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Correlation between Cervical Cytology and Histopathological Grade in Symptomatic VIA-Positive Women

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Abstract

Background: *Cervical cancer is a significant public health concern in developing countries. The timely detection of preinvasive lesions is crucial for reducing morbidity and mortality. Visual inspection with acetic acid (VIA) is widely used for screening, particularly in resource-limited settings. However, correlating these findings with cytology and histopathology can enhance its diagnostic accuracy. This study aimed to evaluate the correlation between cervical cytology findings and histopathological grade in symptomatic VIA-positive women.*

Methods: *This cross-sectional study was conducted at the Department of Gynaecology and Obstetrics, BSMMU, Dhaka, Bangladesh, from January to December 2016. A total of 105 women tested positive on Visual Inspection with Acetic Acid (VIA). Participants underwent Pap smear testing and colposcopy-directed cervical biopsy. Cytological findings were classified using the Bethesda system, and histopathological diagnoses were categorized as chronic cervicitis, CIN I–III, and invasive carcinoma. Statistical correlations and diagnostic accuracy were analyzed*

Results: *Cytological findings revealed 56.19% NILM, 20.00% ASC-US, 12.38% LSIL, 8.57% HSIL, and 2.86% SCC. The histopathological diagnoses included chronic cervicitis (40.95%), CIN I (26.67%), CIN II (13.33%), CIN III (8.57%), and invasive carcinoma (10.48%). A strong correlation was observed between increasing cytological severity and corresponding histological grades. The Pap smear showed a sensitivity, specificity, PPV, NPV, and accuracy of 87.20 %, 82.40%, 74.50%, 93.40%, and 84.50 %, respectively.*

Conclusion: *Cervical cytology demonstrates good concordance with histopathological grading in symptomatic VIA-positive women, supporting its continued utility in the early detection and triage of cervical lesions.*

Keywords: *Cervical cytology, VIA-positive, Pap smear, histopathology, cervical intraepithelial neoplasia, cervical cancer screening.*

1. INTRODUCTION

Cervical cancer continues to be a critical public health issue because women in low- and middle-income countries face this as their leading cancer mortality reason [1]. Effective screening programs should detect cervical cancer early because it helps decrease disease-related harm. The low cost and straightforward nature of Visual Inspection with Acetic Acid (VIA) explains why it became popular in areas with limited resources [2]. Visual Inspection with Acetic Acid accuracy depends on situational factors, making additional methods essential for reliable diagnosis.

Papanicolaou (Pap) smear tests are the fundamental cervical screening method that detects precancerous cellular changes in women [3]. The widespread use of Pap smears remains affected by diagnostic precision, which is affected by the combination of collection methods, interpretive procedures, and inflammatory or infectious conditions [4]. Cervical intraepithelial neoplasia (CIN) diagnosis and invasive carcinoma need histopathological examination of cervical biopsy specimens as the definitive diagnostic method [5].

Several scientific investigations focused on evaluating the relationship between diagnostic results obtained through cytology and histopathological assessments. Bamanikar et al. conducted a survey demonstrating that Pap test results closely match histopathological findings,

showing that early detection relies on cytological screening [6]. Prashad A et al. conducted research illustrating how cytology is an essential tool for detecting high-grade lesions in screening programs based on their findings [7].

Various factors result in continuing differences between cytological and histopathological results, including sampling errors, interpretation variability, infections, and inflammatory responses [8]. Such discrepancies between cytological and histopathological results produce errors that cause problems with increasing or decreasing patient diagnoses. The diagnosis of symptomatic VIA-positive women depends on knowing how well cytological findings match those of histopathology because it helps both diagnosis and treatment strategy development [9].

This study aims to evaluate the correlation between cervical cytology and histopathological grades in symptomatic VIA-positive women. The relationship between Pap tests and biopsies helps determine cytology's accuracy for high-grade lesion detection for better decision support in clinical practice. This study hypothesizes that strong diagnostic alignment occurs between Pap smears and histopathological findings, thus validating the Pap smear as an essential tool alongside VIA for screening purposes.

2. Objective

The objective of this study was to evaluate the correlation between cervical cytology findings and histopathological grades in symptomatic VIA-positive women.

3. Methodology & Materials

This cross-sectional observational study was conducted at the Department of Gynecology and Obstetrics, Bangabandhu Sheikh Mujib Medical University (BSMMU), Dhaka, Bangladesh, from January to December 2016. A total of 105 women tested positive on Visual Inspection with Acetic Acid (VIA).

