Original Article

Evaluation of cervical lesions with colposcopy and comparison with histopathological findings

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ABSTRACT

Background: *Colposcopy is a highly useful tool for early detection of precancerous cervical lesions. Colposcopy gives quick result and guides the site of biopsy which can be done in a single visit proving itself a better screening modality for premalignant lesion and thus plays an important role in primary screening, guiding cervical biopsy and even treatment in some cases. This study was carried out to compare the colposcopy findings with the histopathological diagnosis in women attending the outpatient department with per vaginal white discharge, post coital bleeding, intermenstrual bleeding or post-menopausal bleeding or where colposcopy was done as a screening test.*

Methods: *This retrospective study was conducted in the Department of Obstetrics and Gynaecology in BIRDEM General Hospital (Mohila O Shishu). Relevant data of 58 women from March 2023 to December 2023 from the colposcopy register were used. Patients were referred for colposcopy based on clinical symptoms or who had unhealthy cervix on per speculum examination. Cervical lesions were assessed colposcopically, biopsy was taken and was sent for histopsthology. Statistical analysis was performed by statistical software SPSS version 27.0.*

Results: *The mean age (±SD) of the participants was 45.64±10.05 years and majority of the subjects (39.7%) were in the 40-49 years age group. Most prevalent premalignant cervical lesion diagnosed colposcopically was cervical intraepithelial neoplasia I (CIN I) (18; 31.03%) followed by CIN II (5; 8.62%). On histopathology, the most common benign lesion was chronic cervicitis in 34(58.62%) cases and the commonest premalignant lesion was CIN I in 16(27.58%) cases and it was most common (8.62%) in the 50-59 year age group. For any type of CIN, colposcopy demonstrated a sensitivity of 66.67% (95% CI: 46.04-83.48) and specificity of 76.32% (95% CI: 59.76-88.56) when compared to histopathology. The overall accuracy of colposcopy was 72.31% (95% CI: 59.81-82.69).*

Conclusion: *This study demonstrated a high sensitivity, specificity, PPV, NPV and accuracy of colposcopy when compared to histopathological findings in diagnosing cervical premalignant conditions.*

Key words: *Cervical intraepithelial neoplasia, colposcopy, histopathology, premalignant cervical lesions.*

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INTRODUCTION

Cervical cancer is the fourth most common cancer in women globally. Around 660,000 new cases and around 350,000 deaths were documented worldwide in 2022. About 94% of these occurred in low- and middle-income countries (LMICs). Cervical cancer is most prevalent with highest mortality rates in sub-Saharan Africa, Central America and South-East Asia where screening efforts have been suboptimal.[1] Cervical cancer is the 2nd most common cancer among women in Bangladesh

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and is also the 2nd most frequent cancer among women of reproductive age. In the year 2022, approximately 8268 women were diagnosed with cervical cancer and 4971 died from the disease and in 2023, Bangladesh had a population of 64.0 million women aged 15 years and older who were at risk of developing cervical cancer.[2]

The crucial step to reduce cervical cancer incidence is to adopt the preventive approach. The traditional screening approach based on cytology, colposcopy, histological confirmation, early detection and treatment of cervical disease at early stage has been successful at reducing cervical cancer morbidity and mortality.[3] In conjunction with primary screening and treatment, traditional colposcopy plays an important role in guiding cervical biopsy. In LMICs, colposcopy is widely used to detect cervical intraepithelial neoplasia (CIN) and guide cervical biopsy sites for women who had abnormal cytology, human papillomavirus (HPV) infections and clinical symptoms of suspected cervical diseases.[4,5]

