

Sleep Quality Among Women with Endometriosis in Bangladesh: A Hospital- Based Cross-Sectional Study

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Abstract

Endometriosis is a chronic gynecological disorder that is frequently accompanied by pain and reduced quality of life. Although poor sleep has been reported among women with endometriosis in several countries, evidence from Bangladesh is lacking. This study assessed sleep quality among Bangladeshi women with endometriosis and examined the association between sleep quality and endometriosis-related clinical symptoms.

Methods

A hospital-based cross-sectional study was conducted at Kurmitola General Hospital, Dhaka, Bangladesh, between June 2024 and October 2025. A total of 401 women aged 17–45 years were enrolled, including 201 women with clinically diagnosed endometriosis and 200 healthy controls. Sleep quality was assessed using the Pittsburgh Sleep Quality Index (PSQI). Sociodemographic and clinical information was collected using a structured interviewer-administered questionnaire. Independent sample *t* tests and chi-square tests were used to compare groups, with statistical significance defined as $P < .05$.

Results

Among women with endometriosis, 138 (68.7%) were classified as poor sleepers (PSQI > 5). Age, body mass index, and educational level were not significantly associated with sleep quality. However, dyspareunia ($P < .001$), dysmenorrhea ($P < .001$), excessive menstrual bleeding ($P = .03$), pelvic pain ($P = .03$), low back pain ($P = .05$), and abdominal cramping ($P = .02$) were significantly associated with poor sleep quality. Compared with healthy controls, women with endometriosis demonstrated significantly poorer sleep across most PSQI domains, including longer sleep latency, shorter sleep duration, lower sleep efficiency, more sleep disturbances, and greater daytime dysfunction (all $P < .05$). However, the subjective sleep quality component score was lower among women with endometriosis than among healthy controls ($P < .001$). No significant difference was observed in sleep medication use between groups ($P = .232$).

Conclusions

Poor sleep quality is common among Bangladeshi women with endometriosis and is strongly associated with pain-related symptoms. Routine assessment of sleep quality using validated screening tools such as the PSQI may facilitate earlier recognition of sleep disturbances and support more comprehensive clinical management of women with endometriosis. Future multicenter longitudinal studies are needed to confirm these findings and evaluate interventions aimed at improving sleep and overall quality of life.

Introduction

Endometriosis is a chronic inflammatory gynecological disease characterized by the presence of endometrial-like tissue outside the uterine cavity (Bulun et al., 2019). It affects approximately 10% of

women of reproductive age worldwide and is a major cause of chronic pelvic pain, dysmenorrhea, dyspareunia, and infertility (Bulun et al., 2019; Taylor et al., 2021 Child & Tan, 2001). Despite its high prevalence, diagnosis is often delayed because symptoms are nonspecific and disease severity does not always correlate with clinical presentation (Greene et al., 2009; Mehedintu et al., 2014; Taylor et al., 2021). Consequently, many women experience prolonged physical discomfort and reduced quality of life before receiving appropriate treatment. The anatomical differences between a normal uterus and endometriosis are illustrated in Fig. 1.

Increasing evidence suggests that the burden of endometriosis extends beyond reproductive health and includes disturbances in sleep, mental health, and daily functioning. Chronic pain, inflammation, and hormonal alterations associated with endometriosis may interfere with normal sleep physiology, resulting in prolonged sleep latency, fragmented sleep, poor sleep efficiency, and daytime fatigue (Ishikura et al., 2020; Maggiori et al., 2017). Menstrual-cycle-related changes may also influence sleep, as sleep disturbances have been reported during the premenstrual phase among women with premenstrual symptoms and women from the general population (Mauri et al., 1988). Sleep disturbance may further exacerbate pain perception and impair physical, emotional, and social well-being, creating a cycle that negatively affects overall health (Maggiori et al., 2017; Baker et al., 1999).

