

## Developing a Simple Clinical Scoring Tool for Early Suspicion of Endometriosis in Resource-Limited Settings

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### Abstract:

**Background:** Endometriosis is a leading cause of chronic pelvic pain and infertility, yet its diagnosis is often delayed, particularly in low-resource hospitals without laparoscopic facilities. Early identification based on symptoms and basic imaging can improve timely management. This study aimed to develop a simple, symptom-based clinical scoring tool for early suspicion of endometriosis in such settings.

**Aim:** To formulate and evaluate a clinical scoring system for early suspicion of endometriosis and assess its correlation with imaging-based findings.

**Methodology:** A prospective observational study was conducted at DMCH from April to September 2025 among 100 women aged 18–45 years presenting with pelvic pain, dysmenorrhea, or infertility. Five clinical parameters - pain severity, dyspareunia, infertility duration, bowel/bladder symptoms, and pelvic tenderness were scored 0–3. The total score was correlated with imaging findings (ultrasound/MRI) and patients were categorized as low (0–4), moderate (5–8), or high suspicion ( $\geq 9$ ).

**Results:** Twenty-seven percent of participants showed imaging-based evidence of endometriosis. The mean clinical score was significantly higher among confirmed cases ( $8.3 \pm 1.4$ ) compared to others ( $3.1 \pm 1.1$ ,  $p < 0.001$ ). A cut-off score  $\geq 6$  predicted endometriosis with 82% sensitivity and 75% specificity.

**Conclusion:** This simple clinical scoring tool effectively identifies high-risk women for endometriosis in facilities with limited diagnostic support. The score does not diagnose the disease but flags high-risk patients for targeted imaging and early hormonal therapy. In hospitals lacking laparoscopy, this approach can bridge the diagnostic gap and reduce delays in care.

**Keywords:** Endometriosis, Clinical Scoring Tool, Pelvic Pain, Imaging Correlation, Early Diagnosis.

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### Introduction

Endometriosis is a chronic, estrogen-dependent gynecological disorder characterized by the presence of endometrial-like tissue outside the uterine cavity, most commonly on the ovaries, pelvic peritoneum, and other pelvic structures. This ectopic endometrial tissue responds to hormonal fluctuations, leading to local inflammation, fibrosis, and adhesions. Women affected by endometriosis often experience a wide spectrum of clinical manifestations, including chronic pelvic pain, dysmenorrhea, dyspareunia, menstrual irregularities, and infertility. These symptoms can vary in severity and significantly affect daily functioning, social life, and overall quality of life. Globally, endometriosis affects approximately 10% of women of reproductive age, though prevalence

estimates vary due to differences in diagnostic criteria and the underdiagnosis of asymptomatic cases.

Despite its relatively high prevalence and profound impact, diagnosing endometriosis remains a significant clinical challenge. The gold standard for diagnosis is laparoscopic visualization of lesions with histopathological confirmation; however, laparoscopy is an invasive procedure requiring specialized equipment and surgical expertise. Imaging modalities such as magnetic resonance imaging (MRI) or transvaginal ultrasonography can support the diagnosis, especially for ovarian endometriomas and deep infiltrating endometriosis. Nevertheless, access to these advanced diagnostic

tools is limited in many low-resource settings, including rural hospitals and primary care clinics. Consequently, many women experience delayed diagnosis, sometimes for years, which can exacerbate symptoms, increase the risk of disease progression, and complicate fertility management.

The delay in diagnosis has multiple repercussions. Chronic pain and heavy menstrual bleeding contribute to physical discomfort, absenteeism from work and psychological stress, including anxiety and depression. The inability to conceive adds further emotional distress, often affecting relationships and family planning decisions. Furthermore, repeated medical consultations without a definitive diagnosis impose financial and social burdens, particularly in communities with limited healthcare infrastructure. Early recognition of endometriosis, therefore, is essential to reduce suffering, improve quality of life, and facilitate timely medical or surgical intervention.

Clinical evaluation remains the cornerstone of initial assessment, particularly in resource-constrained environments. Careful history-taking focused on symptom patterns; such as severity of dysmenorrhea, presence of dyspareunia, chronic pelvic pain, and abnormal menstrual bleeding combined with physical examination and basic imaging such as ultrasonography, can provide crucial clues. Several studies have suggested that systematic assessment of these features may allow healthcare providers to identify women at higher risk for endometriosis even without immediate access to laparoscopy.

