

Pap Smear Screening During Pregnancy in a Tertiary Care Centre

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Abstract

Background: Cervical cancer remains a significant public health concern, particularly in low- and middle-income countries where screening coverage is limited.^[1,2] Pregnancy offers an opportunity for opportunistic screening among women who may otherwise not undergo routine cervical evaluation.

Methods: A prospective observational study was conducted over 18 months (January 2024 to June 2025) at a tertiary care centre involving 139 antenatal women. Cervical cytology samples were collected and interpreted according to the Bethesda system (2014).^[3] Statistical analysis was performed using SPSS version 29, and associations were assessed using the chi-square test.

Results: Among the participants, 65.5% had negative for intraepithelial lesion or malignancy (NILM), while 34.5% showed inflammatory changes. No epithelial cell abnormalities were detected. A significant association was observed between inflammatory smears and vaginal discharge, lower educational status, and abnormal per-speculum findings.

Conclusion: Cervical cytology screening during pregnancy is safe and feasible. Incorporation of Pap smear into routine antenatal care may enhance early detection and improve awareness regarding cervical health.

Keywords: Pap smear, pregnancy, cervical cancer screening, inflammatory smear, antenatal women

Introduction

Cervical cancer is one of the leading causes of cancer-related morbidity among women worldwide, with a higher burden observed in developing countries.^[1] Limited access to organized screening programs contributes significantly to this disparity.^[2]

The Papanicolaou smear is a simple and cost-effective method for early detection of cervical abnormalities.^[2] The Bethesda system provides a standardized approach for reporting cytological findings.^[3]

Pregnancy presents a valuable opportunity for cervical screening, as antenatal visits may represent the only interaction with healthcare services for many women^[4] This study was conducted to evaluate cervical cytology findings among antenatal women and to assess their association with clinical and sociodemographic factors.

This study aimed to determine the prevalence of abnormal Pap smear findings among antenatal women and assess associated socio-demographic and clinical factors.

Methods

This prospective observational study was conducted from January 2024 to June 2025 at T.S. Misra Medical College and Hospital, Lucknow.

A total of 139 antenatal women attending the outpatient department were enrolled after obtaining written informed consent.

Inclusion criteria: All antenatal women attending to OPD who are consenting

Exclusion criteria: Antepartum hemorrhage, leaking per vaginum, vaginal bleeding, recent intercourse within 48 hours, previous Pap smear within three years, and women in labour, antenatal women not consenting

Pap smear samples were collected using Ayre's spatula and endocervical brush. Slides were immediately fixed in 95% ethanol and evaluated according to the Bethesda system (2014).^{^3}

Statistical analysis was performed using SPSS version 29. Chi-square test was used. A p-value <0.05 was considered statistically significant.

The study was approved by the Institutional Ethics Committee.

Results

A total of 139 antenatal women were included in the study. The baseline characteristics are presented in Table 1.

The majority of participants were aged 26–30 years and were multigravida. Most women were in the second trimester, belonged to rural areas, and were from lower middle socioeconomic status.

Cytological evaluation revealed that 65.5% of women had negative findings for intraepithelial lesion or malignancy, while 34.5% showed inflammatory changes (Table 2). No epithelial abnormalities such as ASC-US, LSIL, HSIL, or malignancy were detected.

A statistically significant association was observed between presenting complaints and inflammatory smears, with vaginal discharge being the most common symptom (Table 3).

Similarly, per-speculum findings such as cervical erosion and inflammatory changes were significantly associated with abnormal cytology (Table 4).

Discussion

The present study demonstrates that opportunistic cervical cytology screening during pregnancy is feasible and clinically relevant in a tertiary care setting. In our study, 34.5% of women exhibited inflammatory smears, while no epithelial cell abnormalities were detected.

Similar findings have been reported in other studies where inflammatory changes constituted the majority of abnormal cytological findings in antenatal women.^[5,6] Mukhtar et al. reported a predominance of inflammatory smears with a low prevalence of premalignant lesions, suggesting that cervical infections remain a major concern in pregnant populations.^[5]

The absence of epithelial abnormalities such as ASC-US, LSIL, or HSIL in the present study may be attributed to the relatively younger age group, lower exposure to high-risk human papillomavirus (HPV), and the opportunistic nature of screening. Niyaf et al. also reported a low prevalence of premalignant lesions in antenatal women, reinforcing the observation that inflammatory pathology is more common than neoplastic changes in this group.^[6]

A statistically significant association was observed between vaginal discharge and inflammatory cytology. This finding is consistent with previous studies that have identified vaginal discharge as a common presenting symptom associated with cervicovaginal infections.^[7] These infections may contribute to adverse pregnancy outcomes if left untreated.

Per-speculum findings such as cervical erosion and congestion showed a strong correlation with inflammatory smears. This highlights the importance of combining clinical examination with cytological screening for comprehensive evaluation.