Previous studies conducted in Europe, North America, and Asia have consistently reported poorer sleep quality among women with endometriosis than among healthy controls (Maggiori et al., 2017; Facchin et al., 2015; Chen et al., 2016; Marinho et al., 2018; Nnoaham et al., 2011). Women with endometriosis have been shown to report higher global Pittsburgh Sleep Quality Index (PSQI) scores, greater insomnia severity, and increased daytime dysfunction, with symptom severity closely associated with chronic pelvic pain and dysmenorrhea. However, evidence from low- and middle-income countries remains limited, particularly in South Asia, where cultural, social, and healthcare factors may influence disease recognition and symptom reporting.

In Bangladesh, endometriosis remains under-recognized, and little is known about its relationship with sleep quality. To our knowledge, no published study has comprehensively evaluated sleep quality among Bangladeshi women with endometriosis using a validated sleep assessment instrument. Understanding this relationship may improve clinical recognition of sleep disturbances and contribute to more comprehensive management strategies for women living with endometriosis.

Therefore, the objectives of this study were to (1) compare sleep quality between women with endometriosis and healthy controls and (2) examine the association between sleep quality and endometriosis-related clinical symptoms among Bangladeshi women.

Methods

Study Design and Setting

This hospital-based cross-sectional study was conducted at Kurmitola General Hospital (KGH), Dhaka, Bangladesh, between June 2024 and October 2025. The study was designed to assess sleep quality among women with endometriosis and to examine the association between sleep quality and endometriosis-related clinical symptoms. The study was reported in accordance with the Strengthening the Reporting of Observational Studies in Epidemiology (STROBE) guidelines.

Participants

Women aged 17 to 45 years attending the outpatient and inpatient gynecology departments of KGH were eligible for participation. The case group included women with a clinical diagnosis of endometriosis confirmed by laparoscopy or high-resolution transvaginal ultrasonography. The control group consisted of age-matched healthy women with normal pelvic anatomy and no history of gynecological disorders.

Participants were excluded if they were pregnant, had a pre-existing psychiatric disorder, had a diagnosed primary sleep disorder, or were unable to provide informed consent or complete the questionnaire.

Sample Size

The required sample size was estimated using Cochran's formula, assuming a population proportion of 50%, a 95% confidence level, and a 5% margin of error. The minimum required sample size was 385 participants. A total of 401 women were enrolled, including 201 women with endometriosis and 200 healthy controls. Incomplete questionnaires and duplicate responses were excluded before the final analysis.

Data Collection

Data were collected using a structured interviewer-administered questionnaire developed following a review of the relevant literature and validated sleep assessment tools. The questionnaire was reviewed by three consultant gynecologists to ensure content validity and clinical relevance before data collection.

The questionnaire consisted of three sections:

1. Sociodemographic characteristics (age, body mass index, and education)
2. Clinical characteristics (dysmenorrhea, dyspareunia, pelvic pain, low back pain, abdominal cramping, and excessive menstrual bleeding)
3. Sleep quality assessment using the Pittsburgh Sleep Quality Index (PSQI).

Sleep Quality Assessment

Sleep quality was measured using the Pittsburgh Sleep Quality Index (PSQI), a validated self-reported instrument that evaluates sleep quality during the previous month. The PSQI consists of seven

components:

- Subjective sleep quality
- Sleep latency
- Sleep duration
- Habitual sleep efficiency
- Sleep disturbances
- Use of sleep medication
- Daytime dysfunction

Each component is scored from 0 to 3, producing a global score ranging from 0 to 21, with higher scores indicating poorer sleep quality. Participants with a global PSQI score greater than 5 were classified as poor sleepers. (Buysse et al., 1989)

Statistical Analysis

Data were analyzed using IBM SPSS Statistics version 27.0.

Continuous variables are presented as mean $\pm$ standard deviation (SD), whereas categorical variables are presented as frequency and percentage.

Differences between study groups were assessed using the independent-samples *t* test for continuous variables and the chi-square test for categorical variables.

A 2-sided *P* value $< .05$ was considered statistically significant. No missing data were included in the final analysis because incomplete questionnaires were excluded before statistical analysis.

