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Original Research Article

## Colposcopic evaluation with modified IFCPC 2011 nomenclature and Swede score for diagnosing premalignant lesions of cervix: a comparative study

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### ABSTRACT

**Background:** Cervical cancer has a long precancerous stage. The early diagnosis in preinvasive stage provides a golden opportunity for prompt intervention to prevent its catastrophic consequences. Through this study we intended to compare the diagnostic accuracy of modified IFCPC 2011 nomenclature and Swede score with respect to gold standard histopathology in colposcopic evaluation of premalignant cervical lesions.

**Methods:** A comparative study was conducted at tertiary care hospital in Delhi, India between January 2021 to June 2022 on 50 women with abnormal Papanicolaou smear (ASCUS, LSIL, ASC-H, HSIL). Scoring of colposcopic lesions was done according to IFCPC nomenclature and Swede's scoring system. The two colposcopic scores were compared and their statistical association with histological findings were analysed. The collected data was analysed using SPSS version 25. The association of the qualitative variables were analysed using Fischer's exact test. Agreement was measured by Cohen kappa statistics.

**Results:** Sensitivity, specificity, positive predictive value, negative predictive value and diagnostic accuracy of modified IFCPC 2011 nomenclature for predicting LSIL and HSIL were 87.50%, 58.82%, 50%, 90.91%, 68% and 100%, 100%, 100%, 100% respectively. Sensitivity, specificity, positive predictive value, negative predictive value and diagnostic accuracy of swede score for predicting LSIL and HSIL were 87.50%, 41.18%, 41.18%, 87.50%, 56% and 100%, 77.27%, 37.50%, 100%, 80% respectively.

**Conclusions:** Modified IFCPC 2011 nomenclature had better predictive value than swede score in diagnosing both low grade and high grade premalignant lesions of cervix.

**Keywords:** HSIL, LSIL, Modified IFCPC 2011 nomenclature, Papanicolaou smear, Swede score

### INTRODUCTION

Cancer of cervix is the fourth most common cancer in women worldwide. It is a major health problem with 604 000 new cases and 342 000 global deaths.<sup>1</sup> It is the second most common cancer in India bearing 23% of global cervical cancer burden and is the third most common cause of mortality after breast and lung cancer.<sup>2,3</sup> The early age at marriage, multiple sexual partners, multiparity, poor genital hygiene, malnutrition, unprotected sexual

intercourse, human papilloma virus infection (HPV) and smoking are various risk factors for occurrence of cervical cancer. The prevalence of HPV infection constitutes around 93.80% in patients with invasive cervical cancer.<sup>4</sup> The screening modalities for cervical cancer includes cytological examination, visual inspection of cervix, and HPV DNA testing. Abnormal screening tests are followed by colposcopy. These modalities enables early identification of cervical lesions and thus help in reducing the morbidity and mortality related to cancer cervix.<sup>5</sup> Colposcopy is a procedure to closely examine cervix,

vagina and vulva for signs of disease. Visual inspection of the cervix, using acetic acid (VIA) or Lugol's iodine (VILI) is done to identify and guide biopsy of abnormal areas. There have been continuous efforts to objectify the procedure.

The Reids colposcopic index was proposed by Reid and Scalzi to reduce the subjective variation in colposcopic diagnosis. Although it reduced interobserver variation but had a drawback of non inclusion of the size of lesion.<sup>6,7</sup> The Swede score devised by Strander et al in 2005 incorporated the size of lesion along with other parameters of Reid score.<sup>8</sup> Modified IFCPC (International federation for cervical pathology and colposcopy) 2011 nomenclature provides descriptive analysis of unhealthy cervix and pays emphasis on normal and abnormal findings and classifies lesion as normal, minor, major and suspicious for invasion to reduce interobserver variations. Many individual findings, especially the two new pathognomonic signs, inner border sign and ridge sign, are proved to have good predictive accuracy. Pathognomonic signs by modified IFCPC 2011 nomenclature differ from other scoring system in that they are simply present or absent and not graduated hence more objective in predicting the severity of cervical intraepithelial neoplasia.

