

ORIGINAL ARTICLE

Association of Clinical Features of Endometriosis with the Laparoscopic Staging of the Disease among Infertile Women

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ABSTRACT

Background: Endometriosis is a common gynecologic disorder that frequently contributes to infertility. While clinical symptoms often guide initial assessment, their correlation with disease severity remains unclear. This study aimed to evaluate the association between clinical features and laparoscopic staging of endometriosis among infertile women. **Methods & Materials:** A cross-sectional observational study was conducted at BIRDEM General Hospital-2, Dhaka, from July 2017 to June 2018. A total of 100 infertile women undergoing diagnostic laparoscopy for suspected endometriosis were enrolled. Clinical symptoms (dysmenorrhea, dyspareunia, chronic pelvic pain, menorrhagia, dyschezia, urinary symptoms) and pervaginal examination findings (tenderness, nodularity, fullness, restricted uterine mobility, chocolate cysts) were recorded. Laparoscopic staging was performed according to the revised American Society for Reproductive Medicine (r-ASRM) classification. Associations were analyzed using Chi-square or Fisher's exact tests, with $p < 0.05$ considered significant. **Results:** Endometriosis was diagnosed in 38% of participants, with Stage IV being most common (47.4%). Stage III and IV together accounted for 68.4% of cases. Severe dysmenorrhea (36.8%) was significantly associated with advanced stages ($p = 0.016$). Dyspareunia, chronic pelvic pain, menorrhagia, and dyschezia were more frequent in women with endometriosis but were not consistently predictive of disease stage. On pervaginal examination, tenderness ($p = 0.019$) and restricted uterine mobility ($p = 0.020$) were significantly associated with higher laparoscopic stages. Other findings, including nodularity, fullness, and chocolate cysts, were more common in advanced stages but did not reach statistical significance. **Conclusion:** Severe dysmenorrhea, pelvic tenderness, and restricted uterine mobility are key clinical indicators of advanced endometriosis in infertile women. While other symptoms may suggest the presence of disease, they are insufficient to predict severity. Careful clinical assessment can aid early identification and timely laparoscopic evaluation, potentially improving fertility outcomes.

Keywords: Endometriosis; Infertility; Laparoscopy; Dysmenorrhea; Uterine mobility; r-ASRM Staging

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INTRODUCTION

Endometriosis is the presence of endometrial-like tissue outside the uterine cavity, producing a chronic inflammatory response that primarily affects women of reproductive age across all populations [1]. It is one of the most common benign gynecologic disorders, affecting approximately 5–15% of women of reproductive age [2], and represents a major burden on healthcare systems worldwide [3]. The disease is characterized by an inflammatory and angiogenic peritoneal environment, with increased levels of cytokines such as IL-1, IL-6, TNF- α , IL-8, and vascular endothelial growth factor (VEGF), along with prostaglandins and proteases. These factors negatively influence oocyte quality, sperm function, embryo development, and tubal motility, contributing significantly to infertility [4].

Endometriosis has a profound impact on women's physical, psychological, and social well-being. Chronic pelvic pain, dysmenorrhea, deep dyspareunia, and infertility are the most common clinical manifestations, while abnormal uterine bleeding, dyschezia, and urinary symptoms may also occur [5,6]. These symptoms can result in reduced quality of life, impaired work productivity, emotional distress, and strained interpersonal relationships. Despite its clinical importance, endometriosis can only be definitively diagnosed through laparoscopic visualization of lesions, with or without histopathological confirmation, making its true prevalence difficult to determine [7]. Moreover, the extent to which clinical symptoms reflect the anatomical severity of disease remains unclear.

Several studies among infertile women have explored the relationship between symptoms and laparoscopic staging. A

retrospective study reported a prevalence of 16.8%, finding that most symptoms did not correlate well with disease stage, whereas restricted uterine mobility and ultrasonographic abnormalities were associated with advanced disease [8]. A large prospective study found endometriosis in 55% of infertile women, more than half of whom were asymptomatic, although dysmenorrhea, dyspareunia, chronic pelvic pain, adnexal tenderness, and restricted uterine mobility were significantly associated with higher laparoscopic stages [9]. Another study demonstrated that chronic pelvic pain and dyspareunia were strongly related to higher revised American Fertility Society (r-AFS) scores, while dysmenorrhea was more commonly associated with superficial peritoneal lesions [10]. In Bangladesh, Ruman et al. reported that laparoscopy is valuable in identifying female causes of infertility, including endometriosis, among infertile couples [11], while Ganguly et al. highlighted that laparoscopic management of endometriosis can improve reproductive outcomes and alleviate symptoms in women with severe disease [12]. However, these studies did not evaluate how clinical symptoms correlate with laparoscopic disease severity. Thus, evidence is lacking on whether clinical features can predict the stage of endometriosis among infertile Bangladeshi women. This study therefore aimed to assess the association between clinical features of endometriosis and laparoscopic staging of the disease among infertile women.

