

PAP Smear versus Colposcopy in Symptomatic Women and Women with Suspicious-Looking Cervix

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Abstract

Objective: The aim of the study was to compare alternatives to human papillomavirus test, such as Papanicolaou (PAP) smear and colposcopy with histopathology in symptomatic women and those with suspicious-looking cervix. **Materials and Methods:** This prospective, 7-month study was conducted on 208 female patients aged ≥ 18 years with suspicious-looking cervix, complaining of vaginal discharge and menstrual bleeding. All patients were subjected to PAP smear, colposcopy, and colposcopy-directed biopsy. Sensitivity, specificity, and diagnostic accuracy were calculated to assess the performance of diagnostic tests. Data were analyzed using Fisher's exact tests using software R version 3.6.0. **Results:** Majority (166) of the patients were in the age group of 31–50 years (79.8%) and the mean age was 39.8 ± 7.9 years. Most of them had abdominal pain (65; 31.2%), white discharge (60; 28.8%), and early sexual exposure at 16–19 years (120; 57.6%) of age. PAP smear cytology revealed high-grade squamous intraepithelial lesion and low-grade squamous intraepithelial lesion (LSIL) in 4.3% and 5.8% women, respectively. Per speculum evaluation revealed cervical abnormalities in 85.6% of women. On colposcopy, low-grade infection and suspicious malignancy were noted in 28.8% and 14.4% women, respectively. The sensitivity and specificity of PAP test were 19.5% and 83.3%, respectively, whereas the corresponding values for colposcopy were 90.2% and 72.8%, respectively. **Conclusions:** PAP smear cytology demonstrated very poor sensitivity compared to colposcopy, especially for LSILs.

Keywords: Cervical cancer, colposcopy, cytology, vaginal discharge

INTRODUCTION

Cervical cancer, the third most common cancer globally, is preventable in majority of the cases. With the introduction of screening techniques in the mid-20th century in developed countries, its incidence has been reduced by $>74\%$.^[1] However, cervical cancer is still common in developing countries with an annual death rate of 8.2%. In India, the mortality rate due to cervical cancer is as high as 9%.^[1,2] Early detection of the disease at the premalignant stage can increase its prevention and cure. Increased awareness among women regarding reproductive health and screening techniques has reduced the disease burden globally.^[3]

Human papillomavirus (HPV), a major etiological factor of cervical cancer, transmits sexually and the risk of transmission increases with early sexual exposure and multiple partners.^[3,4] Colposcopy is a subjective modality which increases the diagnostic accuracy for subjects presenting with symptoms and altered cervical cytology. Colposcopy has around 60% sensitivity in cervical intraepithelial neoplasia (CIN),^[5] but

its sensitivity is increased to around 90% when combined with cervical cytology.^[5] On the contrary, Papanicolaou (PAP) and HPV testing have low sensitivity. Subjecting all women with high-grade squamous intraepithelial lesion (HSIL) or low-grade squamous intraepithelial lesion (LSIL) to colposcopy may increase the diagnostic sensitivity.^[3,5] In addition, the widespread use of HPV testing is often limited by the high cost. Therefore, combining cytology and colposcopy may be a successful screening strategy.^[6]

Very few studies have correlated the findings of PAP smear and colposcopy,^[4] and there is a dearth of studies on the South Indian population with respect to the correlation of PAP smear

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and colposcopy with histopathology which is considered the gold standard. Considering these factors, this study aimed at comparing PAP smear and colposcopy with histopathology in symptomatic women and those with suspicious-looking cervix in a hospital-based setting.

MATERIALS AND METHODS

This prospective study was carried out for 7 months (January 2019–December 2019) in the Obstetrics and Gynecology Department of a Krishna Institute of Medical Sciences (Deemed-to-be) University in Karad, Maharashtra, India, after approval (KIMSDU/IEC-307/015/03/06/2019) from the institutional ethics committee.

