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Cervical Cytological Abnormalities Among Pregnant Women: A Hospital Based Study

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ABSTRACT

Background: Cervical cancer remains a leading cause of cancer-related deaths among women, particularly in developing countries like India and pregnancy offers a crucial opportunity for screening, as women are more likely to access healthcare during this period.
Objective: To determine the prevalence of abnormal cervical cytology in pregnant women and identify associated risk factors.
Methods: A cross-sectional study was conducted among 200 pregnant women attending antenatal OPD at Gauhati Medical College and Hospital from December 2023 to November 2024. Cervical smears were analyzed using the Bethesda System. Statistical analysis was performed using SPSS v20, with significance set at $p<0.05$.
Results: Among the participants, 71.9% had NILM, 24.6% had bacterial vaginosis, and 3.5% had candidiasis. A significant association was found between early age at coitarche and abnormal PAP findings ($p=0.029$). No significant associations were found with age, parity, contraceptive use and symptoms.
Conclusion: Integrating PAP smear screening into routine antenatal care is both feasible and effective. Early screening aids in detecting infections and potential cervical pathology, supporting better maternal health outcomes and highlighting the need for widespread implementation in resource-limited settings.

Keywords: Cervical Cancer, Pregnancy, PAP smear, NILM

INTRODUCTION

Cervical cancer is the fourth most common cancer among women globally and a leading cause of cancer-related mortality, particularly in low and middle income countries[1]. India alone accounted for 127,526 new cases and 79,906 deaths, ranking it second among cancers affecting Indian women[2].In 2022, approximately 666,000 new cases and 350,000 deaths were reported worldwide, with nearly 94% of these deaths occurring in resource-limited settings [3].

Late-stage diagnosis remains a critical challenge in these regions, with about 70% of Indian cases presenting in stages III and IV due to limited screening and awareness [4]. However, early detection significantly improves outcomes, with pre-invasive lesions having a nearly 100% five-year survival rate [5].

The antenatal period provides an ideal opportunity for cervical cancer screening, as women are more likely to engage with healthcare services during pregnancy. The Papanicolaou (PAP) smear, first introduced by Dr. George Papanicolaou, remains an effective method for detecting cervical intraepithelial neoplasia (CIN) and other abnormalities [6]. Screening during pregnancy can also identify vaginal infections such as bacterial vaginosis and candidiasis, which may contribute to adverse outcomes like miscarriage or preterm labor [7].

Global and national guidelines recommend initiating cervical screening between the ages of 21 and 30, depending on resource availability, and continuing until age 65 at regular intervals [8,9]. Despite these recommendations, screening coverage remains low in many low-resource settings.

Integrating cervical screening into routine antenatal care could enhance early detection and reduce disease burden, particularly among women who may not otherwise undergo screening.

METHODS

It is a hospital based cross sectional study conducted from 2023-2024 at a tertiary care centre, Guwahati, India. The study was approved by institutional ethics committee. Here, 200 antenatal patients were enrolled after taking written consent from the participants.

AIMS:

To assess the prevalence of abnormal cervical cytology in study population.

OBJECTIVES:

To find out pregnant women with abnormal cervical cytology.

INCLUSION CRITERIA:

All pregnant females who came to Antenatal OPD for their check up in the age group > 21 years.

EXCLUSION CRITERIA:

1. Patients with obvious vaginal infections.
2. History of sexual exposure in past 48 hours.
3. History of any vaginal medication or vaginal douching in the past 48 hours.

RESULTS

1.Distribution on the basis of PAP Smear findings

Age group(years)	NILM	Bacterial Vaginosis	Candidiasis	P
21-25	61(42.7%)	23(46.9%)	2(28.6%)	
26-30	46(32.2%)	21(42.9%)	4(57.1%)	0.063
31-35	33(23.1%)	5(10.2%)	0	
>35	3(2.1%)	0	1(14.3%)	

2. Distribution of study participants on the basis of following factors

Age	Percentage
21-25	43.2
26-30	35.7
31-35	19.1
>35	2.0
Socioeconomic class	
Lower class	1.0
Lower Middle class	25.6
Middle class	52.8
Upper Middle class	20.6
Age group	
Age at menstruation	
< 14	59.8
≥ 14	40.2
Age at coitarche	
< 21	72.9
≥21	27.1
Gestational age	
< 12 weeks	23.6
12-28 weeks	76.8
Contraceptive method used	
Condom	20.6
IUCD	10.1
OCP	25.6
Not used	43.7

3. Distribution of Participants on the basis of PAP smear finding:

PAP smear findings	Percentages
NILM	71.9%
Bacterial Vaginosis	24.6%
Candidiasis	3.5%

4.Distribution on the basis of age at Coitarche and PAP Smear Finding

Age at coitarche (years)	NILM	Bacterial Vaginosis	Candidiasis	P
<21	105(73.4%)	38(77.6%)	2(28.6%)	0.029
≥21	38(26.6%)	11(22.4%)	5(71.4%)	

Table 5: Distribution on the basis of method of contraceptives use and PAP Smear Finding

Contraceptive method used	NILM	Bacterial vaginosis	Candidiasis	P
Condom	31(21.7%)	9 (18.4%)	1 (14.3%)	0.436
IUCD	14 (9.8%)	5 (10.2%)	1 (14.3%)	
OCP	41 (28.7%)	10 (20.4%)	0	
Not used	57 (39.9%)	25(51.0%)	5 (71.4%)	

Table 6: Distribution according to multiple partners and PAP Smear Finding

Multiple partners	NILM	Bacterial vaginosis	Candidiasis	P
Yes	7(4.9%)	1 (2.0%)	1 (14.3%)	0.285
No	136(95.1%)	48 (98.0%)	6 (85.7%)	

In the present study, the age-wise distribution of study participants revealed that the highest proportion belonged to the 21–25-year age group. Regarding socioeconomic status, most participants (52.8%) belonged to the middle class.

