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SPECTRUM OF PAP SMEAR CYTOLOGY IN WOMEN PRESENTING IN A TERTIARY CARE CENTER, TRICHY DISTRICT, SOUTHERN INDIA

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ABSTRACT: Introduction: Carcinoma cervix is the major health problem with increased morbidity and mortality. Around 60% of cases are diagnosed at an advanced stage, making the treatment more complex. Pap smear can able to detect precancerous and cancer of cervix along with infection and inflammatory pathologies making the clinician in timely and appropriate management. **Objective:** This study aims at detecting the prevalence of current trends of nonneoplastic and neoplastic lesions of cervix in patients who attending our tertiary care centre. **Materials and Methods:** This is a prospective study done in Srinivasan medical college and Hospital for a period of 6 months in patients who attended gynaecology department. Smears were made and stained with Pap stain after fixation in ethyl alcohol. Reporting was done based on the Bethesda system 2014. **Results:** Out of 500 cases, 495 cases (99%) were satisfactory for evaluation. Of these, 470 (94%) cases were negative for intraepithelial lesion/malignancy and 24 cases (4.8%) shown epithelial cell abnormalities. Nonspecific inflammation contributed 30.6% cases, infections like Bacterial vaginosis were seen in 71 cases (14.2%) followed by candidiasis in 31 cases (6.2%). ASCUS were reported in 2.8% cases followed by LSIL in 0.8% cases. HSIL and SCC were observed in 0.4% cases each. **Conclusion:** Pap smear is cost-effective, non-invasive screening test that reduces the incidence of cancerous lesions of cervix and to be implemented at primary health care. All rural women needed to be educated about this screening test.

INTRODUCTION: Cervical carcinoma is an increasing health problem with India has the highest age-standardized incidence rate of 18 per 100,000 women. An estimated 1,23,907 new cervical cancer cases are detected annually in India. Every year, 77,348 deaths occur from it. Nearly 60% of cases are diagnosed at an advanced stage, making treatment more complex and expensive.

The causative agent in 95% of cervical cancers is the Human Papillomavirus. The risk factors in India include early onset of sexual activity, early marriages, multiple partners, multiple childbirths, smoking, low hygiene standards and presence of sexually transmitted infections.

High incidence of cervical cancer is due to lack of awareness and difficulty in running cytology based screening programs ¹. Cervical cancer is a preventable disease due to the long preinvasive stage. Early detection and appropriate treatment are possible if robust screening is implemented. Papanicolaou introduced cervical cytology to the world. His landmark publication in collaboration

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with H. F. Traut "Diagnosis of Uterine Cancer by the Vaginal Smear" in 1943 paved the way to diagnose uterine cervical lesions with the help of a simple and effective method.

Early cervical epithelial changes can be identified by a Pap smear test, which is the primary screening test for detection of precancerous cervical intraepithelial neoplasia and the early stage of invasive cervical cancer. The Sensitivity of Pap smear is 55.4% and specificity is 96.8%. Pap screening done in association with an HPV DNA test increases the sensitivity for early detection of precancerous lesions.

Aims and Objectives: This study aims at detecting the prevalence and current trends of various nonneoplastic and epithelial cell abnormalities of cervix in females attending in our tertiary care hospital. The reporting of the Pap smear was based on 2014 Bethesda system.

MATERIALS AND METHODS: This study was conducted in the Department of Pathology at Srinivasan Medical College and Hospital, Samayapuram, Trichy in South India. This was a prospective study done for a period of 6 months from July 2022 to December 2022. The Institutional Ethical Committee approval was obtained for this study with IEC No. 12/2022. A total of 500 cases with chief complaints of vaginal discharge, menstrual irregularities, pelvic pain and dyspareunia, who required Pap smear test as requested by gynaecologists were included in the study.

Patients with reproductive age groups (20 to 45 years), premenopausal and postmenopausal age groups were included in the study. Pregnant patients, patients who were been treated before for frank carcinoma cervix and patients who were bleeding at the time of examination were excluded from the study. Informed consent was obtained from all patients involved in the study.

Cervical smears were taken using conventional method of cervical cytology by using Pap kit (endocervical brush, Ayre spatula and cotton swab). The patient was placed in dorsal lithotomy position and a Cusco's bivalve speculum was introduced through vagina and cervix was visualized. The longer projection of the Ayre's

spatula was placed in the cervix near squamocolumnar junction and rotated through 360 degree. The cellular material thus obtained was quickly, but gently smeared on a clean glass slide.

