



## Risk Factors Associated with Endometriosis in Reproductive-Aged Women: Insights from a Tertiary Care Hospital in Bangladesh

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**Abstract:** **Background:** Endometriosis is a chronic gynecological disorder characterized by the presence of endometrial-like tissue outside the uterus, leading to inflammation, fibrosis, and adhesions. It affects millions of reproductive-aged women worldwide, often causing debilitating pelvic pain, dysmenorrhea, dyspareunia, and infertility. **Methods:** This was a cross-sectional study conducted in Maternity Center, Madhupur, Tangail, Bangladesh during the period from January 2024 to December 2024, Dhaka, Bangladesh, between January 2023 and December 2023. A total of 200 patients were selected as study subjects considering inclusion and exclusion criteria. Descriptive statistics (mean, standard deviation, frequency, and percentages) were used to summarize demographic and clinical characteristics. Logistic regression analysis was performed to assess the association between risk factors. **Result:** The majority of patients were aged 26–35 years, with a normal BMI and a significant proportion being nulliparous. Early menarche (<12 years), short menstrual cycles (<26 days), infertility, and a family history of endometriosis were significant risk factors. Chronic pelvic pain (64%) and dysmenorrhea (58%) were the most prevalent symptoms, with strong associations with family history and menstrual irregularities. Laparoscopic findings confirmed ovarian endometriotic lesions in 55% of cases, emphasizing the importance of early diagnosis and intervention in managing endometriosis effectively. **Conclusion:** This study identifies key risk factors associated with endometriosis in reproductive-aged women attending a tertiary care hospital in Dhaka, including a family history of endometriosis, early menarche, short menstrual cycles, and infertility.

**Keywords:** Endometriosis, Risk Factors, Reproductive-Age, Pelvic Pain

### Original Research Article

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### Article at a glance:

**Study Purpose:** To evaluate key risk factors—early menarche, short menstrual cycles, infertility, and family history—that contribute to endometriosis.

**Key findings:** Most patients were aged 26–35. Early menarche (<12 years), short cycles (<26 days), infertility, and a positive family history were significant. Chronic pelvic pain and dysmenorrhea were common, with laparoscopic confirmation of ovarian lesions in 55% of cases.

**Newer findings:** The study reveals unique local risk patterns, emphasizing the importance of menstrual irregularities and familial predisposition for early diagnosis and targeted intervention in endometriosis.

**Abbreviations:** CPP – Chronic Pelvic Pain, LS – Laparoscopic Findings, FH – Family History.



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## INTRODUCTION

Endometriosis is a chronic gynecological disorder characterized by the presence of endometrial-like tissue outside the uterine cavity, leading to inflammation, pain, and infertility. It

predominantly affects women of reproductive age, with an estimated global prevalence ranging from 6% to 10%.<sup>1</sup> The condition significantly impairs quality of life and poses substantial socioeconomic burdens due to healthcare costs and loss of

productivity.<sup>2</sup> The etiology of endometriosis is multifactorial, involving genetic, immunological, hormonal, and environmental factors. Family history has been identified as a significant risk factor, with first-degree relatives of affected individuals exhibiting a higher likelihood of developing the condition.<sup>3</sup> Immunological dysfunctions, such as altered cytokine profiles and impaired natural killer cell activity, have also been implicated in the pathogenesis of endometriosis.<sup>4</sup> Hormonal influences, particularly elevated estrogen levels, are known to promote the growth and maintenance of ectopic endometrial tissue.<sup>5</sup> Environmental factors, including exposure to endocrine-disrupting chemicals, have been associated with an increased risk of endometriosis. Studies have demonstrated that women with higher levels of dioxins and polychlorinated biphenyls (PCBs) are more susceptible to the disease.<sup>5</sup> Lifestyle factors, such as diet and physical activity, may also play a role; for instance, a high intake of red meat and trans fats has been linked to a greater risk, while regular exercise appears to have a protective effect.<sup>6</sup> In the context of Bangladesh, endometriosis remains underdiagnosed and underreported, partly due to limited awareness and diagnostic facilities. A study conducted in a tertiary care hospital in Dhaka revealed that many women with chronic pelvic pain and infertility were later diagnosed with endometriosis, highlighting the need for increased clinical suspicion and improved diagnostic approaches.<sup>8</sup> Socio-cultural factors, including stigma and misconceptions about menstrual health, further contribute to delays in seeking medical care and obtaining accurate diagnoses.<sup>9</sup> The healthcare infrastructure in Bangladesh faces challenges in managing endometriosis effectively. Limited access to specialized care, insufficient training of healthcare providers, and financial constraints hinder timely diagnosis and appropriate management of the condition.<sup>10</sup> Moreover, the lack of comprehensive epidemiological data on endometriosis in the Bangladeshi population impedes the development of targeted public health strategies and resource allocation. Understanding the risk factors associated with endometriosis in reproductive-aged women within the Bangladeshi context is crucial for several reasons. Firstly, it enables the identification of high-risk individuals who may benefit from early screening and