Age at menarche was below 14 years in 59.8% of participants, while 40.2% reported onset at 14 years or older. A majority of participants (72.9%) experienced coitarche before the age of 21 years. Gestational age at the time of the study was between 12–28 weeks in 76.8% of participants, and below 12 weeks in 23.6%.

The distribution of PAP smear findings across age groups showed that bacterial vaginosis was most prevalent among participants aged 21–25 years (46.9%). Candida infection was most common in the 26–30 year group. The majority of participants with NILM (Negative for Intraepithelial Lesion or Malignancy) were aged between 21–25 years, with the fewest cases seen in those above 35 years. However, no statistically significant association was found between PAP smear results and age group (P = 0.063).

Analysis of PAP smear results based on age at coitarche revealed that bacterial vaginosis was significantly more frequent among participants with early coitarche (<21 years), accounting for 77.6% of cases, while 22.4% were in participants with coitarche at 21 years or older. In contrast, candida infections were more prevalent among those with coitarche ≥21 years (5 cases) than those with earlier coitarche (2 cases). Most participants with NILM also had coitarche before 21 years. A statistically significant difference was found between PAP smear findings and age at coitarche (P = 0.029).

Among participants, 43.7% reported no history of contraceptive use, 25.6% used oral contraceptive pills (OCP), 20.6% used condoms, and 10.1% used intrauterine contraceptive devices (IUCDs). Among those diagnosed with bacterial vaginosis, 25 had no contraceptive history, 10 used OCP, 9 used condoms, and 5 used IUCDs. Most participants with candidiasis reported no contraceptive use, with only one each reporting condom and IUCD use. Among participants with NILM, 57 did not use any contraceptive, while 41 used OCP, 31 used condoms, and 14 used IUCDs. No statistically significant correlation was observed between contraceptive use and Pap smear results (P = 0.436).

Most participants with bacterial vaginosis, candidiasis and NILM reported having a single sexual partner. Only a few participants with NILM, and one participant each with bacterial vaginosis and candidiasis, reported having multiple

sexual partners. The association between PAP smear findings and number of sexual partners was not statistically significant (P = 0.285).

Across all participants, NILM was the most common PAP smear result (71.9%), followed by bacterial vaginosis (24.6%) and candidiasis (3.5%).

DISCUSSION

In this study, the majority of participants (43.2%) were aged 21–25 years, followed by 35.7% in the 26–30 years group, and 21.1% above 30 years. This age distribution aligns closely with previous studies by SS Priya et al.[10], Manikkam B et al.[11],and Prabhu RB et al.[12], where the predominant age group was similarly reported as 20–25 years.

In this study, over half of the participants were multigravida, aligning with previous research. While some studies, like Niyaf NA et al.[13], report a higher prevalence of abnormal PAP smears in multigravida women, others such as Choudhury S et al.[14] find no significant association between parity and cervical abnormalities. These contrasting findings highlight the need for further investigation, yet underscore the vital importance of routine cervical screening for all pregnant women.

The study found no significant link between contraceptive use and PAP smear results (P = 0.436). Most bacterial vaginosis and NILM cases occurred in non-users, while contraceptive users showed varied outcomes. A study by Esha K. et al.[15] noted HPV positivity in some barrier method users, suggesting inconsistent use. Overall, contraceptive methods appear to have minimal direct impact on cervical cytology, with other factors like hygiene and sexual behavior possibly playing a greater role.

In the present study, most cases of bacterial vaginosis, candidiasis, and NILM were found in participants with a single partner, with no significant association between multiple partners and cervical cytology (P = 0.285). In contrast, Niyaf NA et al.[13] reported 80% abnormal PAP smears among those with multiple partners. The lack of significance in this study may be due to protective factors like condom use, HPV vaccination, regular screenings, and low-risk partners, suggesting that multiple partners alone may not strongly influence cervical abnormalities.

The present study demonstrated a significant association between early sexual debut (before 21 years) and abnormal PAP smear findings (P = 0.029). Specifically, 77.6% of bacterial vaginosis cases were found in participants who initiated sexual activity early, while Candida infections were more frequent among those with later coitarche (≥21 years). Most NILM results were also observed in the early sexual debut group. These findings align with previous studies by Mannikam B et al.[11], Mohindroo N et al.[16], Seda J et al.[17], and Choudhury S et al.[14], which emphasize that early age at first intercourse and having multiple sexual partners are important risk factors for cervical abnormalities. This underscores the critical role of early sexual health education and regular cervical screening to reduce the risk of cervical neoplasia.

CONCLUSION

This study highlights the demographic and clinical profile of pregnant women undergoing PAP smear screening, emphasizing the predominance of younger age groups and multigravida status. Early sexual debut was significantly associated with higher rates of bacterial vaginosis and abnormal cervical cytology, underscoring its role as a key risk factor. Although contraceptive use and multiple sexual partners did not show a strong direct correlation with cervical abnormalities, their potential influence alongside behavioral and hygiene factors cannot be overlooked. The findings reinforce the critical importance of regular cervical screening and targeted sexual health education, particularly focusing on early intervention and awareness among young and at-risk women. Further research is warranted to clarify the roles of parity and other sociodemographic factors in cervical health, ultimately contributing to improved maternal and reproductive outcomes.

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