Smears were fixed immediately in 95% ethylalcohol and stained by Pap staining. Reporting was done by two cytopathologists as per the Bethesda system 2014 as under:

Specimen Adequacy: Satisfactory or unsatisfactory for evaluation

Quality Indicators: Presence or absence of endocervical or transformation zone component

Interpretation/Result: Negative for intraepithelial lesion or malignancy (NILM).

Nonneoplastic Cellular Findings: Squamous metaplasia, Keratotic changes, Tubal metaplasia, Atrophy, Reactive cellular changes associated with Inflammation, Lymphocytic cervicitis, Radiation.

Organisms: Trichomonas vaginalis, fungal organisms like Candida species, Bacterial vaginosis, Actinomyces species, cellular changes associated with herpes simplex virus, cellular changes associated with cytomegalovirus.

Epithelial Cell Abnormalities: Squamous cells- Atypical squamous cells of undetermined significance (ASC-US), Atypical squamous cells cannot exclude HSIL (ASC-H), Low grade squamous intraepithelial lesion (LSIL), High grade squamous intraepithelial lesion (HSIL) and Squamous cell carcinoma.

Glandular cell-Atypical Endocervical cells NOS, Atypical Endometrial cells NOS, Atypical Glandular cells NOS, Endocervical cells favor neoplastic, Endocervical adenocarcinoma *in-situ*, Endocervical Adenocarcinoma, Endometrial Adenocarcinoma.

OBSERVATION AND RESULTS: Out of 500 cases of our study, 5 cases were reported as unsatisfactory with more than 75% of the smear were obscured by inflammatory exudate and few were inadequate smears due to technical error. All unsatisfactory smears were seen above 40 years of age. Remaining 455 cases were reported as adequate and satisfactory smear.

Majority of cases in our study belonged to 41 to 50 years of age group with 37% cases as in **Table 1**, followed by 172 cases occurring in 31 to 40 years age group (34.4%). Around 153 cases (30.6%) were diagnosed as non-specific inflammation probably due to chronic cervicitis. Among the infectious etiology, Bacterial vaginosis occurred with highest prevalence as in **Table 2**.

Second common infectious disorder in our study is candidiasis in **Fig. 1** with patients presented with commonest complaints of white discharge. 2 cases were showing infection with both *Trichomonas vaginalis* and Bacterial vaginosis, 2 cases were showing infection with Bacterial vaginosis and candida and 1 case shown infection with both *Trichomonas* and candida. In our study, total number of cases reported with atrophic changes were 24(4.8%). Among these 7 cases were diagnosed as atrophic inflammatory smear. 1 case shown candida infection in the background of atrophy. Around 88 cases (17.6%) were reported with squamous metaplastic changes.

The number of cases showing endocervical cells were 25. The number of smears shown both metaplastic squamous cells and endocervical smears were 8, indicating the best quality of the smear. Among the epithelial cell abnormalities, ASCUS was commonly reported with 14 cases (2.8%). Most of ASCUS cases belonged to 41-50 years of age groupas shown in **Table 3**.

A 52 year female was diagnosed as ASC-H. Second most common epithelial cell abnormality in our study was LSIL seen in 4 cases (0.8%).1 case was reported as ASCUS with candidiasis and 1 case shown LSIL along with Bacterial vaginosis suggesting mixed infection with HPV with koilocytic changes. We reported 2 cases of HSIL and SCC (0.4%). 1 case of SCC shown squamous metaplasia along with malignant cells suggestive of tumor arising from transitional zone. A 62 year female was diagnosed with adenocarcinoma cervix, who presented with complaint of postmenopausal bleeding.

