ORIGINAL RESEARCH

STUDY OF SPECTRUM OF CERVICAL LESIONS ON PAP SMEARS AND GYNECOLOGICAL CYTOHISTOLOGIC CORRELATION -WHEREVER FEASIBLE, IN A RURAL TERTIARY TEACHING COLLEGE HOSPITAL.

[1]Dr. Ashwini Rege-Gundawar, [2]Dr. Sneha Joshi

[1]Assistant Professor, Department of Pathology, Zydus Medical College and Hospital, At & Post: Nimnaliya, Muvaliya, Dahod, Gujarat, India
[2]Professor; Department of Pathology, MIMER medical college, Talegaon (Dabhade), District Pune, Maharashtra, India

Correspondence:
Dr. Ashwini Rege- Gundawar
Assistant Professor, Department of Pathology, Zydus Medical College and Hospital At & Post: Nimnaliya, Muvaliya, Dahod, Gujarat, India
Email: gundawar.ashwini@gmail.com

ABSTRACT

Introduction: Cervical carcinoma (Ca Cx) is a high incidence malignancy in India (6–29% of all cancers in women). The Pap smear test is a proven effective measure for reducing cervical carcinoma incidence. Lack of population level screening program in India corresponds with the detection of most cervical lesions at a late stage of disease (stage II or stage III) with consequent high mortality and morbidity. The hospital where this study was conducted offers Pap smear free of cost.

Aims & Objectives:

1. **To study the spectrum of cervical lesions by analyzing the results of Pap smear tests -for a period of one year.**
2. **To evaluate clinical utility of Pap smear testing by studying histopathological correlation- wherever feasible, for the same one-year period.**

Materials and Methods: Retrospective observational study conducted by retrieving data for 1 year, pertaining to conventional Pap smear tests and related histopathological examination reports.

Results [(1)]: Of 808 Pap smear tests done, 788 (97.5%) were satisfactory for evaluation. These were reported using, "The Bethesda system for evaluation of cervical pathology (2014)". Results were divided into: i) Inflammatory (70.56%), ii) NILM (23.60%), iii) Atrophic (3.42%) and iv) Epithelial cell abnormalities [ECA] (2.41%). The ECAs included ASCUS, LSIL, HSIL and SCC. The inflammatory Pap smears included 28 cases of Trichomonas vaginalis, 7 cases of Yeast, (likely Candida) infection, and 2 cases with presence of blue wool like microorganisms morphologically resembling

[(1)] 1. NILM: No intraepithelial lesion or malignancy
2. ECA: Epithelial cell abnormalities
3. ASCUS: Atypical squamous cells of undetermined significance
4. LSIL: Low grade Squamous Intraepithelial Lesion
5. HSIL: High grade Squamous Intraepithelial Lesion
6. SCC: Squamous cell carcinoma

Actinomyces. Histopathological report association was done for 118 (14.97%) cases. Of these, 112 (94.91%) cases were reported as inflammatory pathology and 6 (5.08%) cases as ECAs. The ECAs included 3 HSILs, 2 LSIL/inflammatory changes and 1 case of SCC. All 118 cases were reported with 100% concurrence rate for cytopathology – histopathology correlation.

Conclusions: 1) Pap smear is a good screening as well as diagnostic test. 2)However more significant yield towards prevention of Ca Cx will be achieved by adding supplemental testing e.g., HPV DNA testing.3) Concentrated efforts need to be made to target screening efforts towards older age group women and also towards follow up and treatment of the Positive Pap smear cases.

Keywords: Pap smear, cervical cancer, screening, prevention, women, India

INTRODUCTION

Incidence of cervical carcinoma is defined as occurrence of new cases of ***overt*** carcinoma cervix per year. In India, cervical cancer incidence ranges from approximately 6–29% of all cancers in women. It is one of the highest occurring malignancies in Indian women(1–3). As World bank statistics shows, the Pap smear test has been a cost effective, noninvasive screening method for cervical cancer(4). Inclusion of this screening in India's national cancer control program, has long been awaited(1–3). Inability to instate this screening at population level reflects in poor outcomes such as a) the late stage of disease (stage II or stage III) at which most cervical lesions are first detected in India and the resultant high mortality and morbidity due to cervical cancer (2,3,5).

While national level screening is yet to be initiated, the hospital in western Maharashtra where this study was conducted, offers the Pap smear test free of cost. Being located in a rural location and catering mostly to low socioeconomic strata patients, this is a conscientious social responsibility gesture. It is meant to contribute to the goal of curbing the incidence and improving the prognosis, - of cervical carcinoma by early detection of premalignant and malignant lesions of the cervical malignancy.

AIMS & OBJECTIVES

1. To study the spectrum of cervical lesions by analyzing the results of Pap smear tests -for a period of one year.
2. To evaluate clinical utility of Pap smear testing by studying histopathological correlation- wherever feasible, for the same one-year period.

MATERIAL & METHODS

STUDY DESIGN

Retrospective observational study.

Data was retrieved from records pertaining to conventional Pap smear tests and related histopathological examination reports- for the period of one year.

Pap smears were derived from two sources. In the Obstetrics and Gynaecology department OPD (OBGYN OPD) Pap smears were collected for all patients visiting for gynaecological complaints and for those obstetric patients who needed a diagnostic Pap smear. Also, included in the study sample were, Pap smear samples collected through outreach camps, from women in remote areas. All Pap smears were collected and processed as conventional Pap smears.

INCLUSION CRITERIA

All Pap smears collected during the study period and the relevant surgical pathology specimens to generate Cyto-Histologic correlation (CHC) pairs.

EXCLUSION CRITERIA

1. Pap smears were not collected from obstetric patients without any clear indication to facilitate diagnosis of their current complaints.
2. For CHC, histopathological specimens with unmatched Pap smears were excluded.

RESULTS

A. Spectrum of Cervical lesions on Pap smears: Of the 808 Pap smear tests done, 788 (97.5%) were satisfactory for evaluation. These were reported using, "The Bethesda system for evaluation of cervical cytology (2014)" (TBSRTC) (6).

Results for the Pap smears were divided into total 5 categories (Refer to Table I and Figure 1):

1) Negative for intraepithelial malignancy [NILM] = 769/808, (95%) that were further subdivided into:

A) No significant pathology/ No abnormal findings- detected (labelled NILM category in the current data) = 186/808 (23%)

B) Reactive inflammatory changes = 556/808 (69%),

C) Atrophic = 27/808, (3%),

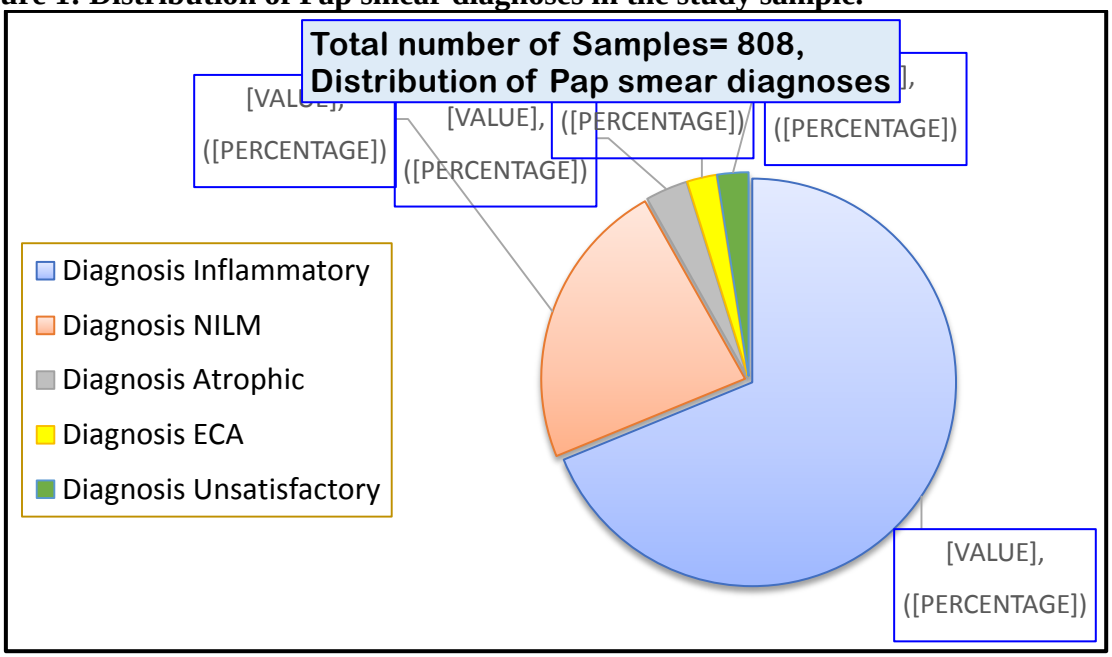
2) Epithelial cell abnormalities [ECA] 19/808 (2%),

3) Unsatisfactory

Table I

Distribution of PAP smear diagnoses in the study sample	Number of Cases	Percentage of Total number of cases
Inflammatory	556	69%
NILM (No significant/abnormal findings)	186	23%
Atrophic	27	3%
Unsatisfactory	20	2%
EAC	19	2%
Total	808	100%

Figure 1: Distribution of Pap smear diagnoses in the study sample.

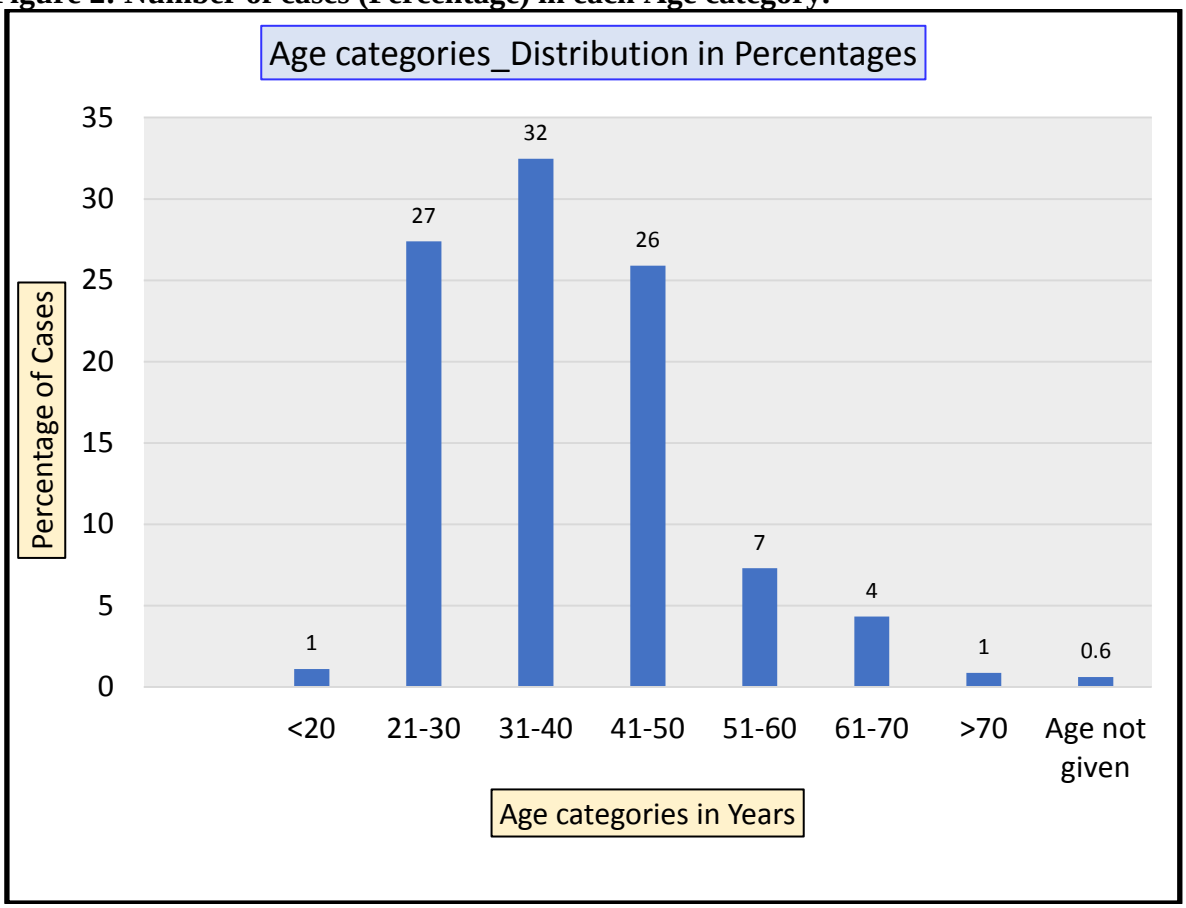


The age range for the study population ranged from less than 20 years to more than 70 years. For the 'age' variable, study population was divided into 7 categories of non-overlapping decade wise divisions, with an additional 8th category for cases with age not mentioned in the records. Refer to Table II and Figure 2 for details.