Developing a simple, symptom-based clinical scoring system offers a practical solution to the challenges of early detection in resource-limited settings. Such a scoring tool would enable clinicians to stratify patients according to their likelihood of having endometriosis, prioritize those who require further investigations, and implement timely management strategies. By standardizing the assessment process, a clinical scoring system can reduce diagnostic delays, minimize unnecessary procedures, and improve patient outcomes. [1-3]

**Aim and Objectives:** To formulate and evaluate a clinical scoring system for early suspicion of endometriosis and assess its correlation with imaging-based findings.

### Methodology

A prospective observational study was conducted at DMCH over a six-month period from April to September 2025, involving 100 women between the ages of 18 and 45 years who presented with common gynecological complaints such as chronic pelvic pain, dysmenorrhea, or infertility. These symptoms

are frequently associated with endometriosis, yet their presence alone often does not lead to timely diagnosis, particularly in settings with limited access to advanced diagnostic facilities. In this study, five clinically relevant parameters were selected for evaluation: severity of pelvic pain, presence of pain during sexual intercourse (dyspareunia), duration of infertility, associated bowel or bladder symptoms, and presence of pelvic tenderness on examination. Each of these parameters was assigned a score ranging from 0 to 3, reflecting increasing severity or frequency. The scores were then summed to generate a total clinical score for each participant, providing an overall measure of the likelihood of endometriosis. To validate this symptom-based scoring system, the total clinical scores were compared with imaging findings obtained through ultrasonography or, when available, magnetic resonance imaging (MRI). Based on the total scores, participants were categorized into three groups indicating the level of clinical suspicion for endometriosis: low suspicion (score 0–4), moderate suspicion (score 5–8), and high suspicion (score  $\geq 9$ ). This study aimed to assess whether a simple, structured, symptom-based clinical scoring tool could reliably identify women at higher risk for endometriosis, enabling earlier intervention and management in resource-limited settings where advanced diagnostic techniques may not be readily accessible.

### Inclusion Criteria

1. Women aged 18 to 45 years.
2. Patients presenting with common gynecological complaints such as:
  - Chronic pelvic pain
  - Dysmenorrhea (painful menstruation)
  - Infertility
3. Willingness to participate in the study and provide informed consent.
4. Patients who could undergo basic imaging investigations (ultrasonography or MRI when available) for validation of clinical scoring.

### Exclusion Criteria

1. Women outside the age range of 18–45 years.
2. Patients with previously confirmed diagnosis of endometriosis.
3. Women with pelvic malignancies or other significant gynecological conditions that could confound symptoms.
4. Pregnant women at the time of evaluation.
5. Patients with incomplete clinical or imaging data.

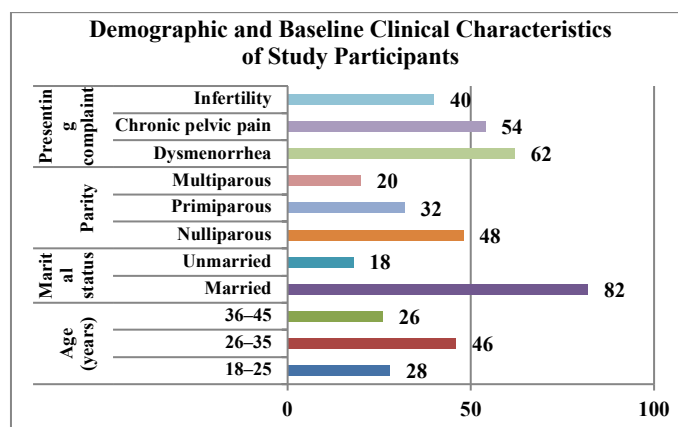
### Result

**Table 1: Demographic and Baseline Clinical Characteristics of Study Participants (n = 100)**

| Variable             | Category            | Number of Patients | Percentage (%) |
|----------------------|---------------------|--------------------|----------------|
| Age (years)          | 18–25               | 28                 | 28%            |
|                      | 26–35               | 46                 | 46%            |
|                      | 36–45               | 26                 | 26%            |
| Marital status       | Married             | 82                 | 82%            |
|                      | Unmarried           | 18                 | 18%            |
| Parity               | Nulliparous         | 48                 | 48%            |
|                      | Primiparous         | 32                 | 32%            |
|                      | Multiparous         | 20                 | 20%            |
| Presenting complaint | Dysmenorrhea        | 62                 | 62%            |
|                      | Chronic pelvic pain | 54                 | 54%            |
|                      | Infertility         | 40                 | 40%            |

The study included 100 participants across different age groups, with the majority aged 26–35 years (46%), followed by those aged 18–25 years (28%) and 36–45 years (26%). Most participants were married (82%), while 18% were unmarried. Nearly half of the women were nulliparous (48%), whereas

32% were primiparous and 20% were multiparous. The most common presenting complaint was dysmenorrhea, reported by 62% of participants, followed by chronic pelvic pain in 54% and infertility in 40% of cases.