TABLE 1: DISTRIBUTION OF THE CASES ACCORDING TO AGE

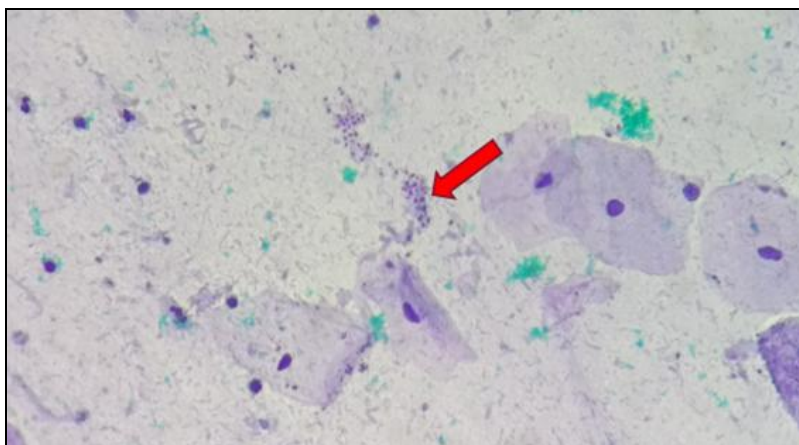
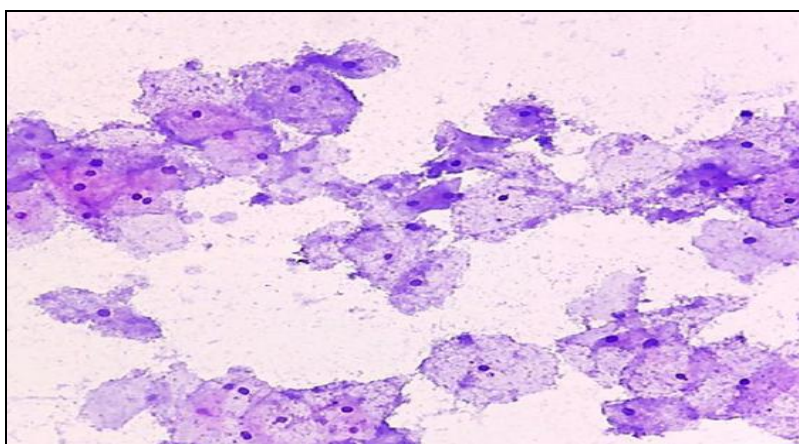
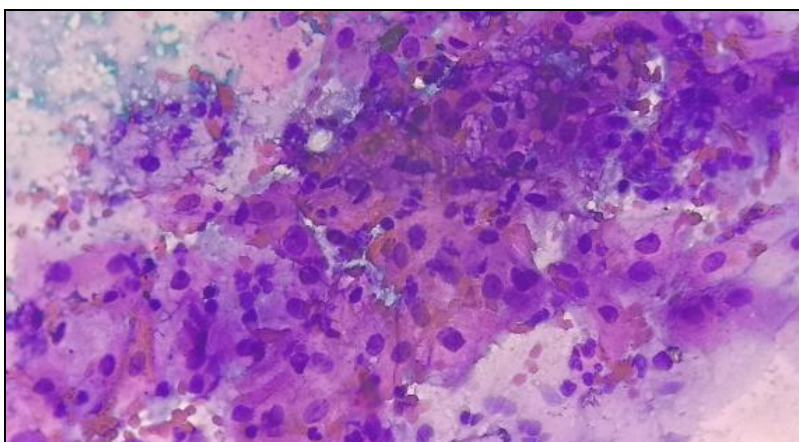
Age group (years)	Total no. of cases	Percentage (%)
21 to 30	75	15%
31 to 40	172	34.4%
41 to 50	185	37%
51 to 60	47	9.4%
61 to 70	17	3.4%
>70	04	0.8%

TABLE 2: DISTRIBUTION OF PAP SMEAR REPORTS AS PER THE BETHESDA SYSTEM 2014

Diagnosis	Total no. of cases	Percentage (%)
Unsatisfactory	05	1%
Negative for intraepithelial lesion or Malignancy		
Organisms		
Trichomonas vaginalis	26	5.2%
Candida	31	6.2%
Bacterial vaginosis	71	14.2%
Actinomyces species	-	-
Leptothrix vaginalis	05	1%
Non-specific inflammation	153	30.6%
Other non-neoplastic		
Squamous metaplasia	88	17.6
Keratotic changes	-	-
Atrophy	24	4.8
Epithelial cell abnormalities		
ASCUS	14	2.8
ASC-H	01	0.2
LSIL	04	0.8
HSIL	02	0.4
SCC	02	0.4
AGC	-	-
Adenocarcinoma	01	0.2

TABLE 3: AGE WISE DISTRIBUTION OF EPITHELIAL CELL ABNORMALITIES

Age group	Epithelial lesion						
	ASCUS	ASC-H	LSIL	HSIL	SCC	AGS	Adenocarcinoma
21-30	01		01				
31-40	02		01				
41-50	07		01	02			
51-60	02	01	01		01		01
61-70	01				01		
>70	01						