Table II

Table 2: Age category wise - Case numbers and %.		
Age categories (in years)	**Total number of cases (808)**	**Percentage of total cases belonging to each Age category**
<20	9	1%
21-30	221	27%
31-40	262	32%
41-50	209	26%
51-60	59	7%
61-70	35	4%
>70	7	0.87%
Age not given	6	0.74%

Figure 2: Number of cases (Percentage) in each Age category.



The distribution of Pap smear diagnoses across age categories is shown in Table III and Figure3.

Table III

TABLE 3: Distribution of Pap smear diagnoses across Age categories												
Age	Total number of cases + (% tage)		Unsatisfactory (20)		NILM (inflammatory) (556)		NILM (No significant abnormal findings) (186)		Atrophic (27)		ECA (19)	
<20	9	1.10%	0	0.00%	6	0.74%	3	0.40%	0	0.00%	0	0.00%
21-30	221	27.40%	1	0.10%	166	20.54%	49	6.10%	0	0.00%	5	0.60%
31-40	262	32.40%	7	0.90%	195	24.13%	59	7.30%	0	0.00%	1	0.10%
41-50	209	25.90%	5	0.60%	142	17.57%	49	6.10%	8	1.00%	5	0.60%
51-60	59	7.30%	2	0.20%	28	3.47%	16	2.00%	9	1.10%	4	0.50%
61-70	35	4.30%	4	0.50%	13	1.61%	7	0.90%	8	1.00%	3	0.40%
>70	7	0.90%	1	0.10%	2	0.25%	2	0.20%	2	0.20%	0	0.00%
Age not given	6	0.70%	0	0.00%	4	0.50%	1	0.10%	0	0.00%	1	0.10%
TOTAL	808	100%	20	2.50%	556	68.81%	186	23.00%	27	3.30%	19	2.40%
Abbreviations: NILM= Negative for Intraepithelial lesion or Malignancy; ECA= Epithelial cell abnormalities												

Figure 3: Distribution of Pap smear diagnoses -Age category wise.

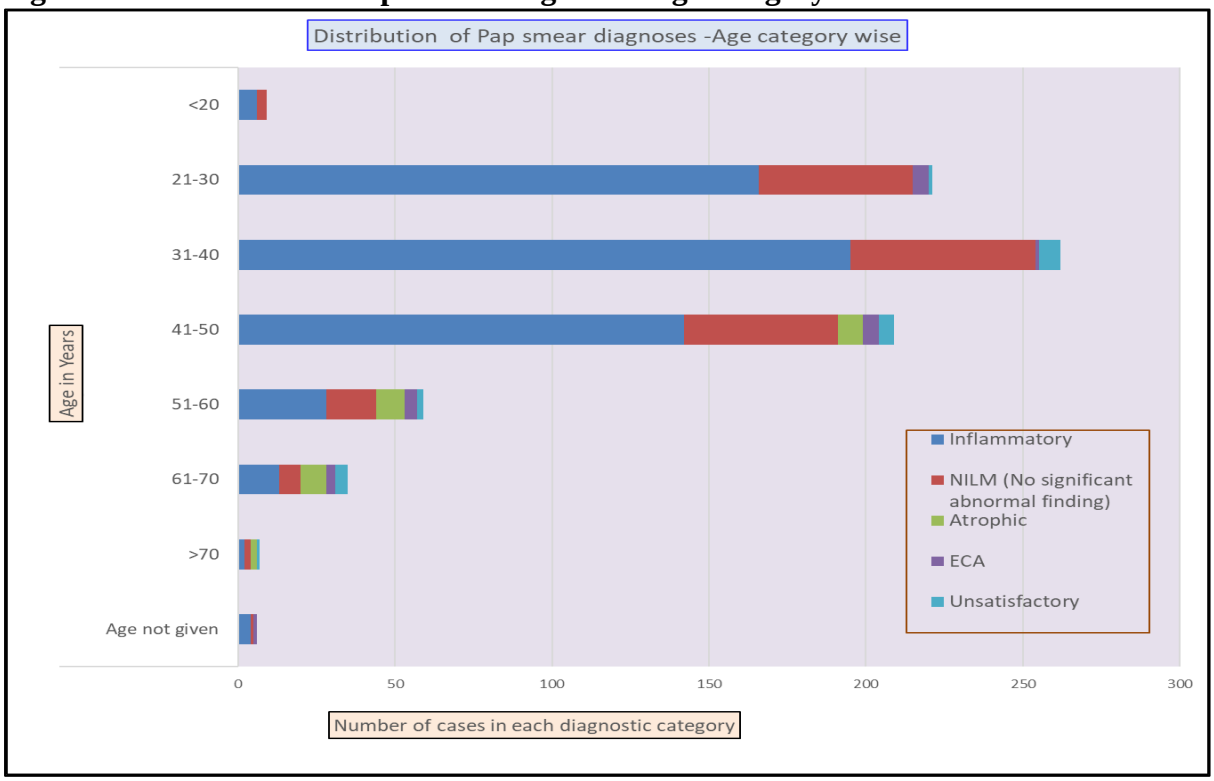


Table IV shows the distribution of NILM category for 'inflammatory' and 'no significant pathology' cases. The inflammatory Pap smears included 28 cases of Trichomonas vaginalis, 7 cases of Yeast (likely Candida) infection, and 2 cases with presence of blue wool like microorganisms, morphologically resembling Actinomyces.

Table IV

Table 4: Distribution of NILM, including inflammatory smears.					
		NILM (Inflammatory)		NILM (No significant pathology)	
	Age	Total number of cases	Percentage contributed by each age category	Total number of cases	Percentage contributed by each age category
1	<20 years	6	1%	3	2%
2	21-30 years	166	30%	49	26%
3	31-40 years	195	35%	59	32%
4	41-50 years	142	26%	49	26%
5	51-60 years	28	5%	16	9%
6	61-70 years	13	2%	7	4%
7	>70 years	2	0%	2	1%
8	Age not given	4	1%	1	1%
	Total=742	556	75%	186	25%
Specific infective agents found (Number of cases & %)					
	Trichomonas	22	3.96%		
	Candida	5	0.90%		
	Actinomyces	2	0.36%		

The ECAs (Table V) included i) Atypical squamous cells of undetermined significance [ASCUS], ii) Low grade Squamous Intraepithelial Lesion [LSIL], iii) High grade Squamous Intraepithelial Lesion [HSIL] and Squamous cell carcinoma [SCC]. Distribution of ECAs is as given in Table V.

Table V

Table 5: Distribution of ECA-Epithelial cell abnormalities across Age groups and as per diagnosis										
Age (Years)	Percent of Total study population (%)	ASCUS-US	ASCUS-H	LSIL	HSIL	SCC	Total	Percent of total study population as a group (%)	ECA percent in the group	ECA percent in the entire study cohort
<20	1%						0	0%		
21-30	27%	3		2			5	60%	1.24%	0.74%
31-40	32%			1			1			
41-50	26%		1	1	2	1	5	26%	2.39%	0.62%
51-60	7%			1	3		4	11%	7.45%	0.87%
61-70	4%			1	1	1	3			
>70	0.87%						0	0%		
Age not given	0.74%	1					1	1%		
Total Number	100%	4	1	6	6	2	19	2.35%		
Percentage of Total Pap smears		0.50%	0.10%	0.70%	0.70%	0.20%				

B. Correlation of cytological report of Pap smears with histopathological report (CHC) (Table VI)- for either cervical biopsy or hysterectomy or both - was possible for 118 (15%) Pap smear samples. Of these, 112 (95%) cases were reported as inflammatory pathology and 6 (5 %) cases as epithelial cell abnormalities. The epithelial cell abnormalities included 3 HSILs, 2 LSIL/inflammatory changes and 1 case of SCC. All 118 cases were reported with 100% concurrence for cytopathology –histopathology correlation.

Table VI

Table 6: Cyto-Histopathological correlation	
Cytology	**Histology**
NILM, Inflammatory (n=112)	Chronic Cervicitis
LSIL / Inflammatory atypia, (n=2), (Presence of Koilocytes)	Chronic Cervicitis
HSIL (n=2)	Large cell nonkeratinizing squamous cell carcinoma
HSIL (n=1)	Large cell Keratinising squamous cell carcinoma
SCC (n=1)	Large cell Keratinising squamous cell carcinoma
Total =(n=118)	
Abbreviations: n: Number of Pap smears, HSIL: High grade squamous intraepithelial lesion, LSIL: Low grade squamous intraepithelial lesion, SCC: Squamous cell carcinoma	

DISCUSSION

I) BACKGROUND

I.1) The Global Scenario

The WHO fact sheets on cervical cancer (2022), state that globally this cancer is the fourth most common cancer among women, with an estimated 604 000 new cases and 342 000 deaths in 2020. About 90% of the new cases and deaths worldwide in 2020 occurred in low- and middle-income countries(7)**.** The annual number of new cases of cervical cancer has been projected to increase from 570 000 to 700 000 between 2018 and 2030, with the annual number of deaths projected to increase from 311 000 to 400 000 (8). The International Agency for Research on Cancer (IARC), projected in 2018, that by 2020, cancer will cause more deaths than heart disease and emerge as the world's number 1 killer. In 2010, 12.5% of all deaths were caused by cancer, which were greater than HIV/acquired immunodeficiency syndrome (AIDS), tuberculosis, and malaria combined. The low and middle income countries (LMICs) that idolize and therefore increasingly ape Western lifestyles, diets and have a rising practice of tobacco use, -will bear the major impact of this catastrophe—contributing up to 70% of all emerging cases(9). Per the 2012 World bank data, too, cervical carcinoma (Ca Cx) was the fourth most common cancer in women and the seventh most common malignancy, world over (4). Globally, there were approximately 528,000 new cases of Ca Cx in the year 2012, of which a large majority (around 85%) occurred in the less developed regions of the world (4). So, it appears that the situation has not changed much in the last decade [(2)].