By convenient sampling technique, 208 female patients aged ≥ 18 years with the chief complaints of vaginal discharge and menstrual (or post coital) bleeding were recruited after obtaining written informed consent from all of them. The cervix considered as suspicious when it has one or more of the following: white or red patches, polyps, nodular cervix with retention cyst, hypertrophied cervix, ulcer, purulent or persistent discharge, and bleeding on touch. All patients were subjected to PAP smear and colposcopy, and the final diagnosis of premalignant cervical lesion was made on histopathology. Women with vaginal bleeding, acute infection, and cervical carcinoma (invasive); pregnant women; premenarchal girls; and postmenopausal women were excluded from the study.

Data regarding sociodemographics, clinical presentations, obstetric and gynecological history, and marital status were recorded in a pre-structured pro forma. Household income was categorized into lower class (<2000 rupees), middle class (2000–5000 rupees), and upper class (>5000 rupees). All patients underwent cervical examination. Patients with genital infections were prescribed vaginal pessaries and oral antibiotics and asked to come after a week. All symptomatic women treated for infections were subjected to PAP smear using Ayre's spatula and endocervical cytobrush. All slides were sent to the cytology Department and findings interpreted based on the Bethesda system.^[7] All the slides were evaluated by the same pathologist to maintain consistency in interpretation and reporting. Later, all patients were subjected to colposcopy. Colposcopic assessment included assessing the abnormal areas after application of acetic acid followed by Lugol's iodine and grading based on modified Reid's colposcopic index (RCI).^[7] Colposcopy-directed punch biopsies were taken from suspected lesions and sent for histopathological analysis.

Statistical analysis was done using software R version 3.6.0 (USA). Normality of the data was determined using the Shapiro–Wilk test. Continuous variables with normal distribution were presented as mean \pm standard deviation. Categorical variables were presented as frequencies and percentages and compared using Fisher's exact test. Sensitivity, specificity, and diagnostic accuracy were determined to assess the performance of the diagnostic tests. $P < 0.05$ was considered statistically significant at a 95% confidence interval.

RESULTS

Out of 208 patients, majority (166) were in the age group of 31–50 years (79.8%). The mean age of all patients was 39.8 ± 7.9 years. Economically, 150 (50.5%) belonged to the lower class followed by 98 (47.1) from the middle class and 5 (2.4%) from the upper class. One hundred and seventy-seven (85.1%) women were multiparous (>2 children), 28 (13.5%) were primiparous, and 3 (1.4%) were nulliparous. The mean parity of all patients was 2.3 ± 1.2 . Table 1 depicts the symptoms of all patients at the time of presentation and possible risk factors. Majority of the women had abdominal pain (65; 31.2%) and white discharge (60; 28.8%). Early sexual exposure at 16–19 years (120; 57.6%) of age was the major risk factor. Most women (85.6%) had cervical abnormalities; 170 (81.7%) had cervical polyps; and 8 (3.8%) had suspicious-looking cervix.

Table 2 shows sensitivity, specificity, and diagnostic accuracy of PAP smear and colposcopy in comparison to histopathology and colposcopy, respectively. Colposcopy demonstrated high sensitivity (90.2%) in comparison to histopathology. Table 3 depicts the comparison of the RCI score with histopathological findings; RCI >6 indicated a significant association with the abnormal findings of histopathology ($P < 0.001$; Chi-square

Table 1: Clinical presentations and possible risk factors

	Frequency, n (%)
Symptoms	
White discharge	60 (28.8)
Postcoital bleeding	8 (3.8)
Intermenstrual spotting	12 (5.8)
Urinary tract infection	25 (12)
Pain in the abdomen	65 (31.2)
Asymptomatic	38 (18.3)
Risk factors	
No contraceptive method used	96 (46.2)
Oral contraceptives usage	25 (12)
IUCD	60 (28.8)
History of STD	5 (2.4)
Tobacco abuse	30 (14.4)
Multiple sex partners	32 (15.3)
Early sexual exposure (years)	
11-15	30 (14.4)
16-19	120 (57.6)
>20	58 (27.8)

