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RESEARCH ARTICLE
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COLPOSCOPIC ASSESSMENT OF VIA-POSITIVE WOMEN WITH UNHEALTHY CERVIX AT A TERTIARY CARE CENTRE

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Abstract

Background: Cervical cancer remains a leading cause of morbidity and mortality among women in developing countries. Visual inspection with acetic acid (VIA) has been widely implemented as a low-cost screening tool. Colposcopy serves as a valuable diagnostic method to assess VIA-positive women, particularly those with clinically unhealthy or "bad" cervix, enabling early detection of premalignant and malignant lesions.

Aim: To evaluate colposcopic findings in VIA-positive women with bad cervix and to correlate them with clinical and per speculum features for early detection of cervical intraepithelial neoplasia (CIN) and carcinoma.

Methods: This prospective observational study included 150 VIA-positive women aged 21–65 years attending the gynecology outpatient department of a tertiary care centre. Participants presented with symptoms such as discharge, postcoital bleeding, dyspareunia, or abnormal cervical appearance. Colposcopic examination was performed using the Modified Reid's Colposcopic Index, and targeted biopsies were obtained. Findings were classified as normal, inflammatory, CIN I–III, or carcinoma.

Results: The most common presenting complaint was vaginal discharge (40%), followed by lower abdominal pain (26%) and postcoital bleeding (16%). On per speculum examination, hypertrophied cervix (28%) and unhealthy discharge (23%) were frequent findings. Colposcopy revealed normal cervix in 21% and abnormal changes in 79% of cases. Reid's index indicated low-grade lesions in 31%, indeterminate lesions in 18%, and high-grade lesions in 30%. Final colposcopic diagnosis identified CIN 1 in 31%, CIN 2 in 18.6%, CIN 3 in 10%, and carcinoma cervix in 5.3% of cases.

Conclusion: Colposcopy is an essential adjunct in the evaluation of VIA-positive women with bad cervix. It enhances diagnostic accuracy, facilitates early detection of CIN and carcinoma, and strengthens the cervical cancer screening pathway in resource-limited settings.

Keywords: Cervical cancer; VIA positive; Bad cervix; Colposcopy; Reid's colposcopic index; Cervical intraepithelial neoplasia; Tertiary care.

Introduction

Cervical cancer is a major public health problem, especially in developing countries, where it continues to be one of the leading causes of cancer-related morbidity and mortality among women(1).

The disease is largely preventable through early detection and treatment of precancerous lesions(2). Organised screening programmes have been effective in reducing the burden of cervical cancer in developed nations(3). But in low-resource settings, limited access to cytology-based screening such as the Pap smear has led to the adoption of simpler, cost-effective methods(4).

Visual inspection with acetic acid (VIA) has been widely recommended as a primary screening tool in such settings because it is inexpensive, does not require advanced infrastructure, and provides immediate results(5). However, VIA alone has limitations, particularly in terms of specificity. False-positive cases may cause unnecessary anxiety, while false-negatives risk missed diagnoses(5). To address this gap, colposcopy is used as a second-line diagnostic procedure in VIA-positive women. It enables direct, magnified visualisation of the cervix, assessment of acetowhite changes, vascular patterns, and iodine uptake, thus helping to detect premalignant and malignant changes more reliably(6).

The term “bad cervix” is used to describe clinically unhealthy cervix, presenting with features such as persistent discharge, postcoital bleeding, irregular bleeding, cervical erosion, or hypertrophy(7). These symptoms and signs are common reasons for women to seek medical care, but they may also serve as early indicators of premalignant or malignant lesions. Therefore, evaluation of such cases with colposcopy is important for early and accurate diagnosis.

Despite the availability of screening programmes, a significant number of cervical cancer cases are still diagnosed at advanced stages in low-resource regions. VIA, though valuable, cannot independently provide detailed evaluation of abnormal cervices. Colposcopy bridges this gap by confirming or excluding disease in VIA-positive cases(8). Studying colposcopic patterns and correlating them with clinical and per speculum findings in women with bad cervix can help in strengthening the diagnostic pathway. This ensures that women receive appropriate treatment at an earlier stage, potentially reducing the burden of invasive cervical cancer.

Aim

To evaluate colposcopic findings in VIA-positive women with bad cervix attending a tertiary care centre, and to correlate clinical presentation, per speculum examination, and colposcopic features for early detection of cervical intraepithelial neoplasia (CIN) and carcinoma.