No other cancer displays the inequities in social and health care issues like Ca Cx (7–10). Prevention of Ca Cx is therefore also a human rights and specifically women's rights

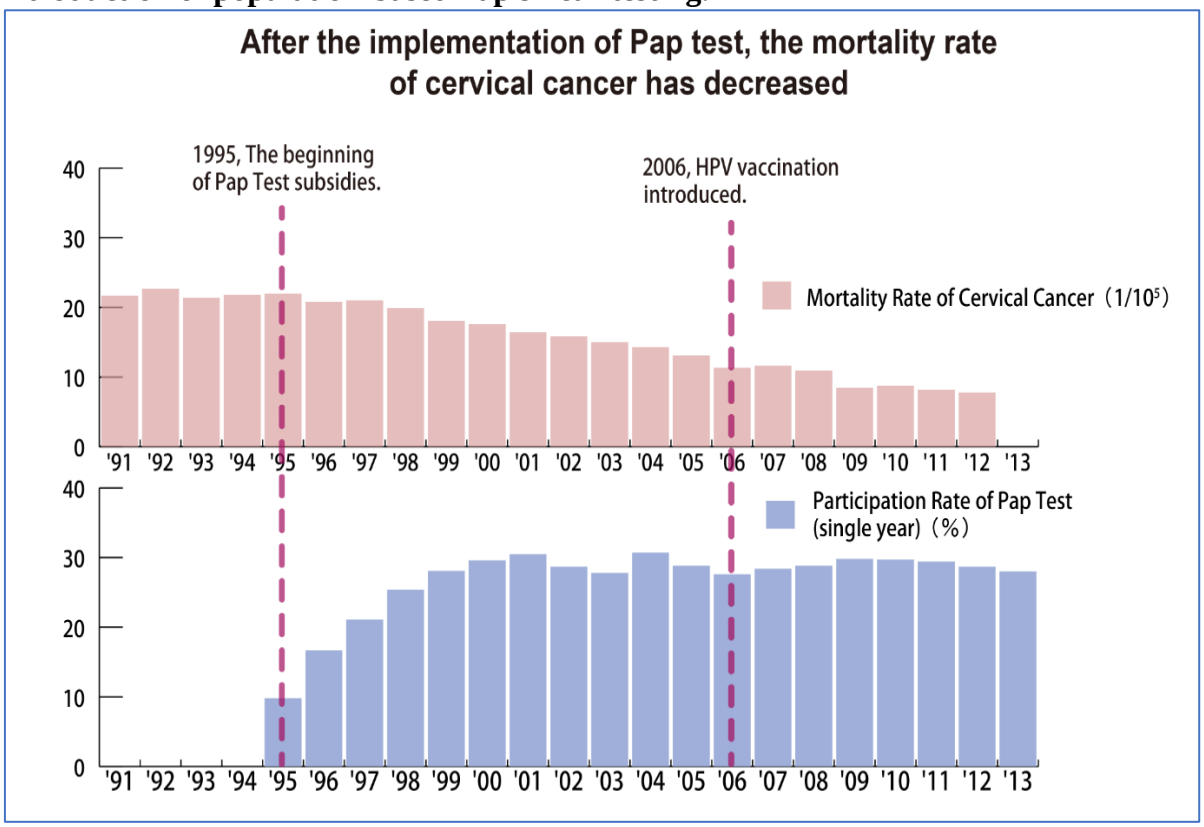
[(2)] Refer to Figure 3, from the Supporting material enclosed below.

issue (2,7,9,10). In LMICs, cervical cancer accounts for almost 12% of all cancers in females (4,7,9,10).

The famous Pap smear test, named in honour of the scientist, Dr. George Papanicolaou, who introduced this test (11) has been a cost effective, non-invasive screening method for cervical cancer especially in resource poor situations (3). Pap smear was first introduced in the USA in the 1940s as a population-based screening method for uterine cervical carcinoma. This single measure has completely changed the mortality and morbidity associated with this disease in this country, bringing it down by 70% (12). As World bank statistics shows, this is also true of all other developed countries, where systematic population based Pap smear screening has been in place for several decades(4). Such as the lowest global incidence rates for Ca Cx in Australia/New Zealand (5.5 cases) and Western Asia (4.4 cases) due to government schemes that were initiated long ago for Pap screening and have very good participation rates due to acceptance.

Other Asian countries such as Taiwan have demonstrated that participation in the Pap smear screening from age 30 years does make a difference, towards bringing down the incidence, morbidity and mortality associated with Ca Cx, and that not only availability but participation in the testing also affects outcomes(13). **(Figure 4)**

Figure 4: Decrease in Ca Cx Incidence, Morbidity and Mortality in Taiwan following introduction of population-based Pap smear testing.



While in LMICs, not only there is lack of availability of cervical cancer screening but also due to the social constraints affecting women in these countries, participation is poor (2,9,14). There are logistical and other difficulties in conducting the Pap smear testing for women in rural and remote areas as well as conveying the reports back to them(2,9,15). The other most important issue is the lack of downstream system and social advocacy-based support systems that ensure that the premalignant/malignant condition, once diagnosed, is followed up on and the necessary health care and other facilities are disbursed (2,8,9,15).

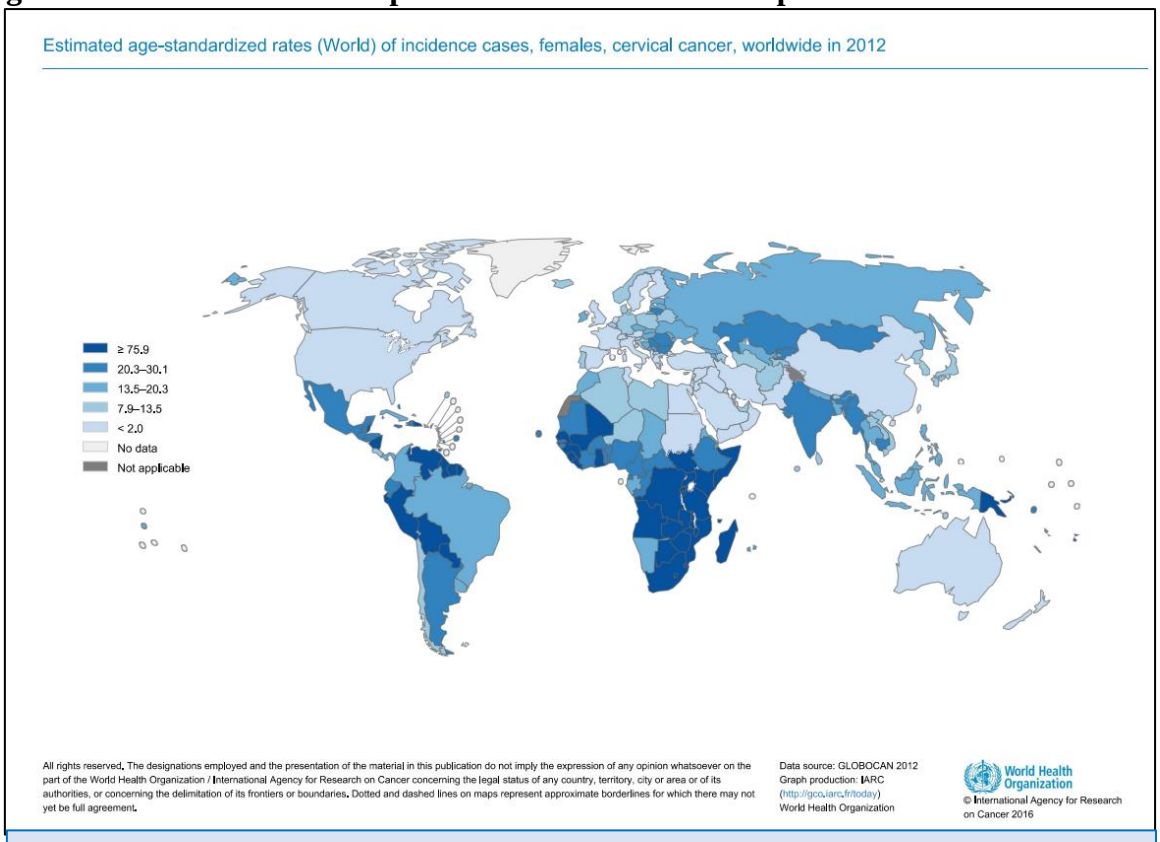
Therefore the lack of an adequate screening facilities set up, translates into,- 1) lack of picking up the premalignant lesions, when they may be potentially curable and 2) majority of cases of Ca Cx being detected at an advanced stage of the disease (2,3,9,14,15).

More than 85% of those affected are young, undereducated women who live in the world's poorest countries. Many are also mothers of young children whose survival is subsequently truncated by the premature death of their mothers (8).This disease strikes women, many of whom are in their prime and have families dependent on them (2,3,8).

The latest WHO document on "Elimination of Cervical Carcinoma-2022" (8), has declared Ca Cx to be a preventable and potentially curable non-communicable disease, especially in the early (CIN I)/premalignant phases. But the current figures for incidence and mortality from Ca Cx for the LMICs suggest that, there will be a lot of work needed to put in for that to happen.

Thus, Ca Cx is a disease that is – essentially – "Preventable but not prevented- for the less developed world!!" (2–4,8–10,12,14–16) **(Figure 5)**

Figure 5: Preventable but not prevented for the less developed world!!



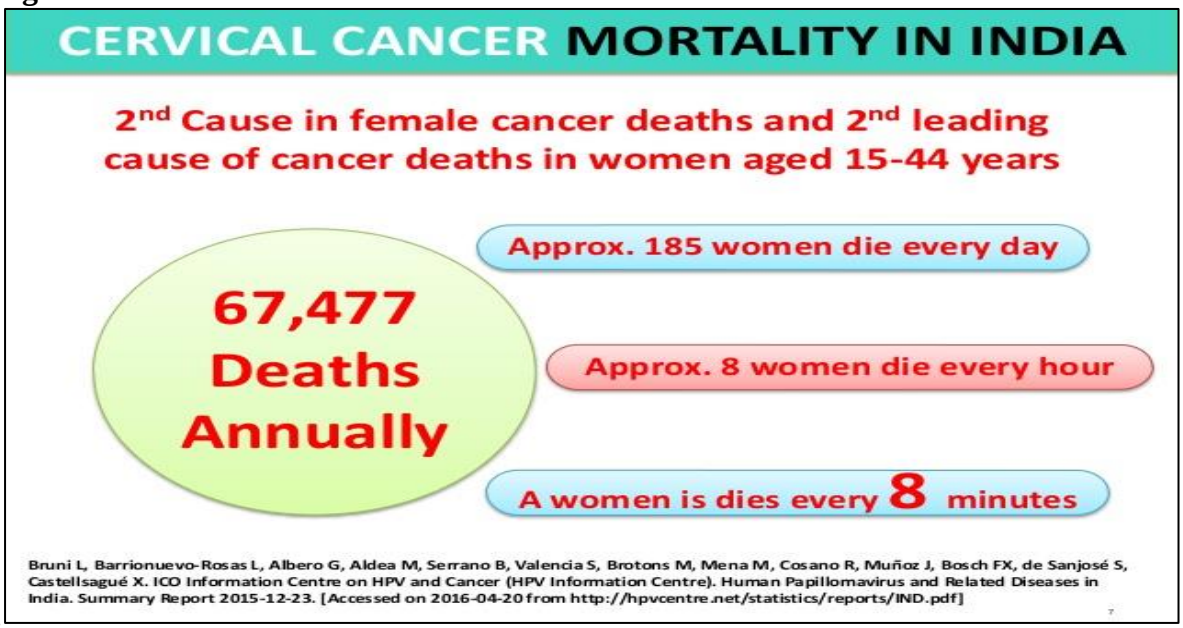
Age related Carcinoma Cervix incidence in India = 22, higher than Bangladesh (=19.2), Sri Lanka (=13). Also, Myanmar and Nepal. From: http://gsco.iarc.fr/today/data/pdf/fact-sheets/cancers/cancer-fact-sheets-16.pdf (4)

I.2) The Indian scenario

Apart from the very high-risk regions in the African subcontinent (estimated age-standardized incidence rates of Ca Cx of more than 30 cases per 100 000 females- in 2012), India ranks the next highest for cervical carcinoma incidence with more than 20 cases per 100 000 females(4).