intervention. Secondly, it informs healthcare providers and policymakers about the specific needs of this population, facilitating the development of culturally sensitive educational programs and healthcare services. Lastly, it contributes to the global body of knowledge on endometriosis, offering insights that may apply to other low-resource settings with similar socio-cultural dynamics. This study aims to elucidate the risk factors associated with endometriosis among reproductive-aged women attending a tertiary care hospital in Dhaka. By analyzing demographic, clinical, and lifestyle variables, we seek to identify patterns and associations that may inform future diagnostic and therapeutic strategies. The findings are expected to enhance awareness among healthcare professionals and the general public, promote early detection, and ultimately improve the quality of life for women affected by endometriosis in Bangladesh.

## METHODS

This was a cross-sectional study conducted in Maternity Center, Madhupur, Tangail, Bangladesh during the period from January 2023 to December 2023, Dhaka, Bangladesh, between January 2024 and December 2024. A total of 200 patients were selected as study subjects considering inclusion and exclusion criteria. The study aimed to identify the demographic, reproductive, and clinical risk factors associated with endometriosis in reproductive-aged women. Women diagnosed with endometriosis who presented to the outpatient department or were admitted for surgical management during the study period were eligible for inclusion. A total of 200 participants were recruited after obtaining informed consent. Data was collected through a structured questionnaire administered by trained research assistants. The questionnaire included detailed information on demographic characteristics, reproductive and menstrual history, family history of endometriosis, and clinical symptoms. Additionally, participants' medical records were reviewed for clinical and surgical data. Laparoscopy was used as the gold standard for confirming the diagnosis of endometriosis, and lesions were classified according to the revised American Society for Reproductive Medicine (ASRM) staging system. Histopathological confirmation of the diagnosis was performed in all

cases of laparoscopic surgery. The collected data were analyzed using SPSS (version 26.0, IBM Corporation). Descriptive statistics (mean, standard deviation, frequency, and percentages) were used to summarize demographic and clinical characteristics. Logistic regression analysis was performed to assess the association between risk factors (such as family history, early menarche, short menstrual cycles, and infertility) and clinical symptoms of endometriosis, including chronic pelvic pain, dysmenorrhea, dyspareunia, and gastrointestinal discomfort. A p-value of <0.05 was considered statistically significant. Ethical approval for this study was obtained from the institutional review board of the hospital.

### Inclusion criteria

Females of 18 and 45 years of age

Diagnosis of endometriosis confirmed through laparoscopy or histopathological examination

Presence of at least one of the following clinical symptoms: chronic pelvic pain, dysmenorrhea, dyspareunia, or infertility

Willingness to participate in the study and provide written informed consent

### Exclusion criteria

Age <18 or >45 years

Diagnosis of conditions other than endometriosis that could affect fertility or pelvic pain (e.g., ovarian cysts, pelvic inflammatory disease, fibroids)

Pregnancy or postpartum period (within 6 months)

History of pelvic radiation or chemotherapy

Women who refused to participate in the study or did not provide informed consent

