6% cases were in the age group of 20–39 followed by 35% cases in the age group of 40–59 years and 9.5% in the age group of 60 years and above.[24]

In the present study the higher incidence of inflammatory smears was in the age group of 21-30 years (87.9%) and the incidence of premalignant lesions was highest in the 5th and 6th decade (50%). Other studies **Bukhari MH *et al.*** (2012) and **Bhojani KR *et al.*** (2011) also reported that the incidence of premalignant and malignant lesions was highest in the 5th decade (39.2 %) and 6th decade (25%) respectively.[25,18] The incidence of inflammatory smears was highest in the 20–29 age group in our study and this matched with literature.[18]Hence forth, advanced age is considered as a significant risk factor for cervical carcinoma.

The high incidence of infection by *Bacterial vaginosis* and *Trichomonas vaginalis* in our study was in the age group of 10–20 (9.09%) and 41–50 years (3.85%), respectively. The study done by **Rana S *et al.*(2013)** evaluated the entire spectrum of cytological abnormalities *i.e.* infective, pre-cancerous and cancerous and found 5.6% *Trichomonasvaginalis* in the age group of 41-50 years, followed by 7.7% in the age group of 51-60years.The study **by Bhojani KR*et al.***(2011) found 20% cases of *Bacterial vaginosis* in the age group of ≤20 years.[18]

Parity:

In the present study, maximum number of patients were multiparaous [59/78 or 75.64%]. All our LSIL cases were multiparous. We found that carcinoma cervix is associated with high parity. The studies done by **Bhojani KR *et al*.** (2011) and **Rathod GB *et al.*** (2015) also found that maximum patients were multiparous and that high parity was associated with premalignant and malignant lesions of cervix. Our study also found that the high incidence of inflammatory smears were of para 1 (89.47%) followed by para 2 (82.76%). Increasing parity is observed to be significantly associated with LSIL in our study. Hence forth, it is obvious that multiparity is a significant risk factor for carcinoma cervix.

Other clinical features:

Clinical features like discharge per vaginum, pain lower abdomen, bleeding per vaginum, menstrual abnormalities were correlated with smear diagnosis.

Vaginal discharge was the most common presenting complaint in our study present in [54 /138 or 39.13%] cases followed by pain lower abdomen [52 /138 or 37.68%] and menstrual abnormalities[22/138 or 15.94%]. The history of bleeding per vaginum was found in[10 /228 or 7.25%] cases. This observation is confirmed with literature also.[18, 26] Of the 54 (39.13%) cases of discharge per vaginum, 36 cases (66.6%) were diagnosed as inflammatory smears followed by LSIL [9/54 or 16.16%] and normal smears [6/54 or 11.11%] in our present study. The study by **Rubia N *et al*. (2011)** on patients of vaginal discharge found 55.7% inflammatory lesions, followed by normal (35.7%) and LSIL (2.8%). HSIL in 0.85 cases and 5% smears were inadequate.[27]

Pain lower abdomen was present in 52/138 or 37.68% of cases and was the second most common complaint. Of these 52 cases (37.68), 41 cases (78.85%) were diagnosed as inflammatory cervical smears, 5 cases (9.62%) were diagnosed as normal, 3cases (5.77%) were of infections and 3(5.76%) cases were diagnosed as LSIL.

The menstrual abnormalities were present in 22 (15.94%) cases in our study. Out of these, maximum lesions were inflammatory 16/22 (72.72%), followed by LSIL 4 /22 or 18.18%. 1 case (4.55%) was of *Bacterial vaginosis*.

Ten cases (7.25%) had history of bleeding per vaginum in our study. Out of these 10 cases, maximum lesions were inflammatory 8 cases (80%) followed by 1 case of LSIL (10%) and 1 case of infection (10%).

The study by **Bhojani KR *et al***. (2011) emphasized the significance of vaginal discharge and its association with neoplastic changes in the cervix. The association of vaginal discharge and cervical is well known, however, majority patients are treated with antibiotics and a follow up screening with Pap smear is not a routine practice in our settings.[18]

Histopathological correlation:

Of the 228 cases of cervical smears, we received only 60 biopsies for histopathology examination. Again this could be because of long turnover of histopathological reports in our hospital. Of the total 60 biopsies, 45 were reported as chronic cervicitis and 11 as LSIL, 2 as HSIL and 2 were normal. Of the 45 cases of chronic cervicitis, 42 were reported as inflammatory cervical smears in cytology and 3 as LSIL. Of 11 cases of LSIL, 7 was reported as inflammatory cervical smears and 4 as LSIL in cytology. Of 2 cases of HSIL, 1 were reported as LSIL on cytology and 1 as inflammatory smear on cytology. Two (2) smears were normal both on histology and cytology.

Conclusion:

This study establishes the importance of conventional cervical Pap smear test in cervical cancer screening for diagnosis of precancerous and cancerous lesions of cervix especially in India where majority of population is rural-based and belong to low socioeconomic group. But conventional smear test should be supplemented by newer techniques like liquid based cytology, automated image analysis, digital colposcopy, human papilloma virus testing, molecular markers (MCM & P16) and HPV vaccine. Biopsy is considered to be gold standard for diagnosis of carcinoma cervix.

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