Screening in India is mostly opportunistic(2,3) and therefore reaches very tiny proportions of populations that particularly need it- like rural, low educated, poor women, with young age at marriage and multiparity with poor resources for health care. This was also true in case of our study population.

Figure 6:



.

Figure 7:

Figure 7- Legend: All these deaths in India due to Ca Cx -are equivalent to an Airbus-320 full of women crashing every day!!

(Source: Figures 6 and 7 downloaded from, (Dr. Sharda Jain. Mission "Say No to Cervical Cancer with HPV vaccination." [PowerPoint presentation]. Available from: https://www.slideshare.net/LifecareCentre/mission-say-no-to-cervical-cancer-with-hpv-vaccination-dr-sharda-jain-secretary-general-of-delhi-gynaecologist-forum-drjyoti-aggarwal-drjyoti-bhaskar.Retrieved on: Dec. 05, 2018)

While these deaths are a reflection of the poor surveillance and screening in the past, the key question is whether anything is being done in current time so that the incidence rate comes down?? Like finding the precancerous lesions as early as possible and prevent their progress to committed carcinoma. - The true essence and purpose of a screening program!(2,8,9,12,15)

In India, cervical cancer incidence (that is occurrence of new cases of overt carcinoma cervix per year) ranges from approximately 6–29% of all cancers in women. It is one of the highest occurring malignancies in Indian women(2). Inclusion of this screening in the national cancer control program, is much needed and has long been awaited (2,3,5). This lack of screening at population level reflects in the late stage of disease (stage II or stage III) (2) at which most cervical lesions are first detected in India and the attendant high mortality and morbidity due to cervical cancer (2,3,5).

Failure to start systematic national level pap screening program is due to several reasons, including non-availability of adequate funds to overcome the several challenges involved. These include mainly, logistical difficulties in reaching out to women in child bearing age groups and older women – especially those located in remote areas, the large numbers of women to be screened , unavailability of infrastructural facilities including trained personnel, unwillingness of the women to submit to an examination of their private organs, a perceived or actual lack of adequate privacy for the procedure(2,5) and most importantly the lack of awareness regarding importance of screening and early detection of cervical carcinoma amongst the women who need to undergo screening (17).

II) DISCUSSION OF THE RESULTS OF OUR STUDY

A) Cervical lesions spectrum on Pap smears

1. Age (Table II and Figure 2)

Majority of the patients encountered belonged to the 31-40 years age group. The next common age groups were 21-30 and 41-50 years. Totally 60% of the study population belonged to the 21-50 years age group. This is an age group of women, who are in the reproductive age bracket, have young dependent children and are economically active. So, they are able to access health care facilities. However this also means that due to family responsibilities and lack of economic freedom and the freedom of decision making regarding self-care, they may not be able to receive the necessary treatment at the right time to prevent morbidity and mortality (2,3,8,9,14,15,18). Therefore, downstream organization of adequate follow through of Pap smear examination is much needed if the Ca Cx screening is to be effective.

The other age groups, were - The “less than 20 years”, and the older age group of women. The younger age group women were married at an early age, thereby sexually active at an early age and thereby candidates for primary prevention of carcinoma cervix by means of Human Papilloma virus (HPV) vaccinations. This is necessary as, though most south Asian women, except the high-risk groups, will have a total of sexual partners of one, their entire life time, their sexual partners may be the conduit introducing sexually transmitted diseases (19), including HPV, causing Ca Cx lesions eventually.

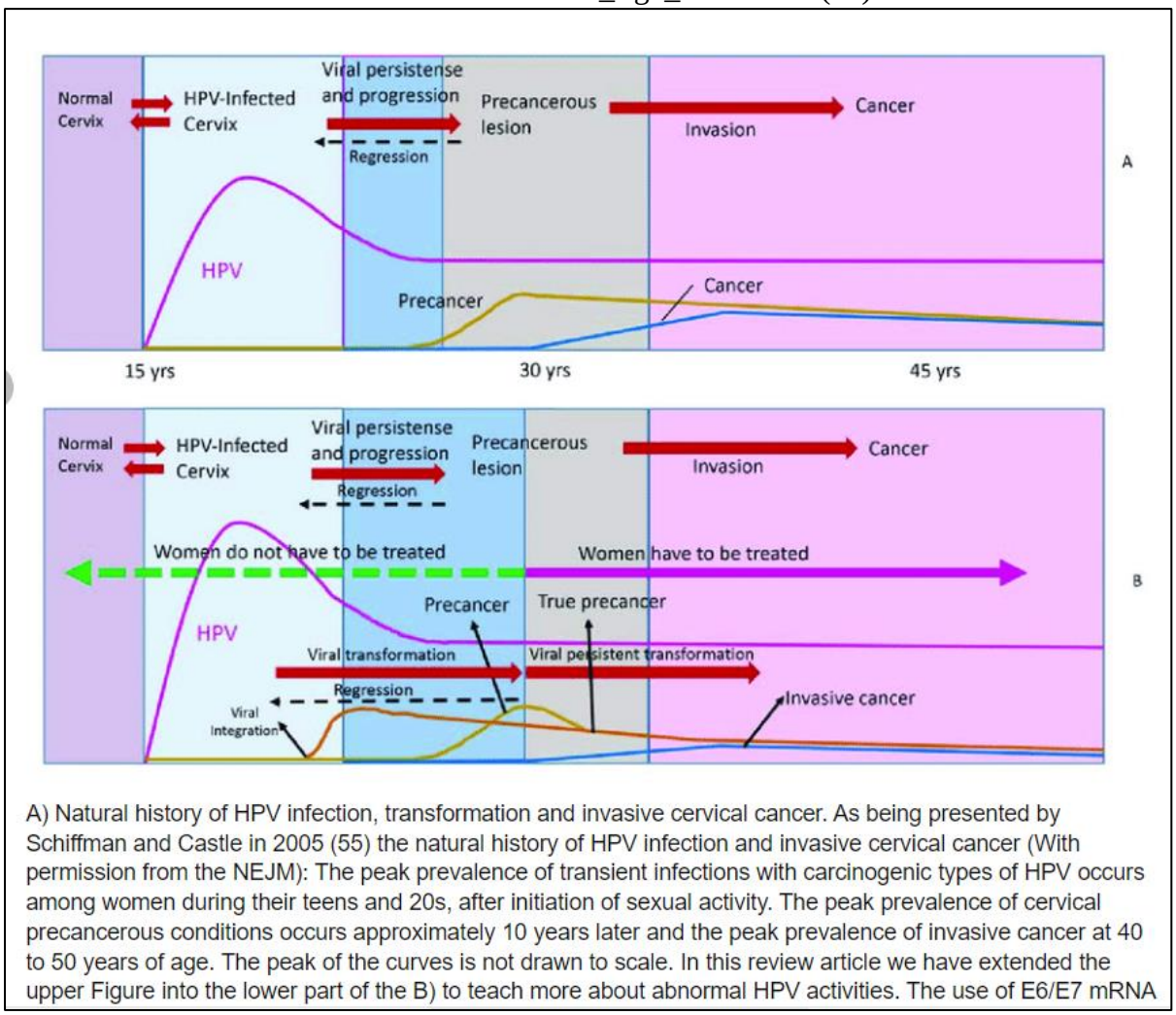
The older age group of women are mostly out of the work force and are therefore economically dependent. This could be a cause for them to not able to access health care as and when they need it. Extrapolating this finding, perhaps this means that this age group is not adequately represented in the study sample and the numbers are less than the actual cases requiring medical/therapeutic intervention.

2. The Cervical lesions spectrum on Pap smear: were distributed in a typical pattern. **(Table III and Figures 1 and 3).** The younger age group 21 to 50 yrs. showed

predominantly inflammatory findings. Atrophic changes started appearing in the 41-50 years bracket. The ECA were seen earliest at age group 21-30 years and then continued to be seen till age 70 years **(Table V).** The ECA lesions seen in younger age groups (21-40 years) were predominantly premalignant lesions and the percentage of ECA lesions present in this age group was the least, (1.24%) despite the large size of this group, comprising approximately 60% of the study population. These represent the premalignant/early stages of the Ca Cx spectrum of progression and are potentially reversible or treatable (8). The age group of '41-50 years' had a high proportion of ECAs (2.39%) compared to the percentage contributed by this group to the study population (26%). This group also had both premalignant as well as malignant lesions. The actual and only malignant lesions were found in the '51-70 years' age group. This group contributed only 11% of the study population but the percentage of the cases showing ECAs were high (7.45%), in this group.

This demonstrates that an approximate period of minimum 15-20 years is required for the Ca Cx to progress from the premalignant lesions to the actual malignant lesions. This is in keeping with the currently accepted theory of Ca Cx disease etiopathogenesis that states this disease to be a result of HPV oncogenic viruses, evolving from premalignant lesions to frank malignancy (8). Also see (**Figure 8**)- retrieved from Karlsen F, Muturi Met et al (20).

Figure 8: Natural history of HPV infection, and transformation to invasive Ca Cx. Source:https://www.researchgate.net/figure/A-Natural-history-of-HPV-infection-transformation-and-invasive-cervical-cancer-As_fig1_329856742(20)



A) Natural history of HPV infection, transformation and invasive cervical cancer. As being presented by Schiffman and Castle in 2005 (55) the natural history of HPV infection and invasive cervical cancer (With permission from the NEJM): The peak prevalence of transient infections with carcinogenic types of HPV occurs among women during their teens and 20s, after initiation of sexual activity. The peak prevalence of cervical precancerous conditions occurs approximately 10 years later and the peak prevalence of invasive cancer at 40 to 50 years of age. The peak of the curves is not drawn to scale. In this review article we have extended the upper Figure into the lower part of the B) to teach more about abnormal HPV activities. The use of E6/E7 mRNA

This demonstrates the importance of picking up the premalignant lesions for Ca Cx as early as possible in order to reduce the incidence and morbidity and mortality induced by Ca Cx. In other words, the long awaited projected national level screening of women, for Ca Cx, needs to be rolled off as soon as possible.

Also, this also brings forth the question, as to, whether it might be useful to reflexly test for high-risk HPV (hr- HPV) - at least for those subjects that are positive for premalignant lesions and also for those in the bracket of high-risk behavioral pattern, - with/without positive Pap smear results. Restricted testing is in with consideration of the fact that we are a low resource setting. Whereas testing and treating of core groups, as early as possible prevents transmission to the general population and further spread and downstream effects of STIs including Ca Cx (21).

The other important finding was that the appearance of premalignant lesions in the '21-30 years' age group and finding of malignant lesions in 'greater than 50 years' age group - were a decade later than the Western world, as has also been shown by other authors(2,3).

While, the detection of premalignant lesions is important, observations at the grass roots level suggest that perhaps what is even more important, - is to have a team including the community medicine people, gynaecologists and a social worker. This team would essentially take care of the follow ups for the positive Pap smear cases and facilitate the necessary health care treatments required post detection as well as the mobilization of familial as well as social units for this to happen. As in any LMICs, in India too, women are lesser citizens than the other sex and the value that is placed on their lives and the family resources made available to take care of their needs has been proved to be only proportional to their social strata, their own incomes and their support groups (22,23). The decision making regarding their own health care needs for women in SE Asia is very often not within their own purview per their social status (18). Therefore, saving women's lives may require a multipronged approach just like the issue of violence against women, with creation and mobilization of units to work upon each individual woman as regards the individual, familial, social, financial aspects for the facilitation of adequate and necessary health care, especially for these women who are poor. This is important as Ca Cx ***is*** predominantly a disease of the poor (2,3,8,14,15,22). Therefore, without this back up capacity building and availability, only the detection of the premalignant lesions may be wasted. As these women with premalignant lesions, belong to the age group that has young dependent children and belong to the class where they miss their daily wages if they happen to take time off to care of their own health care needs, which are in any case, culturally the last priority for their families, and even worse, for their own selves (2). In demonstration of this bitter truth, in case of our study, - of the total 19 ECAs detected, except for the 6 Non -ASCUS ECAs, all the others were lost to follow up. A finding also noted by other authors from LMICs (2,5,9,16).

