

ORIGINAL ARTICLE

Colposcopic Evaluation of VIA-Positive Cases in a Primary Healthcare Setting of Sreepur, Gazipur, Bangladesh

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**ABSTRACT**

Introduction: Cervical cancer remains a leading cause of morbidity and mortality among women in developing countries. Visual Inspection with Acetic Acid (VIA) is an effective, low-cost screening tool for early detection of precancerous cervical lesions, especially in resource-limited settings like Bangladesh. Colposcopy serves as a confirmatory diagnostic procedure following VIA positivity. **Methods and materials:** A cross-sectional study was conducted at the Upazila Health Complex, Sreepur, Gazipur, from January 2022 to December 2023, including 300 VIA-positive women aged 20–60 years. Demographic and clinical data were recorded, and all participants underwent standardized colposcopic evaluation. Colposcopic findings were classified into normal, inflammatory, low-grade, high-grade, or suspicious for invasive carcinoma. Data analysis was performed using SPSS 25.0. **Results:** Among 300 VIA-positive women, 143 (47.7%) were confirmed colposcopically positive, while 157 (52.3%) showed no abnormal findings, indicating a false-positive rate of 52.3%. Among the colposcopically positive cases, CIN-I was detected in 27.69%, CIN-II in 18.46%, and CIN-III in 1.54% of women. Most participants were aged 30–49 years and of low socioeconomic status. The findings suggest that VIA is an effective primary screening tool, though confirmatory colposcopy remains essential for accurate diagnosis and lesion grading. **Conclusion:** Colposcopy is essential for confirming and grading cervical epithelial abnormalities in VIA-positive women. This study highlights the value of integrating VIA and colposcopy at primary and tertiary care levels to ensure early detection and timely management of precancerous cervical lesions. Enhancing awareness, provider training, and follow-up can help reduce cervical cancer incidence and improve women's reproductive health outcomes in Bangladesh.

Keywords: Cervical cancer, Colposcopy, Invasive carcinoma, VIA positive, Precancerous lesions, Women's health

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INTRODUCTION

Cervical cancer is a major public health problem affecting women globally, particularly in low- and middle-income countries where access to effective screening and early treatment remains limited [1]. It is currently the fourth most common cancer among women worldwide and ranks as one of the leading causes of cancer-related deaths in developing nations [2]. The disease originates from the transformation of normal cervical epithelial cells into precancerous lesions, which, if left untreated, may progress to invasive carcinoma over several years [3]. Persistent infection with high-risk types of human papillomavirus (HPV) has been identified as the primary etiological factor responsible for cervical carcinogenesis [4]. Early detection and treatment of precancerous lesions are crucial strategies for reducing the incidence and mortality of cervical cancer [5]. In high-income countries, cytology-based screening programs such as the Papanicolaou (Pap) smear have successfully reduced cervical cancer rates through systematic screening and follow-up [6]. However, such cytology-based programs are resource-intensive and require well-established laboratory infrastructure, trained cytotechnologists, and reliable follow-

up systems—factors often unavailable in resource-limited settings like Bangladesh [7]. Consequently, alternative low-cost, simple, and feasible screening methods have been introduced to improve accessibility and coverage in low-resource populations. Among these, Visual Inspection with Acetic Acid (VIA) has emerged as a practical and cost-effective screening tool [8]. VIA involves the application of 3–5% acetic acid to the cervix, followed by visual inspection for acetowhite changes that may indicate underlying cervical intraepithelial neoplasia (CIN) [9]. This method offers several advantages—it provides immediate results, does not require laboratory support, and can be performed by trained mid-level healthcare workers [10]. The World Health Organization (WHO) has recommended VIA as a viable alternative to cytology-based screening in low-resource countries to promote early detection and treatment of cervical precancerous lesions [11]. Although VIA is an effective screening approach, its diagnostic accuracy depends on the skill and experience of the healthcare provider and the subjective nature of visual interpretation. Therefore, VIA-positive women should undergo confirmatory diagnostic evaluation using colposcopy [12]. Colposcopy is a specialized