IUCD: Intrauterine contraceptive device, STD: Sexually transmitted disease

Table 2: Comparison of findings of Papanicolaou smear, colposcopy, and histopathology

Variables	Sensitivity	Specificity	DA
PAP smear versus HP	19.5	83.4	33.9
Colposcopy versus HP	90.2	72.8	86.5
PAP smear versus colposcopy	22.5	100	40.4

HP: Histopathology, DA: Diagnostic accuracy, PAP: Papanicolaou

Table 3: Comparison of Reid's colposcopic index score with histopathological findings

RCI	Frequency (n)	No biopsy (n)	Histopathology (n)				
			Chronic cervicitis with metaplasia	Cervicitis with mild atypia/dysplasia/koilocytic changes	CIN 2/3	Cervical endometriosis with squamous Metaplasia	Inadequate
0-2	100	36	62	0	0	0	02
3-5	60	0	52	5	1	1	1
6-8	30	0	10	7	8	4	1
Unsatisfactory	18	4	5	5	0	0	4

CIN: Cervical intraepithelial neoplasia, RCI: Reid's colposcopic index

Table 4: Comparison of Papanicolaou smear with histopathological findings

PAP smear	Frequency (n)	Histopathology (n)					
		Normal	Chronic cervicitis with metaplasia	Cervicitis with mild atypia/dysplasia/koilocytic changes	CIN 2/3	Cervical endometriosis with squamous Metaplasia	Inadequate
NILM	172	39	112	9	0	6	6
ASC-US	12	0	7	5	0	0	0
LSIL	12	0	12	0	0	0	0
HSIL	9	0	0	0	9	0	0
US	3	3	0	0	0	0	0

ASC-US: Atypical squamous cells-undetermined significance, HSIL: High-grade squamous intraepithelial lesion, LSIL: Low-grade squamous intraepithelial lesion, NILM: Negative for intraepithelial lesion or malignancy, US: Unsatisfactory smear, PAP: Papanicolaou, CIN: Cervical intraepithelial neoplasia

analysis). Table 4 represents comparison of PAP smear with histopathological findings; PAP smear showed a significant association with abnormal histopathological findings ($P = 0.028$; Fisher's Exact test). PAP smear findings were compared with RCI score [Table 5], which was not statistically significant ($P = 0.751$; Fisher's exact test).

DISCUSSION

The present study compared the findings of cytology and colposcopy in comparison to histopathology in women with suspicious-looking cervix. Majority of the patients were in the 31–50-years age group, indicating that the middle-age group was more prone to cervical neoplasms. Supporting our study findings, Gupta *et al.*^[8] reported that majority of the abnormal cytology cases (40.37%) were in the age group of 30–39 years, followed by 35.96% in the age group of 20–29 years. The mean age and mean parity were 39.8 ± 7.9 years and 2.3 ± 1.2 , respectively. These findings were in accordance with the studies conducted by Thulaseedharan *et al.*^[9] and Bhalerao *et al.*^[10] who reported a strong influence of multiparity on the risk for cervical lesions. Majority of the women in this study were of low-income status; however, they agreed to undergo all the required tests after description of the procedures. Various Indian studies have reported a higher incidence of cervical neoplasms among women from lower socioeconomic groups.^[9,11]