Ethical Considerations

Ethical approval was obtained from the Institutional Review Board of BRAC University (Approval No. BRACUIRB_220240006). The study was conducted in accordance with the principles of the Declaration of Helsinki and relevant ethical guidelines and regulations for research involving human participants. Written informed consent was obtained from all participants before enrollment. For participants aged 16–17 years, informed consent was obtained in accordance with the approved study protocol. No participants younger than 16 years were included in the study. Participation was voluntary, and confidentiality was maintained by removing all personal identifiers before data analysis.

Results

A total of 401 women were included in the study, comprising 201 women with clinically diagnosed endometriosis and 200 healthy controls, as illustrated in the participant flow diagram (Fig. 2). Among

women with endometriosis, 138 (68.7%) were classified as poor sleepers (PSQI > 5), whereas 63 (31.3%) were classified as good sleepers.

Table 1
Quality of sleep among endometriosis women by socio-demographic, clinical characteristics

Variable	Good sleeper (PSQI ≤ 5) (N = 63)	Poor sleeper (PSQI > 5) (N = 138)	P-value
Age	31.03 ± 8.72	30.15 ± 8.36	.496
BMI	22.55 ± 4.07	22.55 ± 4.15	.995
Education	8(17)	17(8.5)	.940
University	55(27.4)	121(60.2)	
Non University			
Dyspareunia	56(27.9)	88(43.8)	< .001
Yes	7(3.5)	50(24.9)	
No			
Dysmenorrhea	38(18.9)	114(56.7)	< .001
Yes	25(12.4)	24(11.9)	
No			
Excessive Bleeding	45(22.4)	77(38.3)	.03
Yes	18(9.0)	61(30.3)	
No			
Pelvic pain	49(24.4)	123(61.2)	.03
Yes	14(7.0)	15(7.5)	
No			
Low back pain	44(21.9)	113(56.2)	.05
Yes	19(9.5)	25(12.4)	
No			
Cramping	46(22.9)	77(38.3)	.02
Yes	17(8.5)	61(30.3)	
No			

Table 1 presents the association between sleep quality and participants' sociodemographic and clinical characteristics. There were no statistically significant differences between good and poor sleepers with respect to age, body mass index (BMI), or educational attainment. The mean age was 31.03 ± 8.72 years among good sleepers and 30.15 ± 8.36 years among poor sleepers ($P=.496$). Similarly, the mean BMI was 22.55 ± 4.07 kg/m² for good sleepers and 22.55 ± 4.15 kg/m² for poor sleepers ($P=.995$). Educational level was also not associated with sleep quality ($P=.940$). These findings suggest that sociodemographic characteristics were not significantly associated with sleep quality among women with endometriosis. Women reporting dyspareunia were significantly more likely to be poor sleepers than good sleepers (43.8% vs 27.9%; $P<.001$). Likewise, dysmenorrhea was significantly more prevalent among poor sleepers (56.7%) than good sleepers (18.9%; $P<.001$). Significant associations with poor sleep quality were also observed for excessive menstrual bleeding ($P=.03$), pelvic pain ($P=.03$), low back pain ($P=.05$), and abdominal cramping ($P=.02$).

Table 2
Comparison of sleep quality women with and without endometriosis

Subjective sleep quality	Case(N = 201) mean $\pm$ SD	Control(N = 200) mean $\pm$ SD	P-value
	0.72 $\pm$ 0.90	1.27 $\pm$ 0.88	< .001
Sleep latency	2.06 $\pm$ 1.03	1.03 $\pm$ 0.93	< .001
Sleep duration	1.42 $\pm$ 0.94	1.05 $\pm$ 1.06	< .001
Sleep efficiency	1.19 $\pm$ 1.21	0.71 $\pm$ 1.09	< .001
Sleep disturbance	1.22 $\pm$ 0.55	0.69 $\pm$ 0.60	< .001
Use of sleep medication	0.20 $\pm$ 0.67	0.13 $\pm$ 0.46	.232
Daytime dysfunction	0.80 $\pm$ 0.94	0.57 $\pm$ 0.85	.014