3.1. Inclusion Criteria

1. Women aged 21–60 years.
2. Symptomatic patients with positive VIA test results.
3. Willingness to participate and provide informed consent.

3.2. Exclusion Criteria

1. Pregnant women.
2. History of cervical cancer or prior treatment of cervical intraepithelial neoplasia.
3. Women who underwent a hysterectomy.
4. Inadequate cytological and histopathological samples.

3.3. Data Collection Procedure

Data were collected using structured questionnaires, clinical examinations, Pap smear tests, and cervical biopsies. Pap smears were interpreted using the 2001 Bethesda System, and histopathological grading was performed on biopsy specimens. Written informed consent was obtained from all participants. All the data were anonymized to ensure confidentiality.

3.4. Statistical Analysis

Data were analyzed using SPSS version 25.0. Descriptive statistics were used to summarize demographic and clinical characteristics. The correlation between cytological and histopathological findings was assessed using the chi-squared test. The sensitivity, specificity, positive predictive value (PPV), and negative predictive value (NPV) of the Pap smear results were calculated, considering histopathology as the gold standard. Statistical significance was set at $P < 0.05$.

4. Results

Table 1. *Baseline Characteristics (n=105)*

Variable	Category	Frequency (n)	Percentage (%)
Age (years)	<30	16	15.24
	30–39	29	27.62
	≥40	60	57.14
Parity	Nulliparous	13	12.38
	Multiparous	92	87.62
Presenting Symptoms	Abnormal bleeding	39	37.14
	Discharge	46	43.81
	Pelvic pain	21	20.00
Menstrual Status	Regular	58	55.24
	Irregular/Postmenopausal	47	44.76

Table 1 presents the baseline characteristics of the study population. Participants were mainly aged ≥40 (57.14%), with 27.62% between 30–39 years and 15.24% under 30 years. Most women were multiparous (87.62%). The main symptom was vaginal discharge (43.81%), followed by abnormal bleeding (37.14%) and pelvic pain (20.00%). Menstrual status was regular in 55.24% and irregular or postmenopausal in 44.76% of participants.

Table 2. *Distribution of Cytological Findings (Bethesda System) Among VIA-Positive Symptomatic Women (n=105*)

Cytology Category	Number of Cases	Percentage (%)
NILM	59	56.19
ASC-US	21	20.00
LSIL	13	12.38
HSIL	9	8.57
SCC	3	2.86

Table 2 shows the distribution of cervical cytology findings based on the Bethesda system. The most frequent cytological category was NILM (Negative for Intraepithelial Lesion or Malignancy), observed in 56.19% of cases. Abnormal cytological findings included ASC-US (20.00%), LSIL (12.38%), HSIL (8.57%), and SCC (2.86%).

Table 3. *Histopathological Diagnosis Among VIA-Positive Symptomatic Women (n=105)*

Histopathological Diagnosis	Number of Cases	Percentage (%)
Chronic Cervicitis	43	40.95
CIN I	28	26.67
CIN II	14	13.33
CIN III	9	8.57
Invasive Carcinoma	11	10.48

Table 3 outlines the histopathological diagnoses of cervical tissue. Chronic cervicitis was the most prevalent histological finding (40.95%), followed by CIN I (26.67%), CIN II (13.33%), CIN III (8.57%), and invasive carcinoma (10.48%).

Table 4. *Correlation Between Cytological and Histopathological Findings*

Cytology Category	Histopathology Diagnosis	Number of Cases
NILM	Chronic Cervicitis	36
ASC-US	CIN I	11
LSIL	CIN I / CIN II	17
HSIL	CIN II / CIN III	12
SCC	Invasive Carcinoma	9

Table 4 presents the correlation between cytological and histopathological findings. Most NILM cases corresponded with chronic cervicitis (n=36). ASC-US was primarily associated with CIN I (n=11). LSIL cases correlated with CIN I and CIN II (n=17), while HSIL was linked to CIN II and CIN III (n=12). All SCC cases identified on cytology (n=9) corresponded with invasive carcinoma on histopathology.