procedure that allows detailed examination of the cervix under magnification after the application of acetic acid or Lugol's iodine, enabling identification of abnormal vascular and epithelial patterns suggestive of neoplastic changes [9]. It not only improves diagnostic accuracy but also guides site-directed biopsies for histopathological confirmation, which remains the gold standard for diagnosis [10]. In Bangladesh, cervical cancer is one of the most common malignancies among women, contributing significantly to morbidity and mortality [5]. The country faces multiple challenges in implementing widespread cervical cancer screening, including a lack of awareness, limited trained personnel, and insufficient healthcare infrastructure, particularly in rural areas [6]. In response, national health initiatives and hospital-based programs have begun incorporating VIA screening to identify women at risk and refer VIA-positive cases for colposcopic evaluation [7]. Understanding the colposcopic findings among VIA-positive women provides valuable insight into the burden and distribution of precancerous lesions in the population. It also helps evaluate the performance of VIA as a primary screening tool and guides policy decisions regarding the integration of colposcopy services at various healthcare levels.

METHODS & MATERIALS

A cross-sectional study was conducted at the Department of Gynecology and Obstetrics Upazila Health Complex, Sreepur, Gazipur, Bangladesh from January 2022 to December 2023. The study population comprised 300 women aged 20–60 years who tested positive on Visual Inspection with Acetic Acid (VIA) screening. Women with a history of cervical treatment, invasive cervical cancer, or significant comorbidities were excluded to maintain sample homogeneity. **Data collection:** Detailed demographic and clinical information was collected using a structured proforma. Variables included age, marital status, educational level, socioeconomic status, parity, menstrual history, contraceptive use, and history of sexually transmitted infections. These data provided context for correlating colposcopic findings with potential risk factors for cervical lesions.

Colposcopic examination: All participants underwent a colposcopic evaluation performed by trained gynecologists according to standardized protocols. The cervix was visualized after the application of 3–5% acetic acid, followed by Lugol's iodine when necessary. Colposcopic impressions were categorized as normal, inflammatory, low-grade squamous intraepithelial lesions (LSIL), high-grade squamous intraepithelial lesions (HSIL), or lesions suspicious for invasive carcinoma. Biopsies were taken when clinically indicated to confirm the diagnosis histopathologically.

Data analysis: Collected data were entered into a structured database and analyzed using statistical software. Descriptive statistics were used to summarize demographic characteristics and the distribution of colposcopic findings. Inferential statistical tests, including chi-square tests and t-tests where appropriate, were applied to examine associations between demographic/clinical factors and colposcopic outcomes. The collected data were analyzed using SPSS version 25.0

Ethical considerations: Written informed consent was obtained from all participants before inclusion. The study protocol was approved by the mentioned hospital.

RESULTS

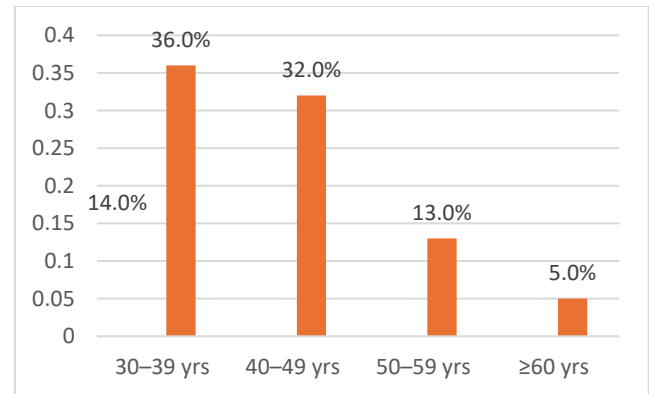


Figure - 1: Age distribution (n=300)

In this study, a total of 300 VIA-positive women were included. The majority of participants belonged to the 30–39-year age group (36%), followed by 40–49 years (32%). The 20–29-year-old group comprised 14%, while the 50–59 and ≥ 60-year-old groups represented 13% and 5%, respectively. Thus, 68% of VIA-positive women were within the 30–49-year age bracket, indicating that precancerous cervical lesions were more frequent during middle age.