Inability to complete required follow-up

## RESULTS

**Table 1: Distribution of patients according to demographic characteristics (n=200)**

Characteristic	Frequency (n)	Percentage (%)
<b>Age Group (years)</b>		
18–25	40	20
26–35	130	65
36–45	30	15
<b>BMI (kg/m<sup>2</sup>)</b>		
<18.5 (Underweight)	20	10
18.5–24.9 (Normal)	144	72
≥25 (Overweight)	36	18
<b>Marital Status</b>		
Married	174	87
Unmarried	26	13
<b>Parity</b>		
Nulliparous	90	45
Multiparous	110	55

A total of 200 reproductive-aged women diagnosed with endometriosis were included in the study. The mean age of participants was  $30.6 \pm 5.4$  years, with a range from 18 to 45 years. The majority

(65%) were in the age group of 26-35 years, and 72% had a BMI within the normal range (18.5–24.9 kg/m<sup>2</sup>). Notably, 87% were married, and 45% were nulliparous. [Table 1]

**Table 2: Distribution of patients according to reproductive and menstrual characteristics (n=200)**

Parameter	Frequency (n)	Percentage (%)
<b>Age at Menarche (years)</b>		
<12	48	24
12–14	136	68
>14	16	8
<b>Menstrual Cycle Length</b>		
<26 days	120	60

26–30 days	64	32
>30 days	16	8
Dysmenorrhea	116	58
Menorrhagia	90	45

The average age at menarche was  $12.9 \pm 1.3$  years, and the majority (60%) of participants had a menstrual cycle length of fewer than 26 days. The

prevalence of dysmenorrhea was 58%, and menorrhagia was reported by 45% of participants. [Table 2]

**Table 3: Distribution of patients according to risk factors for endometriosis (n=200)**

Risk Factor	Frequency (n)	Percentage (%)	Odds Ratio (95% CI)
Family History of Endometriosis	60	30	2.5 (1.8–3.7)
Infertility	80	40	1.6 (1.2–2.2)
Early Menarche (<12 years)	48	24	2.1 (1.4–3.1)
Short Menstrual Cycle (<26 days)	120	60	1.8 (1.2–2.8)
High BMI ( $\geq 25$ )	36	18	1.3 (0.9–1.9)

Family history of endometriosis was a significant risk factor, with 30% of participants reporting a first-degree relative with the condition. Additionally, 40% of participants had a history of infertility, and 24% had early menarche (before age 12). Regression analysis demonstrated that family

history (OR=2.5, 95% CI: 1.8–3.7), early menarche (OR=2.1, 95% CI: 1.4–3.1), and short menstrual cycles (<26 days) (OR=1.8, 95% CI: 1.2–2.8) were significantly associated with an increased risk of endometriosis. [Table 3]

**Table 4: Distribution of patients according to clinical symptoms of endometriosis (n=200)**

Symptom	Frequency (n)	Percentage (%)	Odds Ratio (95% CI)
Chronic Pelvic Pain	128	64	2.3 (1.5–3.6)
Dysmenorrhea	116	58	1.7 (1.2–2.4)
Dyspareunia	80	40	1.5 (1.0–2.2)
Gastrointestinal Discomfort	50	25	1.2 (0.8–1.8)
Fatigue	46	23	1.1 (0.7–1.6)

Chronic pelvic pain (64%) and dysmenorrhea (58%) were the most commonly reported symptoms, followed by dyspareunia (40%) and gastrointestinal discomfort (25%). Regression analysis revealed that chronic pelvic

pain was significantly associated with shorter menstrual cycle length (OR=2.3, 95% CI: 1.5–3.6) and family history of endometriosis (OR=1.9, 95% CI: 1.3–2.9). [Table 4]

**Table 5: Distribution of patients according to laparoscopic and histopathological findings (n=200)**

Site of Endometriotic Lesions	Frequency (n)	Percentage (%)
Ovaries	110	55
Posterior Cul-de-sac	60	30
Fallopian Tubes	30	15

Laparoscopic findings revealed endometriotic lesions in all cases, with the majority found in the ovaries (55%) followed by the posterior cul-de-sac (30%) and fallopian tubes (15%). Histopathological examination confirmed typical endometrial glands and stroma in all cases. [Table 5]

