Section: Obstetrics and Gynaecology

Original Research Article

STUDY OF COLPOSCOPIC EVALUATION OF UNHEALTHY CERVIX IN THE RURAL POPULATION OF VIRUDHUNAGAR

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Received : 20/11/2025
Received in revised form : 07/01/2026
Accepted : 24/01/2026

Keywords:
Cervical cancer; Colposcopy; Unhealthy cervix; Histopathology; Rural women; Dysplasia.

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DOI: 10.47009/jamp.2026.8.1.81

Source of Support: Nil,
Conflict of Interest: None declared

Int J Acad Med Pharm
2026; 8 (1); 427-431

ABSTRACT

Background: Cervical cancer remains one of the most common cancers affecting Indian women, particularly in rural areas where access to early screening is limited. The evaluation of symptomatic women using colposcopy helps identify precancerous and cancerous lesions at an early stage and guides appropriate treatment. **Aims and Objectives:** This study aimed to evaluate the diagnostic accuracy of colposcopic examination in identifying preinvasive cervical lesions among women with an unhealthy cervix in the rural population of Virudhunagar, India. **Materials and Methods:** This cross-sectional observational study was conducted at the Department of Obstetrics and Gynaecology, Government Medical College, Virudhunagar, Tamil Nadu, over six months from June to December 2023. A total of 150 women aged 25–65 years with symptoms such as white discharge, postcoital bleeding, and lower abdominal pain were included. All patients underwent speculum examination, VIA testing, colposcopic evaluation, and colposcopy-directed punch biopsy. Histopathological findings were used as reference standards for diagnosis. **Result:** The most common presenting symptom was white discharge per vaginum (48%), followed by urinary symptoms (16%), lower abdominal pain (12%), and postmenopausal bleeding (8.6%). Colposcopic findings included acetowhite areas (42.7%), punctuations (24%), mosaic patterns (10%), and abnormal vasculature (6%). Histopathological analysis revealed cervicitis as the most frequent diagnosis across all age groups, along with 40 cases of dysplasia and 8 cases of carcinoma in situ. Among the 102 colposcopy-positive patients, 38 were biopsy-confirmed. Colposcopy had a sensitivity of 84.44%, specificity of 39.04%, positive predictive value of 37.25%, and negative predictive value of 85.42%. **Conclusion:** Colposcopy, despite its lower specificity, is a highly sensitive tool for the early detection of cervical lesions in symptomatic women, especially in rural healthcare settings.

INTRODUCTION

Cervical cancer is the second most common cancer among women in India, contributing significantly to cancer-related morbidity and mortality in low- and middle-income countries.[1] Rural populations are particularly vulnerable due to limited access to screening services, lack of awareness, and delayed diagnosis.[2] Early detection of precancerous lesions through screening programs has proven effective in reducing cervical cancer incidence and mortality.[3]

Visual inspection methods, such as visual inspection with acetic acid (VIA), Pap smears, and HPV testing, are commonly used screening tools. Still, these often require further evaluation when the cervix appears clinically unhealthy.[4] A cervix is considered "unhealthy" when there is persistent discharge, bleeding, erosion, or visible lesions on speculum examination, which may indicate underlying cervical intraepithelial neoplasia (CIN) or carcinoma.[5]

Colposcopy is a valuable diagnostic procedure that allows magnified visual assessment of the cervix and facilitates targeted punch biopsies from suspicious areas.[6] A prospective observational study demonstrated that colposcopy had a sensitivity of 83.3% for detecting CIN lesions when correlated with histopathology, highlighting its effectiveness in symptomatic women with an unhealthy cervix.[7] Similarly, a prospective Indian study reported a comparable sensitivity of 83%, confirming its diagnostic utility in identifying cervical precancerous lesions.[8]

A meta-analysis applying the 2011 International Federation for Cervical Pathology and Colposcopy

(IFCPC) terminology showed a pooled sensitivity of 92% for LSIL+ and 68% for HSIL+, underscoring the method's reliability across different grades of cervical pathology.[9] In Indian hospital-based studies, colposcopy has shown high specificity (up to 96.2%) and positive predictive value when compared with histopathological results.[10] The use of scoring systems like the Swede score can further improve diagnostic precision, with some studies reporting 100% sensitivity for a score ≥5, although specificity improves with higher cut-offs.[11]

The present study aimed to evaluate the diagnostic accuracy of colposcopic examination in identifying preinvasive cervical lesions among women with an unhealthy cervix in the rural population of Virudhunagar. The study also aimed to correlate colposcopic findings with histopathological results and to determine the sensitivity, specificity, positive predictive value (PPV), and negative predictive value (NPV) of colposcopy.

