

## Cytopathological pattern of cervical pap smears - a study among population of North Malabar in Kerala

Geethu G. Nair<sup>1,\*</sup>, Fatima Shamsuddin<sup>2</sup>, Thidil Narayanan<sup>3</sup>, Prejisha Balan<sup>4</sup>

<sup>1,2</sup>Assistant Professor, Dept. of Pathology, <sup>3</sup>Professor & HOD, <sup>4</sup>Associate Professor, Dept. of Obstetrics & Gynecology, Malabar Medical College, Kozhikode, Kerala

**\*Corresponding Author:**

Email: drggnair573@gmail.com

### Abstract

**Background:** India, the second most populous country in the world accounts for about 25% of cervical cancer deaths. Only limited studies are available on the prevalence of cervical epithelial abnormalities in various populations in India, especially in North Kerala. We have undertaken the present study, with the intention to estimate the prevalence of abnormal cervical cytology smears in this region so that appropriate screening strategies can be planned.

**Methods & Materials:** A one year retrospective descriptive study was conducted in Department of Pathology of a private medical college to evaluate all the pap smears reported during September 2012 to August, 2013. Smears were assessed according to the revised 2001 Bethesda system. A total of 2028 cases were analyzed. Prevalence of epithelial abnormalities was calculated in percentages.

**Results:** Out of total 2028 patients, 49 (2.41%) cases revealed epithelial abnormalities. The most frequent epithelial cell abnormality was Low grade Squamous Intra epithelial Lesion (32 cases, 1.58%). Nearly half of the patients with abnormal pap smears presented with a normal looking cervix. Epithelial abnormality was more prevalent in post-menopausal age group.

**Conclusion:** Our hospital based study shows a relatively low prevalence of cervical epithelial abnormality which is similar to that seen in the developed world. Every woman above the age of 30 must be subjected to Pap smear even with a normal looking cervix and this must be continued in post-menopausal period, as most of patients with epithelial abnormalities in our study falls in this group.

**Keywords:** Epithelial Abnormality; North Kerala; Pap smear; Prevalence

### Introduction

Cervical cancer is the fourth most frequently occurring cancer affecting women worldwide after breast, colorectal and lung cancers; it is also the seventh most common type of cancer overall. In the year 2012, the worldwide estimate was of 5,28,000 new cases and 2,66,000 deaths from cervical cancer, accounting for 7.5% of all female cancer deaths. Of these, approximately 85% of the global burden of this cancer and 87% of cervical cancer deaths occurs in less developed countries. India, the second most populous country in the world accounts for about 25% of cervical cancer deaths with an estimated incidence of about 23.29%.<sup>[1]</sup> Cervical cancer ranks as the second cause for female cancer in India.<sup>[2]</sup> Among south Asian countries, highest Age Standardized Rate (ASR) of 22 is noted in India. But this differs in different regions in India reaching upto 28 in Chennai with a low rate of 8.9 in Karunagappally and 10 in Trivandrum, both in South Kerala.<sup>[2]</sup>

The screening for cervical cancer is based on the assumption that early detection may allow early treatment. It is a well-known fact that cytology based screening programs has resulted in dramatic reduction in the incidence and mortality of invasive cervical cancer in different countries of the world.<sup>[3]</sup> The high burden of cervical cancer in developing countries is largely due to a lack of effective screening programs.<sup>[3,4]</sup> Even though national guidelines are there,

the screening coverage in India is grossly inadequate and is mainly due to inequality between infrastructure, resources and outsized population.<sup>[5]</sup> As a result, in most of the cases the diagnosis of cervical cancer is based on opportunistic screening or after the onset of symptoms.

Papanicolaou (Pap) smear testing is an effective method of detecting, preventing and delaying the progress of cervical cancer. Even as liquid-based cytology is popular in the developed countries, in low resource settings, a conventional Pap test is the main screening system. It is important to know the overall scenario of epithelial cell abnormality in the Pap smear, especially in a developing country like India which accounts for quarter of the cervical cancer deaths.<sup>[1]</sup> By knowing the pattern of premalignant and malignant lesions in an area, we can set up screening strategies and counsel women about the need of cervical screening. Only limited studies are available on prevalence of various cervical epithelial abnormalities in various populations in India, especially in North Kerala.

Reporting of pap smears using revised Bethesda System has unified various overlapping terminologies and created a standardized framework for laboratory reports that includes a descriptive diagnosis and an evaluation of specimen adequacy.<sup>[6]</sup> Hence, we have undertaken the present study using the revised Bethesda

System, with the intention to estimate the prevalence of cervical epithelial abnormalities.

