Bioscene

Bioscene
Volume- 22 Number- 04
ISSN: 1539-2422 (P) 2055-1583 (O)
www.explorebioscene.com

Role of Pap smear in the Evaluation of Uncomplicated Pelvic Inflammatory Disease: Prospective Clinical Observational Study

[1] Birjis Fatma , [2] Abid Nadeem Nomani , [3] Suboohi Mustafa , [4] Fahmeeda Zeenat

[1,3&4] Department of Niswan-Wa-Qabalat, Ajmal Khan Tibbiya College, Aligarh Muslim University, Aligarh, Uttar Pradesh, India

[2]Research Officer, Clinical Research Unit (U), CCRUM, Ministry of AYUSH, Government of India, Ribandar, Goa, India

Abstract: Background: Pelvic Inflammatory Disease (PID) is a common reproductive tract infection with significant consequences for women's health. The Papanicolaou (Pap) smear, while mainly used for cervical cancer screening, can also yield information on genital tract inflammation. **Objective:** To examine Pap smear cytological findings among women with uncomplicated PID and to determine variations across age groups and socio-economic classes. **Methods:** A prospective observational study was performed on 30 clinically diagnosed uncomplicated PID patients. Data on age and socio-economic background were collected. Pap smears were taken and analyzed according to the Bethesda System. **Results:** All 30 women (100%) showed Pap smears reported as Negative for Intraepithelial Lesion or Malignancy (NILM). No epithelial abnormality, dysplastic changes, or malignancy were identified. Neither age nor socio-economic status influenced results. **Conclusion:** Pap smears remain normal in many cases of uncomplicated PID, reflecting their limited diagnostic use for this condition. However, they continue to be vital in cervical cancer prevention. Clinical and microbiological approaches remain indispensable for PID diagnosis.

Keywords: Pap smear, pelvic inflammatory disease, cytology, NILM, Bethesda system

Introduction

Uncomplicated PID involves infection of the uterus, fallopian tubes, and adjacent pelvic structures without evidence of abscess or generalized peritonitis. Despite its name, the disorder significantly impacts reproductive health due to risks of infertility, chronic pelvic pain, and ectopic pregnancy. Early detection and appropriate therapy lower the chance of long-term complications (1). Around 10–15% of women are expected to develop PID at some point in their lifetime, showing its global burden (1).

Cervical cancer, particularly in low- and middle-income countries, contributes substantially to women's cancer mortality, including in India (2). Persistent infection with high-risk HPV strains is the primary cause of cervical malignancy. This virus has a prolonged precancerous stage, creating opportunities for early

screening and management (3). In many cases, HPV transmission and coexisting infections manifest clinically as PID, which often brings women to healthcare facilities and provides an occasion for concurrent cervical screening (3).

Screening for cervical changes is key to reducing disease burden and mortality, particularly in settings where late presentation worsens outcomes (3). The Pap smear has been globally accepted as a primary screening test for decades (4). In India and other similar settings, Pap smears are often conducted on symptomatic women in outpatient clinics presenting with discharge, pelvic discomfort, or irregular bleeding (4). Thus, Pap smears function both as preventive tools for cervical cancer and as part of comprehensive gynaecological care.

Women with PID frequently undergo Pap smears, where inflammatory findings may appear (5). Within the Bethesda framework, such non-specific inflammatory changes are categorized as benign, reflecting reactive rather than neoplastic processes (6). However, these alterations cannot confirm a PID diagnosis, which remains primarily clinical and microbiological.

Several studies have attempted to assess the relevance of Pap smears in PID, with inconsistent results. Some observed frequent inflammatory smears among PID patients, whereas others reported normal findings, emphasizing limited sensitivity and specificity for detecting upper tract infections (7,8). These disparities indicate the need for further evaluation of cytological outcomes in PID cases.

This study was designed to evaluate Pap smear findings in women with uncomplicated PID and to explore whether Pap smear contributes diagnostic value in such cases.

Materials and Methods

Design: Prospective clinical observational study.

