

Diagnostic Accuracy of Cervical Pap Smear in Detecting Cervical Lesions: A Comparative Study

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Abstract

Background: Carcinoma of cervix is a preventable condition and considerable effort goes into detecting and treating the preinvasive disease. Since 1943, Pap smear cytology has been used for the screening of cervical cancer. Therefore, the present study was conducted to compare pap smear and histopathological findings of unhealthy cervix in tertiary care hospital.

Methods: The present comparative cross-sectional study was carried among women who presented with various gynaecological complaints at Department of Obstetrics and Gynaecology of tertiary care centre during November 2019 to October 2020. Sample sizes of 108 participants were enrolled in study. The collected data were analyzed with proper statistical methods using MS excel 2016.

Results: The majority of participants were with mean age of 37.48 ± 8.03 years and white discharge (58.33%) as the commonest complaint. Pap smear shows sensitivity of 86.67%, specificity of 83.33% with accuracy of 84.26% when compared to histological findings.

Conclusions: The high specificity and sensitivity of pap smear indicated that pap smear has an important role in the diagnosis of cervical pathology.

Keywords: Cytology, Histopathological findings, Unhealthy cervix

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Introduction

Carcinoma of the cervix is the most frequent of all the genital tract cancers. It is a very common for the gynaecologists who work in tertiary care institutes in the developing countries to get referrals from practitioners and peripheral health centres for patients with a clinical diagnosis of an “unhealthy cervix” [1]

In India, cervical cancer is the 2nd most frequent cancer in women (aged 15–44 years) after breast cancer accounting for nearly 14% of female cancer cases. [2] According to GLOBOCAN, India bears

18% of a load of invasive cancer in the world, and 80–85% of cases are found in phase III/IV. [3]

The Papanicolaou’s (Pap) smear is the primary screening tool for Cervical Intra-epithelial Neoplasia (CIN) and for invasive cancer of the uterine cervix. Recently, the assumed accuracy of the Pap smear, which was found to be 80% to 95% for detecting CIN and early invasive cancer, was questioned. Conversely, a false negative rate of the Pap smear had been reported under carefully controlled conditions. [4]

Carcinoma of cervix is a preventable condition and considerable effort goes into detecting and treating the preinvasive disease. Since 1943, Pap smear cytology has been used for the screening of cervical cancer. [5] However, the best method for cervical cancer screening still remains unclear. [5]

Therefore, the present study was conducted to compare pap smear and histopathological findings of unhealthy cervix in tertiary care hospital.

Objectives:

- To study the effectiveness of pap smear cytology findings.
- To correlate pap smear cytology and histopathological findings of unhealthy cervix.

Methodology:

The present comparative cross-sectional study was carried among women who presented with various gynaecological complaints. The study was carried out at Department of Obstetrics and Gynaecology of tertiary care centre during November 2019 to October 2020. The study was conducted after obtaining clearance from the Ethical Committee of the institute.

Colposcopy was performed on all those women who had recurrent vaginal discharge, postcoital or intermenstrual bleeding and unhealthy cervix on pelvic examination. The patients already diagnosed or treated for cervical cancer were excluded. Sample size was calculated using Power Analysis & Sample Size (PASS) software based on sample size determination technique mentioned in This resulted in a sample size of 108. Cytology findings and histopathology reports were entered in a specially-designed proforma. PAP smear was planned in women with abnormal complaints and abnormal cervix on naked eye examination, after consent. PAP smear was not done during menses, during abnormal vaginal bleeding, vaginal douching / sexual intercourse/ antibiotic taken in immediate past. On PAP smear, the Bethesda classification system [6] was used for cytological grading. The histopathological changes were classified as normal, CIN1, CIN2, CIN3 or invasive carcinoma. The collected data were analysed with proper statistical methods using MS excel 2016. Data was summarized in percentages and proportions.

Results:

Table 1: Age distribution among patients:

Age group (years)	No. of Patients	Percentage
≤30	06	05.56
31-40	61	56.48
41-50	23	21.29
51-60	11	10.19
>60	07	06.48
Total	108	100

The table no. 1 describes age profile of the patients. Among 108 patients, majority were in age group 31-40 years (56.58%) with mean age of 36.28± 10.12 years.