METHODS & MATERIALS

Study Design and Setting: This was a cross-sectional observational study conducted at BIRDEM General Hospital-2, Dhaka, from July 2017 to June 2018. The study aimed to investigate the association between clinical features of endometriosis and its laparoscopic staging among infertile women. **Study Population:** The study included women presenting with infertility who underwent diagnostic laparoscopy for suspected endometriosis. Women with other causes of pelvic pathology or prior pelvic surgeries were excluded to reduce confounding. **Sample Size:** A total of 115 participants were enrolled, of whom 38 were diagnosed with endometriosis via laparoscopy. The severity of endometriosis was classified according to the revised American Society for Reproductive Medicine (rASRM) laparoscopic staging system into Stage I, II, III, and IV. **Data Collection:** Data were collected using a structured questionnaire and clinical assessment, which included:

- Demographic and infertility characteristics: Type and duration of infertility.
- Clinical symptoms: Dysmenorrhoea, menorrhagia, dyspareunia, chronic pelvic pain, dyschezia, and urinary symptoms. Symptom severity was graded as mild, moderate, or severe.
- Pervaginal examination findings: Tenderness, nodularity, fullness, restricted uterine mobility, and presence of chocolate cysts.
- All participants underwent laparoscopic evaluation to confirm the presence and stage of endometriosis.

Statistical Analysis: Data were analyzed using SPSS version 22.0. Categorical variables were expressed as frequencies and percentages. Associations between clinical features and

laparoscopic stage were assessed using the Chi-square test or Fisher’s exact test, with $P < 0.05$ considered statistically significant. **Ethical Considerations:** The study protocol was approved by the Institutional Review Board (IRB) of BIRDEM General Hospital. Informed written consent was obtained from all participants prior to inclusion in the study.

RESULTS

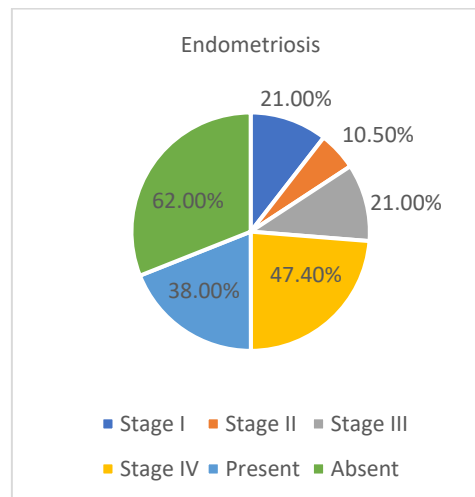


Figure – 1: Endometriosis Among Study Participants Undergoing Laparoscopy and Endometriosis Severity (n = 38)

Distribution of Endometriosis with Laparoscopic Stages

Figure 1 shows Out of the total 100 study participants, 38 were diagnosed with endometriosis on diagnostic laparoscopy, while the remaining 62 had no evidence of endometriosis. Among the 38 women diagnosed with endometriosis on laparoscopy, nearly half had advanced disease, with Stage IV being the most common (47.4%). Stage I and Stage III each accounted for 21.0% of cases, while Stage II was the least frequent, observed in 10.5% of participants. Overall, the predominance of Stage III and IV disease (68.4%) indicates that a large proportion of infertile women in this study presented with moderate to severe endometriosis at the time of laparoscopic evaluation.

Association of Clinical Presentation with Endometriosis

Table I shows in this study, pain-related symptoms were significantly associated with endometriosis. Dysmenorrhea was reported in 68.4% of participants with endometriosis, with 36.8% experiencing severe pain, compared to only 6.5% of participants without endometriosis ($p = 0.001$). Similarly, dyspareunia was significantly more frequent among women with endometriosis (36.8% vs 6.7%; $p = 0.001$), and chronic pelvic pain was also more common and severe in this group ($p = 0.001$). Menorrhagia was observed in 23.7% of participants with endometriosis compared to 6.5% without ($p = 0.013$), and dyschezia occurred exclusively in the endometriosis group (7.9%; $p = 0.025$). Urinary symptoms, however, did not differ significantly between the two groups (5.3% vs 3.2%; $p = 0.614$).

