Original article

Cytological Evaluation of Cervical Pap Smears Among Women Attending a Gynecology Outpatient Department: A Prospective Observational Study

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Abstract

Background: Cervical cancer is one of the leading causes of cancer-related morbidity and mortality among women, especially in developing countries. The Papanicolaou smear is a simple, inexpensive, and effective screening tool for early detection of premalignant and malignant cervical lesions. Regular cervical cytology screening helps in early diagnosis and timely treatment of epithelial cell abnormalities.

Aim: To evaluate the cytological pattern of cervical Pap smears among women attending a gynecology outpatient department and to assess the frequency of inflammatory, premalignant, and malignant lesions.

Materials and Methods: A prospective observational study was conducted in the Department of Obstetrics and Gynaecology among 180 women attending the outpatient department with gynecological complaints. Cervical smears were collected using Ayre's spatula and endocervical brush where required. Smears were fixed, stained by Papanicolaou stain, and reported according to the Bethesda system. Sociodemographic profile, presenting complaints, per speculum findings, and cytological diagnosis were recorded. Data were analyzed using descriptive statistics.

Results: The majority of women belonged to the 31–50 years age group. The most common presenting complaint was vaginal discharge, followed by lower abdominal pain, menstrual irregularity, postcoital bleeding, and postmenopausal bleeding. Inflammatory smear was the most common cytological finding. Epithelial cell abnormalities included atypical squamous cells of undetermined significance, low-grade squamous intraepithelial lesion, high-grade squamous intraepithelial lesion, and squamous cell carcinoma. Unsatisfactory smears were observed in a small proportion of cases.

Conclusion: Pap smear is a useful, simple, and cost-effective screening test for detection of cervical epithelial abnormalities. Inflammatory lesions are common among symptomatic women, but premalignant and malignant lesions can also be detected through routine screening. Regular Pap smear screening, awareness programs, and follow-up of abnormal smears are essential for prevention of cervical cancer.

Keywords- Bethesda System, Cervical Cancer Screening, Cervical Cytology, Pap Smear, Squamous Intraepithelial Lesion, Women's Health.

Introduction

Cervical cancer is a major public health problem among women and remains one of the leading causes of cancer-related morbidity and mortality in many developing countries. The disease usually develops slowly through a sequence of premalignant epithelial changes before progressing to invasive carcinoma. This long pre-invasive phase provides an important opportunity for screening, early diagnosis, and prevention.[1]

The Papanicolaou smear, commonly known as Pap smear, is a widely used screening test for detection of cervical epithelial abnormalities. It is simple, inexpensive, minimally invasive, and suitable for outpatient settings. Pap smear screening has contributed significantly to reduction in cervical cancer incidence and mortality in countries with organized screening programs.[2]

The primary objective of Pap smear screening is to detect premalignant cervical lesions before they progress to invasive cancer. Cytological abnormalities such as atypical squamous cells, low-grade squamous intraepithelial lesion, high-grade squamous intraepithelial lesion, and malignant cells can be identified on cervical cytology. Early detection allows timely colposcopy, biopsy, treatment, and follow-up.[3]

Persistent infection with high-risk human papillomavirus is the most important etiological factor for cervical cancer. Other associated risk factors include early age at marriage, early onset of sexual activity, multiple sexual partners, high parity, poor genital hygiene, smoking, long-term oral contraceptive use, immunosuppression, and low socioeconomic status.[4]

Many women with premalignant cervical lesions remain asymptomatic. Some may present with vaginal discharge, postcoital bleeding, intermenstrual bleeding, pelvic pain, or postmenopausal bleeding. However, symptoms are not reliable indicators of early disease. Therefore, screening should not be limited only to symptomatic women.[5]

The Bethesda system provides standardized terminology for reporting cervical cytology. It includes assessment of specimen adequacy, general categorization, and interpretation of findings. It helps clinicians understand cytology reports and plan appropriate follow-up. The use of standardized reporting improves communication between cytopathologists and clinicians.[6]

In resource-limited settings, Pap smear remains a valuable screening tool despite the availability of HPV testing and visual inspection methods. Its usefulness depends on proper sample collection, adequate fixation, quality staining, accurate interpretation, follow-up of abnormal reports, and patient compliance.[7]

The present study was conducted to evaluate the cytological pattern of cervical Pap smears among women attending a gynecology outpatient department and to assess the frequency of inflammatory, premalignant, and malignant cervical lesions.

Materials and Methods

This prospective observational study was conducted in the Department of Obstetrics and Gynaecology. A total of 180 women attending the gynecology outpatient department with various gynecological complaints were included in the study.

Women aged 21 years and above who were willing to undergo Pap smear examination were included. Pregnant women, women with active vaginal bleeding at the time of examination, women with known diagnosed cervical malignancy, women who had undergone hysterectomy, and women who refused consent were excluded.

Detailed clinical history was obtained from all participants. Information regarding age, parity, age at marriage, menstrual history, presenting complaints, obstetric history, contraceptive use, history of vaginal discharge, postcoital bleeding, postmenopausal bleeding, and previous Pap smear screening was recorded.