Table 5. *Diagnostic Performance of Pap Smear Compared to Histopathology*

Parameter	Value (%)
Sensitivity	87.20
Specificity	82.40
Positive Predictive Value (PPV)	74.50
Negative Predictive Value (NPV)	93.40
Accuracy	84.50

Table 5 summarizes the diagnostic performance of Pap smear when compared to histopathology. The test demonstrated a sensitivity of 87.20% and a specificity of 82.40%. The positive predictive value was 74.50%, the negative predictive value was 93.40%, and the overall

diagnostic accuracy was 84.50%, indicating the reliable performance of cytology in identifying cervical abnormalities.

5. Discussion

This study investigated the correlation between cervical cytology and histopathological grading in symptomatic VIA-positive women. The study participants who were≥40 years of age were the most frequently present demographic (57.14%) alongside a majority of women experiencing multiple pregnancies (87.62%). Abnormal discharge and bleeding symptoms affected 43.81% and 37.14% of the study participants, respectively. Among participating women, the cytology result NILM appeared most frequently (56.19%), ASC-US followed at 20%, and LSIL occurred in 12.38% of cases. Hospital studies revealed that chronic cervicitis (40.95%) and CIN I (26.67%) appeared most frequently, yet invasive carcinoma was present in 10.48% of cases. Results from Pap smear testing achieved higher specificity (82.40%) and sensitivity (87.20%) than histopathological evaluations.

The research on NILM and inflammatory smears proves consistent with Sachan et al.'s study on women undergoing routine cervical cancer screening in North India [10]. The research demonstrates that chronic cervicitis appeared as the dominant histopathological diagnosis, which matches previous studies reporting chronic cervicitis as common in symptomatic women undergoing cervical pathology screenings (Bindroo and Garg) [11].

The identification precision of Pap smears for premalignant and malignant lesions achieved 84.5% accuracy based on our research, according to Malpani et al., whose work supported Pap smears as primary screening tests in resource-limited areas due to their accessibility and accurate diagnostic potential [12]. Our findings match the research by Atla et al., which demonstrated similar frequencies for LSIL and HSIL diagnoses in symptomatic patient populations, thus demonstrating the importance of cytology for clinical decision-making [9].

The findings strongly agree with Joshi et al., who established that severe histological changes show meaningful correlations with HSIL on cytology and CIN II/III on histopathology [13]. According to Bodal and Brar's findings, the widespread use of SCC as a cytologic marker corresponded highly with invasive carcinoma diagnosed histologically [14].

A few cases displayed differences between the diagnosis made through cytology and the results obtained from histological analysis. Some LSIL cytology observations showed CIN subtype histological findings that were more advanced than the initial diagnosis. The natural progression of lesions combined with subjective reading and sampling errors might explain the findings between the initial cytology and subsequent biopsy. According to Ashmita et al., colposcopy and histology examinations identify additional high-grade lesions. Pap smears failed to be diagnosed, leading to the justification for a multi-stage diagnostic approach that enhances diagnostic accuracy [15].

The study results indicating 93.4% sensitivity and negative predictive value confirm the conclusions of Algotar et al., which emphasize how cytology effectively dismisses high-grade disease through its integration with colposcopy and other diagnostic methods [16]. The results we published revealed a diminished PPV of 74.5%, which validates the major diagnostic challenge of cytology for establishing specific high-grade lesions as observed in Mallur et al. [17].

Research findings create vital implications which must be applied within clinical settings. The medium rate of premalignant and malignant lesions detected in VIA-positive symptomatic women requires routine cytology tests that lead to histopathological verification when abnormalities are found. The sound sensitivity level of the Pap test establishes its role as an initial screening method when healthcare resources are limited since confirmation through histopathology should be used only when tests indicate abnormalities or symptoms present.

The study contributes to existing research evidence, confirming cervical cytology's diagnostic quality when used with symptomatic female patients. The screening method needs to merge with histopathology analyses to swiftly identify cervical tissue abnormalities in areas with high cervical cancer death rates, which include developing nations (Ferlay et al.,) [18]. The main strength emerges from studying symptomatic VIA-positive women who demonstrate a high risk of cervical neoplasia. Histopathology and cytological screening provided a dependable comparative diagnostic approach to all analyzed cases.

6. Limitations And Recommendations

This study conducted at a single center and using a cross-sectional design, may face limitations due

to possible variations between observers and sampling bias. To confirm the results and enhance diagnostic precision, future research should involve multicenter, longitudinal studies that include HPV testing, which could lead to more effective cervical cancer prevention strategies for populations at high risk.