MATERIALS AND METHODS

Study design and setting

This cross-sectional observational study included 150 patients from the Department of Obstetrics and Gynaecology at the Government Medical College, Virudhunagar, Tamil Nadu, for six months, from June 2023 to December 2023. Ethical approval for the study was obtained from the Institutional Ethics Committee, and written informed consent was obtained from all participants before enrolment.

Inclusion criteria

Women aged between 25 and 65 years who attended the outpatient department with symptoms suggestive of cervical pathology were included in the study. The symptoms considered for inclusion were white discharge per vaginum, postcoital bleeding, postmenopausal bleeding, lower abdominal pain, urinary complaints, and low backache.

Exclusion criteria

Patients were excluded if they were pregnant, in the puerperal or post-abortal period, actively bleeding per vaginum at the time of examination, or immunocompromised.

Methods

After obtaining ethical clearance, women attending the outpatient clinic with the above-mentioned symptoms were first assessed through a per speculum examination. VIA was also performed, and patients with a clinically unhealthy cervix or abnormal VIA findings were referred for colposcopic evaluation. Colposcopy was performed using a standard instrument. Findings such as acetowhite areas, mosaic patterns, and vascular abnormalities were also documented. Based on colposcopic impressions, punch biopsies were performed on suspicious areas and sent for histopathological examination.

Statistical analysis

Data were compiled using Microsoft Excel and analysed using IBM SPSS software version 20. Categorical variables were expressed as frequencies and percentages. The diagnostic accuracy of colposcopy was calculated in terms of sensitivity, specificity, PPV, and NPV, using histopathology as the reference standard.

RESULTS

The most common presenting complaint was white discharge per vaginum in 48% of patients, followed by urinary symptoms in 16%, lower abdominal pain in 12%, postmenopausal bleeding in 8.6%, low back ache in 8%, and post-coital bleeding in 7.4%. Colposcopic examination revealed acetowhite areas in 42.7% of cases, punctuations in 24%, normal cervix in 17.3%, mosaic pattern in 10%, abnormal vasculature in 6%, and post-coital bleeding in 7.4%. [Table 1]

Table 1: Common presenting complaints and colposcopic findings

Category	Findings	N (%)
Complaint	White discharge per vaginum	72 (48%)
	Urinary symptoms	24 (16%)
	Lower abdominal pain	18 (12%)
	Postmenopausal bleeding	13 (8.60%)
	Low back ache	12 (8%)
	Post coital bleeding	11 (7.40%)
Colposcopic finding	Acetowhite areas	64 (42.7%)
	Punctuations	36 (24%)
	Normal cervix	26 (17.30%)
	Mosaic pattern	15 (10%)
	Abnormal vasculature	9 (6%)
	Post coital bleeding	11 (7.40%)

Among women aged 25–34 years, cervicitis was observed in 38 cases, followed by 2 cases of mild dysplasia, 1 case of moderate dysplasia, 2 cases of severe dysplasia, and 15 normal findings. In the 35–44 age group, there were 19 cases of cervicitis, 12 of mild dysplasia, 8 of moderate dysplasia, 4 of severe dysplasia, 3 of carcinoma in situ, and 4 were normal.

Among women aged 45–54 years, 14 had cervicitis, 3 had mild dysplasia, 2 had moderate dysplasia, 1 had severe dysplasia, 1 had carcinoma in situ, and 6 were normal. In the 55–65 age group, cervicitis was seen in 7 cases, with 1 mild dysplasia, 2 moderate dysplasia, 1 severe dysplasia, 2 carcinoma in situ, and 2 normal findings. [Table 2]

ISSN (O): 2687-5365; ISSN (P): 2753-6556

Table 2: Age-wise distribution of biopsy report

Age group (years)	Cervicitis	Mild dysplasia	Moderate dysplasia	Severe dysplasia	Carcinoma in situ	Normal
25 – 34	38	2	1	2	–	15
35 – 44	19	12	8	4	3	4
45 – 54	14	3	2	1	1	6
55 – 65	7	1	2	1	2	2

Among patients with positive colposcopic findings, 38 had biopsy-confirmed lesions, while 64 were biopsy-negative. Among those with negative colposcopic findings, 7 were biopsy-positive and 41 were biopsy-negative. A total of 45 patients had positive biopsies, and 105 had negative biopsies. [Table 3]