Colposcopy was first described as a method for early cervical cancer detection more than 90 years ago. It includes a magnified visual inspection of the cervix using 5% acetic acid under a strong light source and remains the standard procedure to guide biopsy and treatment approaches.[6] Most commonly CIN originates as a single focus in the transformation zone (TZ) at the advancing squamocolumnar junction (SCJ) and can progress horizontally to involve the entire TZ.[7] According to American Society for Colposcopy and Cervical Pathology (ASCCP), colposcopy is defined as 'the use of a specific instrument, a colposcope, for the real-time visualization and assessment of the uterine cervix, specifically the TZ, for the detection of CIN/squamous intraepithelial lesions (SIL) and invasive cancer'.[4] Colposcopy is indicated for the evaluation of women at increased risk for cervical neoplasia, including those with abnormal or inconclusive cervical cancer screening tests, symptoms suggestive of cervical cancer, unhealthy looking cervix, abnormal per vaginal bleeding or unexplained cervicovaginal discharge.[7]

Current WHO guidelines recommend using HPV testing for primary screening and suggest either treatment of all HPV-positive women or a 'screen, triage and treat' approach using partial genotyping, colposcopy, visual inspection with acetic acid or cytology to triage women after a positive HPV test.[1,6] In developed countries, three yearly screening programme based on cytology and/or HPV testing has led to a decline in cervical cancer incidence and mortality. But such screening programmes have achieved very limited success in developing countries due to a number of factors like limited number of trained personnel, laboratory facilities, equipments, high cost of services and poor follow-up.[8] In such scenario, colposcopy can be a highly useful tool for early detection of precancerous lesions. Colposcopy gives faster result and guides the site of biopsy which can be done in a single visit proving itself as a better screening modality for premalignant lesion and colposcopy guided biopsy is accepted as the gold standard in the evaluation of cervical lesions.[8,9] Especially, colposcopy is considered a definitive diagnostic tool for highgrade CIN II-III/carcinoma in situ and microinvasive cervical cancer.[3]

This study was carried out to compare the colposcopy findings with the histopathological diagnosis in women attending the outpatient department with relevant clinical symptoms or in some cases where colposcopy was done as a screening test.

METHODS

This retrospective study was conducted in the Department of Obstetrics and Gynaecology in BIRDEM General Hospital (Mohila O Shishu). Relevant data from March 2023 to December 2023 from the colposcopy register were used. Women who had symptoms like per vaginal white discharge, post coital bleeding, intermenstrual bleeding or post-menopausal bleeding and some patients with clinically unhealthy cervix diagnosed by speculum examination like, cervical erosion, cervical polyp and patients with abnormal pap smears were advised for doing colposcopy by consultant gynaecologists. Data of 58 women in whom both colposcopy and biopsy followed by histopathology had been done were included in the study. Colposcopy was performed following standard protocol.[4] During colposcopy general appearance and characteristics of the cervical TZ were assessed and were termed as TZ1, TZ2 or TZ3 according to the International Federation of Cervical Pathology and Colposcopy (IFCPC) terminology.[4] According to visibility, the squamocolumnar junction (SCJ) were designated as 'fully visible' or 'not fully visible'.[4] The application of 5% acetic acid was used to identify potential lesions. Changes were assessed colposcopically and biopsy was taken and was sent for

histopathology. Statistical analysis was performed by statistical software SPSS version 27.0.

RESULTS

Colposcopy and histopathology reports of total 58 women were analyzed and compared in this study. The mean age (±SD) of the participants was 45.64±10.05 years with a range from 27 years to 65 years. Distribution of the study subjects according to age group is given in Table I. Majority of the subjects (39.7%) were in the 40-49 years age group.

Table I. Distribution of the study subjects according to age group (N=58)

Age group	Frequency (Percentage)
<30	2 (3.44)
30-39	14 (24.13)
40-49	23(39.65)
50-59	11(18.96)
≥60	8(13.88)

SCJ was fully visible in 40 cases (68.96%) and TZ of these women were designated as TZ1. Among the rest of the 18 not fully visible SCJs, 4(6.89%) had TZ2 and 14(24.13%) had TZ3. When analyzed against age group, finding of not fully visible SCJ and both TZ2 and TZ3 were related to increasing age (Table II).