Location: Department of Niswan-Wa-Qabalat, Ajmal Khan Tibbiya College and Hospital, Faculty of Unani Medicine, AMU, Aligarh, India.

Participants: 30 married women with clinical evidence of uncomplicated PID.

Inclusion Criteria: Women aged 18–45 years with mucopurulent/yellow/green vaginal discharge, pelvic or abdominal pain, low backache, dyspareunia, dysuria, or leucorrhoea (>10 WBC/HPF). Presence of at least one CDC minimum criterion (cervical motion tenderness, uterine tenderness, adnexal tenderness, or lower abdominal pain) was mandatory.

Exclusion Criteria: Pregnant or lactating women, acute or complicated PID, tubo-ovarian abscess, hemorrhagic ovarian cyst, appendicitis, pelvic pain >30 days, recent abortion or surgery (<30 days), recent antibiotics, or coexisting UTI, HIV, syphilis, malignancy, diabetes, genital TB, or cardiovascular disease. Women intolerant to oral antibiotics were also excluded.

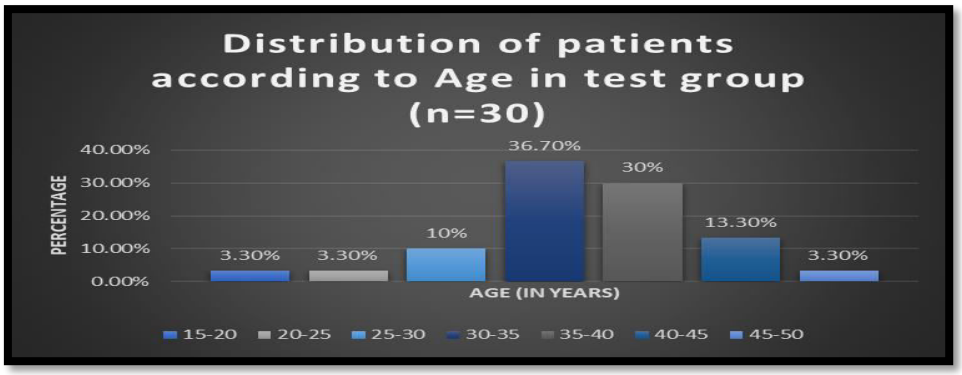
Data Recording: Age in years and socio-economic classification using the modified Kuppuswamy scale.

Pap smear: Cervical samples collected from the ectocervix and endocervix, stained by the Papanicolaou method, and interpreted per the 2014 Bethesda system.
Outcome Measures: Cytological categories included NILM, ASCUS, LSIL, HSIL, and AGC.

Results:
Age Profile: Participants ranged from 15–50 years. The largest proportion (36.7%) was in the 30–35year group, while the smallest groups (3.3% each) were 15–20, 20–25, and 45–50 years.
Socio-Economic Profile: All patients (100%) belonged to the lower socio-economic group.
Cytology Results: All 30 smears were NILM, with no atypia, dysplasia, or malignant changes.

Table1. Age Distribution

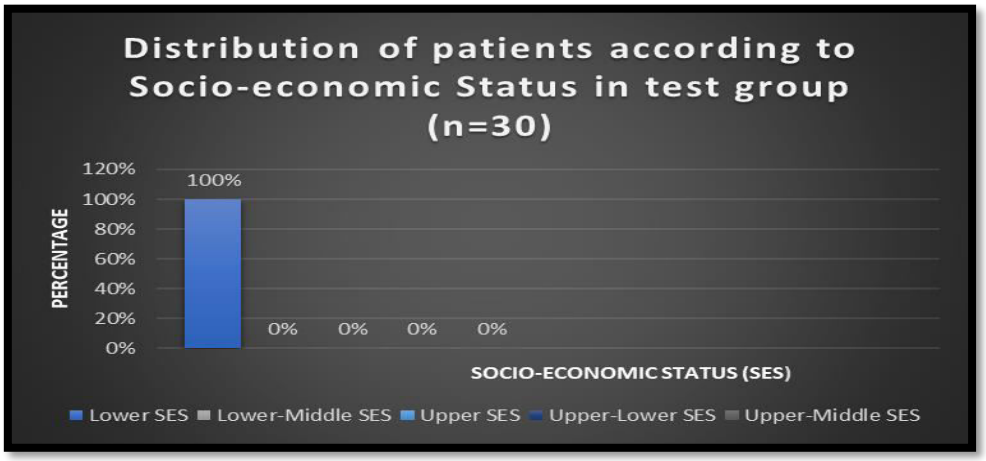
Age in years	Test group (n=30)
15-20	1 (3.3%)
20-25	1 (3.3%)
25-30	3 (10%)
30-35	11 (36.7%)
35-40	9 (30%)
40-45	4 (13.3%)
45-50	1 (3.3%)