The NILM inflammatory percentage (the proportion of cases with inflammatory pathological findings), was the largest Pap smear group. As is common with the LMICs rural and underprivileged class of women, the contributory factors were malnutrition, early age at marriage, multi parity and low social status with lack of availability of affordable and patient friendly health care facilities (2,9,14,18).

We used the conventional Pap preparation for our study. This method is known to be less sensitive than the liquid based cytological (LBC) preparations. Therefore, it is debatable but highly probable that using LBC preparations would lead to detection of greater number of abnormalities on Pap smear preparations.

We compared the results of the present study of cervical lesions distribution with other studies, on the same study topic. **(Table VII)**. These studies were, 1) from- the same geographic area,- Nikumbh et al (5); 2) from the same country (India) but from different regions, North- Jetley, S; Rana,S. et al (17) and South- Kalyani R, Sharief N. et al (3) and

additionally another study from Tripura, a state from the remote North East region- Khasnabish et al(24).

Table VII: Spectrum of cervical lesions seen on Pap smears, a comparison with other studies.

Comparison of various parameters of Pap smears in present study with other studies					
Diagnoses	**Present study**	**Kalyani et al** (3)	**Nikumbh et al** (5)	**S. Rana et al** (17)	**Khasnabish et al** (24)
Total number of cases	808	1501	930	610	1349
Duration of data considered	1 year	2.5 years	5 years	2 years	5 years
Commonest Age group	31-40 years	30-39years	21-40 yrs.	31-40 years	30-39years
IInd Commonest Age group	Both, 21-30 yrs. and 41-50 yrs.	40-49 years		21-30 years	40-49 years
Unsatisfactory	2.48%	17.80%	Not mentioned	4.0%	13.63%
NILM, Inflammatory	69%	83.14%	91.55%	50.80%	21.40%
NILM	23%	13.78%	2.65%	39%	46.40%
ASCUS	0.62%	1.46%	0.96%	2.1%	1.11%
LSIL	0.74%	0.24%	0.96%	1.3%	8.37%
HSIL	0.74%	0.41%	1.98%	1.7%	5.20%
SCC	0.25%	0.41%	1.60%	0.6%	2.89%
Total ECA percentage (Positive pap smear percentage)	2.35%	3.08%	5.80%	6.80%	17.80%
ASCUS/SIL ratio	0.42	0.50%	Not mentioned	Not mentioned	Not mentioned

B) Cyto histological correlation (CHC) was done for 118/808 (14.97%) Pap smear cases. (Refer to **Table VI).** Of these, 112 (94.91%) cases were reported as inflammatory pathology and 6 (5.08%) cases as ECAs. The ECAs included 3 HSILs, 2 LSIL/inflammatory changes and 1 case of SCC. All 118 cases were reported with 100% concurrence rate for cytopathology –histopathology correlation. The LSIL/inflammatory changes conundrum has been reported by other authors too (3,24).

ISSN 2515-8260 Volume 9, Issue 4, Summer 2022

MICROSCOPIC PICTURES OF PAP SMEAR DIAGNOSES and CORRESPONDING SURGICAL PATHOLOGY SPECIMENS- DURING THE STUDY:

Figure 7: Unsatisfactory Pap smears

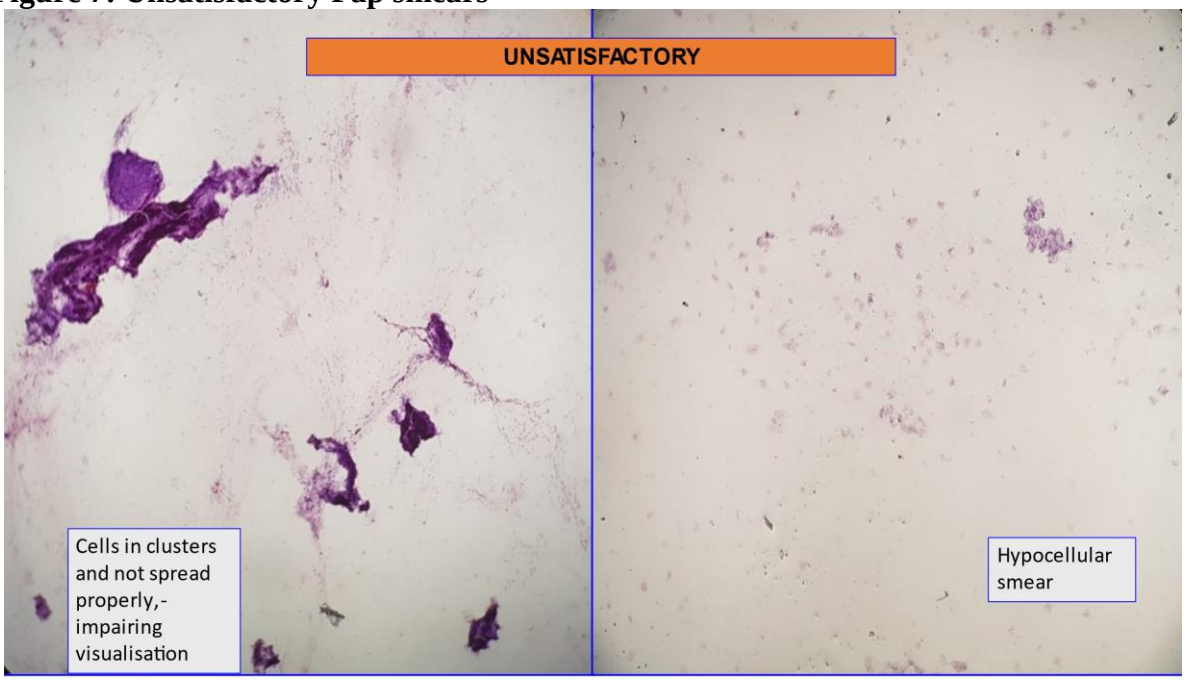
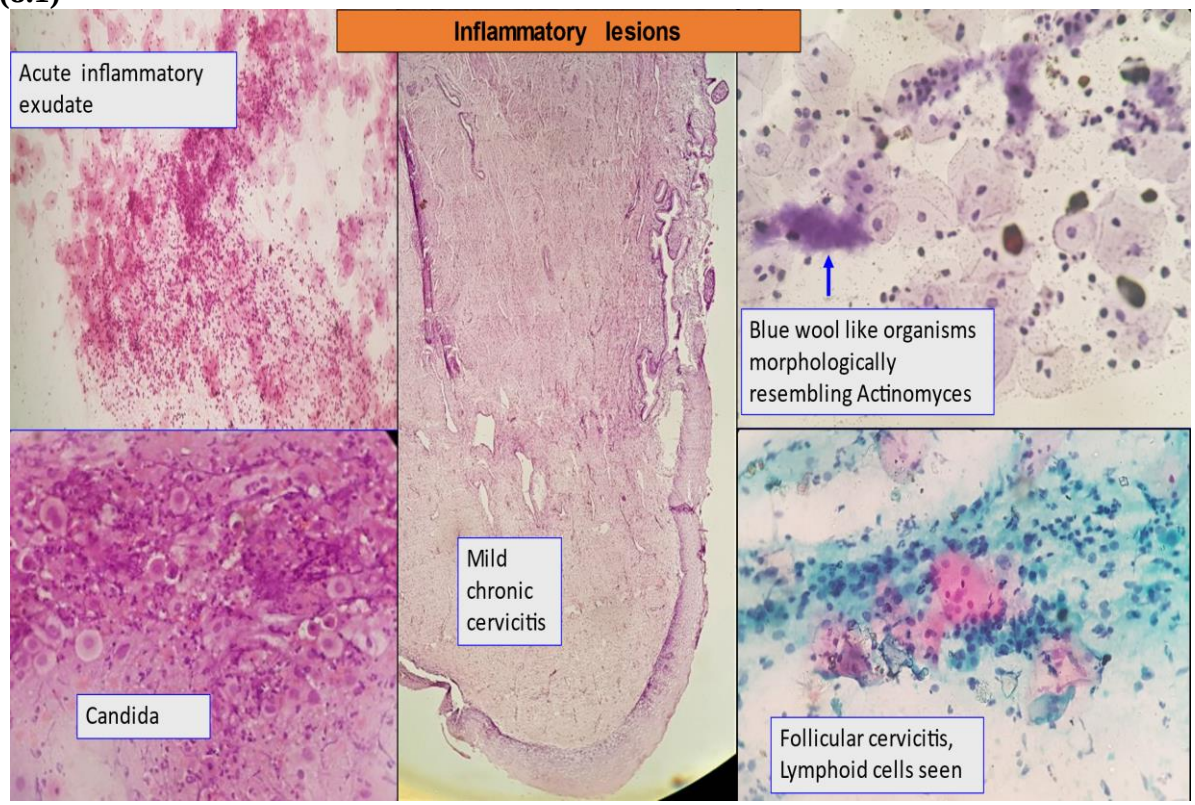


Figure 8: Inflammatory Pap smears
(8.1)



(8.2)