To improve the accuracy of colposcopy, repeated efforts have been made to unify the colposcopic nomenclature which provides standardized interpretations of the colposcopic findings. Very few studies are available in Indian settings where efforts have been put to compare the scoring systems to find out a more objectified method of colposcopy. Therefore, through this study we have tried to validate the positive claims emanating from the sparse literature that is presently available and explore this new colposcopic nomenclature.

## METHODS

A comparative study was done in the department of obstetrics and gynecology, Lady Hardinge Medical College, New Delhi between January 2021 to June 2022. The sample size of 50 was calculated based on sensitivity of modified IFCPC and prevalence of premalignant lesions. After obtaining ethical clearance from institutional ethical committee, about 50 women who were screened as abnormal Papanicolaou test attending gynecology OPD who fulfilled the inclusion criteria and willing to participate were included in the study after written informed consent. The reporting of abnormal Papanicolaou test was done according to standard Bethesda classification. All sexually active women >21 years of age to 65 years of age with abnormal Papanicolaou test showing ASCUS (atypical squamous cells of undetermined significance), AS-H (atypical squamous cells- cannot exclude HSIL), LSIL (low-grade squamous intraepithelial lesion includes human papillomavirus infection/mild dysplasia/CIN 1), HSIL (high-grade squamous intraepithelial lesion includes moderate and severe dysplasia, CIN2/3, and carcinoma in

situ were included. The patients with post hysterectomy status, pregnancy, who had earlier treated for cervical intraepithelial neoplasia and one already diagnosed with cervical cancer was excluded from study.

After careful history and examination, the women were subjected to colposcopic assessment of cervix on OPD basis. Colposcopic examination included: direct examination of cervix with a green filter after saline application; examination after application of 5% acetic acid; examination after Lugol iodine application.

Findings were recorded and colposcopic evaluation was done both according to modified IFCPC 2011 nomenclature and Swede score in same patient. Modified IFCPC 2011 nomenclature indicating the colposcopic findings as normal, minor (grade 1), major (grade 2), suspicious for invasion was considered as benign, low-grade lesion, high-grade lesion and cancer respectively.

Colposcopic diagnosis according to swede score by International Agency for Research on Cancer was done. The scoring of 0-4 is normal/low grade, 5-6 is high grade/non invasive cancer, 7-10 is high grade/invasive cancer. Results of both tests were correlated with histopathology. Histopathological analysis was done according to 2012 lower anogenital squamous terminology. The histopathological diagnosis was made as normal or benign, LSIL (CIN 1), HSIL (CIN 2/3), and carcinoma (including micro invasive carcinoma and invasive carcinoma). Standard treatment protocols were adopted according to American Society for Colposcopy and Cervical Pathology 2019 guidelines.

## Statistical analysis

The collected data was entered in MS excel and analysed using SPSS latest version 25. Quantitative data was expressed by mean and standard deviation and difference of means was observed by t-test. Qualitative data was expressed as percentages and difference between proportions was observed using chi square test. The association of the qualitative variables were analysed using Fischer's exact test. Agreement was measured by Cohen kappa statistics. P<0.05 was considered significant.

## RESULTS

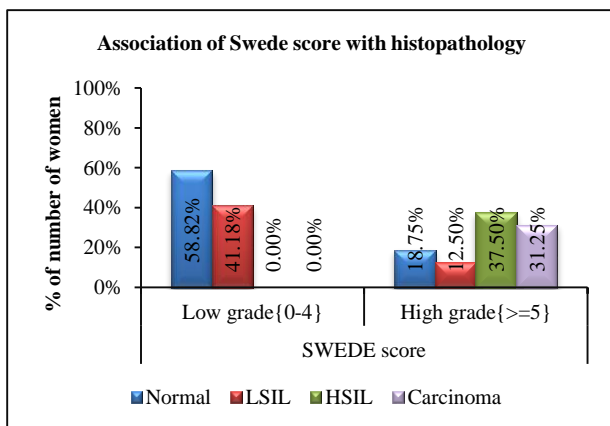
The majority of our study participants (50%) were in the age group of 31 to 40 years. Most were multiparous (92%) with 44% of women had two children. Around 58% were illiterate and 48% belonged to lower socioeconomic class as shown in Table 1.

