



RESEARCH ARTICLE

A Study on The Relationship of Endometrial Thickness and Abnormal Uterine Bleeding in Women of Reproductive Age Group

Garima Singh¹, Sushila Shekhawat^{2*}, Yamini Singh³, Rajani Yadav⁴

ABSTRACT

Background: Abnormal uterine bleeding (AUB) is a common gynecological complaint that significantly affects women's health and quality of life. Endometrial thickness measured by transvaginal ultrasonography serves as a useful non-invasive marker of endometrial pathology. Evaluating its relationship with AUB may improve diagnostic accuracy and reduce unnecessary invasive procedures.

Aim: To evaluate endometrial thickness and its association with abnormal uterine bleeding in reproductive-age women.

Method: After informed consent, demographic, menstrual, obstetric, clinical, laboratory, and sonographic data were collected using a structured proforma. Endometrial thickness was measured by ultrasonography, with menstrual cycle day recorded. Data were analyzed using SPSS version 27 and expressed as mean $\pm$ standard deviation.

Results: Among 90 women, mean age was 33.78 ± 5.01 years and mean endometrial thickness 13.28 ± 4.03 mm. Heavy menstrual bleeding predominated. Fibroid was the commonest abnormality. Increased BMI correlated with greater endometrial thickness, while hyperplasia and combined lesions were associated with higher thickness values.

Conclusion: The present study demonstrated a significant association between endometrial thickness and abnormal uterine bleeding. Most patients had moderately increased endometrial thickness, with heavy menstrual bleeding as the commonest symptom. Higher thickness was associated with fibroids, adenomyosis, hyperplasia, PCOD, and increased BMI, supporting ultrasonography as a valuable non-invasive diagnostic tool.

Keywords: Uterine Bleeding, Gynecological, Ovarian Axis, Menstrual Cycles, Endometrial Pathologies, Dysfunctional.

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INTRODUCTION

Abnormal uterine bleeding (AUB) is a common gynecological complaint among women of reproductive age and represents a significant proportion of outpatient visits. It is a clinical symptom resulting from hormonal, structural, systemic, or endometrial abnormalities rather than a disease itself.[1] AUB refers to bleeding that deviates from normal menstrual frequency, regularity, duration, volume, or cyclicity in the absence of pregnancy. Such deviations from normal menstrual patterns require clinical evaluation.[2]

Abnormal uterine bleeding affects 10–20% of women globally and up to 50% of perimenopausal women.[3] In India, its prevalence is approximately 17.9%, particularly among women aged 41–50 years. AUB is a major cause of gynecological consultations and hysterectomies. Clinical presentations vary with age, while postmenopausal bleeding warrants evaluation for endometrial malignancy.[4]

To standardize terminology and etiological classification, the International Federation of Gynecology

¹Post Graduate Resident, Department of Anatomy, Jawaharlal Nehru Medical College, Ajmer, Rajasthan, India.

²Professor, Department of Anatomy, Jawaharlal Nehru Medical College, Ajmer, Rajasthan, India.

³Senior Medical Officer, Department of Anatomy, Jawaharlal Nehru Medical College, Ajmer, Rajasthan, India.

⁴Post Graduate Resident, Department of Anatomy, Jawaharlal Nehru Medical College, Ajmer, Rajasthan, India.

Corresponding Author: Sushila Shekhawat, Professor, Department of Anatomy, Jawaharlal Nehru Medical College, Ajmer, Rajasthan, India. Email: dr.sush08@gmail.com

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and Obstetrics (FIGO) introduced the PALM–COEIN classification system, which categorizes structural and non-structural causes of AUB. Dysfunctional uterine bleeding (DUB), a diagnosis of exclusion, accounts for nearly half of AUB cases and is commonly associated with hormonal imbalance.[5]

The endometrium undergoes cyclical hormonal changes, with thickness varying from 1–4 mm during menstruation to 16–18 mm in the secretory phase.[6] Transvaginal ultrasonography (TVS) is a non-invasive and cost-effective method for assessing endometrial thickness in AUB.[7] Increased thickness may suggest pathology, though histopathology remains the diagnostic gold standard. [8]

Systemic and endocrine disorders such as hypothyroidism, obesity, stress, and structural lesions including fibroids, adenomyosis, and endometrial hyperplasia also contribute to AUB.[9] Therefore, evaluating the relationship between endometrial thickness and AUB may help identify women at risk of significant pathology, reduce unnecessary invasive procedures, and improve evidence-based clinical management.

This study Aim's to assess endometrial thickness, identify factors influencing it, and evaluate its association with abnormal uterine bleeding in reproductive-age women.

MATERIALS AND METHODS

Study Design

This prospective observational study was conducted in the Department of Obstetrics and Gynecology, JLN Medical College, Ajmer, from July 2024 to December 2025.

Study Population

The study included women of reproductive age presenting with abnormal uterine bleeding (AUB) in the gynecology outpatient department who were willing to participate in the study. A total of 90 participants were selected using simple random sampling.

