# **Original Research**

# Studying Endometrial Thickness via Transvaginal Ultrasound in Perimenopausal Women with Irregular Bleeding

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Received date: 21 February2025 Acceptance date: 15 March 2025 Published: 25 April, 2025

# Abstract

**Background:** Abnormal uterine bleeding (AUB) is a common complaint among perimenopausal women, often associated with a variety of benign and malignant endometrial conditions. This study aims to assess endometrial thickness using TVS in perimenopausal women presenting with AUB and to correlate these findings with histopathological outcomes.

**Materials and Methods**: Present study was conducted during February 2024 to August 2024 A prospective study was conducted on 190 perimenopausal women aged 39–51 years presenting with AUB. Detailed clinical histories were obtained, and all patients underwent general, systemic, and gynecological examinations. Transvaginal ultrasonography was performed using a Siemens Acuson X300 (5–9 MHz) probe to measure endometrial thickness and assess uterine and adnexal structures. Cases requiring further evaluation underwent dilatation and curettage, and the samples were sent for histopathological examination. Data were analyzed using descriptive statistics, chi-square tests, and Student's t-tests; a p-value <0.05 was considered statistically significant.

**Results**: The majority of patients were aged between 41–45 years, with a mean age of  $45.03 \pm 4.2$  years. Heavy menstrual bleeding was the most common presenting symptom (62.1%). Most patients (51%) had an endometrial thickness between 10 and 14.9 mm. Fibroid uterus (22.6%) and adenomyosis (15.7%) were the most common uterine pathologies observed. Histopathologically, secretory endometrium (43.1%) and proliferative endometrium (40%) were predominant, while endometrial hyperplasia (6.3%) and carcinoma (2.6%) were also noted.

**Conclusion:** Transvaginal ultrasonography is an effective initial investigation for evaluating endometrial thickness and identifying uterine pathology in perimenopausal women with abnormal uterine bleeding.

Keywords: Perimenopausal women, Abnormal uterine bleeding (AUB), Endometrial thickness, Transvaginal ultrasonography

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# Introduction

The perimenopausal period, representing the transitional phase leading to menopause, is a complex endocrinological stage characterized by ovarian follicular depletion, anovulation, and hormonal fluctuations. This transition often manifests clinically with menstrual irregularities such as oligomenorrhea, polymenorrhea, menorrhagia, and intermenstrual bleeding (1). Such disturbances are not only distressing but may also reflect underlying endometrial pathology, making their evaluation critical in clinical practice.

Endometrial thickness (ET), typically measured via transvaginal ultrasonography (TVS), serves as a noninvasive biomarker for assessing the endometrial environment. TVS is widely used due to its accessibility, safety, and high sensitivity in detecting intrauterine abnormalities, particularly in women presenting with abnormal uterine bleeding (AUB) (2). During the perimenopausal years, ET can vary significantly due to fluctuating estrogen levels, and these variations may or may not correspond with histopathological changes (3).

Menstrual irregularities during perimenopause are common, but their evaluation remains challenging due to the overlap of normal aging physiology with potential pathology, including endometrial hyperplasia or carcinoma (4). A thickened cited >11 mm in endometrium (commonly perimenopausal women) may warrant further investigation through biopsy or hysteroscopy to exclude malignancy (5). However, clear diagnostic thresholds specific to perimenopausal populations are still debated, and existing guidelines often extrapolate data from postmenopausal cohorts (6).

Furthermore, underlying risk factors such as obesity, diabetes mellitus, polycystic ovary syndrome (PCOS), hypertension, and nulliparity have been associated with increased endometrial proliferation, thereby compounding the risk of pathology in perimenopausal women (7,8). As the endometrium is highly responsive to estrogen stimulation, unopposed estrogen exposure—common during anovulatory cycles—can lead to hyperplastic changes, some of which may become atypical or neoplastic (9).

A prospective evaluation of ET in women with menstrual irregularities can help establish normative data and stratify risk in symptomatic perimenopausal populations. Such studies are imperative to distinguish benign hormonal changes from pathologic alterations, minimize unnecessary interventions, and improve early detection of significant disease. The integration of sonographic parameters with clinical and metabolic profiles offers a comprehensive strategy for individualized care.

In light of the above, this study aims to systematically investigate the association between menstrual irregularities and ET in perimenopausal women using prospective methodology. By doing so, it seeks to enhance diagnostic accuracy, guide management decisions, and contribute to the refinement of clinical thresholds for intervention.

#### **Materials and Methods**

Present study was conducted during February 2024 to August 2024 at NMCH, Patna. This time-bound prospective study encompassed a cohort of 190 women aged between 39 and 51 years, all within the perimenopausal age group. A comprehensive history was recorded for each participant, including details regarding menstrual irregularities, duration of symptoms, as well as obstetric, medical, surgical backgrounds, and any prior treatments undertaken. Each woman underwent a thorough clinical evaluation, comprising general physical, systemic, and gynecological examinations. Additionally, all necessary laboratory investigations and preanaesthetic assessments were completed.