Papanicolaou test in our women showed ASCUS in 66%, HSIL in 18%, LSIL in 12% and ASC-H in 4%. Swede score was 0-4 in 68% of women, 5-6 in 16%, 7-10 in 16%. Mean value of Swede score of study subjects was 3.74±2.64. According to modified IFCPC 2011 nomenclature, 56% had minor findings, 22% were normal,

12% had major findings. Modified IFCPC 2011 nomenclature diagnosed suspicious for invasion in only 10% of participants. Majority of our women (32%) had histopathology findings suggestive of low grade squamous intraepithelial lesion, 24% with inflammatory findings (chronic cervicitis with and without squamous metaplasia), no dysplasia in 22% and HSIL (high-grade squamous intraepithelial lesion) in 12%. Histopathology findings diagnosed carcinoma in 10% women.

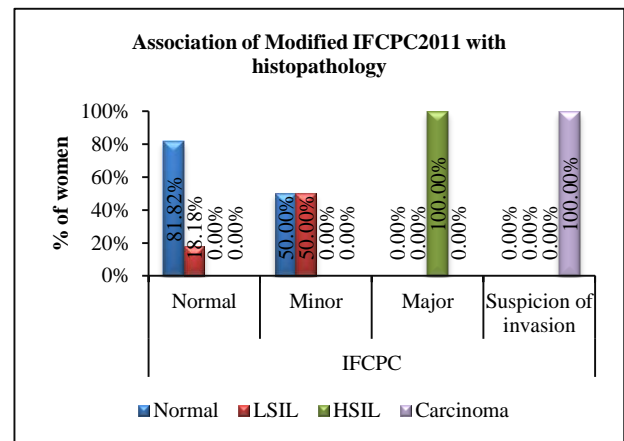
**Table 1: Socio-demographic details of study population.**

Parameters	N=50 (percentage)
<b>Age distribution (years)</b>	
21-30	8 (16)
31-40	25 (50)
41-50	12 (24)
51-60	2 (4)
61-65	3 (6)
<b>Mean±SD</b>	39.02±9.5
<b>Range</b>	22-65
<b>Education</b>	
Illiterate	29 (58)
Primary school	6 (12)
High school	7 (14)
Intermediate/diploma	4 (8)
Graduate	4 (8)
Professional/honours	Nil
<b>Socioeconomic status</b>	
Lower	24 (48)
Upper lower	4 (8)
Lower middle	14 (28)
Upper middle	8 (16)
Upper	Nil
<b>Parity</b>	
Para 1	4 (8)
Para 2	22 (44)
Para 3	13 (26)
Para 4	11 (22)



**Figure 1: Association of Swede score with histopathology.**

Out of 34 women who were diagnosed as low grade according to swede score, 20 (58.82%) had normal and while 14 (41.18%) had LSIL on histopathology. Out of 16 women diagnosed as high grade according to swede score 3 (18.75%) had normal histopathology, 2 (12.50%) had low grade lesions, 6 (37.50%) had high grade lesions on histopathology. 5 (31.25%) women were diagnosed with carcinoma on histopathology (Figure 1). Good agreement existed between histopathology and Swede score with kappa 0.749 and p value <0.0001 (statistically significant).



**Figure 2: Association of modified IFCPC 2011 with histopathology.**

Out of 11 women, who were diagnosed normal through modified IFCPC 2011 nomenclature 9 (81.82%) had normal histopathology and 2 (18.18%) had LSIL on histopathology. Out of 28 women who were diagnosed as minor by modified IFCPC 2011 nomenclature 14 (50%) had LSIL and 14 (50%) had normal findings on histopathology. About 6 women diagnosed as major lesion had HSIL on histopathology. Out of 5 women diagnosed as suspicious for invasion had carcinoma on histopathology (Figure 2). Good agreement existed between modified IFCPC 2011 nomenclature and histopathology with kappa 1 and p value <0.0001 (statistically significant).