In the test group, the highest number of participants was 11 (36.7%) in the 30-35 age group. The lowest and equal number of participants, 1 (3.3%), was in the 15-20, 20-25, and 45-50 age groups

Table2. Socio-Economic Status

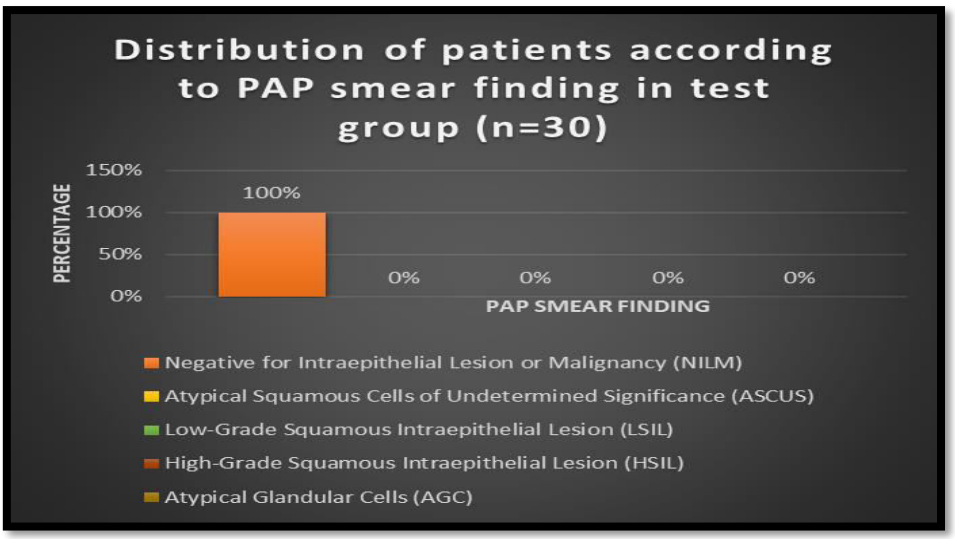
Socio-economic Status (SES)	Test group (n=30)
Lower SES	30 (100%)
Lower-Middle SES	0 (0%)
Upper SES	0 (0%)
Upper-Lower SES	0 (0%)
Upper-Middle SES	0 (0%)



The findings reveal that all women diagnosed with uncomplicated pelvic inflammatory disease in this study belonged to the lower socio-economic category, accounting for 100% of the cases.

Table3. PAP Smear Results

PAP Smear finding	Test group (n=30)
Negative for Intraepithelial Lesion or Malignancy (NILM)	30 (100%)
Atypical Squamous Cells of Undetermined Significance (ASCUS)	0 (0%)
Low-Grade Squamous Intraepithelial Lesion (LSIL)	0 (0%)
High-Grade Squamous Intraepithelial Lesion (HSIL)	0 (0%)
Atypical Glandular Cells (AGC)	0 (0%)



The observation revealed that the maximum number of uncomplicated PID patients in the test group had negative results for intraepithelial lesion or malignancy (NILM), i.e., 30 (100%).

Discussion

The findings indicate that Pap smears in uncomplicated PID cases were consistently negative, reaffirming that Pap smears have minimal diagnostic utility for this infection. Its limitation stems from the fact that it examines cervical epithelial changes, whereas PID affects the endometrium and adnexal structures.