Regarding parity, 47% of participants had 3–4 children, 25% had 1–2 children, and 22% had five or more. Nulliparous women accounted for only 6% of the study population. This trend demonstrates that the prevalence of VIA positivity increased with higher parity, suggesting a possible link between repeated childbirth and cervical epithelial changes. [Table I]

Table - I: Distribution of cases by parity

Parity	n	%
Nulliparous	18	6.0%
1–2 children	75	25.0%
3–4 children	141	47.0%
≥5 children	66	22.0%

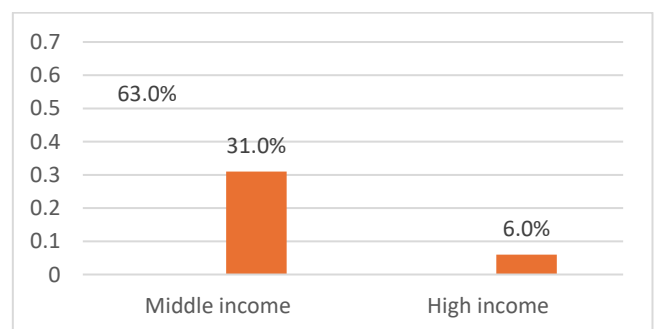


Figure - 2: Distribution of economic status

The majority of respondents (63%) came from low-income families, 31% were from the middle-income group, and only 6% belonged to the high-income class. This distribution highlights that cervical precancerous lesions are more common among socioeconomically disadvantaged women, possibly due to limited healthcare access, poor hygiene, and lack of awareness.

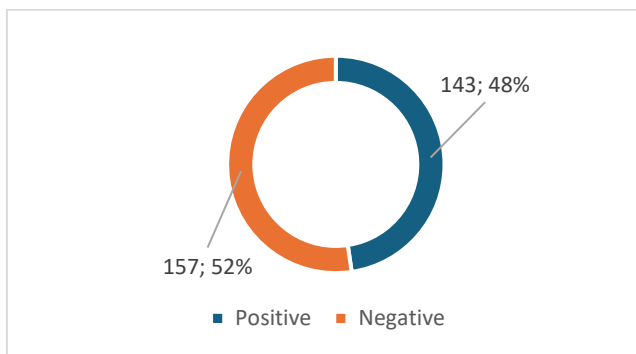


Figure – 3: Colposcopic findings among women

Of the 300 VIA-positive participants, 143 (47.7%) were confirmed as colposcopically positive, while 157 (52.3%) showed no significant abnormality. Therefore, the false-positive rate of VIA in this study was 52.3%. These findings demonstrate that although VIA is a sensitive screening tool, its specificity is limited and requires further confirmation by colposcopy.

Among the 143 colposcopically positive women, 39 (27.69%) showed features consistent with CIN-I, 26 (18.46%) had CIN-II, and 2 (1.54%) had CIN-III lesions. In addition, 3 (2.10%) cases were suspected of invasive carcinoma, while the remainder demonstrated inflammatory or nonspecific epithelial changes. The predominance of CIN-I lesions indicates that most abnormalities detected were of low grade and potentially reversible with appropriate management. [Table II]

Table – II: CIN among colposcopic positive women (n=143)

Type of lesion	n	%
CIN-I	39	27.7%
CIN-II	26	18.5%
CIN-III	2	1.5%
Suspicious for invasive carcinoma	3	2.1%
Total	70	49.7%

***Only abnormal colposcopic findings; the remainder had inflammatory or nonspecific changes.**

The overall correlation between VIA and colposcopy was moderate. Out of all VIA-positive women, only 47.7% were confirmed positive on colposcopy. This result reflects the diagnostic limitations of VIA due to its subjective interpretation and operator dependency. Nonetheless, the method remains a valuable first-line screening strategy in low-resource settings, as it can rapidly identify women requiring further evaluation. [Table III]