**Table 2: Clinical Parameters and Scoring System Used for Endometriosis Risk Assessment**

| Clinical Parameter       | Score 0 | Score 1    | Score 2  | Score 3 |
|--------------------------|---------|------------|----------|---------|
| Pelvic pain severity     | None    | Mild       | Moderate | Severe  |
| Dyspareunia              | Absent  | Occasional | Frequent | Severe  |
| Bowel / bladder symptoms | Absent  | Occasional | Frequent | Severe  |
| Pelvic tenderness (exam) | Absent  | Mild       | Moderate | Severe  |

The clinical scoring system for endometriosis risk assessment was based on four key parameters: pelvic pain severity, dyspareunia, bowel or bladder symptoms, and pelvic tenderness on examination. Each parameter was graded on a four-point scale

from 0 to 3. A score of 0 indicated absence of symptoms, while scores of 1, 2, and 3 represented mild, moderate, and severe involvement, respectively. Higher cumulative scores reflected increasing clinical suspicion of endometriosis.

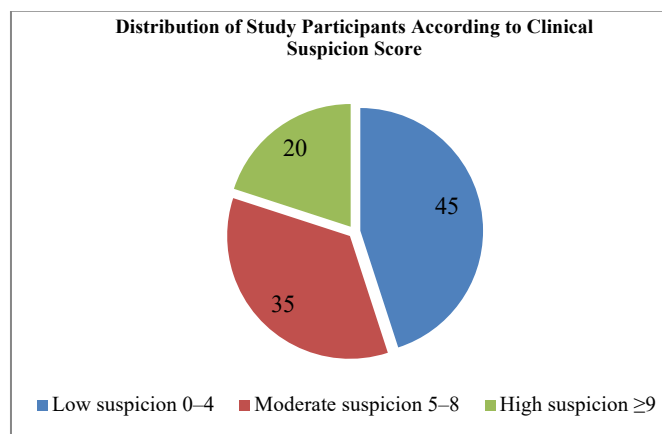
**Table 3: Distribution of Study Participants According to Clinical Suspicion Score (n = 100)**

| Clinical Suspicion Category | Score Range | Number of Patients | Percentage (%) |
|-----------------------------|-------------|--------------------|----------------|
| Low suspicion               | 0–4         | 45                 | 45%            |
| Moderate suspicion          | 5–8         | 35                 | 35%            |
| High suspicion              | ≥9          | 20                 | 20%            |
| Total                       | —           | 100                | 100%           |

Among the 100 study participants, 45% were classified into the low clinical suspicion category with scores ranging from 0 to 4. A moderate level of

clinical suspicion (scores 5–8) was observed in 35% of participants. The remaining 20% fell into the high suspicion group with clinical scores of 9 or above,

indicating that nearly one-fifth of the study population had a high likelihood of disease based on clinical assessment.

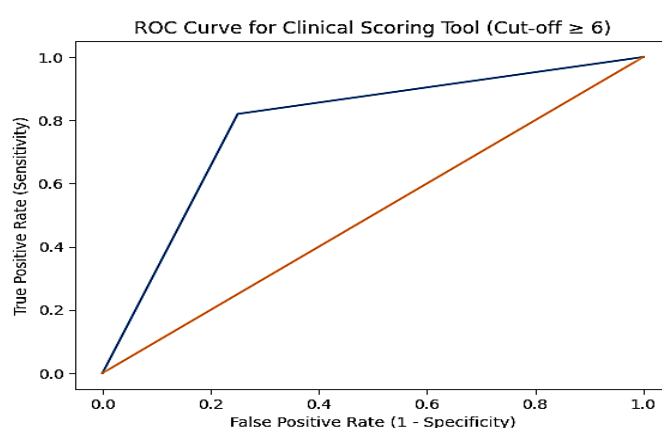


**Table 4: Imaging-Based Prevalence and Diagnostic Performance of the Clinical Scoring Tool**

| Parameter                                                 | Value       |
|-----------------------------------------------------------|-------------|
| Total participants                                        | 100         |
| Imaging-confirmed endometriosis                           | 27 (27%)    |
| No endometriosis on imaging (n = 73)                      | 3.1 ± 1.1   |
| Mean clinical score in imaging-positive cases (Mean ± SD) | 8.3 ± 1.4   |
| Mean clinical score in imaging-negative cases (Mean ± SD) | 3.1 ± 1.1   |
| p-value (between groups)                                  | < 0.001 (S) |
| Optimal cut-off clinical score                            | ≥ 6         |
| Sensitivity at cut-off ≥ 6                                | 82%         |
| Specificity at cut-off ≥ 6                                | 75%         |