Table – I: Association of Clinical Presentation with and without Endometriosis (n = 100)

Clinical presentation	With endometriosis (n=38)	%	Without endometriosis (n=62)	%	P value
Dysmenorrhea					
Mild	2	5.3	2	3.2	0.001
Moderate	10	26.3	6	9.7	
Severe	14	36.8	4	6.5	
None	12	31.6	50	80.6	
Menorrhagia					
Present	9	23.7	4	6.5	0.013
Absent	29	76.3	58	93.5	
Dyspareunia					
Yes	14	36.8	4	6.7	0.001
No	24	63.2	56	93.3	
Chronic pelvic pain					
Mild	6	15.8	2	3.2	0.001
Moderate	14	36.8	54	87.1	
Severe	3	7.9	0	0	
None	15	39.5	6	9.7	
Dyschezia					
Yes	3	7.9	0	0	0.025
No	35	92.1	62	100	
Urinary symptoms					
Yes	2	5.3	2	3.2	0.614
No	36	94.7	60	96.8	

Table II Among clinical symptoms, severe dysmenorrhoea showed a significant association with advanced stages of endometriosis (P = 0.016), being most common in Stage III (28.6%) and Stage IV (71.4%) patients. Other clinical

features—including mild/moderate dysmenorrhoea, menorrhagia, dyspareunia, chronic pelvic pain, dyschezia, and urinary symptoms—were more frequent in higher stages but did not reach statistical significance (P > 0.05).

Table – II: Association of Clinical Presentation and Laparoscopic Staging of Endometriosis (n = 38)

Clinical presentation	Stage I (n=8)	Stage II (n=4)	Stage III (n=8)	Stage IV (n=18)	P value
Dysmenorrhoea					
Mild	1 (50%)	0 (00%)	0 (00%)	1 (50%)	0.68
Moderate	3 (30%)	2 (20%)	3 (30%)	2 (20%)	0.227
Severe	0 (00%)	0 (00%)	4 (28.6%)	10 (71.4%)	0.016*
None	4 (33.3%)	2 (16.7%)	1 (8.3%)	5 (41.7%)	0.34
Menorrhagia					
Present	1 (11.1%)	0 (00%)	2 (22.2%)	6 (66.7%)	0.435
Absent	7 (24.1%)	4 (13.8%)	6 (20.7%)	12 (41.4%)	0.435
Dyspareunia					
Yes	1 (7.1%)	1 (7.1%)	4 (28.6%)	8 (57.1%)	0.345
No	7 (29.2%)	3 (12.5%)	4 (16.7%)	10 (41.7%)	0.345
Chronic pelvic pain					
Mild	1 (16.7%)	1 (16.7%)	1 (16.7%)	3 (50%)	0.942
Moderate	2 (14.3%)	2 (14.3%)	2 (14.3%)	8 (57.1%)	0.635
Severe	0 (00%)	0 (00%)	1 (33.3%)	2 (66.7%)	0.678
None	5 (33.3%)	1 (6.7%)	4 (26.7%)	5 (33.3%)	0.317
Dyschezia					
Yes	0 (00%)	0 (00%)	0 (00%)	3 (100%)	0.306
No	8 (22.9%)	4 (11.4%)	8 (22.9%)	15 (42.9%)	0.306
Urinary symptoms					
Yes	0 (00%)	0 (00%)	0 (00%)	2 (100%)	0.504
No	8 (22.2%)	4 (11.4%)	8 (22.2%)	16 (44.4%)	0.504

Association of Pervaginal Examination Findings with Laparoscopic Stage of Endometriosis

Table III shows the pervaginal examination findings showed significant associations with the severity of endometriosis in certain clinical signs. Tenderness on examination was significantly more frequent in advanced stages, occurring in 42.9% of Stage III and 50.0% of Stage IV cases compared to

0% in Stage I (p = 0.019). Similarly, restricted uterine mobility was more common in higher stages, noted in 37.5% of Stage III and 56.2% of Stage IV participants (p = 0.020). Other findings, including nodularity, fullness, and presence of chocolate cysts, were more prevalent in advanced stages but did not reach statistical significance (p > 0.05).

Table - III. Association of Pervaginal Examination Findings with Laparoscopic Stage of Endometriosis (n = 38)

Pervaginal finding	Stage I (n=8)	Stage II (n=4)	Stage III (n=8)	Stage IV (n=18)	P value
Tenderness					
Yes	0 (0%)	1 (7.1%)	6 (42.9%)	7 (50.0%)	0.019*
No	8 (100%)	3 (12.5%)	2 (8.3%)	11 (45.8%)	
Nodularity					
Yes	0 (0%)	0 (0%)	0 (0%)	2 (100%)	0.504
No	8 (100%)	4 (100%)	8 (100%)	16 (44.4%)	
Fullness					
Yes	0 (0%)	0 (0%)	3 (33.3%)	6 (66.7%)	0.139
No	8 (100%)	4 (100%)	5 (17.2%)	12 (41.4%)	
Restricted uterine mobility					
Yes	1 (6.2%)	0 (0%)	6 (37.5%)	9 (56.2%)	0.020*
No	7 (31.8%)	4 (100%)	2 (9.1%)	9 (40.9%)	
Chocolate cyst					
Yes	0 (0%)	0 (0%)	3 (37.5%)	5 (62.5%)	0.172
No	8 (100%)	4 (100%)	5 (16.7%)	13 (43.3%)	

DISCUSSION

In this cross-sectional study of infertile women undergoing diagnostic laparoscopy, 38% of participants were diagnosed with endometriosis, with 68.4% presenting at Stage III or IV, indicating a predominance of moderate-to-severe disease. This distribution is consistent with regional studies, where Khawaja et al. reported that 62% of infertile women with endometriosis presented at advanced stages (Stage III-IV) [8], and Mishra et al. reported a prevalence of 55%, with over half of cases classified as Stage III or IV [9]. These findings suggest that women attending infertility clinics often present late, reflecting delays in diagnosis or referral.