General and systemic examination was performed where indicated. Per speculum examination was done to assess cervix, vaginal discharge, cervical erosion, hypertrophy, bleeding on touch, unhealthy cervix, and any visible growth. Findings were documented before collection of Pap smear.

Cervical smear was collected using Ayre's spatula from the transformation zone. Endocervical brush was used where required. Smears were immediately fixed in alcohol and stained by Papanicolaou stain. Cytological reporting was done according to the Bethesda system.

Cytological findings were categorized as negative for intraepithelial lesion or malignancy, inflammatory smear, organism-associated changes, atypical squamous cells of undetermined significance, low-grade squamous intraepithelial lesion, high-grade squamous intraepithelial lesion, squamous cell carcinoma, and unsatisfactory smear.

Data were entered and analyzed using descriptive statistics. Results were expressed as frequencies and percentages. Association of abnormal smear findings with age group, presenting symptoms, and per speculum findings was assessed descriptively.

Institutional ethical committee approval was obtained prior to commencement of the study. Informed consent was obtained from all participants. Confidentiality of patient information was maintained.

Results

A total of 180 women underwent Pap smear examination during the study period.

Table 1: Age Distribution of Study Participants

Age Group	Frequency (%)
21–30 years	34 (18.9)
31–40 years	62 (34.4)
41–50 years	52 (28.9)
51–60 years	22 (12.2)
>60 years	10 (5.6)

The majority of women belonged to the 31–40 years age group, followed by the 41–50 years age group. This indicates that most women undergoing Pap smear evaluation were in the reproductive and perimenopausal age groups.

Table 2: Presenting Complaints Among Study Participants

Presenting Complaint	Frequency (%)
Vaginal discharge	82 (45.6)
Lower abdominal pain	48 (26.7)
Menstrual irregularity	36 (20.0)
Postcoital bleeding	14 (7.8)
Postmenopausal bleeding	10 (5.6)
Routine screening	28 (15.6)

Vaginal discharge was the most common presenting complaint, observed in 82 (45.6%) women. Lower abdominal pain and menstrual irregularity were also common. Routine screening without major symptoms was performed in 28 (15.6%) women. Postcoital bleeding and postmenopausal bleeding were clinically important symptoms requiring careful cervical evaluation.

Table 3: Per Speculum Findings

Clinical Finding	Frequency (%)
Healthy cervix	58 (32.2)
Cervical erosion	54 (30.0)
Hypertrophied cervix	34 (18.9)
Unhealthy cervix	22 (12.2)
Bleeding on touch	12 (6.7)

Healthy cervix was observed in 58 (32.2%) women. Cervical erosion was seen in 54 (30.0%) cases, followed by hypertrophied cervix in 34 (18.9%) women. Unhealthy cervix and bleeding on touch were observed in smaller but clinically significant proportions.

Table 4: Pap Smear Cytology Findings

Cytological Finding	Frequency (%)
Negative for intraepithelial lesion or malignancy	46 (25.6)
Inflammatory smear	92 (51.1)
ASC-US	14 (7.8)
LSIL	12 (6.7)
HSIL	6 (3.3)
Squamous cell carcinoma	2 (1.1)
Unsatisfactory smear	8 (4.4)

Inflammatory smear was the most common cytological finding, observed in 92 (51.1%) women. Epithelial cell abnormalities were observed in 34 (18.9%) women. ASC-US was found in 14 (7.8%) cases, LSIL in 12 (6.7%), HSIL in 6 (3.3%), and squamous cell carcinoma in 2 (1.1%). Unsatisfactory smears were observed in 8 (4.4%) cases.

Table 5: Cytological Abnormalities According to Age Group

Age Group	Epithelial Cell Abnormality n (%)
21–30 years	4 (11.8)
31–40 years	10 (16.1)
41–50 years	12 (23.1)
51–60 years	6 (27.3)
>60 years	2 (20.0)

Epithelial cell abnormalities were more commonly observed among women aged above 40 years. The 51–60 years age group showed the highest proportion of abnormalities. This suggests that cervical screening is particularly important in perimenopausal and postmenopausal women.

Table 6: Association of Clinical Findings with Abnormal Pap Smear

Clinical Finding	Abnormal Pap Smear n (%)
Cervical erosion	12 (22.2)
Hypertrophied cervix	8 (23.5)
Unhealthy cervix	10 (45.5)
Bleeding on touch	6 (50.0)

Abnormal Pap smear findings were more frequent among women with unhealthy cervix and bleeding on touch. However, epithelial cell abnormalities were also observed in women without obvious malignant-looking lesions, emphasizing the importance of cytological screening.

Table 7: Organism-Associated and Inflammatory Changes

Finding	Frequency (%)
Non-specific inflammation	68 (37.8)
Bacterial vaginosis-like flora	12 (6.7)
Candida-like organisms	8 (4.4)
Trichomonas vaginalis	4 (2.2)

Non-specific inflammation was the most common inflammatory finding. Candida-like organisms and Trichomonas vaginalis were observed in smaller proportions. Pap smear can therefore also provide useful information regarding cervicovaginal infection and inflammation.

