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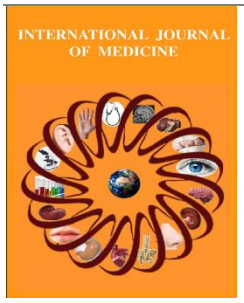

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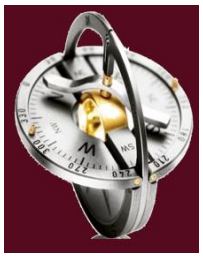

Research Article

Opportunistic Screening with Human Papilloma Virus Dna Test Along with Visual Inspection with Acetic Acid and Colposcopy in Women Attending Gynaecology Outpatient with White Discharge

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Abstract

Background: Cervical cancer remains a major public health problem worldwide, particularly in low- and middle-income countries. Despite being largely preventable through screening and early treatment of precancerous lesions, late diagnosis continues to contribute to high mortality. Opportunistic screening strategies using a combination of cytology, visual inspection techniques, and Human Papillomavirus (HPV) DNA testing may improve early detection, especially in resource-limited settings. ***Aim and Objectives***: To evaluate the effectiveness of opportunistic cervical cancer screening using Pap smear, Visual Inspection with Acetic Acid (VIA), Visual Inspection with Lugol's Iodine (VILI), colposcopy, and HPV DNA testing in women attending gynecology outpatient departments with complaints of white discharge. ***Materials and Methods***: A descriptive study was conducted among 100 married women aged 18–65 years presenting with white discharge at gynecology outpatient departments of two tertiary care hospitals. All participants underwent Pap smear, VIA, VILI, colposcopy, and high-risk HPV DNA testing. Statistical analysis was performed using Fisher's exact test. ***Results***: Most participants belonged to the 31–40-year age group. HPV positivity was observed in 11% of cases. A statistically significant association was found between abnormal Pap smear findings and HPV positivity ($p = 0.0037$). VIA and VILI findings also showed significant associations with HPV DNA positivity ($p = 0.0063$ and $p = 0.0197$ respectively). ***Conclusion***: The combined use of cytology, visual inspection, and HPV DNA testing is an effective opportunistic screening approach for early detection of cervical abnormalities. In low-resource settings, VIA and cytology may serve as cost-effective alternatives with comparable diagnostic value.

Keywords: Cervical cancer; HPV DNA testing; Pap smear; VIA; VILI; Opportunistic screening

Introduction:

Cervical cancer is one of the most common malignancies affecting women globally, ranking second among women aged 15–44 years. India contributes approximately 21% of global cervical cancer cases and 23% of related deaths, reflecting a disproportionately high disease burden. Late-stage diagnosis remains a major contributor to high mortality rates, emphasizing the need for effective screening strategies [1–3].

Cervical cancer is characterized by a prolonged precancerous phase that may extend up to 10 years, offering a significant window for early detection and intervention. Survival rates are strongly dependent on the stage at diagnosis, with localized disease showing markedly better outcomes. Screening modalities such as Pap smear, visual inspection methods, and HPV testing play a crucial role in identifying precancerous lesions [4–6].

While HPV vaccination offers long-term prevention, its immediate impact on adult populations is limited. Opportunistic screening using affordable and easily deployable methods can provide immediate benefits. Evaluating a combined screening approach involving cytology, visual inspection, colposcopy, and HPV DNA testing in symptomatic women can help optimize screening strategies in resource-constrained settings [7–11].

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MATERIALS AND METHODS

Study Design: Descriptive cross-sectional study.

Study Setting: Gynecology outpatient departments of Owaisi Hospital and Research Centre and Princess Esra Hospital, affiliated with Deccan College of Medical Sciences.

Sample Size: 100 married women.

Inclusion Criteria:
- Women aged 18–65 years
- Married women
- Women presenting with complaints of white discharge

Exclusion Criteria:
- Unmarried women
- Women outside the specified age group
- Women unwilling to participate

Methodology: All participants underwent Pap smear, VIA, VILI, colposcopy, and high-risk HPV DNA testing. HPV testing was performed using the FDA-approved Digene Hybrid Capture 2 system, detecting high-risk HPV types (16, 18, 31, 33, 35, 39, 45, 51, 52, 56, 58, 59, and 68) through real-time PCR targeting the E7 gene.

Statistical Analysis: Data were analyzed using Fisher's exact test. A p-value ≤ 0.05 was considered statistically significant.