7. Conclusion

This study demonstrates a strong correlation between cervical cytology and histopathological findings among symptomatic VIA-positive women, affirming the diagnostic utility of the Pap smear in the early detection of cervical lesions. Its high sensitivity and specificity highlight its relevance in low-resource settings. The integration of cytology with histopathological confirmation remains essential for accurate diagnosis, timely intervention, and improved patient outcomes in cervical cancer screening programs.

References

[1] World Health Organization. Cervical cancer. [Internet]. 2018. Available from: https://www.who.int/news-room/fact-sheets/detail/cervical-cancer

[2] Sankaranarayanan R, Nessa A, Esmy PO, Dangou JM. Visual inspection methods for cervical cancer prevention. Best practice & research Clinical obstetrics & gynaecology. 2012 Apr 1;26(2):221-32.

[3] Nayar R, Wilbur DC, editors. The Bethesda system for reporting cervical cytology: definitions, criteria, and explanatory notes. Springer; 2015 Apr 13.

[4] Cibas ES, Ducatman BS. Cytology: Diagnostic principles and clinical correlates. Gulf Professional Publishing; 2003.

[5] Young R. WHO classification of tumours of female reproductive organs. Monodermal Teratomas and Somatic-Type Tumours Arising from a Dermoid Cyst. WHO. 2014:170-1.

[6] Bamanikar SA, Chandanwale SS, Baravkar DS, Dapkekar P. Study of Cervical Pap Smears in a Tertiary Hospital.

[7] Prasad A, Kumar A. Utility of Pap smear in detection of cervix cancer in females: a clinical study. Int J Clin Obst Gynaecol. 2018;2(3):10-2.

[8] Patil PR, Jibhkate SN. Cytohistopathological correlation of Papanicolaou smears: a hospital-based study. Int J Reprod Contracept Obstet Gynecol. 2016;5(6):1695-9.

[9] Atla BL, et al. Cytological patterns of cervical Pap smears with histopathological correlation. Int J Res Med Sci. 2015;3(7):1911-6.

[10] Sachan PL, Singh M, Patel ML, Sachan R. A study on cervical cancer screening using pap smear test and clinical correlation. Asia-Pacific journal of oncology nursing. 2018 Jul 1;5(3):337-41.

[11] Bindroo S, Garg M. Correlation of cervical pap smear with histopathological diagnosis in cervical lesions: A 2 years retrospective study.

[12] Malpani G, Agrawal P, Varma AV, Khandelwal N, Tignath G. Cervical Pap smear study and detection of abnormal epithelial lesions and determination of its accuracy by cytohistological correlation in patients of tertiary care teaching hospital in central India. Int J Reprod Contracept Obstet Gynecol. 2016 Jul;5(7):2312-6.

[13] Joshi C, Kujur P, Thakur N. Correlation of Pap smear and colposcopy in relation to histopathological findings in detection of premalignant lesions of cervix in a tertiary care centre. International Journal of Scientific Study. 2014;2(8):55-60.

[14] Bodal VK, Brar RK, Bal MS, Kaur B, Kaur S, Suri AK. Correlation of pap smear with histopathological findings in malignant and non-malignant lesions of cervix. Glob J Med Res E Gynecol Obstet. 2014 Jul 14; 14:19-23.

[15] Ashmita D, Shakuntala PN, Rao SR, Sharma SK, Geethanjali S. Comparison and correlation of PAP smear, colposcopy and histopathology in symptomatic women and suspicious looking cervix in a tertiary hospital care centre. Int J Health Sci Res. 2013 May;3(5):50-9.

[16] Algotar K, Nalawade A, Sachdev S. Predictive value of colposcopy in cervical cancer screening. Bombay Hosp J. 2004 Jul; 4603:1-9.

[17] Desai BR, Malur PR, Anita D, Geeta D, Bhavana S, Pallav G. Sequential screening with cytology and colposcopy in detection of cervical neoplasia. Journal of South Asian Federation of Obstetrics and Gynaecology. 2012 Apr 1; 1:45-8.

[18] Ferlay J, Shin HR, Bray F, Forman D, Mathers C, Parkin DM. Estimates of worldwide burden of cancer in 2008: GLOBOCAN 2008. International journal of cancer. 2010 Dec 15;127(12):2893-917

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