**Materials and Methods**

The study is a one year retrospective descriptive study conducted in Department of Pathology of a private medical college, Kozhikode, Kerala to evaluate all the pap smears reported during September 2012 to August, 2013. As this was a retrospective study, no separate informed consent was required and the study was approved by Institutional Ethics Committee. All cytological smears were taken by gynecologists for routine screening by conventional method. After fixation in 95% isopropyl alcohol, these slides were stained with Papanicolaou’s method. Specimen adequacy as well as reporting was assessed according to the revised 2001 Bethesda system. Data on patient’s clinical details were collected from patient’s case notes & cytopathologic findings from slide archive. All patients aged more than 21 years were included in this study. Pap smears taken on post hysterectomy patients and already known cases of carcinoma cervix were excluded. A total of 2045 cases were studied, of which 17 were vault smears, which were excluded from further analysis.

**Results**

A total number of 2028 samples were retrospectively analyzed. Cytological findings of the smears are listed in Table 1. These data show that 55 (2.71%) cases were unsatisfactory for evaluation of epithelial abnormality. The main causes for inadequacy were inadequate squamous component or obscuring inflammation. Benign cytology results were seen in 1924 (94.87%) of the samples. Infections made up 128 cases (6.31%) while remaining were noninfectious. Bacterial vaginosis was the most common infection. (Table 2)

A total number of 49 (2.41%) cases revealed epithelial abnormalities. The age of the patients with an abnormal Pap smear was between 33 and 72 years, with the mean age being 50.89 years (Table 3). The most frequent epithelial abnormality was LSIL (32 cases, 1.58%), with majority belonging to 33-69 age group. A total of 14 Pap smears revealed high grade lesions and malignancy, most of which were in the 38-72 age group. Nearly half of the patients with abnormal pap smears presented with a normal looking cervix while the only significant finding in the remaining majority was a congested cervix. (Table 4)

**Table 1: PAP smear result of study group**

PAP Result	No of cases	Percentage of total no of smears
Unsatisfactory	55	2.71
ASC-US	3	0.15
LSIL	32	1.58
HSIL	10	0.49
SCC	4	0.20
NILM	1924	94.87
Total	2028	100

**Table 2: Non neoplastic cytological diagnosis in pap smear**

PAP Result	No of cases
Atrophy	359
Nonspecific inflammation	205
Trichomoniasis	1
Candidiasis	14
Bacterial Vaginosis	113
Reactive changes	80
No other changes	1152
Total	1924

**Table 3: Cervical epithelial abnormalities in relation to age**

Age Group	ASC-US	LSIL	HSIL	SCC	Percent-age
31-40		5	2		14.29
41-50		11	3		28.57
51-60		15	4	3	44.90
61-70	3	1		1	10.20
71-80			1		2.04
Total	3 (6.12%)	32 (65.30%)	10 (20.41%)	4 (8.16%)	49 (100%)

**Table 4: Per speculum examination findings of cervix**

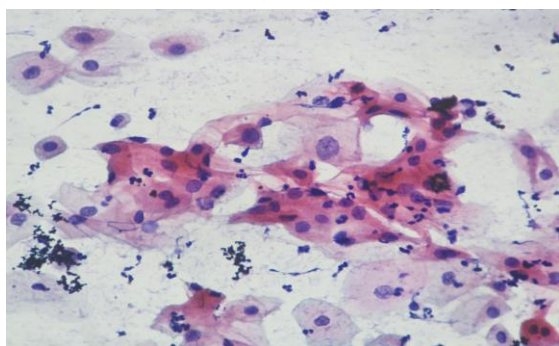
Per speculum examination of cervix	No of patients	Percentage
Friable and bleeds on touch	5	10.20%
Blood Stained discharge	1	2.04%
Congested	13	26.53%
Congested and Hypertrophied	1	2.04%
Unhealthy with erosion	3	6.12%
Irregular and pulled up	1	2.04%
Normal	25	51%