Transvaginal ultrasonography (TVS) was conducted for all participants using a Siemens Acuson X300 machine equipped with a 5–9 MHz transvaginal probe. Imaging was exclusively performed via the transvaginal route. Parameters assessed on ultrasound included endometrial thickness, echogenicity of the endometrium, integrity of the endometrial-myometrial interface, and myometrial features. Endometrial thickness was measured in the sagittal plane at its maximum point. Any abnormal findings, such as the presence of polyps or suspicious masses, were documented. A full evaluation of the uterus was carried out in both longitudinal and transverse planes to detect myometrial abnormalities. Color Doppler imaging was utilized when necessary, particularly to differentiate between conditions such as adenomyosis and leiomyoma or endometrial hyperplasia and polyps.

Procedure for Dilatation and Curettage: Prior to the procedure, patients received intravenous sedation with diazepam and atropine to minimize the risk of vasovagal reactions. Following sedation, patients were positioned in the dorsal lithotomy position, and sterile preparation of the operative field was performed. The cervix was visualized using a Sims posterior vaginal wall speculum and an anterior vaginal wall retractor. The anterior lip of the cervix was grasped with a vulsellum for stabilization. Sequential dilation of the cervical canal was performed using Hegar's dilators, increasing gradually up to size 8. Following adequate dilation, a curette was introduced into the uterine cavity, and systematic curettage of all uterine walls was performed. The collected tissue samples were preserved in 10% formalin and subsequently sent for histopathological examination.

### **Statistical Analysis**

Data collected during the study were systematically entered into Microsoft Excelspreadsheets. Statistical analyses were conducted using XLSTAT software integrated within MS Excel. Descriptive statistics were utilized to summarize the data. The Chi-square test was applied to evaluate associations between categorical variables, while the Student's t-test was used for comparison of quantitative variables where appropriate. A p-value less than 0.05was considered to indicate statistical *significance*.

#### Results

A total of 190 patients, aged between 39 to 51 years were included in the study. Among 190 patients in the study group, most of the patients were between 41-45 years (41.0%). Mean ageof patients was  $45.03\pm4.2$  years. Mean age of menarche was found to be  $13.7\pm2.29$  years (Table 1).

Age group of patients	No. of patients(%)
36-40years	52 (27.3)
41-45years	78 (41.0)
46-50years	60 (31.5)
Total	190 (100)

Table 1: Distribution of patients according to age.

Majority of the women were multiparous (95.2%) in the study. Among them 52.6% were para 2,26.8% were para 3 and 12.6% were with parity more than 4. Only 7.8% of women were para 1 (Table 2).

Parity of the patients	No. of patients(%)			
Para1	15(7.8)			
Para2	100(52.6)			
Para3	51(26.8)			
Para≤4	24(12.6)			
Total	190 (100)			

Table 2: Distribution of patients according to parity.

Majority of women(62.1%) presented with HMB followed by(16.8%) polymennorhoea,(9.4%) Polymennorhagia, (4.7%) oligomennorhagia,(3.6%) metrorrhagia,(2.1%) menometrorhagia,(1.0%) oligomennorhoea(Table3).

Table3: Distribution of patients according to menstrual complaints.				
	Menstrual complaints	No. of patients(%)		
	Menorrhagia/HMB	118 (62.1)		
	Polymenorrhoea	32 (16.8)		
	Polymenorrhagia	18 (9.4)		
	Oligomenorrhagia	9 (4.7)		
	Metrorrhagia	7 (3.6)		
	Menometrrhagia	4 (2.1)		
	Oligomenorrhoea	2 (1.0)		
	Total	190(100)		

In the study group majority had fibroid uterus (22.6%) followed by adenomyosis (15.7%), endometrial hyperplasia (10.5%), ovarian cyst (4.2%), endometrial polyp (2.6%), one case each of endometritis, cervical polyp, ovarian dermoid, ovarian functional tumour, PCOS, endometrial cyst, hydrosalpinx, cystitis (Table 4).





In the study 36.3% patients had endometrial thickness between 5 and 9.9 mm, 51.0% patients had endometrial thickness between 10 and 14.9 mm, 6.3% had Endometrial thickness between 15-19.9 mm, 6.3% had Endometrial thickness >20 mm (Table 5).

Endometrial thickness(mm)	No. of patients	% of patients
5 - 9.9	69	36.3
10 -14.9	97	51.0
15 -19.9	12	6.3
≤20	12	6.3
Total	190	100

 Table 5: Distribution of patients endometrial thickness on TVS.

Secretory endometrium (43.1%) was the most common histological pattern followed by 40% proliferative endometrium. Endometrial carcinoma was 2.6%, endometrial hyperplasia 6.3% endometrial polyps were 2.6% and endometritis was 1%. Disordered proliferative endometrium considered as an intermediate step between normal proliferative endometrium and endometrial hyperplasia was detected in 2.6% of the patients (Table 6).