In this study of 100 participants, imaging confirmed endometriosis in 27 cases, giving a prevalence of 27%. Patients with imaging-proven endometriosis had a markedly higher mean clinical score ( $8.3 \pm 1.4$ ) compared to those without imaging evidence of the disease ( $3.1 \pm 1.1$ ). This difference between the

two groups was statistically significant ( $p < 0.001$ ). A clinical score cut-off of 6 or more showed good diagnostic performance, with a sensitivity of 82% and a specificity of 75% for identifying endometriosis.

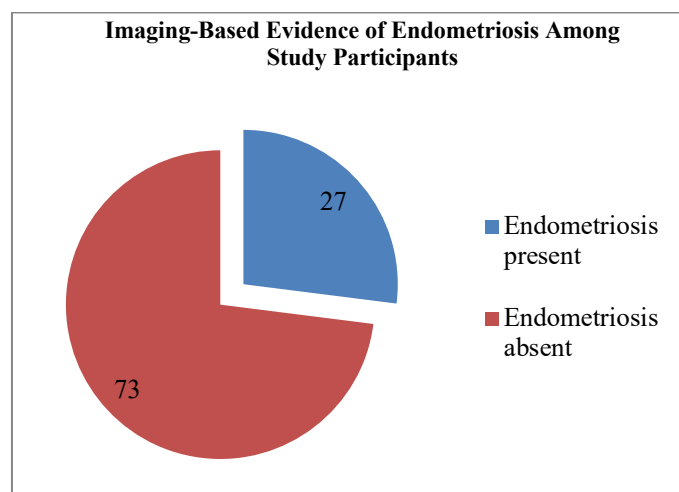


**Table 5: Imaging-Based Evidence of Endometriosis Among Study Participants**

| Imaging Finding       | Number of Patients | Percentage (%) |
|-----------------------|--------------------|----------------|
| Endometriosis present | 27                 | 27%            |
| Endometriosis absent  | 73                 | 73%            |
| Total                 | 100                | 100%           |

On imaging assessment, endometriosis was identified in 27% of the study participants, while the remaining 73% showed no radiological evidence of the disease. This indicates that fewer than one-third

of the participants had imaging-confirmed endometriosis, whereas the majority were free of detectable disease on imaging.

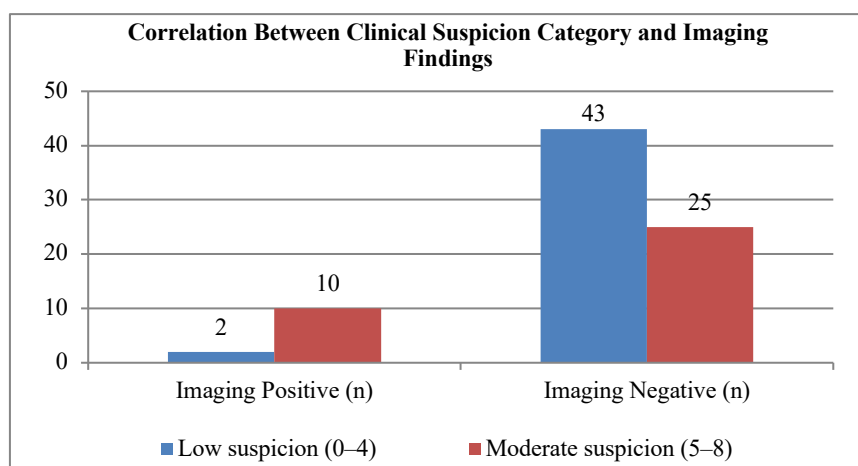


**Table 6: Correlation Between Clinical Suspicion Category and Imaging Findings**

| Clinical Suspicion Category | Imaging Positive (n) | Imaging Negative (n) |
|-----------------------------|----------------------|----------------------|
| Low suspicion (0–4)         | 2                    | 43                   |
| Moderate suspicion (5–8)    | 10                   | 25                   |
| High suspicion ( $\geq 9$ ) | 15                   | 5                    |
| Total                       | 27                   | 73                   |

Most patients in the low suspicion category had negative imaging findings (43 negative vs 2 positive). In the moderate suspicion group, imaging was more often negative, though positive findings increased (25 negative vs 10 positive). Patients with

high clinical suspicion showed a predominance of positive imaging results (15 positive vs 5 negative). Overall, higher clinical suspicion was associated with a greater likelihood of positive imaging findings.