Agreement between women who were diagnosed as low grade by swede score and women with histologically diagnosis of normal or benign, low grade squamous intraepithelial lesions (LSIL) was 87.17%. The agreement between colposcopic diagnosis and pathological diagnosis was 100% with kappa value of 0.749 in women with high grade by swede score and women with histologically diagnosis of high grade squamous intraepithelial lesions (HSIL) or carcinoma as depicted in Table 2.

Agreement between women who were diagnosed as normal by modified IFCPC 2011 nomenclature and women with histological diagnosis of normal or benign was 39.13%. Agreement between women who were diagnosed as minor by modified IFCPC 2011 nomenclature and women with histological diagnosis of low grade squamous intraepithelial lesions was 87.5%.

Agreement between women who were diagnosed as major by modified IFCPC 2011 nomenclature and women with histological diagnosis of high grade squamous intraepithelial lesions was 100%. Agreement between

women who were diagnosed as suspicious for invasion by modified IFCPC 2011 nomenclature and women with histological diagnosis of carcinoma was 100% and kappa value was 0.54 (Table 3).

**Table 2: Agreement between Swede score and histopathology.**

Swede score	Benign/low grade (n=39) (%)	High grade/malignant (n=11) (%)	Total (%)	P value	Kappa
<b>Benign</b>	34 (100)	0 (0)	34 (100)	<0.0001*	0.749
<b>Malignant</b>	5 (31.25)	11 (68.75)	16 (100)		
<b>Total</b>	39 (78)	11 (22)	50 (100)		

\*Fisher's exact test

**Table 3: Agreement between modified IFCPC 2011 nomenclature and histopathology.**

Modified IFCPC 2011	Histopathology				P value	Kappa
	Normal (%)	LSIL (%)	HSIL (%)	Carcinoma (%)		
<b>Normal (n=11)</b>	9 (18.00)	2 (4.00)	0 (0.00)	0 (0.00)	<0.0001	0.540
<b>Minor (n=28)</b>	14 (28.00)	14 (28.00)	0 (0.00)	0 (0.00)		
<b>Major (n=6)</b>	0 (0.00)	0 (0.00)	6 (12.00)	0 (0.00)		
<b>Suspicious for invasion (n=5)</b>	0 (0.00)	0 (0.00)	0 (0.00)	5 (10.00)		
<b>Total</b>	23 (46.00)	16 (32.00)	6 (12.00)	5 (10.00)		

**Table 4: Comparison of diagnostic accuracy of swede score and modified IFCPC 2011 nomenclature for diagnosing low grade and high-grade premalignant lesions.**

	Swede score		Modified IFCPC 2011	
	Low grade	High grade	Low grade	High grade
<b>Sensitivity</b>	87.50%	100.00%	87.50%	100.00%
<b>Specificity</b>	41.18%	77.27%	58.82%	100.00%
<b>Positive predictive value</b>	41.18%	37.50%	50.00%	100.00%
<b>Negative predictive value</b>	87.50%	100.00%	90.91%	100.00%
<b>Diagnostic accuracy</b>	56.00%	80.00%	68.00%	100.00%

The comparison of swede score and modified IFCPC 2011 nomenclature for diagnosing low grade premalignant lesions showed sensitivity of all three were comparable (87.50%). The modified IFCPC 2011 nomenclature had maximum specificity (58.82%), positive predictive value (50%), negative predictive value (90.91%) and diagnostic accuracy (68%) for predicting low grade premalignant lesions. For diagnosing high grade premalignant lesion, the sensitivity and negative predictive value of all three were comparable 100% for both while modified IFCPC 2011 nomenclature had maximum specificity (100%), positive predictive value (100%) and diagnostic accuracy (100%) for predicting high grade premalignant lesions (Table 4).

Our results thus showed that modified IFCPC 2011 nomenclature is better in predicting the premalignant lesions of cervix.