The sensitivity of PAP smear was 19.5% which is low when compared to the other studies wherein the sensitivity ranged from 27% to 50%. On the other hand, the sensitivity of colposcopy (90.2%) observed in this study was very high compared to that reported in established literature where it

ranged from 44% to 89%.^[10,12,13] These contrasting findings could be due to the small sample size in their studies. However, a better specificity with PAP smear compared to colposcopy was noted in this study. On PAP smear, 82.7% of women were diagnosed as NILM. More than 70% of them had abnormal colposcopy or RCI >3, indicating that PAP smear has a poor pickup rate for low-grade lesions. Nine women with a histopathological report of CIN2/3 showed HSIL in the cytology report, indicating that PAP smear has better sensitivity for high-grade lesions. Two prospective trials conducted by Flannelly *et al.*^[14] and Shafi *et al.*^[15] reported that colposcopy is an effective and safer option for HSIL and LSIL lesions. In a recent study, PAP findings were unsatisfactory in 38% of cases.^[16] Unsatisfactory colposcopic or cytologic findings represent real obstacles against proper screening.^[17] Moreover, many physicians encounter cervical lesions that may or may not be associated with cytologic abnormalities.^[18] On the contrary, Vaghela *et al.* reported 4.8% unsatisfactory report rate with PAP smear which might have been due to proper training of personnel and the use of the proper technique.^[19] Dharaiya and Maitra^[20] found a significant association between cytology and RCI with respect to HSIL and LSIL ($P = 0.02$), which was insignificant in our study ($P = 0.751$). Padmini *et al.*^[21] reported LSIL (5%), and HSIL (3%) in women screened with the PAP smear test. High rates of HSIL (3.8%) and LSIL (8.6%) lesions were observed in a study by conducted Nayani and Hendre.^[22] The quality of the PAP smear test depends on a number of factors such as specimen collection techniques, staining process and fixation and requires an experienced cytopathologist. Dharaiya *et al.*^[20] discussed that the PAP smear quality can be improved by using the Ayre's spatula, followed by endocervical cytobrush. Smears

Table 5: Comparison of Papanicolaou smear with Reid's colposcopy

PAP smear	Frequency (n)	Colposcopy (n)		
		Normal (0-2)	Abnormal (3-5)	Suspicious cervix (>6)
NILM	172	39	112	9
ASC-US	12	0	7	5
LSIL	12	0	12	0
HSIL	9	0	0	0
US	3	3	0	0

ASC-US: Atypical squamous cells-undetermined significance, HSIL: High-grade squamous intraepithelial lesion, LSIL: Low-grade squamous intraepithelial lesion, NILM: Negative for intraepithelial lesion or malignancy, US: Unsatisfactory smear, PAP: Papanicolaou

contaminated with blood may result in more false positivity of squamous intraepithelial lesions. Therefore, the cytological evaluations in this study were performed, keeping in mind the points discussed by Dharaiya *et al.*^[19] If PAP smear had been the only diagnostic modality used in this study, the cases with preinvasive cervical lesions would be missed. This is in accordance with the study conducted by Mallur *et al.*^[12]

The cytological and colposcopic findings in this study were correlated individually with the histopathological findings, but we failed to correlate them with each other. Combining PAP smear (due to its very low sensitivity) with colposcopy as a complementary method could make the screening more effective. As women in developing and low-resource countries are referred for colposcopy based on visual screening methods with a high positivity rate, it is important to have a triaging laboratory test like colposcopy practised competently in public health care settings.

CONCLUSIONS

PAP smear cytology demonstrated very poor sensitivity compared to colposcopy, especially for LSILs.

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Conflicts of interest

There are no conflicts of interest.