Table 3: Correlation between colposcopy and biopsy findings

Category	Biopsy positive	Biopsy negative
Colposcopy positive	38	64
Colposcopy negative	7	41
Total	45	105

The sensitivity of colposcopy was 84.44%, and the specificity was 39.04%. The PPV was 37.25%, while the NPV was 85.42%. [Table 4]

Table 4: Diagnostic test

Statistic	Value
Sensitivity	84.44%
Specificity	39.04%
Positive predictive value	37.25%
Negative predictive value	85.42%

DISCUSSION

In our study, the most common complaint was white discharge per vaginum (48%), followed by urinary symptoms (16%), lower abdominal pain (12%), postmenopausal bleeding (8.6%), low backache (8%), and postcoital bleeding (7.4%). Colposcopy revealed acetowhite areas in 42.7%, punctuations in 24%, a normal cervix in 17.3%, mosaic pattern in 10%, abnormal vasculature in 6%, and postcoital bleeding in 7.4%. Daivi et al. reported white discharge in 54.6%, irregular menses in 19.3%, lower back pain in 14%, postcoital bleeding in 7.33%, and postmenopausal bleeding in 4.66%. Colposcopic findings included acetowhite areas (34.6%), punctuations (32%), mosaic patterns (13.3%), abnormal vasculature (5.33%), and normal cervix (14.6%).[12] The predominance of white discharge as the presenting symptom and acetowhite areas on colposcopy in our study aligns with patterns observed in rural gynaecological settings, supporting the utility of colposcopy in evaluating symptomatic cervices, particularly in resource-constrained populations.

Prasad et al. reported that white discharge was the most frequent symptom (50%), followed by pelvic pain (20%). Colposcopic findings showed acetowhite lesions in 15.3%, negative Lugol's iodine in 6%, and smaller percentages of atypical vessels, mosaic and punctate patterns, or dense acetowhite lesions.[13] Das et al. also found white discharge as the most common complaint (45%), followed by abdominal pain (18%), with the 31–40 years age group most affected (36%).[14] Upadhyay et al. observed white discharge in 74% of cases, cervical erosion in 54%, cervicitis in 26%, and cervical hypertrophy in 14%.[15] Comparative studies similarly identify white discharge as the leading symptom, highlighting its role as an early indicator of cervical pathology. This consistency across studies supports its inclusion as a key clinical criterion for colposcopy referral.

In our study, cervicitis was the most common histopathological finding in all age groups. Among women aged 25–34 years, there were 38 cases of cervicitis, 2 with mild dysplasia, 1 with moderate dysplasia, 2 with severe dysplasia, and 15 with normal reports. In the 35–44 age group, cervicitis was found in 19 cases, with dysplastic lesions being more prominent: 12 mild, 8 moderate, 4 severe dysplasia, and 3 with carcinoma in situ. The 45–54 years age group had 14 cases of cervicitis, along with 3 mild, 2 moderate, 1 severe dysplasia, and 1 carcinoma in situ. Among women aged 55–65 years, there were 7 cases of cervicitis, 6 dysplastic lesions, and 2 carcinoma in situ. Daivi et al. reported cervicitis in 56.6%, with mild dysplasia in 18%, moderate in 12.6%, severe in 6.6%, and CIN in 6%. Their age-wise data showed an increase in dysplasia with advancing age.[12] Dysplasia increases with age, highlighting the need for age-targeted screening and early detection strategies.

Avula et al. found chronic non-specific cervicitis in 45%, normal histology in 14%, and dysplasia, including mild (12%), moderate (5%), and severe (7%) cases. Invasive carcinoma was observed in 3% of the cases. They also noted higher dysplasia and malignancy rates among grand multiparas and women who married at a younger age.[16] Das et al. reported cervicitis in 68% of biopsy specimens, mild

ISSN (O): 2687-5365; ISSN (P): 2753-6556

dysplasia in 18%, moderate-to-severe dysplasia in 9%, and carcinoma in 5% of specimens. Benign inflammatory lesions were the most common, similar to our findings.[14] Panwar et al. also observed an increase in the severity of cervical lesions with age, with CIN 1 being the most prevalent (63.8%), followed by CIN 2 (22%), and CIN 3 (5.5%). CIN 2 and CIN 3 were most frequent in older women, especially those with postmenopausal and intermenstrual bleeding.17 Our findings align with those of other studies, with cervicitis and dysplasia being the most common, highlighting the importance of early identification of inflammatory and pre-malignant lesions.