**FIG. 1: CANDIDA GLABARATA WITH SMALL, UNIFORM, ROUND BUDDING YEAST FORMS (RED ARROW)****FIG. 2: BACTERIAL VAGINOSIS WITH MANY COCCOBACILLI ADHERE OVER SQUAMOUS CELLS-CLUE CELLS****FIG. 3: ASCUS-ATYPICAL SQUAMOUS CELLS WITH SLIGHTLY INCREASED N/C RATIO, MINIMAL NUCLEAR HYPERCHROMASIA AND IRREGULAR CONTOUR**

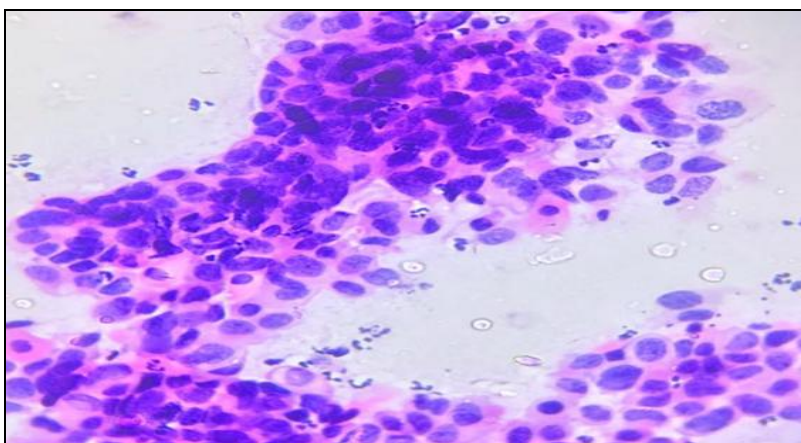


FIG. 4: HSIL-SHEETS OF PARABASAL CELLS SHOWING HYPERCHROMATIC NUCLEI WITH IRREGULAR NUCLEAR CONTOURS

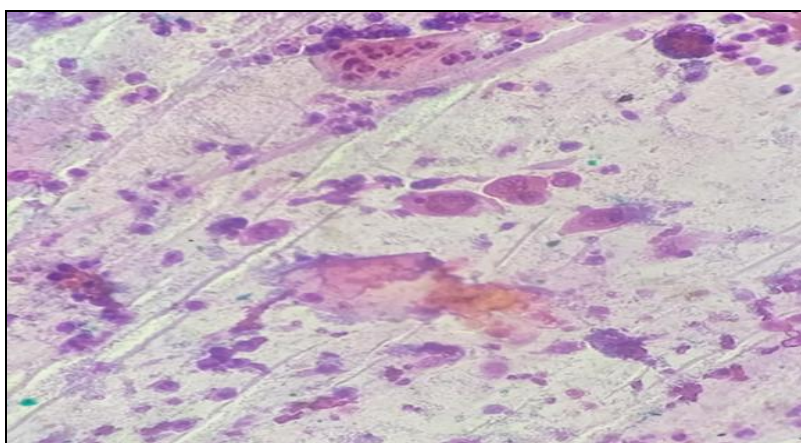


FIG. 5: SCC-MALIGNANT CELLS WITH VARYING SIZE AND SHAPE, TADPOLE CELLS IN A BACKGROUND OF TUMOR DIATHESIS

DISCUSSION: Carcinoma cervix commonly occurs between 40-50 years of age group and its precursor lesion occurs 5-10 years earlier. Various screening tests are available for cervical cancer detection like the conventional Pap smear, liquid based smears, visual inspection of cervix after Lugol's Iodine and acetic acid application, cervicography and speculoscopy. Gold standard for cervical screening is exfoliative cytology.

Cervix has an easy accessibility for exfoliative cytology or Pap smear test. Most widely used and most successful cervical cancer screening test is conventional cervical cytology. In developed countries, cervical cytology screening programme has been associated with drastic reduction in cervical cancer burden. Women with abnormal Pap smears has to undergo colposcopy, if there is an abnormal colposcopy has to undergo cervix biopsy. Human papilloma virus plays an important role in the development of cervix cancer. So, Pap smear test in association with HPV DNA test helps in

easy identification of precancerous cervical epithelial lesions. Pap smear test is cost-effective, can be done at primary health centers while HPV DNA test is done at higher centers. According to American Cancer Society, Pap smear test should be done once in 3 years. A conventional Pap smear test should have approximately 8000 to 12000 well preserved squamous epithelial cells to be adequate.