Table6: Distribution of patients histopathological examination report after D and C.

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Pathology	No. of patients	% of patients	
Proliferative Endometrium	76	40	
Secretory Endometrium	82	43.1	
Simple hyperplasia with/ without atypia	12	6.3	
Complex hyperplasia with atypia	5	2.6	
Disorder edproliferative endometrium	3	1.5	
Endometrial carcinoma	5	2.6	
Endometritis	2	1.0	
Endometrial polyp	5	2.6	
Total	190	100	

Discussion

This prospective study analyzed clinical, ultrasonographic, and histopathological characteristics of 190 perimenopausal women aged 39 to 51 years, aiming to evaluate endometrial thickness (ET) in the context of menstrual irregularities. The findings underscore the importance of correlating menstrual history with sonographic and histologic data to guide clinical decision-making in perimenopausal patients.

The mean age of participants  $(45.03 \pm 4.2 \text{ years})$  aligns with previously reported data identifying 40–50 years as the typical age range for perimenopausal symptoms to manifest (1,11). Most women were multiparous (95.2%), a trend consistent with other regional studies where high parity is commonly observed (12). High parity has been suggested to offer some protective effects against endometrial carcinoma, although its role in other pathologies such as fibroids remains unclear (13).

Heavy menstrual bleeding (HMB) emerged as the most frequent presenting symptom (62.1%), followed by polymenorrhoea and polymenorrhagia. These findings echo those of studies conducted by Breijer et al. and Munro et al., who identified HMB as the predominant menstrual irregularity in perimenopausal women (14,15). The high prevalence of HMB in this group emphasizes the need for thorough evaluation, particularly as it may mask or coincide with underlying pathologies.

Ultrasound assessment revealed that the majority of women (51%) had endometrial thickness between 10–14.9 mm, while 12.6% exhibited thickening beyond 15 mm. These findings are significant, as an ET of more than 11 mm in symptomatic perimenopausal

women is often considered a threshold that warrants further histological evaluation (16,17). Notably, 6.3% of patients had ET exceeding 20 mm, suggesting a substantial risk for endometrial hyperplasia or malignancy.

Regarding uterine pathology, fibroids (22.6%) and adenomyosis (15.7%) were the most common findings, consistent with existing literature which highlights these as the leading causes of abnormal uterine bleeding in this age group (18). The presence of fibroids may influence ET measurements, and care must be taken to distinguish true endometrial thickening from pseudo-thickening caused by adjacent myometrial pathology (10).

Histopathologically, the most common endometrial pattern was secretory (43.1%), followed closely by proliferative (40%), reflecting the hormonal fluctuations typical of perimenopause. These normal patterns were found even among those with significant menstrual irregularities, highlighting the complexity of perimenopausal bleeding disorders (19). Importantly, endometrial hyperplasia was diagnosed in 6.3% of patients, while endometrial carcinoma was detected in 2.6%. This supports findings from other studies that show an approximate 2–3% prevalence of endometrial malignancy in symptomatic perimenopausal women (20,21).

The study also identified disordered proliferative endometrium in 2.6% of participants, which is considered a histologic precursor to hyperplasia. This observation reiterates the concept of a continuum in endometrial pathology and the importance of timely intervention (22). Rare but noteworthy findings such as endometrial polyps, endometritis, and adnexal

masses were also reported, necessitating individualized treatment strategies.

Overall, the data affirm the diagnostic utility of transvaginal ultrasound as a first-line tool in evaluating perimenopausal bleeding, with histopathology serving as the gold standard for definitive diagnosis. The study reinforces the need for a threshold-based approach to endometrial thickness, emphasizing that values  $\geq 12$  mm in symptomatic women should prompt further investigation (23,24).

# Conclusion

In this study of 190 perimenopausal women aged 39 to 51 years presenting with abnormal uterine bleeding, heavy menstrual bleeding emerged as the most prevalent clinical complaint. The majority of women were multiparous, and the most common age group was between 41 and 45 years. Transvaginal ultrasonography proved to be an effective, non-invasive tool for evaluating endometrial thickness and detecting underlying uterine abnormalities.

Most patients demonstrated an endometrial thickness between 10 and 14.9 mm, reinforcing the need for close monitoring when ET exceeds 10 mm in symptomatic perimenopausal women. Histopathological evaluation revealed that while secretory and proliferative endometrium accounted for the majority of findings, a significant proportion of cases demonstrated endometrial hyperplasia and carcinoma, highlighting the potential risk of malignant transformation during the perimenopausal period. Fibroid uterus and adenomyosis were the most common structural abnormalities identified. correlating with the clinical presentation of abnormal uterine bleeding. The detection of endometrial hyperplasia, carcinoma, and disordered proliferative endometrium underlines the importance of combining transvaginalsonography with histopathological examination for accurate diagnosis and timely intervention.Early identification and appropriate management of endometrial pathology are critical to improving outcomes and preventing progression to malignancy.

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