Discussion

The present prospective observational study evaluated Pap smear cytology findings among 180 women attending a gynecology outpatient department. The majority of women were in the 31–50 years age group. Vaginal discharge was the most common presenting complaint. Inflammatory smear was the most frequent cytological finding. Epithelial cell abnormalities included ASC-US, LSIL, HSIL, and squamous cell carcinoma.

Sankaranarayanan et al. emphasized that cervical cancer screening is highly effective in reducing cervical cancer burden when organized screening, proper follow-up, and treatment of precancerous lesions are ensured.[8] The present study supports the utility of Pap smear screening in identifying premalignant cervical epithelial abnormalities among women attending outpatient services.

Nanda et al. reviewed accuracy of the Papanicolaou test and reported that cervical cytology is useful for detecting premalignant lesions, although sensitivity varies according to sampling and interpretation quality.[9] In the present study, epithelial abnormalities were detected in a clinically relevant proportion, showing the value of cytological screening.

Solomon et al. provided the 2001 Bethesda system terminology for reporting cervical cytology.[10] In the present study, Pap smear reports were categorized according to Bethesda terminology, including ASC-US, LSIL, HSIL, and squamous cell carcinoma. This standardized reporting helps guide clinical follow-up.

Banik et al. studied epithelial cell abnormalities in Pap smears and reported that abnormal smears reflect the need for awareness and regular cervical screening.[11] In the present study, epithelial cell abnormalities were observed in 18.9% of women, indicating the importance of routine screening among symptomatic women.

Verma et al. applied the Bethesda system for cervical cytology in women with unhealthy cervix and found that Pap smear can detect epithelial abnormalities and guide further evaluation.[12] In the present study, abnormal smears were more frequent among women with unhealthy cervix and bleeding on touch.

Saslow et al. issued cervical cancer screening guidelines and emphasized regular screening for early detection of cervical precancer.[13] The present study supports screening because abnormal cytology was also found in some women without obvious severe clinical lesions.

Schiffman et al. highlighted the central role of persistent high-risk HPV infection in cervical carcinogenesis.[14] Although HPV testing was not performed in the present study, detection of LSIL and HSIL on Pap smear indicates the need for further evaluation and follow-up.

Denny et al. discussed cervical cancer prevention in low-resource settings and emphasized the importance of feasible screening strategies.[15] In the present study, Pap smear was used as a simple outpatient screening tool, which is practical in routine gynecology services.

Gakidou et al. reported that coverage of cervical cancer screening varies widely across countries and is often low in developing regions.[16] The present study found that only a small proportion of women attended for routine screening, suggesting the need for better community awareness and screening programs.

Inflammatory smears were the most common findings. This may be related to cervicovaginal infections, poor genital hygiene, reproductive tract infections, or chronic cervicitis. Women with inflammatory smears should receive appropriate clinical treatment and repeat cytology where indicated.

ASC-US was the most common epithelial abnormality. This category represents atypical squamous cells that are not sufficient for definitive intraepithelial lesion diagnosis. ASC-US requires clinical correlation and follow-up depending on age, risk factors, and available facilities.

LSIL was observed in 6.7% of women. LSIL is commonly associated with HPV-related changes and may regress spontaneously in many cases. However, follow-up is important to ensure resolution and to detect persistent or progressive lesions.

HSIL was observed in 3.3% of women. This is clinically important because HSIL has a higher risk of progression to invasive carcinoma if left untreated. Women with HSIL require colposcopic evaluation, biopsy, and appropriate management.

Squamous cell carcinoma was detected in 1.1% of cases. Although the number was small, detection of carcinoma through Pap smear highlights its value as a screening tool. Such patients require urgent referral for confirmation and treatment.

Abnormal cytology was more common among women above 40 years. This finding emphasizes the importance of screening in perimenopausal and postmenopausal women. However, younger women should not be neglected, particularly if they have symptoms or risk factors.

Unhealthy cervix and bleeding on touch showed higher frequency of abnormal Pap smear findings. These clinical signs should alert clinicians to possible premalignant or malignant pathology. Nevertheless, Pap smear should also be performed in women without obvious lesions because early disease may be clinically silent.

The present study has certain limitations. HPV testing was not performed. Colposcopic and histopathological correlation was not available for all abnormal smears. The study was hospital-based and may not reflect community prevalence. Long-term follow-up of abnormal smears was not included. Future studies with HPV testing, colposcopy, biopsy confirmation, and follow-up outcomes may provide stronger evidence.

Conclusion

Pap smear is a simple, inexpensive, and useful screening test for detecting cervical epithelial abnormalities. In the present study, inflammatory smear was the most common cytological finding. Epithelial cell abnormalities included ASC-US, LSIL, HSIL, and squamous cell carcinoma. Abnormal cytology was more frequent among women above 40 years and among those with unhealthy cervix or bleeding on touch. Regular Pap smear

screening, awareness programs, proper sample collection, Bethesda-based reporting, follow-up of abnormal smears, and timely colposcopic evaluation are essential for prevention and early detection of cervical cancer.

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