In our cohort, 68.4% of women with endometriosis reported dysmenorrhea, with 36.8% experiencing severe pain, compared to only 19.4% among women without endometriosis (p = 0.001). This aligns with Mishra et al., who found 72% prevalence of dysmenorrhea among infertile women with endometriosis [9]. Similarly, Mehmud et al. reported that menstrual pain is significantly more frequent and severe in endometriosis patients [10]. Dysmenorrhea is therefore a strong clinical indicator of endometriosis, particularly when severe.

Dyspareunia was observed in 36.8% of women with endometriosis versus 6.7% in those without the disease (p = 0.001). Comparable prevalence rates have been reported by Khawaja et al. (33%) [8] and Mishra et al. (41%) [9]. Deep dyspareunia is often associated with deep infiltrating lesions, particularly in the posterior pelvic compartment, and its presence may suggest advanced disease [13,14]. In our study, chronic pelvic pain was significantly more frequent among women with endometriosis (60.5%, p = 0.001), whereas it was mostly mild or absent in women without the disease. This aligns with Rossi HR, who reported that endometriosis is associated with increased pain perception and long-term negative effects on women's overall health [15]. Menorrhagia was observed in 23.7% of endometriosis patients compared to 6.5% in the non-endometriosis group (p = 0.013). Mishra et al. reported a 28% prevalence of menorrhagia in endometriosis patients [9]. Dyschezia occurred exclusively in women with endometriosis (7.9%). This symptom is commonly associated with deep infiltrating endometriosis involving the bowel or rectovaginal septum and is more likely to occur in advanced disease stages [16].

Among all clinical symptoms, severe dysmenorrhea was significantly associated with advanced stages (Stage III-IV; p = 0.016). Stage IV patients accounted for 71.4% of those reporting severe dysmenorrhea. Although dyspareunia, chronic pelvic pain, menorrhagia, and dyschezia were more frequent in higher stages, they did not reach statistical

significance. Previous studies support these findings. Mehmud et al. reported that severe dysmenorrhea and dyspareunia were strongly correlated with higher r-ASRM scores [10]. Mishra et al. also observed that advanced endometriosis is often associated with more intense pain [9]. In contrast, Khawaja et al. noted that while pain is common, it does not consistently predict laparoscopic stage [8]. Severe dysmenorrhea appears to be the most reliable symptom for anticipating advanced endometriosis, whereas the presence of other pain-related symptoms alone is insufficient for predicting disease stage.

Tenderness on pervaginal examination was significantly associated with advanced disease (Stage III-IV; p = 0.019), present in 42.9% of Stage III and 50% of Stage IV patients. This finding aligns with Khawaja et al. (2009), who reported pelvic tenderness as a strong indicator of more extensive disease [8]. Restricted uterine mobility was significantly more frequent in advanced stages (Stage III-IV; p = 0.020), observed in 37.5% of Stage III and 56.2% of Stage IV patients. Restricted mobility reflects pelvic adhesions and is a recognized clinical marker of advanced endometriosis [17]. These findings were more prevalent in advanced stages but did not reach statistical significance. Previous studies have shown that adnexal nodularity and the presence of endometriomas (chocolate cysts) are commonly associated with advanced or deep infiltrating endometriosis [18,19]. While not definitive, these signs can support clinical suspicion of severe disease. Careful evaluation of pain severity and pervaginal examination findings can help clinicians identify women at high risk of advanced disease and prioritize them for early laparoscopic evaluation, particularly in resource-limited settings [20,21].

CONCLUSION

In infertile women, endometriosis is frequently diagnosed at moderate to severe stages, with Stage IV being most common. Among the evaluated clinical features, severe dysmenorrhea, tenderness on pervaginal examination, and restricted uterine mobility are the most reliable indicators of advanced disease. Other symptoms, including dyspareunia, chronic pelvic pain, menorrhagia, and dyschezia, although more frequent in higher stages, are not consistently predictive of laparoscopic severity. These findings emphasize the critical role of thorough clinical evaluation in identifying women at risk of advanced endometriosis and suggest that clinicians should consider early laparoscopic assessment in patients presenting with these key features to optimize management and fertility outcomes.

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