Table 2 compares the PSQI component scores between women with endometriosis and healthy controls. Women with endometriosis demonstrated significantly poorer sleep across most PSQI domains than healthy controls. The mean sleep latency score was significantly higher among women with endometriosis than among controls (2.06 ± 1.03 vs. 1.03 ± 0.93 , $P < .001$). Similarly, women with endometriosis had significantly higher scores for sleep duration, habitual sleep efficiency, sleep disturbance, and daytime dysfunction (all $P < .05$). However, the subjective sleep quality component score was lower among women with endometriosis than among healthy controls (0.72 ± 0.90 vs. 1.27 ± 0.88 , $P < .001$), whereas no significant difference was observed in sleep medication use ($P = .232$).

Overall, women with endometriosis exhibited significantly poorer sleep quality than healthy controls across nearly all domains of the PSQI, whereas sleep medication use did not differ significantly between groups

Discussion

This hospital-based cross-sectional study evaluated sleep quality among Bangladeshi women with endometriosis and examined the relationship between sleep quality and endometriosis-related clinical symptoms. The findings demonstrated that poor sleep quality was highly prevalent among women with endometriosis, with more than two-thirds of participants classified as poor sleepers. Women with endometriosis exhibited poorer sleep across most PSQI domains, including sleep latency, sleep duration, sleep efficiency, sleep disturbances, and daytime dysfunction. However, the subjective sleep quality component showed a lower mean score among women with endometriosis than among healthy controls. This finding may indicate that participants' subjective perception of their sleep did not fully correspond with other measured dimensions of sleep quality or may reflect differences in self-perception and symptom reporting. Further studies are needed to clarify this observation. In addition, poor sleep quality was significantly associated with dysmenorrhea, dyspareunia, pelvic pain, excessive menstrual bleeding, low back pain, and abdominal cramping, whereas sociodemographic characteristics such as age, BMI, and educational level were not significantly associated with sleep quality.

Our findings are consistent with previous studies reporting impaired sleep quality among women with endometriosis. Maggiore et al. found that women with symptomatic endometriosis experienced significantly poorer sleep quality, increased insomnia symptoms, and excessive daytime sleepiness compared with healthy women (Maggiore et al., 2017). Similarly, Marinho et al. concluded that sleep disturbance is an important contributor to reduced quality of life in women with endometriosis (Marinho et al., 2018). These findings support the growing evidence that sleep disturbance is an important component of the overall disease burden associated with endometriosis.

The observed association between pain-related symptoms and poor sleep quality is also supported by previous research. Facchin et al. reported that pelvic pain was one of the strongest predictors of impaired quality of life and poor sleep among women with endometriosis (Facchin et al., 2015). Likewise, the multicountry study by Nnoaham et al. demonstrated that pain severity was closely associated with reduced physical functioning, impaired daily activities, and poorer health-related quality of life (Nnoaham et al., 2011). Our findings extend this evidence by demonstrating similar associations in a Bangladeshi population, where local data on sleep quality among women with endometriosis have previously been unavailable.

Although the biological mechanisms underlying this relationship were not examined in the present study, previous research suggests that chronic pelvic pain, persistent inflammation, hormonal changes, and repeated sleep interruption may contribute to poor sleep quality among women with endometriosis (Taylor et al., 2021; Ishikura et al., 2020). Chronic pain may interfere with normal sleep initiation and maintenance, while inadequate sleep may further increase pain sensitivity and fatigue, creating a cycle that adversely affects overall well-being. Because the present study was cross-sectional, these findings should be interpreted as associations rather than causal relationships.

Interestingly, no significant difference was observed in the use of sleep medication between women with endometriosis and healthy controls. This finding may indicate that sleep disturbances remain under-recognized or undertreated in routine gynecological care. Routine screening for sleep problems using validated instruments such as the Pittsburgh Sleep Quality Index may facilitate earlier identification of women requiring comprehensive symptom management (Buysse et al., 1989).