Ethical Approval: Institutional Ethical Committee approval was obtained prior to commencement of the study.

RESULTS

The majority of participants were aged 31–40 years (35%), followed by 18–30 years (32%). Early age at marriage (<21 years) was observed in 78% of women. Inflammatory smears were reported in 80% of cases, while 9% showed dysplasia (6% LSIL and 3% HSIL). HPV DNA positivity was detected in 11% of participants.

Significant associations were observed between:

- Pap smear findings and HPV DNA positivity (p = 0.0037)
- VIA findings and HPV DNA positivity (p = 0.0063)
- VILI findings and HPV DNA positivity (p = 0.0197)

Abnormal cytology and visual inspection findings were more frequently associated with HPV positivity.

Table 1: Correlation between Pap Smear and HPV-DNA Results

Cytology Class	HPV Positive	HPV Negative	Total
Normal Smear	0	11	11
Inflammatory	5	75	80
LSIL	3	3	6
HSIL	3	0	3

Interpretation: The p-value is small 0.0037, which is less than the typical significance level of 0.05. This means there is a statistically significant association between Pap smear findings and HPV DNA test results. Suggesting that normal or inflammatory Pap smear are less likely to test positive for HPV, whereas LSIL or HSIL are more likely to be positive for HPV.

Table 2: Correlation between via findings and HPV-DNA Results

VIA Findings	HPV Positive	HPV Negative	Total
Normal	2	58	60
Abnormal Acetowhite Areas	6	25	31
Mosaicism	3	3	6
Abnormal Vessels	0	3	3

p-value: 0.0063

Interpretation: Given that the p-value is 0.0063, which is much less than the typical significance level of 0.05, we reject the null hypothesis. This indicates that there is a significant association between colposcopy (VIA) findings and HPV positivity. Suggesting that abnormal acetowhite areas and mosaicism are strongly associated with HPV positivity, whereas normal VIA findings are likely to be HPV negative.

In summary, the analysis shows a significant association between VIA findings and HPV positivity, suggesting that colposcopy findings are related to HPV status.

Table 3: Correlation between Vili findings and HPV-DNA results

VILI Findings	HPV Positive	HPV Negative
Normal Uptake	2	48
Partial Staining	3	15
Absent Staining	6	26

Odd's ratio:6.9167; p-value :0.0197

Interpretation: The p-value of 0.0197 is less than the common significance threshold of 0.05. This means we reject the null hypothesis at the 5% significance level. In other words, there is statistically significant association between VILI findings and HPV positivity, suggesting absent and partial staining are associated with HPV positivity, whereas normal uptake tends to be HPV negative.

DISCUSSION

Cervical cancer continues to be a leading cause of cancer-related morbidity and mortality among women, particularly in low- and middle-income countries. The present study evaluated an opportunistic combined screening approach using Pap smear, VIA, VILI, colposcopy, and HPV DNA testing in women presenting with white discharge, a common gynecological complaint in outpatient settings.

In the present study, the majority of women belonged to the reproductive age group of 31–40 years, which is consistent with findings reported by Nair and Pillai [9] and Bruni et al. [10], who observed higher prevalence of cervical abnormalities in sexually active women in this age group. Early age at marriage, noted in 78% of participants, is a well-established risk factor for persistent HPV infection and cervical neoplasia, as it increases the duration of exposure to HPV [4,11].

Inflammatory smears constituted the majority (80%) of Pap smear findings, similar to observations by Sahebali and Depuydt [6]. However, dysplastic changes (LSIL and HSIL) were detected in 9% of cases, emphasizing the importance of screening even in women presenting with seemingly benign symptoms such as white discharge. The detection of LSIL and HSIL in symptomatic women supports the role of opportunistic screening in routine gynecological practice.

HPV DNA positivity was observed in 11% of cases in this study. This prevalence is comparable to other Indian hospital-based studies, where HPV positivity ranged from 8% to 15% among symptomatic women [9,10]. A statistically significant association was observed between abnormal cytology and HPV positivity (p = 0.0037), reaffirming the causal relationship between high-risk HPV infection and cervical epithelial abnormalities, as originally established by Walboomers et al. [4].