Educational status showed a significant association with abnormal findings, indicating that awareness and health-seeking behaviour play an important role in cervical health. Women with lower educational levels are less likely to undergo routine screening, leading to delayed diagnosis.^[8]

Pregnancy offers a unique window of opportunity for cervical cancer screening, particularly in developing countries where organized screening programs are limited. Integration of Pap smear into routine antenatal care may improve early detection and increase awareness among women.^[4]

This is supported by global evidence emphasizing the role of opportunistic screening in improving cervical cancer detection rates in low-resource settings.^[9]

Additionally, WHO has highlighted the importance of integrating cervical cancer screening into routine healthcare services to achieve elimination targets.^[10]

Conclusion:

Pap smear screening during pregnancy is safe, feasible, and clinically useful. The high prevalence of inflammatory smears and their association with symptoms and clinical findings emphasize the importance of opportunistic screening.

Incorporating cervical cytology into routine antenatal care can enhance early detection, improve awareness, and contribute significantly to cervical cancer prevention strategies in resource-limited settings.

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Declarations

Ethics approval and patient consent to participate

The study was conducted in accordance with the ethical principles of the Declaration of Helsinki. Ethical approval was obtained from the Institutional Ethics Committee of T.S. Misra Medical College and Hospital, Lucknow (Approval No.: TSMCH&H/IEC/2024/112(13); Date: 22.04.2024). Written informed consent was obtained from all participants prior to inclusion in the study.

9. REFERENCES

1. Sung H., Ferlay J., Siegel R.L., Laversanne M., Soerjomataram I., Jemal A., et al., “Global Cancer Statistics 2020: GLOBOCAN Estimates of Incidence and Mortality Worldwide for 36 Cancers in 185 Countries”, *CA: A Cancer Journal for Clinicians*, 2021, 71(3), 209–249.
2. 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”, *The Lancet Global Health*, 2020, 8(2), e191–e203.
3. Nayar R., Wilbur D.C., “The Bethesda System for Reporting Cervical Cytology: Definitions, Criteria, and Explanatory Notes”, 3rd Edition, Springer, New York, 2015.
4. Sankaranarayanan R., Nene B.M., Shastri S.S., Jayant K., Muwonge R., Budukh A.M., et al., “HPV Screening for Cervical Cancer in Rural India”, *New England Journal of Medicine*, 2009, 360(14), 1385–1394.
5. Mukhtar N.F., Abdul Rahman N., Zainuddin Z.M., et al., “Prevalence and Risk Factors of Abnormal Pap Smear in Pregnancy”, *Malaysian Journal of Medical Sciences*, 2023, 30(1), 45–52.
6. Niyaf N.A., Nazeema N., Sreelatha S., et al., “Prevalence and Risk Factors of Abnormal Pap Smear in Pregnant Women”, *International Journal of Reproduction, Contraception, Obstetrics and Gynecology*, 2022, 11(4), 1056–1061.
7. Ahuja R., Suri V., Aggarwal N., et al., “Evaluation of Pap Smear Findings in Antenatal Women and Its Clinical Correlation”, *Journal of Clinical and Diagnostic Research*, 2020, 14(8), QC01–QC04.
8. Chamani R.S., Shojaeizadeh D., Tol A., et al., “Knowledge, Attitude and Practice of Women Regarding Cervical Cancer Screening”, *Journal of Family and Reproductive Health*, 2012, 6(4), 177–182.
9. Sankaranarayanan R., Basu P., Kaur P., Bhaskar R., Singh G.B., Denzongpa P., et al., “Current Status of Human Papillomavirus Vaccination and Screening in Cervical Cancer Prevention”, *The Lancet Oncology*, 2019, 20(2), e79–e91.
10. World Health Organization, “Global Strategy to Accelerate the Elimination of Cervical Cancer as a Public Health Problem”, World Health Organization, Geneva, 2020.

10. TABLES

Table 1: Sociodemographic profile of study participants (n=139)

| Variable | Category | Number (%) |
|----------------------|------------------|------------|
| Age (years) | 20–25 | 25 (18.0) |
| | 26–30 | 52 (37.4) |
| | 31–35 | 37 (26.6) |
| | >35 | 25 (18.0) |
| Parity | Primigravida | 56 (40.3) |
| | Multigravida | 83 (59.7) |
| Gestational age | First trimester | 46 (33.1) |
| | Second trimester | 66 (47.5) |
| | Third trimester | 27 (19.4) |
| Residence | Rural | 90 (64.7) |
| | Urban | 49 (35.3) |
| Socioeconomic status | Upper class | 12 (8.6) |

| | | |
|--------------------|--------------------|-----------|
| | Upper middle class | 50 (36.0) |
| | Lower middle class | 77 (55.4) |
| Educational status | Up to primary | 15 (10.8) |
| | Up to 12th | 72 (51.8) |
| | Graduate and above | 52 (37.4) |

The majority of study participants were aged 26–30 years (37.4%), followed by 31–35 years (26.6%). Most women were multigravida (59.7%). Nearly half of the participants were in the second trimester (47.5%). A higher proportion of women belonged to rural areas (64.7%) and lower middle socioeconomic class (55.4%). Regarding educational status, most had studied up to 12th standard (51.8%), while 37.4% were graduates or above.