**Table 5: Studies comparing prevalence of epithelial abnormalities in different countries**

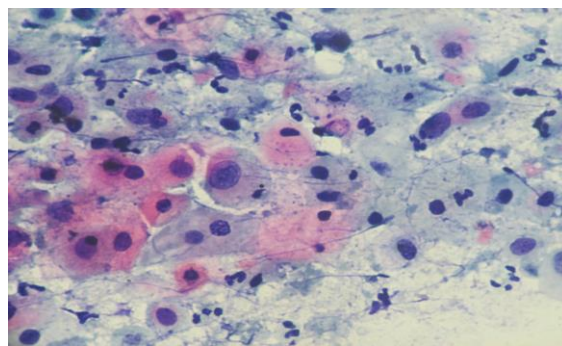
Ref No	Author	Year	Place	Total no of patients	Total prevalence	Epithelial abnormality			
						ASC-US	LSIL	HSIL	SCC
7	Edelman	1999	Bronx, New York	271	13.2	9.9	2.5	0.6	0.2
8	Fonn S	2002	S. Africa	20603	5.09		2.42	1.8	0.47
9	Afrakhteh M	2007	Iran	13315	1.18	0.63	0.21	0.13	0.2
10	Deshou H	2009	China	31500	3.12	2.3	0.41	0.28	0.02
11	Banik U	2011	Bangladesh	1699	8.18	0.18	6.36	1.18	0.35
12	Balaha MH	2011	Saudi Arabia	1171	4.95	2.99	0.09	0.68	0.34
13	Atilgan R	2012	Turkey	32026	2.8	1.9	0.5	0.1	0
14	Bukhari MH	2012	Pakistan	1000	10.2	1	4.5	2.2	1.4
15	Marahatta Khanal R	2014	Nepal	1751	1.14	0.45	0.85	0.28	0
16	Mufti ST	2014	Iran	15721	14.52	7.1	2.2	0.8	0.06
17	Kapila K	2015	Kuwait	135766	4.43	2.37	0.97	0.22	.09
	Present Study		India	2028	2.42	0.15	1.58	0.49	0.20

**Table 6: Studies comparing prevalence of epithelial abnormalities in different regions of India**

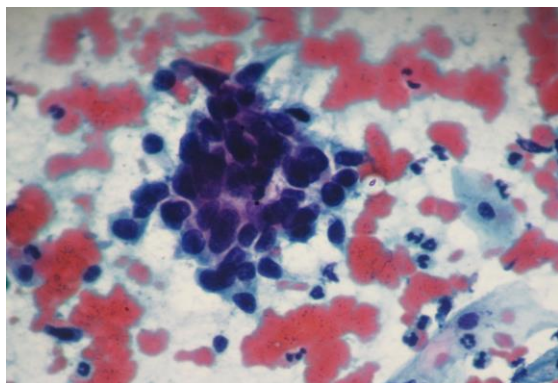
Ref No	Author	Year	Place	Total no of patients	Total prevalence	Epithelial abnormality			
						ASC-US	LSIL	HSIL	SCC
18	Mulay K	2009	Hyderabad	6010	1.39	0.64	0.22	0.16	0.06
19	Misra JS	2009	Lucknow	36484	7.8		5.5	1.6	0.6
20	Mandakini M Patel	2011	Gujarat	995	5.52	4.1	0.1	0.1	0.7
21	Bal MS	2012	Punjab	300	5	0.3	2.7	0.7	1.3
22	Usha Sarma	2012	Guwahati	242	11.95	1.32	3.53	3.53	3.53
23	Kamna Gupta	2013	Uttar Pradesh	4703	3.2	0.52	1.36	0.91	0.28
24	Preeetha George	2014	Mangalore	1000	3.5	0.3	2.0	0.9	0.3
25	Sadhana Kothari	2014	Ahmedabad	36740	1.32	0.11	0.83	0.31	0.05
26	Geetha Katheit	2015	Bhopal	1887	1.32	0.48	0.42	0.16	0.05
	Present Study		Kerala	2028	2.42	0.15	1.58	0.49	0.20



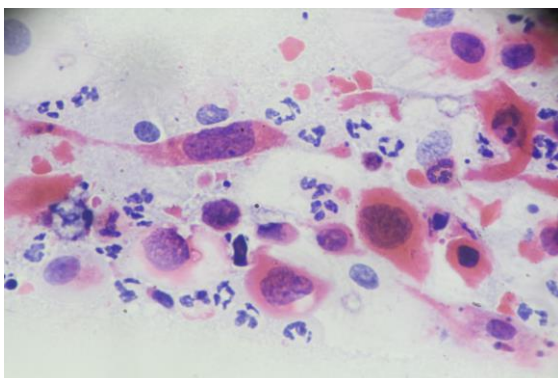
**Fig. 1: Atypical squamous cells of undetermined significance (ASC-US), 100X**



**Fig. 2: Low grade squamous intraepithelial lesion (LSIL), 100X**



**Fig. 3: High grade squamous intraepithelial lesion (HSIL) 400X**



**Fig. 4: Squamous cell carcinoma, 400X**

## Discussion

It is a well-known fact that the burden of cervical cancer has been reduced dramatically after the introduction of screening programmes.<sup>[27]</sup> In order to detect the efficiency of the screening tests and to plan strategic programmes, objective data are required from various hospital studies. Here lies the importance of our study, conducted in North Kerala, where there are no published data concerning the pattern of epithelial cell abnormality in Pap smears.