If the cells are completely obscured by hemorrhage and inflammation, it is reported as unsatisfactory for evaluation. LSIL corresponds to CIN1 with mild dysplasia and HSIL corresponds to CIN II and CIN III with moderate to severe dysplasia. In our study, maximum number of cases i.e., 185 cases (37%) were in 41-50 years age group followed by 172 cases were in age group of 31-40 years (34.4%) which is in concordance with the study done by Sharma P *et al* and Bajpai M *et al*². 495cases(99%) were reported as satisfactory for evaluation according to 2014 Bethesda system of reporting cervical cytopathology, which is in

concordance with study done by Philipose TR *et al* with 99.2%, Burkadze G *et al* with 98.7% and Abdullah L *et al* with 97.2% satisfactory smears. 5 cases (1%) were reported as unsatisfactory for evaluation which corresponds with the study done by Crasta *et al* which reported 1.36% of unsatisfactory smears. In our study out of 500 cases, 470 cases (94%) were negative for intraepithelial lesion with infection and inflammation, which is comparable with studies done by Pudasaini S *et al*³ (98.6%) and Kalyani R *et al* (96.92%)⁴. Among NILM, 32.4% were reported as smears with normal study. Inflammatory smears form the maximum bulk of reporting that constitutes around 32% cases, similar to study done by Verma *et al*⁵.

Among the inflammatory smears, most of them showed nonspecific inflammation (30.6%), correlated with the studies done by Malik SN *et al* which showed higher proportion of cases with nonspecific inflammation. Patients with continuous inflammatory smear for many years to be treated adequately or else probability of developing intraepithelial lesion increases. The most common finding among the infectious pathologies was shift in vaginal flora with many coccobacilli *i.e.*, Bacterial Vaginosis as in **Fig. 2** seen in 71 cases (14.2%). This finding was coinciding with the studies done by Malik SN *et al* and Hosamane S *et al*⁶. Lakshmi *et al*⁷ in their study reported 3% cases of Bacterial vaginosis. Pathak R *et al*⁸ in their study revealed 17.2 % cases of Bacterial vaginosis.

Leptothrix infection (1%) was the least common infection in our study. This was in contrast with the studies of Malik SN *et al* and Hosamane S *et al*⁶, which shows *Trichomonas vaginalis* as the least common cause of infection seen in 1 case (0.68%) and 13 cases (0.51%) respectively. *Trichomonas vaginalis* formed the second most common infection in our study with around 26 cases (5.2%). In the present study, Atrophic cervicitis was reported in 24 cases (4.8%), which was comparable with the study done by Hosamane S *et al*⁶ showing atrophic cervicitis in 2.4% cases. Higher number of cases with atrophic changes *i.e.*, 19 cases (79%) belong to 41-70 years age group. A study by Maheshwari U *et al* showing atrophic changes in 65.52% cases belonging to 41-60 years, concluding

that atrophic changes occur in perimenopausal and menopausal age group due to decreased levels of estrogen and progesterone. Epithelial cell abnormalities were reported in 24 cases (4.8%), similar to observations from Omhare A *et al* in which epithelial cell abnormalities were seen in 4.52% cases. The most common epithelial cell abnormality in our case is ASCUS, with 14 cases (2.8%) were reported in our study, which correlates with findings of the study by Sachan *et al*⁹, who reported 2.90% cases of ASCUS. Most cases of ASCUS as in **Fig. 3** occurred in 41-50 years age group, similar to some other studies^{10, 11}. The incidence of ASCUS is higher in our study may be due to early screening of cases.

ASCUS may gradually progress to LSIL, HSIL and SCC if not treated earlier. AGUS progresses to adeno-carcinoma. Second common epithelial cell abnormality reported was LSIL (0.8%), similar to the study done by Kothari *et al* which showed LSIL in 0.83% cases. In our study, the prevalence of LSIL was seen in 21 to 60 years, even in younger patients, more probably due to HPV infection. In contrary, a study by Gupta *et al* among 4703 females shown LSIL as most frequent abnormality in 1.36% of cases than ASCUS. The prevalence of HSILs in **Fig. 4** in our study is 0.4% correlated with the observation from Sachan *et al*, which showed HSIL in 0.48% population. In this study, higher number of epithelial cell abnormalities were detected in age group of 41 to 50 years, followed by 51 to 60 years.