Public Health Implications

Endometriosis is increasingly recognized as a chronic condition that affects multiple aspects of women's health beyond reproductive function. The high prevalence of poor sleep observed in this study highlights the importance of incorporating sleep assessment into routine clinical evaluation of women with endometriosis. Addressing sleep disturbances alongside pain management may improve quality of life, daily functioning, and overall health outcomes. In Bangladesh, where awareness of endometriosis remains limited, integrating sleep assessment into gynecological services may contribute to more patient-centered care and improved disease management. Lifestyle and dietary factors have also been recognized as potentially relevant to the management and symptom burden of endometriosis, highlighting the importance of a comprehensive approach to disease management (Habib et al., 2022).

Strengths and Limitations

This study has several strengths. It is among the first studies to evaluate sleep quality among women with endometriosis in Bangladesh using the validated Pittsburgh Sleep Quality Index. The inclusion of an age-matched healthy control group allowed direct comparison of sleep quality between women with and without endometriosis. In addition, a relatively large sample size increased the precision of the study findings. Several limitations should also be acknowledged. First, the study was conducted at a single tertiary hospital using convenience sampling, which may limit the generalizability of the findings to the wider Bangladeshi population. Second, the cross-sectional design does not permit conclusions regarding temporal or causal relationships between sleep quality and endometriosis-related symptoms. Third, sleep quality was assessed using self-reported questionnaire data rather than objective sleep measurements such as polysomnography or actigraphy. Finally, several potential confounding variables, including psychological distress, physical activity, dietary habits, medication use, and comorbid chronic conditions, were not assessed and should be considered in future studies. Selection bias may also have been present because participants were recruited from a single tertiary care hospital using convenience sampling. Consequently, the study population may not fully represent all women with endometriosis in Bangladesh, particularly those who do not seek hospital-based care. Therefore, the generalizability of the findings should be interpreted with caution.

Future Research

Future multicenter prospective studies involving more diverse populations are needed to confirm these findings and evaluate changes in sleep quality over time. Research incorporating objective sleep

assessments together with psychological, hormonal, and inflammatory biomarkers may further clarify the mechanisms linking endometriosis and sleep disturbances. Intervention studies are also warranted to determine whether improving sleep quality can reduce symptom burden and enhance quality of life among women with endometriosis.

Conclusion

Women with endometriosis in Bangladesh experienced significantly poorer sleep quality than healthy women across multiple dimensions of sleep. Poor sleep quality was strongly associated with pain-related symptoms, including dysmenorrhea, dyspareunia, pelvic pain, excessive menstrual bleeding, low back pain, and abdominal cramping. These findings suggest that sleep disturbance represents an important aspect of the overall burden of endometriosis and should be considered during routine clinical assessment. Incorporating validated sleep assessment tools into gynecological practice may facilitate earlier identification of sleep problems and support more comprehensive management strategies. Further longitudinal and multicenter studies are required to confirm these findings and evaluate interventions aimed at improving sleep quality and overall health outcomes among women with endometriosis.

Declarations

Conflict of Interest:

The authors declare no conflicts of interest related to this study. All authors contributed significantly to the design, data collection, analysis, and interpretation of the study. Dr. Munima Haque supervised the project and provided critical revisions. All authors read and approved the final manuscript.

Consent for publication:

Not Applicable.

AI Use Disclosure

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Author Contribution

• A.A. = Afsana Afrose • M.M. = Muhammad Muztoba • M.Mar. = Mubashira Marzan • M.H. = Munima Haque A.A., M.M., and M.Mar. contributed to the study design, data collection, and statistical analysis. A.A. and M.H. drafted the main manuscript text. M.H. supervised the project, provided critical revisions, and finalized the manuscript structure. All authors reviewed and approved the final manuscript.