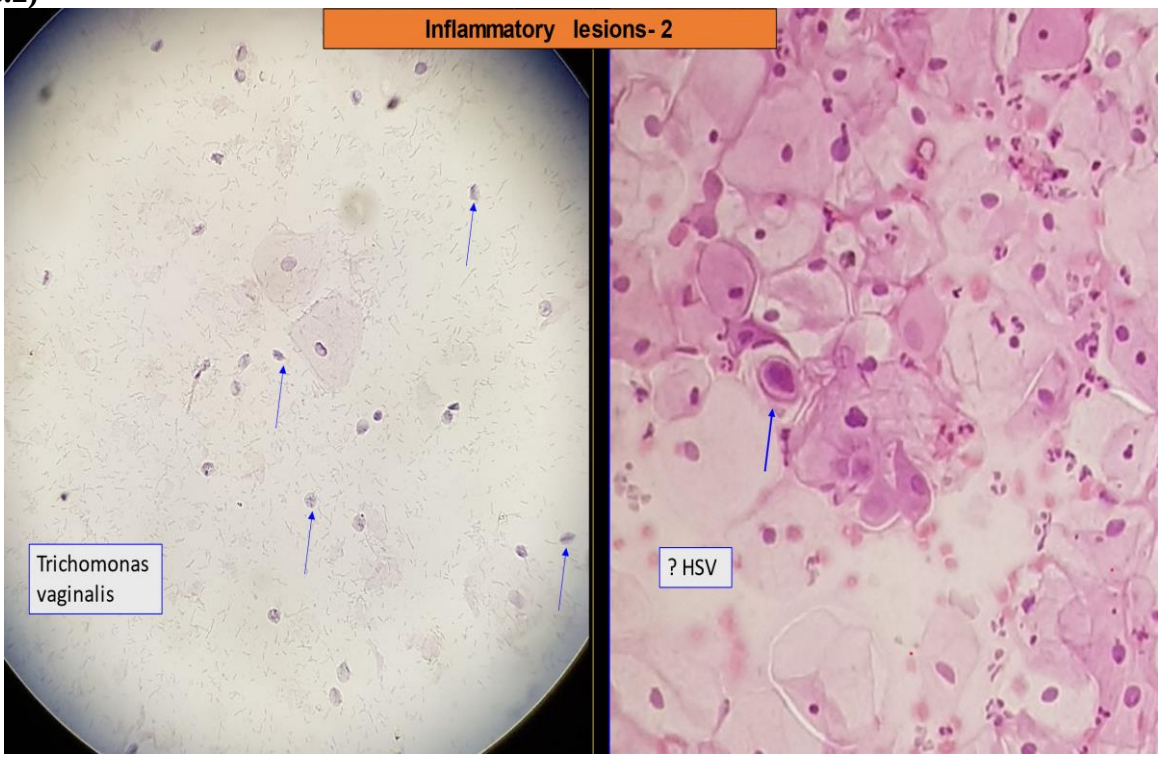


Figure 9: Atrophic Pap smears

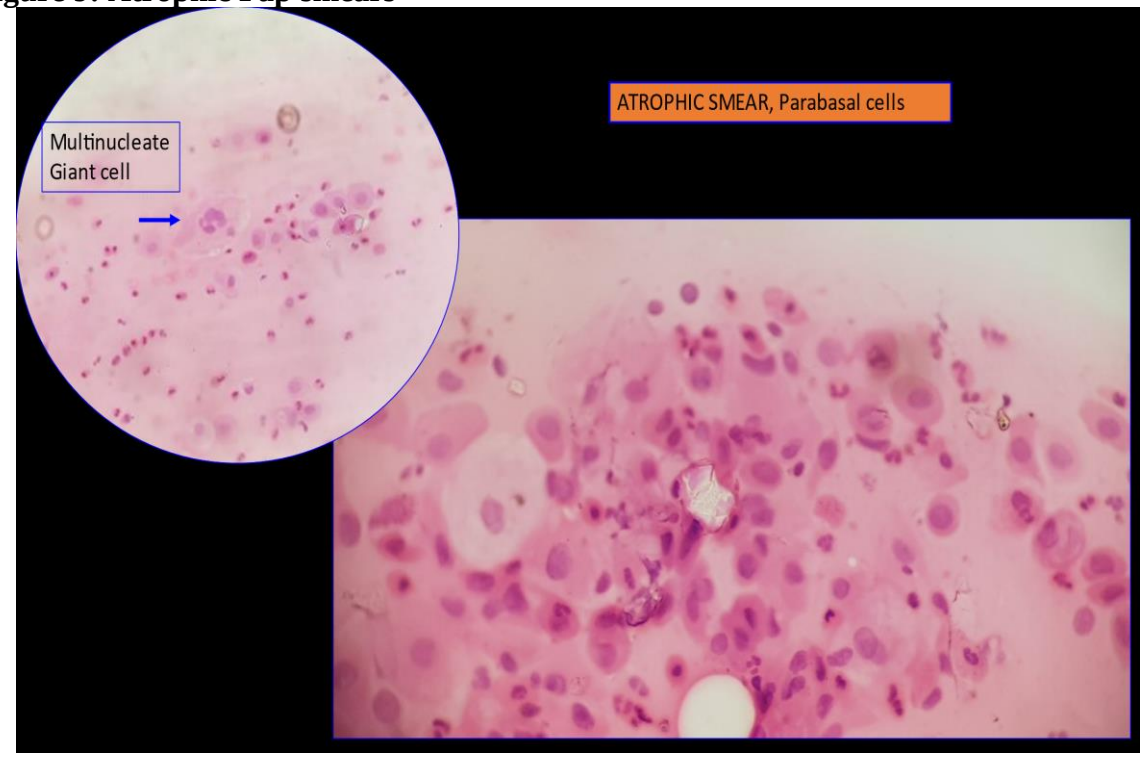
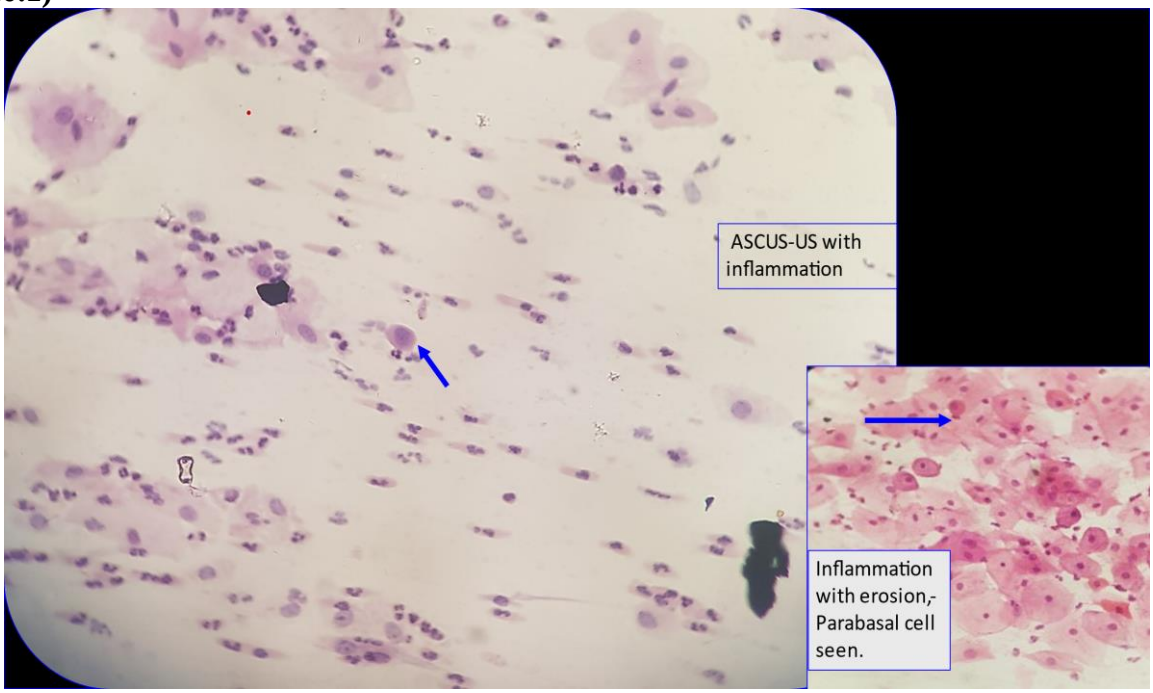
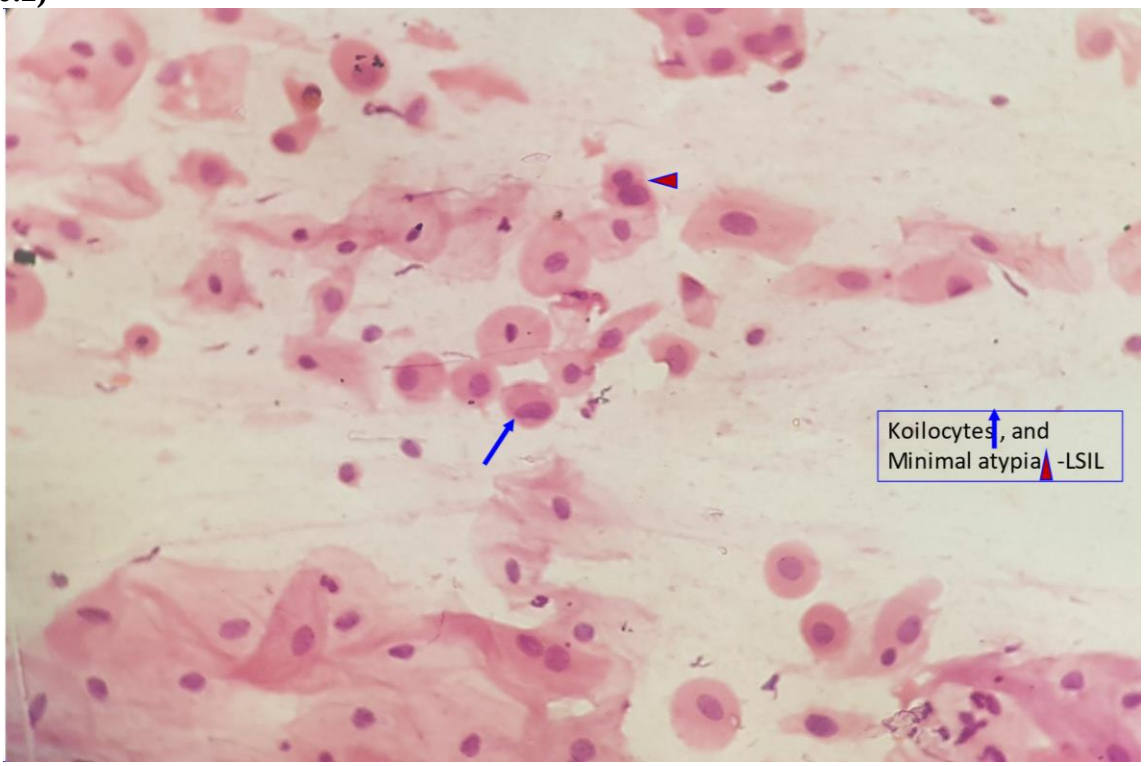


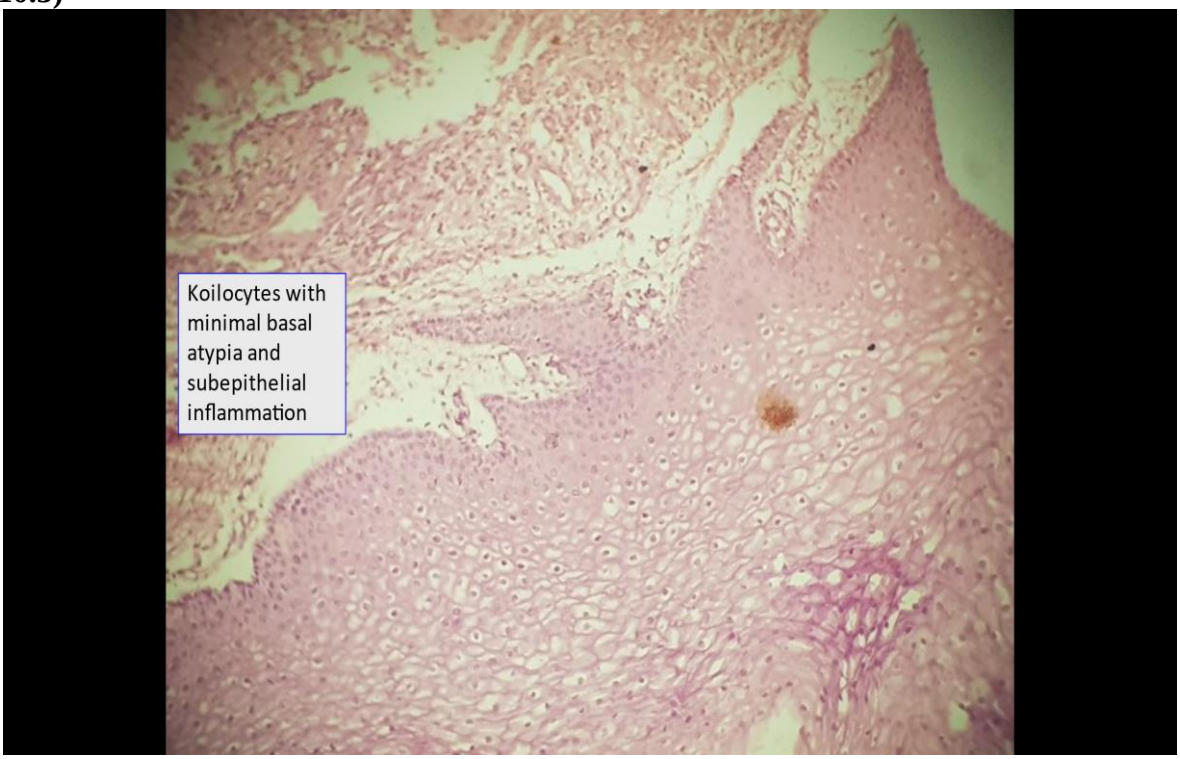
Figure 10: ECA (Epithelial cell abnormalities)
(10.1)