2 cases (0.4%) were reported as SCC as in **Fig. 5** similar to the study by Rani *et al*. who reported SCC in 1 case (0.43%) and Lakshmi *et al*⁷. Camp based study by Nene *et al* shown 0.009% of cervical cancer cases, which was lower than our study. Patients usually reach the tertiary centres at higher stage of disease, so the detection of cancers in tertiary centres is higher than camp-based studies. SCC prevalence was seen in perimenopausal and postmenopausal age groups in our study. A study by Mulay K *et al* showed lower prevalence of SCC (0.06% cases), in spite of including higher sample size *i.e.*, 6010 cases because the study was done among urban population with lower risk of developing carcinoma. One case of adenocarcinoma (0.2%) belonged to 62 years age. The reason for

prevalence of cervix cancer in rural population is lower literacy and inadequate medical facilities. Glandular cell abnormalities were very less when compared to squamous lesions when compared to study by Kumari and Kolte¹², which showed abnormalities in 71 cases (0.46%).

This may be due to differences in demography, literacy, sexual activity, related infections, social and cultural differences and availability of screening program.

CONCLUSION: Conventional Pap smear will diagnose not only premalignant lesions, but also non-neoplastic infectious and inflammatory pathologies. Pap smear screening test has to be included in primary health care level as a routine screening procedure to reduce treatment burden, morbidity and mortality.

All women above 30 years should have to undergo this test periodically even upto postmenopausal period. Since, most women are not aware of this test, the community should be educated and motivated about this screening test.

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CONFLICTS OF INTEREST: There are no conflicts of interest.

REFERENCES:

1. Ferlay J, Soerjomataram I, Dikshit R, Eser S, Mathers C and Rebelo M: Cancer incidence and mortality worldwide: Sources, methods and major patterns in GLOBOCAN 2012. *Int J Cancer* 2015; 136: 359-86.
2. Bajpai M, Raina A and Dwivedi S: A study of Pap smears in a tertiary care hospital: *IOSR JDMS* 2016; 15: 93-95.
3. Pudasaini S, Prasad KBR, Rauniyar SK, Pathak R, Pande K, Koirala S and Kafle S: Cervical pap smear- A prospective study in a tertiary hospital. *Journal of Pathology of Nepal* 2015; 5: 820-23.
4. Kalyani R, Sharief N and Shariff S: A study of PAP smear in Tertiary Hospital in South India. *J Cancer Biol Res* 2016; 4: 1084.
5. Verma A, Verma S, Vashist S, Attri S and Singhal A: A study on cervical cancer screening in symptomatic women using Pap smear in a tertiary care hospital in rural area of Himachal Pradesh, India. *Middle East Fertility Society Journal* 2017; 22: 39-42.
6. Sushma Hosamane, Mili Agarwal, Sakshi Malhotra and Muktha Pai: Pap Smear Evaluation through Opportunistic Screening Programme in Tertiary Care Hospitals and Rural Mangalore. *NJLM* 2017; 6: 01-5.
7. Lakshmi PV and Gouri SRS: Study and analysis of 200 cervical Pap smears in our hospital. *IJCMR* 2016; 3: 2787-9.
8. Pathak R, Pradhan P, Pudasaini S, Maharjan S and Basnyat AS: Study of trichomonasvaginalis and bacterial vaginosis in pap smear at a tertiary health care centre of Nepal. *Nepal Med Coll J* 2020; 22: 8-12.
9. Sachan PL, Singh M, Patel ML and Sachan R: A study on cervical cancer screening using Pap smear test and clinical correlation. *Asia Pac J Oncol Nurs* 2018; 5: 337- 41.
10. Sharadamani GS and Anusha N: Spectrum of Cervical Lesions Detected by Pap smear: An Experience from a Rural- Based Tertiary Care Teaching Hospital. *Indian Journal of Pathology: Research and Practice* 2017; 6(2): 435-438.
11. Sujatha R, Archana, Saravanakumar N and Subramaniam PM: Study of cervical PAP smear at medical college hospital in a rural setup. *Indian Journal of Obstetrics and Gynecology Research* 2017; 4(2): 189-192.
12. Kumari M and Kolte S: Experience of cervical Pap smear screening in tertiary care hospital. *Int J Med Sci Public Health* 2020; 9(1): 68-71.

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