Table 2- Distribution of study subjects as per presenting complaints

| Presenting complaint | Number | Percentage (%) |
|-------------------------|--------|----------------|
| Asymptomatic | 78 | 56.1 |
| Vaginal discharge | 38 | 27.3 |
| Foul-smelling discharge | 16 | 11.5 |
| Lower abdominal pain | 7 | 5.0 |
| Total | 139 | 100.0 |

The majority of women with NILM (Negative for Intraepithelial Lesion or Malignancy) cytology were asymptomatic (56.1%). Among symptomatic cases, the most common complaint was vaginal discharge (27.3%), followed by foul-smelling discharge (11.5%) and lower abdominal pain (5.0%).

Table 3- Association of Per-Speculum Findings with Pap Smear Results

| Cervical/vaginal status | Normal | Abnormal smear | Total | p-value |
|-------------------------------------------------------|------------|----------------|-------------|---------|
| Healthy cervix & vagina | 89 (97.8) | 40 (83.3) | 129 (92.8) | <0.001 |
| Inflammatory / Bacterial vaginosis / mucoid discharge | 2 (2.2) | 8 (16.7) | 10 (7.2) | |
| Total | 91 (100.0) | 48 (100.0) | 139 (100.0) | |

The majority of women had a healthy cervix and vagina (92.8%) on per-speculum examination. A smaller proportion showed inflammatory changes/Bacterial vaginosis with thick curdy discharge (7.2%) and mucoid discharge (7.2%), while no other abnormal findings were noted.

Table 4- Distribution of Pap Smear Findings according to Bethesda classification

| Pap smear finding | Number | Percentage (%) |
|----------------------------------------------------------|--------|----------------|
| NILM (Negative for Intraepithelial Lesion or Malignancy) | 91 | 65.5 |
| Inflammatory smear | 45 | 32.4 |
| Bacterial vaginosis | 3 | 2.1 |

| | | |
|-------|-----|-----|
| Total | 139 | 100 |
|-------|-----|-----|

The majority of women had a healthy cervix and vagina (92.8%) on per-speculum examination. A smaller proportion showed inflammatory changes/Bacterial vaginosis with thick curdy discharge (7.2%) and mucoid discharge (7.2%), while no other abnormal findings were noted.

11. FIGURES AND LEGENDS

Figure 1: Distribution of Pap Smear Findings according to Bethesda classification

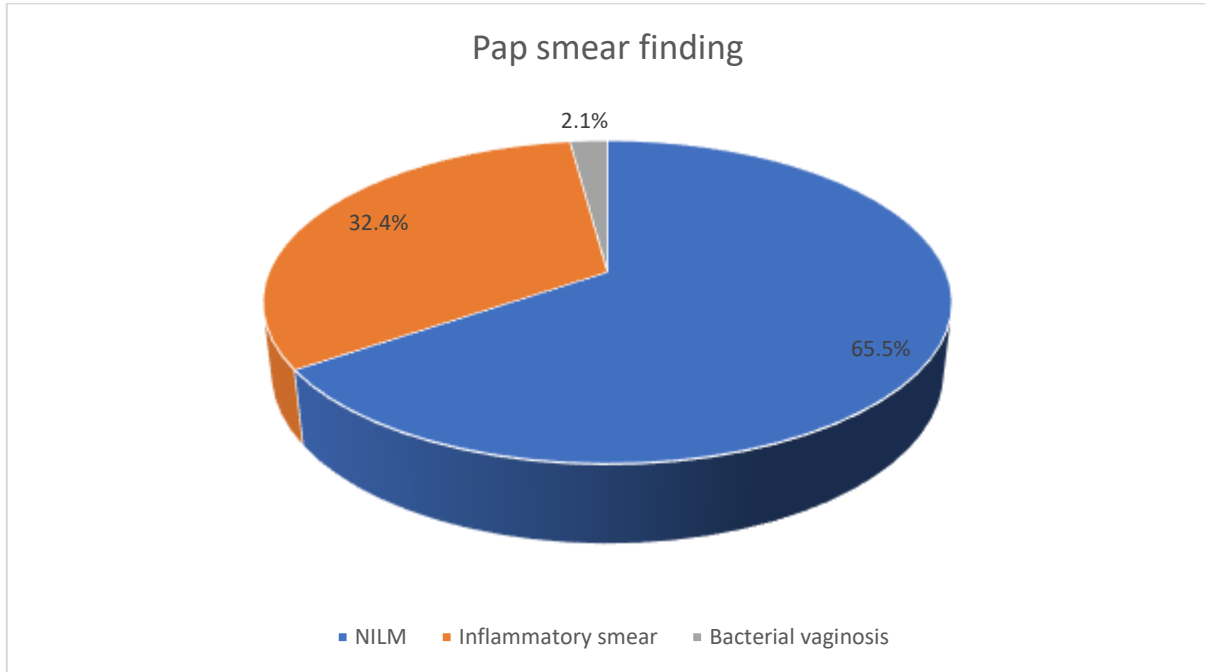


Figure 2: Association of Per-Speculum Findings with Pap Smear Results