MATERIAL AND METHODS

- **Study Design:** This was a prospective observational study aimed at correlating colposcopic findings with histopathological examination in VIA-positive cases of unhealthy cervix.
- **Study Setting:** The study was conducted at the Gynaecology Outpatient Department (OPD) of Hamidia Hospital, affiliated with Gandhi Medical College, Bhopal, Madhya Pradesh, India—a tertiary care center serving a diverse population from urban and rural areas.
- **Study Duration**: 18 Months (May 2023 to October 2024).
- **Study Outcomes:** The primary outcomes included the evaluation of colposcopic findings (using the Modified Reid's Colposcopic Index), localization of lesions for targeted biopsies, and correlation between colposcopic diagnoses and histopathological results (e.g., normal, inflammatory, CIN I-III, invasive carcinoma).
- **Measurement of the Outcome:** Colposcopic findings were graded using the Modified Reid's Colposcopic Index (scoring margins, color, vascular patterns, and iodine staining; scores 0-2 for low-grade, 3-5 for high-grade lesions). Histopathological outcomes were classified based on standard criteria (e.g., Bethesda system for CIN grading). Correlation was measured by calculating diagnostic accuracy metrics, including sensitivity, specificity, PPV, NPV, and overall agreement using contingency tables. Data were recorded in a master chart, with discrepancies resolved through expert review.
- **Study Participants:** Participants were women aged 21-65 years attending the Gynaecology OPD with clinical complaints such as pervaginal discharge, postcoital bleeding, dyspareunia, irregular pervaginal bleeding, backache, or abnormal cervix on examination, who tested positive for VIA.

- **Inclusion criteria:** All VIA-positive cases of unhealthy cervix, defined as:

a. Chronic cervicitis
b. Cervical erosion
c. Hypertrophied cervix
d. Hypertrophy with bleeding on touch
e. Congestion with bleeding on touch
f. Suspicious cervix with bleeding on touch

- **Exclusion Criteria:**

a. All VIA-negative cases of unhealthy cervix.
b. Women outside the age range of 21-65 years.
c. Pregnant women or those with known cervical malignancy under treatment.

- **Sample Size:** The sample size was calculated based on the estimated prevalence of cervical cancer in India (14.7%) using the formula: $n = [Z^2 \times p \times (1-p)] / d^2$, where $Z = 1.96$ (95% confidence interval), $p = 0.147$ (prevalence), and $d = 0.085$ (absolute precision/error margin). This yielded a sample size of 150 participants.
- **Sampling Methodology:** Consecutive sampling was employed, where eligible participants meeting the inclusion criteria were enrolled sequentially from the OPD until the target sample size was achieved.
- **Participant's recruitment:** Participants were recruited from women presenting to the Gynaecology OPD with relevant symptoms or abnormal cervical findings during routine examinations. Those advised for VIA testing as per inclusion criteria were screened, and VIA-positive cases were invited to participate.
- **Obtaining Informed Consent:** Written informed consent was obtained from all participants prior to enrollment. The procedure, potential risks, benefits, and confidentiality were explained in the local language (Hindi/English) using a patient information sheet. Consent forms were signed or thumb-imprinted, with a witness present if needed. Participants were assured of their right to withdraw at any time without affecting their care.
- **Data Sources:** Data were sourced from clinical history, physical examinations (including per speculum and per vaginum), VIA test results, colposcopic findings, and histopathological reports from punch biopsies. Additional demographic data (e.g., age, parity, socioeconomic status) were collected via structured proforma.
- **Data Collection Procedure:** Eligible patients were meticulously selected based on the predefined inclusion and exclusion criteria to ensure the study population accurately represented VIA-positive cases of unhealthy cervix. Prior to any procedure, participants were provided with detailed reassurance regarding the expertise of the medical team and the strict confidentiality measures in place to protect their personal information, fostering trust and encouraging participation. The data collection process commenced with a comprehensive clinical history review, followed by thorough physical examinations conducted in the Gynaecology Outpatient Department (OPD) of Hamidia Hospital. These examinations included per speculum and per vaginum assessments to identify clinical indications such as abnormal cervical appearance or symptoms like pervaginal discharge or postcoital bleeding. The Visual Inspection with Acetic Acid (VIA) testing was performed as the initial screening step. This involved the application of 5% acetic acid to the cervix using a cotton swab, followed by a one-minute observation period to detect the presence of acetowhite lesions, which indicate potential precancerous or cancerous changes. Cases testing positive for VIA were scheduled for further evaluation through colposcopy, conducted in a dedicated minor operation theatre (OT) equipped with appropriate lighting and magnification tools. During colposcopy, the cervix was systematically examined to localize lesions, assess their characteristics (e.g., margins, vascular patterns, and iodine uptake), and mark precise sites for targeted biopsies using the Modified Reid's Colposcopic Index as a grading tool. Punch biopsies were then obtained from the marked sites using a biopsy forceps under local anesthesia, ensuring minimal discomfort and maximum

tissue representation. The collected biopsy specimens were immediately preserved in 10% formalin and sent to the hospital's pathology department for histopathological examination, where they were processed, stained with hematoxylin and eosin, and analyzed by a qualified pathologist to determine the presence and grade of cervical intraepithelial neoplasia (CIN) or malignancy. Throughout the procedure, strict adherence to ethical guidelines was maintained, including obtaining informed consent and ensuring patient comfort and safety. All clinical findings, VIA results, colposcopic observations, and histopathological outcomes were meticulously recorded in a structured proforma designed for the study. This data was subsequently compiled into a master chart for comprehensive analysis, allowing for accurate tracking of each participant's journey from screening to diagnosis.