After colposcopic examination the cervical lesions, if any, were designated as CIN I, II or III. Most prevalent lesion was CIN I in 18(31.03%) cases, followed by 5(8.62%) CIN II cases. The cervices of 2(3.44%) women were suspected to have invasive carcinoma as they had macroscopic growths which were dense white when 5% acetic acid was applied. Subjects of the 30-39 year group had 8(13.79%) CIN I cases, 50-59 year age group had 5(8.62%) CIN I cases and 40-49 year age group had both CIN I and CIN II in same proportion (6.89%) (Table III).

Table II. Distribution of the transformation zones (TZ) and squamocolumnar junctions (SCJ) according to age group (N=58)

Age group	Transformation zone (TZ)			Squamocolumnar junction (SCJ)	
	TZ I	TZ II	TZ III	Fully visible	Not fully visible
<30	2(3.44%)	0	0	2(3.44%)	0
30-39	14(24.13%)	0	0	14(24.13%)	0
40-49	18(31.03%)	1(1.72%)	4(6.89%)	18(31.03%)	5(8.62%)
50-59	5(8.62%)	3(5.17%)	3(5.17%)	5(8.62%)	6(10.34%)
e”60	1(1.72%)	0	7(12.06%)	1(1.72%)	7(12.06%)

Table III. Distribution of the cervical lesions on colposcopy according to age group (n=58)

Age group	Normal	CIN I	CIN II	CIN III	Suspected carcinoma
<30	1(1.72%)	1(1.72%)	0	0	0
30-39	6(10.34%)	8(13.79%)	0	0	0
40-49	14(24.13%)	4(6.89%)	4(6.89%)	0	0
50-59	6(10.34%)	5(8.62%)	0	0	0
e”60	6(10.34%)	0	1(1.72%)	0	2(3.44%)
Total	33(56.89%)	18(31.03%)	5(8.62%)	0	2(3.44%)

On histopathology, the most common benign lesion was chronic cervicitis in 34(58.62%) cases and the commonest premalignant lesion was CIN I in 16(27.58%) cases and it was most common (8.62%) in the 50-59 year age group. Both the 30-39 year group and 40-49 year age group had 4(6.89%) CIN I cases. There was one histologically confirmed CIN II case in the 50-59 year age group and one case of CIN III was detected in the ≥60 age group. (Table IV)

Table V shows the comparison between colposcopic findings and the findings of histopathlogical examination. Out of 33 normal looking cervix on colposcopy, 4(6.89%) cases were normal on histopathology, 25(43.10%) cases had chronic cervicitis and 4(6.89%) apparently normal cervix were finally diagnosed with CIN I. Out of 18 colposcopically diagnosed CIN I cases, 9(15.51%) were finally CIN I, 8(13.79%) were chronic cervicitis and 1(1.72%) case was CIN II on histopathology. Out of 5 colposcopically diagnosed CIN II cases, 3(5.17%) were CIN I, 1(1.72%) was CIN III and 1(1.72%) was chronic cervicitis on histopathology. The 2 macroscopic growths suspected to be invasive carcinoma were histologically confirmed to be invasive squamaous cell carcinoma (SCC) grade I and grade II.

As histopathology is the gold standard for tissue diagnosis, the results of colposcopy were tested against it to find out its diagnostic efficacy. For any type of CIN, colposcopy demonstrated a sensitivity of 66.67% (95% CI: 46.04-83.48) and specificity of 76.32% (95% CI: 59.76-88.56). The overall accuracy of colposcopy was 72.31% (95% CI: 59.81-82.69) (Table VI).

Table IV. Distribution of the histopathological findings according to age group (n=58)

Age group	Normal	CIN I	CIN II	CIN III	Chronic cervicitis	Invasive SCC I	Invasive SCC II
<30	0	1(1.72%)	0	0	1	0	0
30-39	2(3.44%)	4(6.89%)	0	0	8(13.79%)	0	0
40-49	0	4(6.89%)	0	0	18(31.03%)	0	1(1.72%)
50-59	0	5(8.62%)	1(1.72%)	0	5(8.62%)	0	0
≥60	2(3.44%)	2(3.44%)	0	1(1.72%)	2(3.44%)	1(1.72%)	0
Total	4(6.89%)	16(27.58%)	1(1.72%)	1(1.72%)	34(58.62%)	1(1.72%)	1(1.72%)