Table 2: Symptoms among patients

Clinical symptoms	Frequency (n=108)	Percentage
White discharge	63	58.33
Intermenstrual bleeding	16	14.81
Backache	15	13.88
Post-coital bleeding	13	13.03

Post-menopausal bleeding	11	10.18
Pelvic pain	07	06.48

(*Multiple response present)

The majority of patients had underlying disorder of white discharge i.e. 58.33%, followed by intermenstrual bleeding (14.81%), backache (13.88%), Post-coital bleeding (13.03%) and Post-menopausal bleeding. (10.18%)

Table 3: Cytology findings among patients: *

Pap smear findings	Frequency (n=108)	Percentage
Normal	69	63.89
ASCUS	01	00.93
LSIL	25	23.15
HSIL	11	10.18
Squamous cell Ca.	02	01.85
Total	108	100

(*atypical squamous cells of unknown origin, LSIL - low grade squamous intraepithelial lesion, HSIL - high grade squamous intraepithelial lesion)

The table no. 3 shows majority of the abnormal findings of Pap smear was LSIL (23.15%) followed by HSIL (10.18%). ASCUS was seen in one patient while 69 (63.89%) patients had normal cytology findings.

Table 4: Correlation of Pap smear and histopathological findings:

Pap smear findings	Histopathological findings		P value
	Abnormal (%)	Normal (%)	
Abnormal	26 (86.67)	13 (16.67)	X ² =21.19 P<0.0001
Normal	04 (13.33)	65 (83.33)	
Total	30 (100)	78 (100)	

The correlation between Pap smear and histological findings shows statistical significance. (P<0.0001)

Table 5: Effectiveness of Pap smear findings:

Pap smear findings	Percentage
Sensitivity	86.67%
Specificity	83.33%
PPV	66.67%
NPV	94.20%
Accuracy	84.26%

The table no. 5 shows that, Pap smear shows sensitivity of 86.67%, specificity of 83.33% with accuracy of 84.26% when compared to histological findings.

Discussion:

The vast majority, around 85% of cervical cancer cases and 87% of cervical cancer

deaths occur in the less developed regions because of poor access to screening and treatment services. [7] India alone accounts for one-quarter of the worldwide burden of cervical cancer. World Health organization considers cervical cancer as a preventable disease. This is because it can be diagnosed in its long precancerous phase. [8]

The present study shows majority of patients were in age group 31-40 years (56.58%) with mean age of 36.28 ± 10.12 years. Similar findings were observed in Dipali Prasad et al [9] study, where the mean age of patients was 34.68 ± 8.05 years. The results of our study were also comparable to study by Shahida Akhter et al [10] where mean age of the 143 women was 44.85 years (range: 25-72 years). Similar distribution of patients has been observed in other studies also. [11,12]

In the present study, the majority of patients had underlying disorder of white discharge i.e. 74.10%, followed by intermenstrual bleeding (9.82%), Post-coital bleeding (8.03%) and Post-menopausal bleeding. (6.25%)

Similarly, Dipali Prasad et al [9] observed most typical complaint was white discharge (50%) followed by pelvic pain (20%) amongst all symptomatic women. Garg R et al. [13] in his study also observed similar results with white discharge being the most common complaint, i.e., 58.5%.

In the present study, PAP smear cytology shows, majority of the abnormal findings of Pap smear was LSIL (23.15%) followed by HSIL (10.18%). ASCUS was seen in one patient while 69 (63.89%) patients had normal cytology findings.

Kalyankar VY et al [14] observed out of 98 PAP smears, 85.71% were normal and 11.22% were reported to have LSIL while 3.06% had HSIL reports. Similarly, to present study. Shahida Akhter et al [10] observed pap smear was abnormal in 48(33.5%) women and 95(66.5%) had normal Pap smear. This finding was in accordance to present study.

The present study shows, correlation between Pap smear and histological findings shows statistical significance. ($P < 0.0001$) sensitivity of 86.67%, specificity of 83.33% with accuracy of 84.26% when compared to histological findings.

Similarly for PAP smear cytology compared to histology, S. Amrita et al. [15] study had sensitivity and specificity of 81.8% and 78.2% respectively; Manizheh Sayyah-Melli et al [16] had sensitivity (77.4%) and specificity (69.7%) while T. S. Savitha et al [17] had low sensitivity (50%) and high specificity (90%).

Shahida Akhter et al [10] calculated sensitivity and specificity for Pap smear was 38.8% and 71.8%, indicating the low accuracy of Pap smear. This finding was in contrast to present study. [18]

The differences in the sensitivity and specificity of different studies are due to differences in laboratory values and the availability of trained personal. Real-time use of pap smear enhances the rate of carcinoma cervix detection in symptomatic women by the primary physician. With pap smear usage clinically, deaths caused by cervical cancer have decreased dramatically.