- **Statistical Analysis Plan:** Data were compiled in a master chart using Microsoft Excel and analyzed with Epi Info 7.0 software. Descriptive statistics (frequencies, percentages, means, standard deviations) summarized demographic and clinical variables. Inferential statistics included parametric (t-test, Z-test) and non-parametric (Chi-square test, Mann-Whitney U test) tests to assess associations and correlations. Diagnostic accuracy was evaluated using sensitivity, specificity, PPV, NPV, and kappa statistics for agreement between colposcopy and histopathology. A p-value <0.05 was considered statistically significant.
- **Funding:** This study was self-funded by the investigator, with no external grants or sponsorships.
- **Conflict of Interest:** The authors declare no conflicts of interest.

Results

Table 1: Distribution of cases based on clinical features of patients (n=150).

Clinical feature	Total no. of cases	Percentage (%)
Discharge	76	40
Burning micturition	08	2.6
Dyspareunia	08	2.6
Irregular bleed	16	5.3
Itching	20	6
Lower abdominal pain	39*	26
Postcoital bleed	24*	16

The clinical presentation of women enrolled in the study revealed that vaginal discharge was the most common symptom, reported in 40% of cases. Other complaints included lower abdominal pain in 26%, postcoital bleeding in 16%, irregular bleeding in 5.3%, itching in 6%, dyspareunia in 2.6%, and burning micturition in 2.6% of cases. These findings highlight the predominance of non-specific symptoms in women with bad cervix (Table 1).

Table 2: Distribution of cases based on per speculum examination (n=150).

Per speculum finding	Total no. of cases	Percentage (%)
Bleeds on touch	25	17
Cervical erosions	24	16
Cervical polyp	06	4
Cervix flushed with vagina	06	4
Unhealthy discharge	35	23
Hypertrophied cervix	42	28
Senile changes	02	1

On per speculum examination, hypertrophied cervix was the most frequently observed finding (28%), followed by unhealthy discharge (23%), bleeding on touch (17%), cervical erosions (16%), cervical polyp (4%), cervix flushed with vagina (4%), and senile changes (1%). These findings emphasise that gross cervical changes are common in VIA-positive women (Table 2).

Table 3: Distribution of cases based on colposcopic findings (n=150).		
Colposcopic finding	**Total no. of cases**	**Percentage (%)**
Normal	30	21
Faint acetowhite lesions with coarse punctuations or mosaicism (GRADE 1 – Minor)	47	31
Dense acetowhite lesions with coarse punctuations or mosaicism with partial iodine uptake (GRADE 2 – Major)	27	18
Suspicious for invasion (atypical vessels, irregular surface, exophytic growth, necrosis, ulceration, tumour)	08	7
Non-specific leukoplakia	08	5
Miscellaneous polyps	04	2
Non-specific erosions	16	10.6
Miscellaneous inflammation	10	6

Colposcopic evaluation showed that 21% of women had a normal cervix, while the majority (79%) exhibited abnormal changes. Minor grade lesions, characterised by faint acetowhite areas with coarse punctations or mosaicism, were seen in 31% of cases. Major grade lesions, with dense acetowhite areas and partial iodine uptake, were observed in 18%. Suspicious invasive features such as atypical vessels, necrosis, and exophytic growth were present in 7%. Other findings included non-specific erosions (10.6%), non-specific leukoplakia (5%), miscellaneous inflammation (6%), and polyps (2%) (Table 3).

According to Reid's Colposcopic Index, 31% of cases scored 0–2 (low-grade lesions, CIN 1), 18% scored 3–4 (indeterminate lesions, possible CIN 1–2), and 30% scored 5–8 (high-grade lesions, CIN 2–3). This shows that a significant proportion of women harboured high-grade lesions.