Table V. Comparison of colposcopic and histopathological findings (n=58)

Colposcopic findings		Histopathological findings	
Normal	33(56.89%)	Normal	4(6.89%)
		CIN I	4(6.89%)
		Chronic cervicitis	25(43.10%)
CIN I	18(31.03%)	CIN I	9(15.51%)
		CIN II	1(1.72%)
		Chronic cervicitis	8(13.79%)
CIN II	5(8.62%)	CIN I	3(5.17%)
		CIN III	1(1.72%)
		Chronic cervicitis	1(1.72%)
Suspected carcinoma	2(3.44%)	Invasive SCC I	1(1.72%)
		Invasive SCC II	1(1.72%)

Table VI. Evaluation of performance of colposcopy as a diagnostic test

Statistic	Value	95% CI
Sensitivity	66.67%	46.04% to 83.48%
Specificity	76.32%	59.76% to 88.56%
Positive Likelihood Ratio	2.81	1.50 to 5.29
Negative Likelihood Ratio	0.44	0.25 to 0.77
Disease prevalence	41.54%	29.44% to 54.44%
Positive Predictive Value	66.67%	51.58% to 78.97%
Negative Predictive Value	76.32%	64.75% to 84.97%
Accuracy	72.31%	59.81% to 82.69%

DISCUSSION

This study included 58 women who were referred for colposcopy on the basis of clinical symptoms suggestive of any cervical pathology, who had unhealthy looking cervix or who had any abnormal cytology report. Mean age (±SD) of the subjects was 45.64±10.05 years and majority (39.7%) of them were in the 40-49 year age group. This is similar to the studies done by Sabbella and Hasamnis[10], Joshi et al.[11] and Algotar et al.[12] In the study by Gohil et al.[13], most of the patients (53.33%) were also over 40 years. However, it was the second most common age group in studies by Valls et al.[6], Kohale et al.[8], Upadhyay et al.[14] and Vidyadhar et al.[15], making the cumulative age group of 30-49 year the largest group.

Complete visual assessment of the cervix depends on the type of TZ which is not possible in a cervix with a type 3 TZ and intracervical lesions may be missed. In this study, squamocolumnar junction (SCJ) was fully visible in 40 cases (68.96%) and transformation zone (TZ) was of TZ1 type in 40(68.96%), TZ2 in 4(6.89%) and TZ3 in 14(24.13%) cases. When analyzed against age group, finding of not fully visible SCJ and both TZ2 and TZ3 were related to increasing age as observed in studies done by Korolenkova et al.[16], Li et al.[17] and Stuebs et al.[18] On colposcopic examination, most common lesion was CIN I in 18(31.03%) cases, followed by 5(8.62%) CIN II cases and 2(3.44%) cases were suspected to be carcinoma. Subjects of the 30-39 year group had the highest number of CIN I cases i.e. 8(13.79%) and 50-59 year age group had 5(8.62%) CIN I cases. The 40-49 year age group had both CIN I and CIN II in same proportion (6.89%). In an Indian study by Lata et al.[7], incidence of CIN was 2.9% in 20-29 age group, 13.8% in 30-39 age group, 15% in 40-49 age group and 17.64% in 50 years and above. In their study also, cumulative incidence of CIN was found to be high among the age group 30-49 years. However, the age distribution was different in a Russian study by Korolenkova et al.[16], where the mean age of patients with CIN II and III were 32.8±8.4 years and 34.1±6.8 years respectively.