REFERENCES

- de Martel C, Georges D, Bray F, Ferlay J, Clifford GM. Global burden of cancer attributable to infections in 2018: a worldwide incidence analysis. *The Lancet Global Health*. 2020 Feb 1;8(2):e180-90.
- Mathew A, George PS. Trends in incidence and mortality rates of squamous cell carcinoma and adenocarcinoma of cervix - Worldwide. *Asian Pac J Cancer Prev* 2009;10:645-50.
- 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;3:50-59.
- Patel MM, Pandya AN, Modi J. Cervical PAP smear study and its utility in cancer screening, to specify the strategy for cervical cancer control. *Natl J Community Med* 2011;2:49-51.
- Monsonogo J, Bosch FX, Coursaget P, Cox JT, Franco E, Frazer I, *et al.* Cervical cancer control, priorities and new directions. *Int J Cancer* 2004;108:329-33.
- Shanta V, Krishnamurthi S, Gajalakshmi CK, Swaminathan R, Ravichandran K. Epidemiology of cancer of the cervix: Global and national perspective. *J Indian Med Assoc* 2000;98:49-52.
- Sellors JW, Sankaranarayanan R. *Colposcopy and Treatment of Cervical Intraepithelial Neoplasia: A Beginners' Manual*. Lyon: IARC Press; 2003.
- Gupta K, Malik NP, Sharma VK, Verma N, Gupta A. Prevalence of cervical dysplasia in western Uttar Pradesh. *J Cytol* 2013;30:257-62.
- Thulaseedharan JV, Malila N, Hakama M, Esmey PO, Cheriyan M, Swaminathan R, *et al.* Socio demographic and reproductive risk factors for cervical cancer - A large prospective cohort study from rural India. *Asian Pac J Cancer Prev* 2012;13:2991-5.
- Bhalerao A, Kulkarni S, Ghike S, Kawthalkar A, Joshi S. Correlation of Pap Smear, Colposcopy and Histopathology in women with unhealthy cervix. *J South Asian Feder Obst Gynae* 2012;4:97-8.
- Swaminathan R, Selvakumaran R, Vinodha J, Ferlay J, Sauvaget C, Esmey PO, *et al.* Education and cancer incidence in a rural population in south India. *Cancer Epidemiol* 2009;33:89-93.
- Mallur PR, Desai BR, Anita D, Geeta D, Bhavana S, Pallav G. Sequential screening with cytology and colposcopy in detection of cervical neoplasia. *J South Asian Feder Obst Gynae* 2009;1:45-8.
- Massad LS, Collins YC. Strength of correlations between colposcopic impression and biopsy histology. *Gynecol Oncol* 2003;89:424-8.
- Flannelly G, Anderson D, Kitchener HC, Mann EM, Campbell M, Fisher P, *et al.* Management of women with mild and moderate cervical dyskaryosis. *BMJ* 1994;308:1399-403.
- Shafi MI, Luesley DM, Jordan JA, Dunn JA, Rollason TP, Yates M. Randomised trial of immediate versus deferred treatment strategies for the management of minor cervical cytological abnormalities. *Br J Obstet Gynaecol* 1997;104:590-4.
- Damacena AM, Luz LL, Mattos IE. Cervical cancer screening in Teresina, Piauí, Brazil: Evaluation study using data of the Cervical Cancer Information System, 2006-2013. *Epidemiol Serv Saude* 2017;26:71-80.
- Darwish AM, Kamel MA, Zahran K, Aboulela M. Office cervicoscopy versus stationary colposcopy in suspicious cervix: A randomized controlled trial. *J Midlife Health* 2019;10:115-22.
- Fan A, Wang C, Zhang L, Yan Y, Han C, Xue F. Diagnostic value of the 2011 International Federation for Cervical Pathology and Colposcopy Terminology in predicting cervical lesions. *Oncotarget* 2018;9:9166-76.
- Vaghela BK, Vaghela VK, Santwani PM. Analysis of abnormal cervical cytology in papanicolaou smears at tertiary care center – A retrospective study. *IJBAR* 2014;5:47-9.
- Dharaiya N, Maitra N. Correlation of cytology and colposcopic findings using Reid's index in VIA-positive women. *J Obstet Gynaecol India* 2014;64:284-8.
- Padmini CP, Indira N, Chaitra R, Das P, Girish BC, Nanda KM, *et al.* Cytological and colposcopic evaluation of unhealthy cervix. *J Evid Med Healthc* 2015;2:6920-7.
- Nayani ZS, Hendre PC. Comparison and correlation of pap smear with colposcopy and histopathology in evaluation of cervix. *J Evol Med Dent Sci* 2015;4:9236-47.