Visual inspection methods also demonstrated significant associations with HPV DNA positivity. Abnormal VIA findings such as acetowhite areas and mosaic patterns were significantly associated with HPV positivity (p = 0.0063). Similar findings were reported by Kitchener and Kassem [8], who highlighted the utility of VIA as an effective triage tool in low-resource settings. VILI findings also showed a statistically significant association with HPV positivity (p = 0.0197), with absent or partial iodine uptake being more common in HPV-positive women. This supports earlier evidence that VILI improves specificity when combined with VIA [7].

One of the strengths of this study lies in its comprehensive screening approach, where all participants underwent cytological, visual, colposcopic, and molecular testing. Unlike large-scale population-based programs where tests are often performed sequentially or selectively, this study allowed direct comparison of all modalities within the same individuals. Colposcopy provided the added advantage of targeted evaluation and potential biopsy in a single visit, enhancing diagnostic accuracy.

From a public health perspective, Pap smear and HPV DNA testing require laboratory infrastructure and trained personnel, which may not always be available in peripheral or resource-limited settings. In contrast, VIA and VILI are cost-effective, provide immediate results, and can be performed with minimal equipment. The significant association observed between abnormal VIA/VILI findings and HPV positivity in this study suggests that visual screening methods can serve as practical alternatives or adjuncts to cytology and HPV testing in such settings.

The findings of this study reinforce the concept that cervical cancer prevention strategies must be tailored to available resources. While HPV DNA testing is the most sensitive screening method, cytology and visual inspection techniques continue to play a crucial role, especially where laboratory access is limited. The integration of these methods through opportunistic screening can facilitate early detection and timely intervention, thereby reducing cervical cancer burden.

CONCLUSION

The present study demonstrates that a combined opportunistic screening strategy using Pap smear, VIA, VILI, colposcopy, and HPV DNA testing is effective in detecting cervical abnormalities in women presenting with white discharge. Significant associations between abnormal cytology, visual inspection findings, and HPV positivity highlight the complementary nature of these screening tools. In low-resource settings, VIA and cytology can provide comparable diagnostic value to HPV testing. Strengthening screening programs alongside increased awareness and HPV vaccination is essential for reducing cervical cancer morbidity and mortality.

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REFERENCES

1. Bray F, Laversanne M, Sung H, Ferlay J, Siegel RL, Soerjomataram I. Global cancer statistics 2022: GLOBOCAN estimates of incidence and mortality worldwide for 36 cancers in 185 countries. CA: A Cancer Journal for Clinicians. 2024;74(3):229–233.
2. Government of India. National Family Health Survey (NFHS-5), 2019–21: India Fact Sheet. New Delhi: Ministry of Health and Family Welfare; 2021.
3. Canfell K, Kim JJ, Brisson M, Keane A, Simms KT, Caruana M, et al. Mortality impact of achieving WHO cervical cancer elimination targets: A comparative modelling analysis in 78 low-income and lower-middle-income countries. The Lancet. 2020;395(10224):591–603.
4. Walboomers JM, Jacobs MV, Manos MM, Bosch FX, Kummer JA, Shah KV, et al. Human papillomavirus is a necessary cause of invasive cervical cancer worldwide. Journal of Pathology. 1999;189(1):12–19.
5. Park TW, Fujiwara H, Wright TC Jr. Molecular biology of cervical cancer and its precursors. Cancer. 1995;76(10 Suppl):1902–1913.
6. Sahebali S, Depuydt CE. Immunocytochemistry in liquid-based cervical cytology: Analysis of clinical use following a cross-sectional study. International Journal of Cancer. 2005;118(5):1254–1260.
7. Díaz M, Moriña D. Moving towards an organized cervical cancer screening: Costs and impact. European Journal of Public Health. 2018;28(6):1132–1138.
8. Kitchener HC, Kassem J. Opportunistic screening for cervical cancer. BJOG: An International Journal of Obstetrics and Gynaecology. 2008;115(2):142–148.
9. Nair S, Pillai MR. Human papillomavirus, cellular genetics and susceptibility to cervical cancer. International Journal of Human Genetics. 2005;5(1):11–17.
10. Bruni L, Serrano B, Roura E, Alemany L, Cowan M, Herrero R, et al. Cervical cancer screening programmes and age-specific coverage estimates for countries and territories worldwide: A review and synthetic analysis. The Lancet Global Health. 2022;10(8):e1115–e1127.
11. Chesson HW, Dunne EF, Hariri S, Markowitz LE. The estimated lifetime probability of acquiring human papillomavirus in the United States. Sexually Transmitted Diseases. 2014;41(11):660–664.