Conclusion: The high specificity and sensitivity of Pap smear indicated that it has an important role in the diagnosis of cervical intraepithelial neoplasia. The PAP smear screening should be carried out in all women of reproductive and menopausal age group at least once in a lifetime.

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References:

1. Dasari P. Grossly abnormal cervix: evidence for using colposcopy in the absence of squamous intraepithelial lesion by conventional papanicolau test. *Journal of Gynecologic Surgery*. 2011 Mar 1;27(1):5-8.
2. Shobha T, Davuluri S. Cervical cytopathology: Evaluation of its efficacy in detecting cervical precancerous and cancerous lesions, as evidenced by colposcopic biopsy. *Int J Sci Res* 2016;5:378-84.
3. Mustafa RA, Santesso N, Khatib R, Mustafa AA, Wiercioch W, Kehar R, et

- al. Systematic reviews and meta-analyses of the accuracy of HPV tests, visual inspection with acetic acid, cytology, and colposcopy. *Int J Gynaecol Obstet* 2016; 132:259-65.
4. Singh SL, Dastur NA, Nanavat MS. A comparison of colposcopy and the Papanicolaou smear: sensitivity, specificity and predictive value. *Bombay Hospital Journal*. 2000 Jul;42(3):447-51.
 5. Anttila A, Ronco G, Clifford G, Bray F, Hakama M, Arbyn M, et al. Cervical Cancer Screening Programmes and policies in 18 European countries. *Br J Cancer*. 2004; 91:935-41.
 6. Verma I, Jain V, Kaur T. Application of Bethesda system for cervical cytology in unhealthy cervix. *J Clin Diagn Res*. 2014 Sep;8(9): OC26-30.
 7. Suraiya UB, Ratnam SS, Rao KB, Arulkumar S. Cancer screening in gynecology. *Obstetrics and gynecology*. New Delhi: Orient Longman; 1994:454- 464.
 8. Bobdey S, Sathwara J, Jain A, Balasubramaniam G. Burden of cervical cancer and role of screening in India. *Indian J Med Paediatr Oncol*. 2016;37(40);278-85.
 9. Prasad D, Sinha A, Mishra U, Parween S, Raman RB, Goel N. Colposcopic evaluation of cervix in symptomatic women and its correlation with Pap smear. A prospective study at a tertiary care centre. *Journal of Family Medicine and Primary Care*. 2021 Aug ;10(8):2923.
 10. Akhter S, Bari A, Hayat Z. Variability study between Pap smear, Colposcopy and Cervical Histopathology findings. *J Pak Med Assoc*. 2015 Dec 1;65(12):1295-9.
 11. Pimple SA, Amin G, Goswami S, Shastri SS. Evaluation of colposcopy vs cytology as secondary test to triage women found positive on visual inspection test. *Indian J Cancer*. 2010 Jul-Sep; 47(3): 308-13.
 12. Boicea A, Pătrașcu A, Surlin V, Iliescu D, Schenker M, Chișu L. Correlations between colposcopy and histologic results from colposcopically directed biopsy in cervical precancerous lesions. *Rom J Morphol Embryol*. 2012; 53 (3 Suppl): 735-41.
 13. Garg R, Desai R. Cytologic and colposcopic evaluation of all symptomatic women at the tertiary care centre. *Int J Adv Med* 2017; 4:799-804.
 14. Kalyankar VY, Kalyankar BV, Gadappa SN, Kute S. Colposcopic evaluation of unhealthy cervix and its correlation with Papanicolaou smear in cervical cancer screening. *Int J Reprod Contracept Obstet Gynecol* 2017; 6:4959-65.
 15. Singhal A, Raina RK, Verma S, Verma A. Predictive accuracy of cervical cytology and colposcopy in diagnosing premalignant and malignant cervical lesions: A hospital-based study from the sub-Himalayan region of Indian subcontinent. *CHRISMED Journal of Health and Research*. 2019 Jan 1;6(1):39-43.
 16. Sayyah-Melli M, Rahmani V, Ouladsahebmadarek E, Jafari-Shobeiri M, Gharabaghi PM, Vahidi MN. Diagnostic value of pap smear and colposcopy in non-benign cervical lesions. morbidity and mortality. 2019; 7: 211-15.
 17. Savitha TS, Sapna W. A comparison of pap smear, colposcopy and colposcopy directed biopsy in evaluation of unhealthy cervix. *Journal of Evolution of Medical and Dental Sciences*. 2015 Mar 12;4(21):3639-48.