Data Availability

The data sets generated and analyzed during this case-control study on Evaluation of Factors Associated with Endometriosis and Clinical Treatments in Bangladesh (conducted from June 2024 and October 2025) are not publicly available due to ethical and privacy restrictions imposed by the BRAC University Institutional Review Board. However, de-identified data supporting the findings of this study are available from the corresponding author upon reasonable request.

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Figures

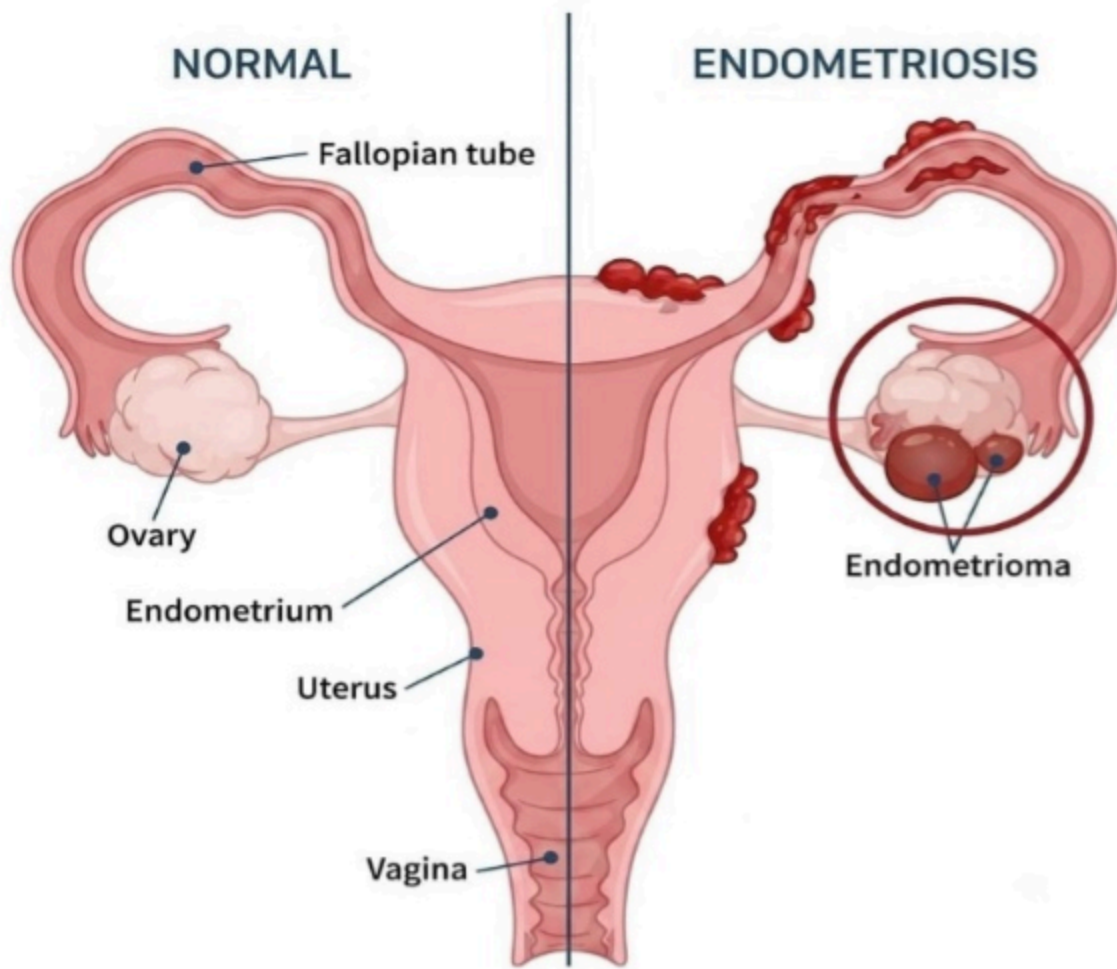


Figure 1

Anatomical diagram comparing a normal uterus with endometriosis

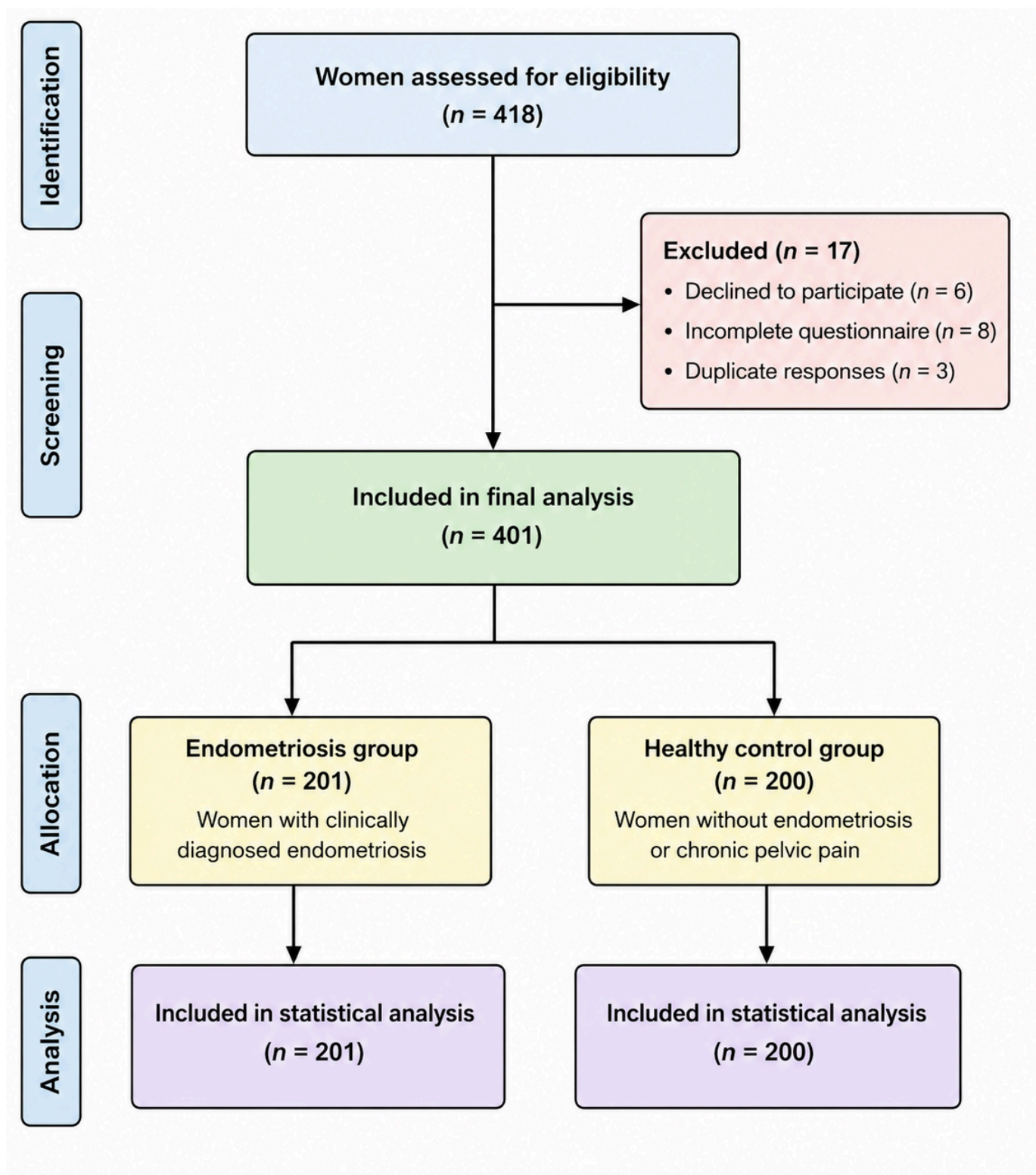


Figure 2

Flow diagram illustrating participant recruitment, exclusions, group allocation, and inclusion in the final statistical analysis.