Previous studies have yielded mixed outcomes: some have detected frequent inflammatory smears with reactive epithelial changes and leukocyte infiltration (6,7), while others have noted that Pap smears may appear normal in cases of PID, suggesting poor sensitivity for early or subclinical infections (7,8). These variations highlight the necessity of combining cytology with clinical and laboratory evaluations.

The strength of this study is its focus on uncomplicated PID, excluding confounding factors such as abscesses and systemic illness. This clarifies Pap smear's limited role in early-stage PID. Nonetheless, Pap smears remain essential in routine gynaecological practice, primarily for excluding cervical intraepithelial lesions and malignancy. Opportunistic screening in symptomatic women ensures early detection of precancerous and malignant lesions, particularly in low-resource populations with restricted access to organized screening programs (9).

Conclusion

In this study, Pap smear cytology was NILM in all women with uncomplicated PID, confirming its limited relevance in diagnosing this condition. While indispensable for cervical cancer prevention, Pap smears cannot substitute for clinical and microbiological assessments in PID. Larger, multicentre investigations are required to define the cytological profile in PID and to assess its utility in varied clinical scenarios.

Acknowledgements
Authors are thankful to the Department of Niswan-wa-Qabalat (Obstetrics & Gynaecology), Aligarh Muslim University, Aligarh (AMU), for providing OPD, IPD, and lab for enrolling patients and performing PAP smear.

Author contributions
Prof. Suboohi Mustafa and Dr. Fahmeeda Zeenat designed and supervised the research studies. Birjis Fatmaexperimented and analysed the data. Prof. Suboohi Mustafa and Dr. Fahmeeda Zeenatreviewed the analysis. Abid Nadeem Nomaniperformed the statistical analysis and made the graphs. Birjis Fatma drafted the original manuscript and prepared all the tables included in the text. All the authors read and approved the final version for submission.

Funding
There is no funding for this research work.

Data availability
All the data generated or analysed in this study are included in the manuscript.

Declarations
Ethics approval and consent to participate applicable.

Consent for publication
Not applicable.

Competing interests
The authors declare no competing interests.

References:

1. Brunham RC, Gottlieb SL, Pavement J. Pelvic inflammatory disease. N Engl J Med. 2015; 372(21):2039–48.
2. Haggerty CL, Taylor BD. Mycoplasma genitalium: an emerging cause of pelvic inflammatory disease. Infect Dis Obstet Gynecol. 2011; 2011:959816.
3. Walker CK, Wiesenfeld HC. Antibiotic therapy for acute pelvic inflammatory disease: the 2006 CDC Sexually Transmitted Diseases Treatment Guidelines. Clin Infect Dis. 2007; 44 (Suppl 3):S111–22.
4. Papanicolaou GN, Traut HF. The diagnostic value of vaginal smears in carcinoma of the uterus. Am J Obstet Gynecol. 1941;42(2):193–206.
5. Nayar R, Wilbur DC. The Bethesda System for Reporting Cervical Cytology: A Historical Perspective. Acta Cytol. 2017;61(4-5):359–72.
6. Moodley JR, Hoffman M, Carrara H, Allan BR, Cooper DD, Rosenberg L, et al. HIV and pre-neoplastic and neoplastic lesions of the cervix in South Africa: a case-control study. BMC Cancer. 2006;6:135.
7. Das S, Sharma JK, Nath P. Inflammatory smears on Pap test: clinical significance revisited. J Cytol. 2019; 36(1):34–9.

8. Tiwari P, Sinha S, Chauhan S, Sharma D. Utility of Pap smear in diagnosing inflammatory and infectious lesions of cervix: an observational study. Int J Report Contraception Obstetric Gynecol. 2018; 7(5):1808–12.
9. Arbyn M, Weiderpass E, Bruni L, de Sanjosé S, Saraiya M, Ferlay J, et al. Estimates of incidence and mortality of cervical cancer in 2018: a worldwide analysis. Lancet Glob Health. 2020;8(2):e191–203.