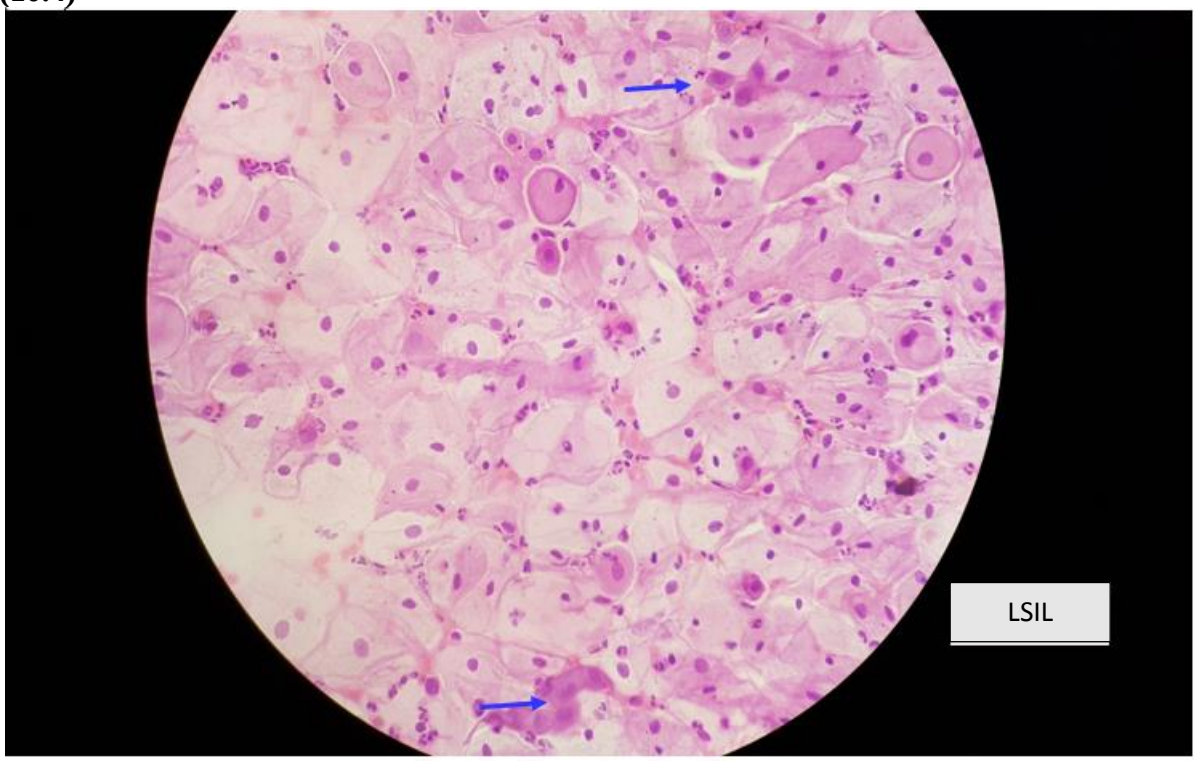
(10.2)



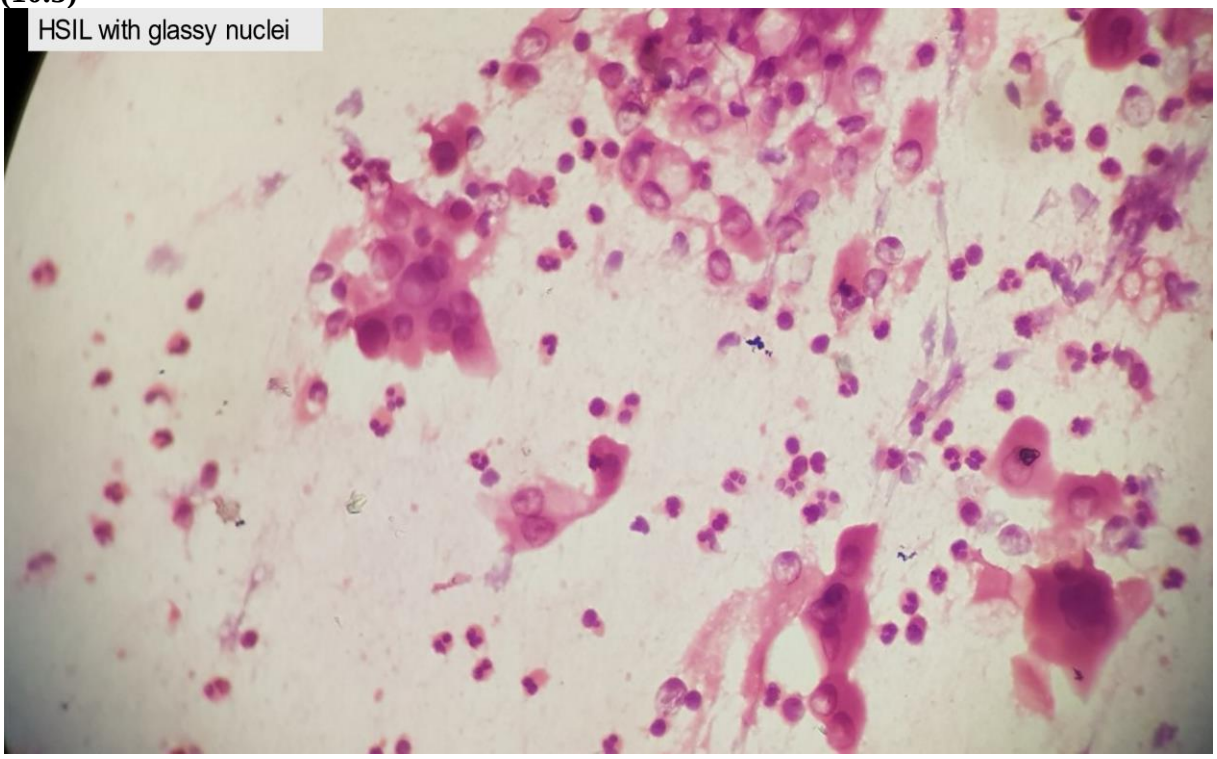
(10.3)


Koilocytes with minimal basal atypia and subepithelial inflammation

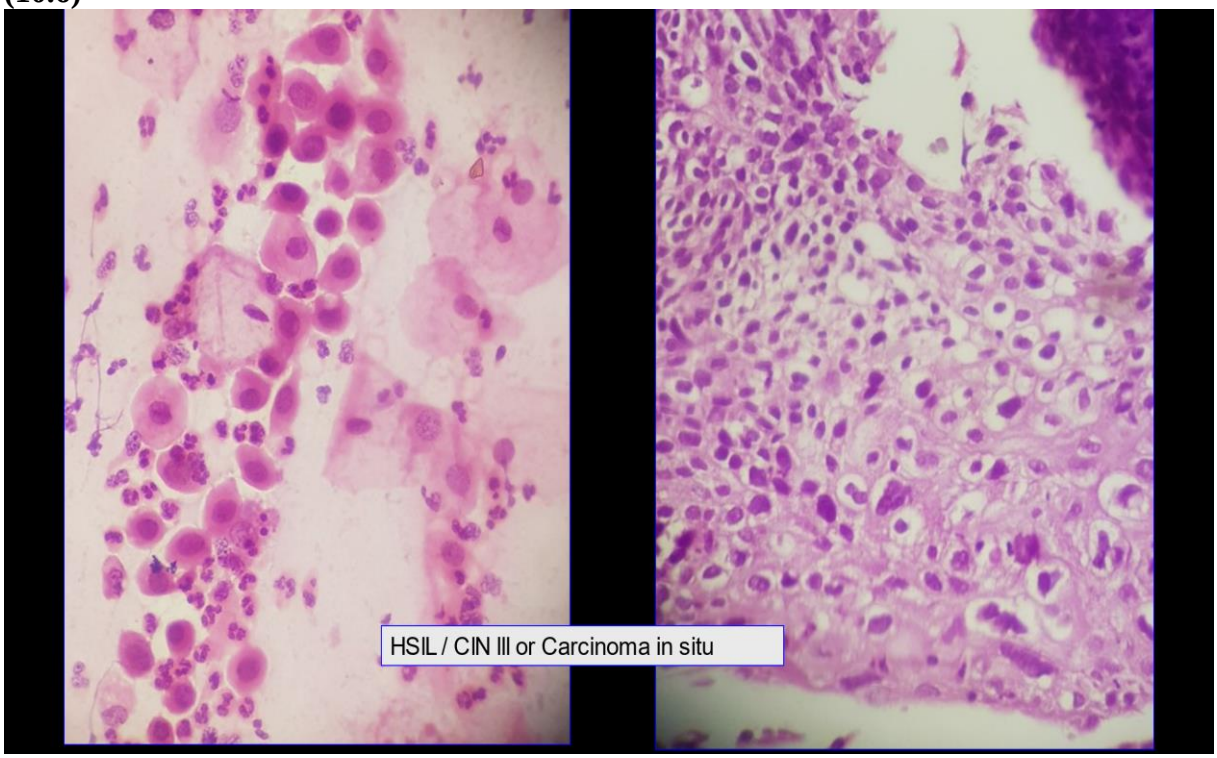
(10.4)


LSIL

(10.5)



(10.6)



CONCLUSIONS

1) Pap smear is a good screening as well as diagnostic test.
2) However more significant yield towards prevention of Ca Cx will be achieved by adding supplemental testing e.g., HPV DNA testing.
3) Concentrated efforts need to be made to target screening efforts towards older age group women and also towards follow up and treatment of the Positive Pap smear cases.

BIBLIOGRAPHY

1. Srinivasan, S.; Johari, V.; Jesani A. Cervical cancer screening in India. In: Schroeder, D.; Cook, J.; Hirsch, F.; Fenet, S.; Muthuswamy V, editor. InEthics dumping Case studies from North South Research Collaborations [Internet]. Springer, Cham.; 2018. p. 33–48. Available from: https://library.oapen.org/bitstream/handle/20.500.12657/27812/1002193.pdf?sequence=1#page=45
2. Sreedevi A, Javed R, Dinesh A. epidemiology of cervical cancer with special focus on India. Int J Womens Health [Internet]. 2015;7:405–14. Available from: http://dx.doi.org/10.2147/IJWH.S50001
3. Kalyani R, Sharief N, Shariff S. A Study of Pap Smear in a Tertiary Hospital in South India. J Cancer Biol Res [Internet]. 2016;4(3):1084. Available from: https://www.jscimedcentral.com/CancerBiology/cancerbiology-4-1084.php
4. World Health Organization. Cancer Fact Sheet: Cervical Cancer [Internet]. WHO - World Health Organization. 2016 [cited 2018 Apr 12]. p. 5 p. Available from: http://gco.iarc.fr/today/data/pdf/fact-sheets/cancers/cancer-fact-sheets-16.pdf
5. Nikumbh D, Nikumbh RD, Dombale VD, Jagtap S V, Desai SR. International Journal of Health Sciences and Research Cervicovaginal Cytology: Clinicopathological and Social Aspect of Cervical Cancer Screening in Rural (Maharashtra) India . Ijhsr. 2012;1(2).
6. Nayar R, Wilbur DC. The Pap test and Bethesda 2014: "The reports of my demise have been greatly exaggerated." (After a quotation from Mark Twain). Acta Cytol. 2015;59(2):121–32.
7. World Health Organization (WHO). Home/Newsroom/Fact sheets/Detail/Cervical cancer [Internet]. Cervical Cancer fact sheets by WHO, dated 22 February 2022. [cited 2022 Aug 11]. p. 1–7. Available from: https://www.who.int/news-room/fact-sheets/detail/cervical-cancer
8. World Health Organization. Global strategy to accelerate the elimination of cervical cancer as a public health problem and its associated goals and targets for the period 2020 – 2030 [Internet]. Vol. 2, United Nations General Assembly. 2021. 1–3 p. Available from: https://www.who.int/publications/i/item/9789240014107
9. Varughese J, Richman S. Cancer Care Inequity for Women in Resource-Poor Countries. Rev Obstet Gynecol [Internet]. 2010;3(3):122–32. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC3046761/
10. Siddiqui IA, Hashim D, Erdmann F, Zeeb H. Editorial: Social Inequities in Cancer. Front Oncol | www.frontiersin.org [Internet]. 2019;1:233. Available from: www.frontiersin.org
11. Chandrasekhar V, Krishnamurti • Chandrasekhar. Ó Federation of Obstetric & Gynecological Societies of India. 2018; Available from: https://doi.org/10.1007/s13224-018-1102-z
12. Safaeian M, Solomon D, Castle PE. Cervical Cancer Prevention-Cervical Screening: Science in Evolution. Obstet Gynecol Clin North Am [Internet]. 2007;34(4):739–60. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2762353/
13. datajournalism NTU. Report on Impact of Implementation of Pap smear screening at Population level in Taiwan since 1995. [Internet]. 2018 [cited 2018 Nov 18]. Available from: https://datajournalism.ntu.edu.tw/post/134712165798/more-produced-by鄭婷宇趙軒翎吳佳穎-sourcetaiwan
14. Singh GK, Romuladus ;, Azuine E, Siahpush ; Mohammad. Global Inequalities in Cervical Cancer Incidence and Mortality are Linked to Deprivation, Low