In our study, among 102 colposcopy-positive patients, 38 were biopsy-positive and 64 were biopsy-negative. Of the 48 colposcopy-negative patients, 7 had biopsy-confirmed lesions and 41 had negative histopathology results. Overall, 45 patients were biopsy positive and 105 were biopsy negative. This indicates a notable rate of false positives among colposcopy-positive cases and a low rate of missed lesions in colposcopy-negative patients. Daivi et al. reported 41 biopsy-positive and 52 biopsy-negative cases among 93 colposcopy-positive patients, and among 57 colposcopy-negative patients, 9 were biopsy-positive and 48 were biopsy-negative.[12] The high false-positive rate highlights the necessity of biopsy confirmation despite positive colposcopic impressions.

Das et al. analysed the diagnostic performance of colposcopy, reporting a sensitivity of 71.88%, specificity of 80.88%, positive predictive value of 63.89%, negative predictive value of 85.94%, and overall diagnostic accuracy of 78%. The association with biopsy findings was statistically significant ($p < 0.001$).[14] Kohale et al. also reported a high diagnostic accuracy (88%) with a sensitivity of 91.46%, specificity of 72.22%, positive predictive value of 93.75%, and negative predictive value of 65%.[18] Prasad et al. found that among 13 patients with abnormal colposcopic findings, 10 had invasive lesions on biopsy, whereas two of 10 with normal colposcopic findings also had invasive lesions. Despite the statistical significance ($p = 0.022$), they noted that colposcopy alone may not reliably predict histological outcomes.[13] Sensitivity and specificity vary due to operator dependence, highlighting the need for standardisation and training.

The diagnostic evaluation in our study showed that colposcopy had a sensitivity of 84.44% and a negative predictive value of 85.42%, demonstrating strong detection of true positives and effective exclusion of disease. However, the specificity was 39.04%, and the positive predictive value was 37.25%, indicating a tendency for false positives. Upadhyay et al. reported a slightly higher accuracy of 90%, with a positive predictive value of 94.1% and a specificity of 87.8%.15 Prasad et al. compared colposcopy with Pap smear and found poor agreement (Cohen's Kappa = 0.018, $p = 0.725$), suggesting that the two methods are complementary. Pap smear findings correlated better with biopsy results ($p = 0.03$), while colposcopic findings also showed a significant association ($p = 0.022$).[13] High sensitivity and NPV support colposcopy as an effective screening tool, but its low specificity limits its standalone diagnostic utility.

Das et al. reported a colposcopy sensitivity of 71.88%, specificity of 80.88%, PPV of 63.89%, and NPV of 85.94%, with an overall diagnostic accuracy of 78%.[14] Panwar et al. correlated colposcopic scores with biopsy findings, showing that higher scores (5–8) were strongly associated with CIN 2 and CIN 3, confirming the ability of colposcopy to distinguish between low- and high-grade lesions.[17] Kohale et al. reported an overall accuracy of 88%, with a 95% confidence interval (CI) of 79.98–93.64%. Their sensitivity (91.46%) and PPV (93.75%) closely aligned with our findings.[18]

Limitations of the study

This was a single-centre study with a limited sample size and no long-term follow-up, which may restrict the generalisability and depth of the outcome assessment.

CONCLUSION

Colposcopy is a valuable tool for evaluating cervical lesion morphology and guiding clinical management of patients. Despite the lower specificity and PPV in this study, colposcopic assessment with guided biopsy remains essential for detecting precancerous and early cervical cancer lesions. However, the limited sample size restricts broader evaluation and generalisability.

Acknowledgement: The authors wholeheartedly thank Prof. Dr. Sangumani, M.D., Dean of Madurai Medical College for permitting this dissertation work. We are deeply grateful to Prof. Dr. N. Sumathi, M.D., D.G.O., Head of the Department of Obstetrics and Gynaecology, Madurai Medical College, for her invaluable guidance, timely suggestions, and constant encouragement throughout this study. We sincerely thank all Assistant Professors of the department for their support and assistance. Our heartfelt gratitude goes to all the patients who participated, without whom this study could not have been completed. We are also grateful to our families and friends for their continuous inspiration and encouragement.

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ISSN (O): 2687-5365; ISSN (P): 2753-6556