Colposcopy directed biopsy were performed in all the cases. On histopathology, the most common benign lesion was chronic cervicitis in 34(58.62%) cases and the commonest premalignant lesion was CIN I in 16(27.58%) cases and it was most common (8.62%) in the 50-59 year age group. Both the 30-39 year group and 40-49 year age group had 4(6.89%) CIN I cases. There was one histologically confirmed CIN II case in the 50-59 year age group and one case of CIN III was detected in the e"60 age group. These findings are in accordance with the findings by Gandavaram et al.[19] where they reported 56.8% with chronic cervicitis with metaplasia, 19.2% CIN I, 14.4% CIN II and 9.6% carcinomas. Sahin et al.[20] reported CIN I in 21%, CIN II in 7% and carcinoma in 0.5% cases. Almost similar percentages were also observed by Joshi et al.[11] and Vidyadhar et al.[15]

Out of 33 normal looking cervix on colposcopy, 4(6.89%) cases were normal on histopathology, 25(43.10%) cases had chronic cervicitis and 4(6.89%) apparently normal cervix were finally diagnosed with CIN I. Out of 18 colposcopically diagnosed CIN I cases, 9(15.51%) were finally CIN I, 8(13.79%) were chronic cervicitis and 1(1.72%) case was CIN II on histopathology. Out of 5 colposcopically diagnosed CIN II cases, 3(5.17%) were CIN I, 1(1.72%) was CIN III and 1(1.72%) was chronic cervicitis on histopathology. The 2 macroscopic growths suspected to be invasive carcinoma were histologically confirmed to be invasive squamaous cell carcinoma (SCC) grade I and grade II. So, colposcopic diagnosis of CIN I was in accordance with histopathology in 50% (9/18) cases, overdiagnosed in 44.44% (8/18) cases and underdiagnosed in 22.22% (4/18) cases. On the other hand, CIN II cases were overdiagnosed in 60% cases, as 3 out of 5 were CIN I, 1 was CIN II and 1 was chronic cervicitis on histopathology. In analysis of previous literature, it is obvious that there is some controversy regarding under- and overestimation of colposcopic assessments. In some studies, cervical lesions are more often underestimated, while in other studies cervical

lesions are more often overestimated. In a study by Fuke et al.[21], colposcopy showed accurate estimation in 57.89% cases, over estimation in 36.84% cases and under estimation in 5.26% cases. Li et al.[17] also showed almost similar results. The rates of overdiagnosis (19.6%; 938/4778) and underdiagnosis (18.8%; 897/4778) were fairly balanced in the study by Stuebs et al.[18] and in a study by Ruan et al.[22] including 1828 women, almost half of the CIN IIs and carcinomas were underestimated. Korolenkova et al.[16] reported that, overdiagnosis was not a problem in CIN II or III diagnosis because all women with CIN II or III were treated with large loop excision of the transformation zone. But underdiagnosis was the most critical colposcopy failure in their study and was observed in 45.9% cases, from which, 34.0% had no acetowhite lesions on the ectocervix. The absence of acetowhite cervical lesions might not exclude high grade cervical lesions especially in HPV-positive patients or patients with cytological abnormalities. So, random multifocal biopsies are suggested in all quadrants of cervix with no visible lesions in these patients category.[23,24] Valls et al.[6] commented in their study that several factors can influence the accuracy of colposcopy to detect cervical intraepithelial neoplasia (CIN) including clinical experience, biopsy site, and the number of biopsies and may lead to cervical lesions being missed or may require additional unnecessary diagnostic procedures. Regardless of skill, performing more biopsies increases the sensitivity of colposcopy.[25]

Evaluation of performance of colposcopy as a diagnostic test demonstrated a wide range of variability in different studies and were more or less similar to this study. The sensitivity in other studies ranged from 56.29% to 80.20%, with a specificity range of 52.74% to 93.82%. The positive predictive value and negative predictive value rates ranged from 76.32% to 77.47% and 85.04% to 95.41%, respectively and accuracy of colposcopy was 84.65% to 88.00%.[19,26,27]

Conclusion

This study demonstrated a high sensitivity, specificity, PPV, NPV and accuracy of colposcopy when compared to histopathological findings. So it can be concluded that a detailed colposcopic evaluation of cervix with a guided biopsy remains an essential tool for the diagnosis of premalignant cervical lesions and early cervical cancer.

Authors' contribution: FTN Designed the study, prepared, reviewed, drafted the manuscript and did literature search. SS reviewed the manuscript and helped in data collection and literature review. NN helped in data collection and reviewed manuscript. MNA helped in data analysis.

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