Socioeconomic Status, and Human Development • Incidence • Mortality • Global inequality • Human development • Gender inequality • Social inequality • Poverty • Literacy • GNI per capita. Global Inequalities in Cervical Cancer. Int J MCH AIDS. 2012;1(1):17–30.

15. Shah SC, Kayamba V, Peek RM, Heimburger D. Cancer Control in Low-and Middle-Income Countries: Is It Time to Consider Screening? J Glob Oncol [Internet]. 2019;March(5):1–8. Available from: https://www.ncbi.nlm.nih.gov/pmc/articles/PMC6452918/pdf/JGO.18.00200.pdf
16. Bobdey S, Sathwara J, Jain A, Balasubramaniam G. Burden of cervical cancer and role of screening in India. Indian J Med Paediatr Oncol [Internet]. 2016;37(4):278–85. Available from: https://www.researchgate.net/publication/220611084_Cervicovaginal_Cytology_Clinicopathological_and_Social_Aspect_of_Cervical_Cancer_Screening_in_Rural_Maharashtra_India
17. Jetley S, Rana S, Jairajpuri Z. Cervical smear cytology on routine screening in a semi urban population in New Delhi: A review of 610 cases. Arch Med Heal Sci. 2013;1(2):131.
18. Feng C, Lai Y, Li R, Wang Y, Gu J, Hao C, et al. Reproductive health in Southeast Asian women: current situation and the influence factors. Glob Heal J [Internet]. 2018;2(1):32–41. Available from: https://doi.org/10.1016/S2414-6447(19)30116-2
19. Simon DSA. Sexually transmitted infections in pregnancy: A 20 year retrospective clinicoepidemiological study from a tertiary care hospital, Kerala, South India. J Med Sci Clin Res. 2020;08(07):514–20.
20. Karlsen F, Muturi M, Muyabwa C, Roseng LE, Bigabwa S, Chihongola B, et al. The potential of rna as a oftargetpre-cancerfor national screening. J Public Health Africa. 2018;9(3).
21. Taylor, M.;Wi T. Report on global sexually transmitted infection surveillance, 2018.Geneva: World Health Organization; 2018. Licence: CC BY-NC-SA 3.0 IGO. [Internet]. Southern Medical Journal. 2019. Available from: https://www.researchgate.net/publication/329877512_Report_on_global_sexually_transmitted_infection_surveillance_2018
22. Pitt MM, Khandker SR. The impact of group-based credit programs on poor households in Bangladesh: Does the gender of participants matter? J Polit Econ. 1998;106(5):958–96.
23. Fatima A, Iftikhar SF, Iftikhar K. Impact Of Micro-Credit On Women Empowerment: A Case Study Of Rural Pakistan. Pakistan J Gend Stud. 2016;13(1):53–80.
24. Khasnabish S, Chakraborty R, Chakraborty D, Hati GC. Study of Cervical Pap Smear Study and Its Utility in Cancer Screening- an Experience in a Tertiary Care Hospital of Tripura, North Eastern State of India. J Evid Based Med Healthc. 2017;4(48):2936–9.

ISSN 2515-8260 Volume 9, Issue 4, Summer 2022

Supporting material for "Spectrum of Cervical lesions on Pap smears and Gynaec CHC": (From: http://gco.iarc.fr/today/data/pdf/fact-sheets/cancers/cancer-fact-sheets-16.pdf)

Figure 1:

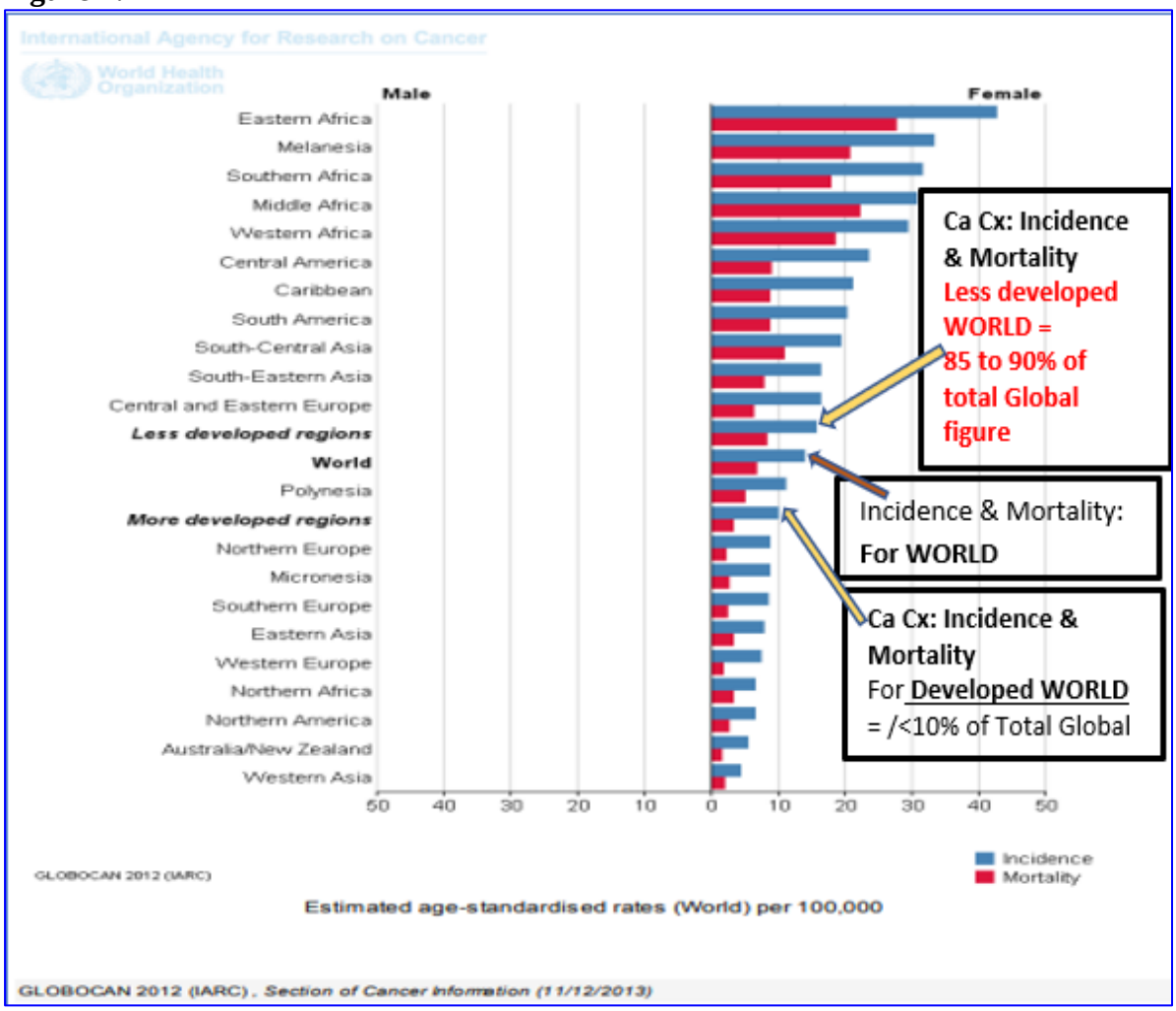


Figure 2:

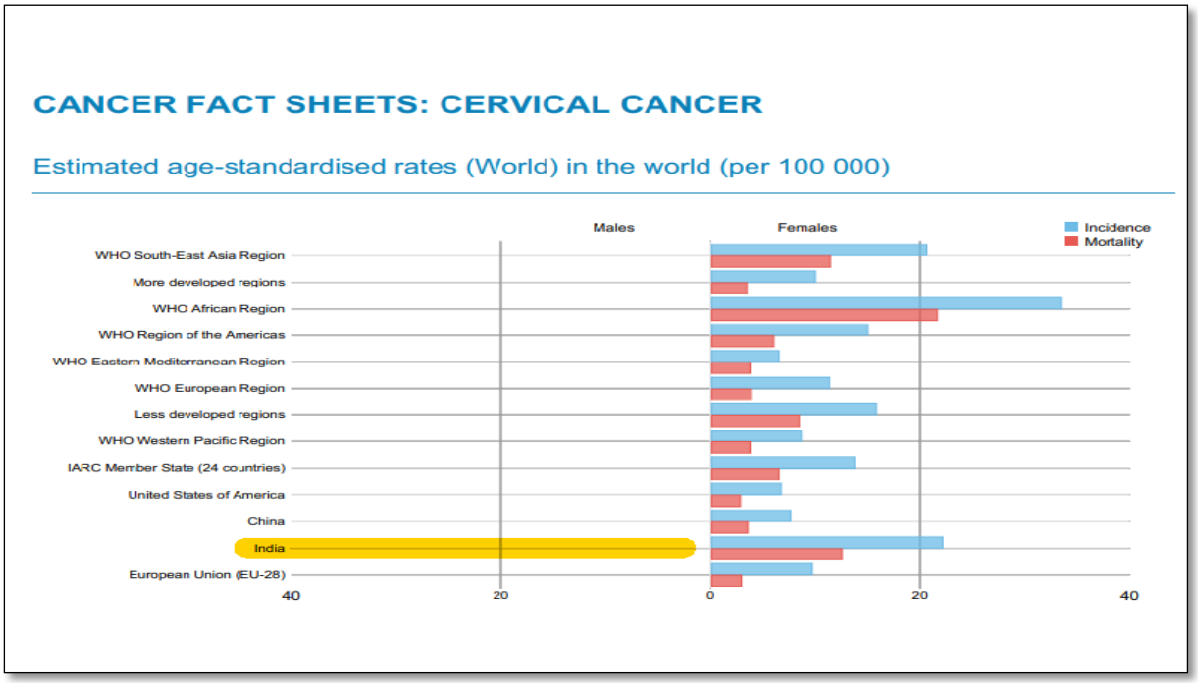


Figure 3: Preventable but not prevented for the developing world!!