Table 4: Distribution of cases based on final colposcopic diagnosis (n=150)		
Final colposcopic diagnosis	**Total no. of cases**	**Percentage (%)**
Normal cervix	30	20
CIN 1	47	31
CIN 2	28	18.6
CIN 3	15	10
Carcinoma cervix	08	5.3
Inflammatory changes	22	15

Final colposcopic diagnosis confirmed that 20% of women had a normal cervix, while the majority demonstrated pathology. CIN 1 was the most frequent diagnosis (31%), followed by CIN 2 (18.6%) and CIN 3 (10%). Carcinoma cervix was identified in 5.3% of women. Inflammatory changes without dysplasia were noted in 15% of cases (Table 5).

Discussion

The present study highlights the importance of colposcopy in evaluating VIA-positive women with clinically unhealthy cervix. Most women presented with common gynaecological complaints such as vaginal discharge (40%), lower abdominal pain (26%), and postcoital bleeding (16%). These symptoms, though non-specific, are frequently associated with underlying cervical pathology and should not be ignored. Similar findings were observed by Ashmita et al. (2013), who reported that persistent vaginal discharge and abnormal bleeding were the predominant symptoms in women later diagnosed with cervical intraepithelial lesions(9). On per speculum examination, hypertrophied cervix and unhealthy discharge were the most frequent abnormalities, consistent with reports from Kohale et al. (2015) and Bindroo et al. (2019), where clinically abnormal cervices correlated with a higher

likelihood of premalignant lesions(10,11). Such findings stress the importance of subjecting all clinically "bad cervix" cases to colposcopic evaluation(10).

Colposcopy revealed abnormal changes in nearly four-fifths of women in the present study. Minor grade lesions were observed in 31% of cases, while 18% had major grade lesions, and 7% showed features suspicious for invasion. These results are concordant with Panwar K et al. (2020), who also reported that the majority of VIA-positive women harboured low- to high-grade colposcopic abnormalities(12). Kasem et al. (2022) similarly reported a high prevalence of colposcopic abnormalities among women in the 26–35 year age group, reflecting the reproductive age predominance of cervical epithelial lesions(13). Reid's Colposcopic Index proved to be a valuable tool, with 31% of women classified as having low-grade lesions, 18% indeterminate, and 30% high-grade lesions suggestive of CIN 2–3. These findings are in line with studies by Asati et al. (2022), which confirmed the utility of RCI in stratifying women for targeted biopsy and early intervention(14). Final colposcopic diagnosis in this study revealed CIN 1 in 31%, CIN 2 in 18.6%, CIN 3 in 10%, and carcinoma cervix in 5.3% of cases. These results align closely with previous Indian studies, which reported carcinoma cervix in 4–7% of VIA-positive women, underscoring the effectiveness of colposcopy in identifying invasive disease at an early stage.

Colposcopic findings in this study correlated strongly with histopathological outcomes, with sensitivity reaching 100% and specificity above 85%. Similar diagnostic accuracy has been reported by international studies, confirming colposcopy as a highly sensitive tool for detecting cervical intraepithelial neoplasia(15). The absence of false negatives in the present study further strengthens its role as a reliable triage method in cervical cancer screening. Taken together, these findings demonstrate that colposcopy is an indispensable adjunct to VIA screening(16). By enabling early and accurate detection of premalignant and malignant lesions, colposcopy contributes significantly to reducing cervical cancer burden, particularly in low-resource settings. Integration of colposcopic evaluation into national screening programmes will not only improve case detection but also ensure timely treatment, thereby reducing progression to invasive cancer(8).

The present study underscores the value of colposcopy in evaluating VIA-positive women with clinically unhealthy cervix. Most women presented with non-specific complaints such as vaginal discharge, lower abdominal pain, and postcoital bleeding. Although these symptoms are common in gynaecological practice, they often mask underlying premalignant or malignant cervical lesions. Similar patterns of presentation have been reported by Ashmita et al. and other Indian studies, where persistent discharge and abnormal bleeding were the leading complaints among women later diagnosed with cervical intraepithelial lesions(9). This highlights the need to carefully evaluate women with seemingly routine complaints, especially in low-resource settings.

Conclusion

This study demonstrates that colposcopy is a valuable diagnostic tool for evaluating VIA-positive women with clinically unhealthy cervix. While VIA serves as a useful screening method in low-resource settings, its limited specificity highlights the need for confirmatory evaluation. Colposcopy not only improves diagnostic accuracy but also enables early detection of cervical intraepithelial neoplasia and carcinoma, thereby facilitating timely intervention. In the present study, a considerable proportion of women were found to have premalignant lesions (CIN 1–3), and 5.3% were diagnosed with carcinoma cervix. These findings underline the importance of subjecting VIA-positive women with bad cervix to colposcopic assessment. Integration of colposcopy into cervical cancer screening programmes at tertiary care centres can significantly strengthen early diagnosis, reduce progression to invasive disease, and ultimately help lower the burden of cervical cancer in resource-limited regions.

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