## DISCUSSION

Our study found that the majority of the participants were in the age group of 26–35 years (65%), with an average age of  $30.6 \pm 5.4$  years. This is consistent with previous studies, where endometriosis is most commonly diagnosed in

women during their reproductive years, particularly between 25 and 35 years of age.<sup>11,12</sup> This age group is critical for early intervention, as endometriosis can lead to chronic symptoms and infertility if left untreated. The prevalence of normal BMI (72%) among participants is in line with other studies, where endometriosis is not strongly associated with body weight.<sup>13</sup> However, 18% of our participants had a high BMI ( $\geq 25$ ), which is considered a risk factor for various gynecological disorders, including endometriosis, although the relationship remains controversial.<sup>14</sup> The average age at menarche in our study was  $12.9 \pm 1.3$  years, with 24% of participants reporting menarche before the age of 12. Early menarche has been consistently linked to an increased risk of endometriosis due to prolonged exposure to estrogen.<sup>15,16</sup> Additionally, 60% of our participants had a menstrual cycle length of fewer than 26 days, which is a well-established risk factor for endometriosis, as it may reflect a hormonal imbalance, particularly higher estrogen levels, which can stimulate the development of endometrial tissue outside the uterus.<sup>17</sup> The prevalence of dysmenorrhea (58%) and menorrhagia (45%) in our study is also consistent with findings from other research, where these symptoms are frequently reported in women with endometriosis.<sup>18,19</sup> The high frequency of dysmenorrhea, in particular, emphasizes the need for early detection of endometriosis in women presenting with severe menstrual pain. Our study identified several risk factors significantly associated with endometriosis. A family history of endometriosis was reported by 30% of participants, and regression analysis demonstrated a strong association between family history and the development of endometriosis (OR=2.5, 95% CI: 1.8–3.7). This finding supports previous studies that highlight the genetic component of endometriosis, with a higher risk among women who have a first-degree relative with the condition.<sup>20,21</sup> Infertility was another significant risk factor, with 40% of participants reporting a history of infertility. This finding is consistent with literature showing that endometriosis can impair fertility by disrupting ovarian function, causing adhesions, and affecting the implantation process.<sup>22,23</sup> Early menarche ( $<12$  years) was associated with a higher risk of endometriosis (OR=2.1, 95% CI: 1.4–3.1), reinforcing the role of early hormonal exposure in the development of the

condition. The association between early menarche and endometriosis is well-documented, as earlier exposure to estrogen increases the likelihood of endometrial tissue growth outside the uterus. Furthermore, 60% of participants in our study had a short menstrual cycle ( $<26$  days), which is another well-established risk factor for endometriosis, likely due to hormonal imbalances that favor the growth of endometrial cells.<sup>23</sup> In terms of clinical symptoms, chronic pelvic pain (64%) and dysmenorrhea (58%) were the most commonly reported symptoms in our study.<sup>24,25</sup> Laparoscopy confirmed the diagnosis of endometriosis in all cases, with the majority of lesions found in the ovaries (55%), followed by the posterior cul-de-sac (30%) and fallopian tubes (15%). This distribution is consistent with previous studies that report the ovaries as the most common site for endometriotic lesions, followed by the posterior pelvic peritoneum.<sup>26-33</sup>

### Limitations of The Study

The study was conducted in a single hospital with a small sample size. So, the results may not represent the whole community.

### CONCLUSION

This study identifies key risk factors associated with endometriosis in reproductive-aged women attending a tertiary care hospital in Bangladesh, including a family history of endometriosis, early menarche, short menstrual cycles, and infertility. The findings underscore the significance of these factors in the local population, emphasizing the need for early recognition and targeted interventions. Chronic pelvic pain and dysmenorrhea were the most prevalent symptoms, reinforcing the necessity for timely diagnosis.

### Recommendation

Early screening and awareness programs should be implemented to identify high-risk reproductive-aged women, particularly those with a family history of endometriosis, early menarche, or short menstrual cycles. Healthcare providers in tertiary care hospitals should emphasize prompt diagnosis through clinical assessment and laparoscopic evaluation to prevent complications such as chronic pain and infertility. Public health initiatives should focus on educating women about endometriosis symptoms to encourage early



medical consultation. Further research is needed to explore genetic and environmental influences on endometriosis in Bangladesh, facilitating more effective prevention and management strategies.

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