## DISCUSSION

Despite Pap smear being the most common screening test in use, the sensitivity is low for detecting high grade

cervical intraepithelial neoplasia.<sup>9,10</sup> Colposcopy developed by Hans Hinselmann in 1925 is a non-invasive method to evaluate abnormal cervical lesions.<sup>11</sup> The various scoring systems like Reid's colposcopy index devised in 1985 and swede's scoring system in 2005 have incorporated various parameters to improve the interpretation of lesions.<sup>12</sup>

The mean age of our study participants was 39.02±9.5 years. It was comparable to study done by Ranga et al, where the mean age was 40.3±8.1 years and study by Ashmita et al, where the mean age was 39.85±7.97 years.<sup>13,14</sup> About 92% of our women were multiparous and had 2 children. This was comparable to study by Ashmita et al where 94% women were multiparous and in study by Kushwah and Kushwah, most of the subjects were multiparous and had two children.<sup>14,15</sup>

In the present study, the sensitivity of swede score in predicting low grade premalignant lesions of cervix was found to be 87.5% and 100% for high grade lesions. It was almost comparable to the study by Rahman et al, with

95.2% for low grade lesion and 94.9% for high grade lesions.<sup>8</sup>

The specificity of swede score for low grade lesions in the present study was found to be 41.18%. Whereas the specificity of swede score for high grade lesions was found to be 77% which was comparable to study by Rahman et al (88.4%) and is lower than the specificity in the study by Li et al, where it was 98.59%.<sup>8,16</sup>

The positive predictive value of swede score as a screening test in the present study was found to be 41.18%. Whereas the positive predictive value of swede score for high grade lesions was found to be 37.5% which was comparable to study by Priya et al, where it was 42.7%.<sup>17</sup>

The negative predictive value of swede score as a screening test in the present study was found to be 87.50% which was also comparable to 91.4% in study by Rahman et al.<sup>8</sup> The negative predictive value of swede score for high grade lesions was 100%, similar to results seen in study by Rahman et al.<sup>8</sup>

In the present study, the sensitivity of modified IFCPC 2011 nomenclature in the detection of low-grade premalignant lesions was found to be 87.5% which was comparable to the study by Fan et al, (80.3%) and study by Li et al (79.34%) whereas the sensitivity of modified IFCPC 2011 nomenclature in the detection of high-grade premalignant lesions was found to be 100% which was comparable to the study by Zhang et al, (92.7%), higher than study by Li et al (63.64%).<sup>16,18,19</sup>

The specificity of modified IFCPC 2011 nomenclature for low grade premalignant lesions in the present study was found to be 58.82% which was comparable to study by Li et al and Fan et al where it was 67.14% and 63.70% respectively whereas the specificity of modified IFCPC 2011 nomenclature for high grade lesions in the present study was found to be 100% which was comparable to study by Li et al (96.01%) and Fan et al (98%).<sup>16,18</sup>

The positive predictive value of modified IFCPC 2011 nomenclature for low grade premalignant lesions in the present study was found to be 50% which was comparable to 67.37% in the study by Li et al and lower than Fan et al (83.4%) whereas for high grade lesions it was found to be 100% which was comparable to 93.2% in the study by Fan et al and 89.7% by Zhang et al.<sup>16,18,19</sup>

The negative predictive value of modified IFCPC 2011 nomenclature for low grade premalignant lesions in the present study was found to be 90.91% which was also almost comparable to the study by Li et al (79.17%) whereas for high grade lesions it was found to be 100% which was also comparable to 91.9% in the study by Li et al, 89.9% in a study by Fan et al and 84.5% in study by Zhang et al.<sup>16,18,19</sup> Modified IFCPC 2011 nomenclature reduces subjectivity and increases reproducibility between different colposcopists.

Sample size is a limiting factor in our study. Hence, further large studies with abnormal papanicolaou test should be done to support the conclusion that modified IFCPC 2011 nomenclature is better than Swede score for diagnosing premalignant lesions of cervix.

## CONCLUSION

Both modified IFCPC 2011 nomenclature and swede score were comparable but modified IFCPC 2011 nomenclature has better diagnostic accuracy than Swede score in predicting low grade and high grade premalignant lesions of cervix. Although the diagnostic accuracy for high grade lesions is more than low grade lesions, percentage agreement between modified IFCPC 2011 nomenclature and histopathology was also more as compared to Swede score. Hence, modified IFCPC 2011 nomenclature is easier and more objectified than Swede score for colposcopic diagnosis of premalignant lesions of cervix.

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