Table – III: Correlation between VIA results and colposcopic diagnosis

VIA result	Colposcopy	
	Positive	Negative
VIA positive	n/% 143 (47.7%)	n/% 157 (52.3%)

DISCUSSION

In this study, we found that half of the women (47.7%) VIA-positive women were confirmed as colposcopically positive, while 52.3% were false positives. This concordance rate between VIA and colposcopy is comparable with findings from

other studies conducted in similar low-resource settings [8,13]. The relatively high false-positive rate of VIA may be attributed to subjective interpretation, cervical inflammation, metaplasia, or the examiner’s level of training [14]. Despite this limitation, VIA remains a valuable and cost-effective screening approach for mass population coverage, particularly where cytology-based screening is not feasible [15]. In the present study, among colposcopically positive women, the majority (27.69%) had CIN-I lesions, followed by CIN-II (18.46%) and CIN-III (1.54%). This predominance of low-grade lesions is consistent with reports from other studies in South Asia and Africa [4,16]. The finding suggests that VIA screening detects many early, potentially reversible lesions, emphasizing the importance of timely follow-up and management to prevent progression to invasive carcinoma [17]. In this study, as the age distribution was observed, it was observed that most VIA-positive women were between 30 and 49 years, aligning with global recommendations that cervical screening should target women aged 30–50 years, when the risk of developing precancerous changes is highest [18]. The association between higher parity and VIA positivity observed in this study also supports existing evidence that repeated childbirth may increase susceptibility to cervical epithelial injury and HPV persistence [19]. Additionally, the predominance of low-income participants among VIA-positive cases reflects the well-documented socioeconomic disparities in cervical cancer incidence, linked to limited awareness, poor hygiene, and restricted access to health services [20]. In the current study, colposcopy remains the gold standard for the evaluation of VIA-positive cases, as it enables direct visualization of the transformation zone and targeted biopsies. Integrating VIA screening with immediate colposcopic assessment, where feasible, enhances diagnostic accuracy and allows for a “screen-and-treat” approach, reducing loss to follow-up [21]. The combined use of these methods can substantially reduce cervical cancer incidence and mortality when implemented through national programs and supported by adequate training and awareness campaigns. Overall, the findings of this study reinforce the role of VIA as a simple and practical initial screening tool, but they also highlight the necessity of colposcopic confirmation to reduce overtreatment and ensure accurate diagnosis. Strengthening training programs for healthcare providers, ensuring access to colposcopy, and promoting regular screening among women of reproductive age are essential steps to control cervical cancer in Bangladesh and similar resource-limited countries.

Limitations of the study: The study faced several limitations. VIA, being a subjective and operator-dependent test, showed a high false-positive rate of 52.3%, reducing specificity. The cross-sectional design restricted the assessment of causality between risk factors and cervical lesions. Additionally, the sample was predominantly from low-income groups, limiting generalizability. Colposcopy confirmation was performed only on VIA-positive women, potentially underestimating true lesion prevalence. Finally, recall bias may have affected parity and socioeconomic data accuracy.

CONCLUSION

Cervical precancerous lesions were most prevalent among women aged 30–49, particularly those with higher parity and low socioeconomic status. VIA screening detected a significant number of potential abnormalities, but only 47.7% were confirmed on colposcopy, highlighting its moderate diagnostic correlation. Most lesions identified were low-grade (CIN-I), suggesting potential reversibility with timely management.

Despite its limitations, VIA remains a useful initial screening tool, especially in resource-limited settings.

RECOMMENDATION

It is recommended to continue using VIA as a primary screening method in low-resource areas due to its rapid and cost-effective nature. However, positive results should be promptly confirmed with colposcopy to reduce false positives. Targeted education and outreach programs should focus on middle-aged women and those with higher parity, particularly in low-income communities. Strengthening follow-up systems, improving healthcare access, and training operators can enhance VIA's diagnostic accuracy and overall effectiveness in cervical cancer prevention.

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