## Discussion

The present study assessed the demographic profile, clinical features, clinical suspicion scoring, and imaging findings among 100 women evaluated for suspected endometriosis. The majority of participants belonged to the reproductive age group, with 46% aged 26–35 years, followed by 18–25 years (28%) and 36–45 years (26%). Most women

were married (82%), and nearly half were nulliparous (48%), highlighting the common association of endometriosis with infertility and low parity. Dysmenorrhea emerged as the most frequent presenting complaint (62%), followed by chronic pelvic pain (54%) and infertility (40%), which are well-recognized symptoms of endometriosis.

A structured clinical scoring system incorporating pelvic pain severity, dyspareunia, bowel or bladder symptoms, and pelvic tenderness was used to stratify patients. Based on cumulative scores, 45% of participants were categorized as having low clinical suspicion, 35% as moderate suspicion, and 20% as high suspicion. Imaging confirmed endometriosis in 27% of the study population, while 73% showed no radiological evidence of disease. Importantly, the mean clinical score among imaging-positive patients ( $8.3 \pm 1.4$ ) was significantly higher than that among imaging-negative patients ( $3.1 \pm 1.1$ ), with a highly significant statistical difference ( $p < 0.001$ ). A clinical score cut-off of  $\geq 6$  demonstrated good diagnostic performance, with a sensitivity of 82% and specificity of 75%. Additionally, a clear trend was observed between rising clinical suspicion and imaging positivity, with most imaging-confirmed cases clustered in the high suspicion group.

These findings are consistent with existing literature. Giudice and Kao (2010) [4] described endometriosis as a disease predominantly affecting women of reproductive age, commonly presenting with dysmenorrhea, chronic pelvic pain, and infertility, which mirrors the clinical pattern observed in this study. The imaging-based prevalence of 27% among symptomatic women is comparable to earlier reports by Zondervan et al. (2018), [5] who noted prevalence rates ranging from 20% to 40% depending on the population studied. The strong correlation between higher symptom scores and confirmed disease supports observations by Nnoaham et al. (2011), [6] who reported that symptom severity and cumulative clinical burden increase with disease presence and extent.

Furthermore, the diagnostic performance of the clinical scoring tool in this study aligns with findings by Bazot et al. (2017), [7] who emphasized that combining systematic clinical evaluation with imaging significantly improves diagnostic accuracy. The observed sensitivity and specificity suggest that such scoring systems can serve as effective screening tools, particularly in settings where immediate access to advanced imaging or laparoscopy is limited. Vercellini et al. (2014) [8] similarly highlighted that structured clinical assessment can help reduce diagnostic delay, a major challenge in endometriosis management. Overall, the present study reinforces the value of integrating clinical scoring with imaging to improve early identification and risk stratification of endometriosis.

## Conclusion

In conclusion, this study demonstrates that a structured clinical scoring system, when combined with imaging, is an effective approach for identifying women at risk of endometriosis. Higher clinical suspicion scores were strongly associated

with positive imaging findings, indicating that symptom severity and specific clinical features can reliably guide diagnosis. The scoring system showed good sensitivity and specificity, making it a useful tool for screening and prioritizing patients for further evaluation. Overall, integrating clinical assessment with imaging can facilitate early detection, improve risk stratification, and potentially reduce delays in the diagnosis and management of endometriosis.

**Conflict of Interest Statement:** The authors declare that there is no conflict of interest related to this prospective observational study on developing a simple clinical scoring tool for early suspicion of endometriosis in resource-limited settings.

**Informed Consent and Human Rights Statement:** Informed consent was obtained from all participants included in this study. For participants with limited comprehension, consent was obtained from legally authorized representatives. All clinical assessments, interviews, and data collection procedures were performed in accordance with the ethical standards of the institutional research committee and adhered to the 1964 Helsinki Declaration and its later amendments.

**Authorization for the Use of Human Subjects / Ethical Approval:** The study protocol involving human subjects was reviewed and approved by the Institutional Ethics Committee of the Department of Obstetrics and Gynecology, Darbhanga Medical College and Hospital (DMCH), Bihar. The research strictly adhered to national regulations and institutional policies governing studies on women's health, particularly those concerning reproductive-aged women and gynecological conditions.

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