Various studies around the world has shown a wide range of prevalence of cervical epithelial abnormalities from as low as 1.14% in Nepal<sup>[15]</sup> to 14.52% in Iran.<sup>[16]</sup> No consistent pattern emerged in these studies both in developed and developing countries. The prevalence of epithelial cell abnormalities varies between 1.32 to 11.95 in different regions of India, ours being 2.42%.<sup>[22,25,26]</sup> The reasons for these variation may be due to differences in inclusion criteria employed for diagnosis, the quality checks used, intrinsic differences in the population studied including the prevalence of risk factors and the sample size. Studies conducted in Hyderabad<sup>[18]</sup>, Ahmadabad<sup>[25]</sup> and Bhopal<sup>[26]</sup> shows a lower rate compared to us. But compared to other countries, we are far better as evident from Table 6.<sup>[19-24]</sup>

Considering all lesions together, the most frequent epithelial abnormality in our study was LSIL. High

prevalence rates of LSIL were also noticed in studies conducted in Bangladesh and Pakistan. This may be explained by the fact that patients in these areas did not visit the tertiary health institute for cancer screening purpose, but rather with specific gynecological complaints emphasizing the need for more awareness programmes in such areas.<sup>[11,14]</sup> In our study HSIL was 0.49% of total epithelial lesions. Except for Pakistan, S. Africa and Bangladesh, prevalence of high grade lesions are less than 1% across the world as mentioned in Table 5. It was noticed that in the majority of studies including ours, prevalence of invasive carcinoma formed less than 1% of the abnormal smears except in Pakistan where the prevalence was 1.4%.<sup>[14]</sup>

In our study, epithelial abnormality was more prevalent in post-menopausal age group (51-60yrs) with mean age of 50.89 consistent with the study by Bukhari et al.<sup>[14]</sup> 44.9% cases of epithelial abnormalities belonged to this age group. Both low and high grade lesions of the cervix were more commonly seen in these patients than in any other age group. This fact highlights the need for cytological screening in older age group of patients and the need to create awareness about cervical cancer for motivating them to attend screening. Surprisingly half of the patients with abnormal smears in our study had a healthy looking cervix. Only one patient complained of blood stained discharge, all others were asymptomatic. This signifies that cervical cancer screening, based only on clinical impression and visual examination, is quite unpredictable in relation to cytological screening.

Kerala is a state in India, which is well known for its high literacy level and good health care system. But study conducted by Naseema et al among health care workers in a Govt. Medical College, Calicut shows that about 46.7% of them had never heard of Pap smear. Only 30.7% had underwent Pap smear atleast once.<sup>[28]</sup> This highlights the need for more awareness programmes among our population.

Limitations of this study are few but important. Being a retrospective study, eventual outcome of all patients could not be known and hence no consistent pattern of the disease could be established. Use of liquid based cytology methods may further reduce the number of unsatisfactory smears, but is not cost effective in our set up. In future, introduction of HPV vaccine in our areas is likely to reduce the number of abnormal smears further. For this, studies has to be done incorporating HPV testing also. Psycho-socio-cultural risk factors could not be explored in depth in our study. More research in this area may help to understand the reasons of those not attending screening programmes.

## Conclusion

Though cervical cancer is a leading cause of death in India, our hospital based study shows a relatively low prevalence which is similar to that of developed world.

Pap smear testing is a very useful, simple, economical and safe tool to detect preinvasive cervical epithelial lesions. Hence on a routine basis, every woman above the age of 30 must be subjected to Pap smear and this must be continued even in post-menopausal period as most of patients with epithelial abnormalities in our study falls in this group. We propose that larger studies are required to estimate the pattern of cervical cytological abnormalities along with detection of common HPV strains in our area, as this knowledge would be useful for prevention of HPV infection either by vaccines or future targeted therapy.

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