Sample Size Estimation

The sample size was calculated for a 95% confidence level using the formula: $n = (p)(q)(z/d)^2$

Where n = required sample size, p = prevalence, $q = 1 - p$, d = allowable error, and $z = 1.96$. Based on an AUB prevalence of 17.9% and an 8% margin of error:

$$n = (17.9) \times (82.1) \times (1.96/8)^2 = 88 \approx 90$$

Reference

A Study on Relationship of Endometrial Thickness and Abnormal Uterine Bleeding in Perimenopausal Women.

Journal of South Asian Federation of Menopause Societies. 2018;6(2):106–111.

Study Method

After obtaining informed consent, demographic, menstrual, obstetric, clinical, laboratory, and ultrasonographic data were collected using a predesigned proforma. Eligible participants underwent ultrasonographic measurement of endometrial thickness with menstrual cycle day recording. Data were analyzed using SPSS version 27 and presented as mean $\pm$ standard deviation.

Inclusion Criteria

Women aged 20–50 years presenting with abnormal uterine bleeding in the gynecology outpatient department.

Exclusion Criteria

Women with normal menstrual cycles, pregnancy-related conditions, pre-menarcheal or postmenopausal status, bleeding disorders, liver or renal disease, thyroid disorders, relevant medications, ovarian tumors, recent uterine perforation, endometriosis, neoplasia, or CIN changes were excluded. Endometrial thickness was measured using transvaginal ultrasonography.

Sonography Machine

Transvaginal ultrasonography measured endometrial thickness and assessed uterine pathology, recording menstrual cycle day using an appropriate transvaginal probe.

RESULTS

Among 90 women, mean age was 33.78 ± 5.01 years and BMI 25.43 ± 3.03 kg/m², with most being overweight (52.22%), vegetarian (97.78%), illiterate (44.44%), and from lower socioeconomic class (60.00%). Most were para 2 (44.44%), without comorbidities (90.00%). Endometrial thickness was predominantly 10–14.9 mm (45.56%), with a mean of 13.28 ± 4.03 mm.

Heavy menstrual bleeding was the most common

Table 1: Distribution of patients according to Presenting Symptoms.

Symptom	No. of Patients	Percentage
Heavy menstrual bleeding	37	41.11
Intermenstrual bleeding	20	22.22
Irregular heavy bleeding	27	30.00
Continuous bleeding	6	6.67
Total	90	100.00

Table 2: Association Between BMI and Endometrial Thickness.

BMI Category	Endometrial Thickness								Total
	5–9.9		10–14.9		15–19.9		≥20		
	No. of Patients	Percentage	No. of Patients	Percentage	No. of Patients	Percentage	No. of Patients	Percentage	
Underweight (<18.5)	4	100.00	0	0.00	0	0.00	0	0.00	4
Normal (18.5–24.9)	15	44.12	19	55.88	0	0.00	0	0.00	34
Overweight (25–29.9)	0	0.00	22	46.81	18	38.30	7	14.89	47
Obese (≥30)	0	0.00	0	0.00	3	60.00	2	40.00	5
Total	19	21.11	41	45.56	21	23.33	9	10.00	90

Table 3: Association Between USG Finding and Endometrial Thickness.

USG Finding	Endometrial Thickness								
	5–9.9		10–14.9		15–19.9		≥20		Total
	No. of Patients	Percentage	No. of Patients	Percentage	No. of Patients	Percentage	No. of Patients	Percentage	No. of Patients
Normal	18	64.29	10	35.71	0	0.00	0	0.00	28
Fibroid	0	0.00	12	50.00	7	29.17	5	20.83	24
Adenomyosis	0	0.00	6	75.00	2	25.00	0	0.00	8
Endometrial hyperplasia	0	0.00	0	0.00	7	100.00	0	0.00	7
Endometrial polyp	1	33.33	2	66.67	0	0.00	0	0.00	3
Ovarian cyst	0	0.00	4	100.00	0	0.00	0	0.00	4
Fibroid + Adenomyosis	0	0.00	0	0.00	0	0.00	2	100.00	2
Fibroid + cyst	0	0.00	0	0.00	3	100.00	0	0.00	3
Fibroid + polyp	0	0.00	0	0.00	0	0.00	2	100.00	2
PCOD	0	0.00	7	77.78	2	22.22	0	0.00	9
Total	19	21.11	41	45.56	21	23.33	9	10.00	90

presenting complaint, affecting 37 patients (41.11%), followed by irregular heavy bleeding in 27 (30.00%) and intermenstrual bleeding in 20 (22.22%). Continuous bleeding was least frequent, occurring in 6 patients (6.67%). Overall, excessive menstrual blood loss represented the predominant clinical presentation among participants.

Normal ultrasonography findings were observed in 28 patients (31.11%), while fibroid was the most common abnormality, detected in 24 patients (26.67%).

PCOD (10.00%), adenomyosis (8.89%), and endometrial hyperplasia (7.78%) followed. Ovarian cysts, polyps, and combined pathologies were less frequent, indicating fibroids as the predominant lesion.

Endometrial thickness was most commonly 10–14.9 mm (45.56%), followed by 15–19.9 mm (23.33%). Underweight and normal BMI patients predominantly had thinner endometrium, whereas overweight and obese women showed greater thickness, including ≥20 mm. These

Table 4: Association Between USG Finding and Age Distribution (in years).

USG Finding	Age Distribution (in years)								
	20–29 yrs		30–34 yrs		35–39 yrs		40–45 yrs		Total
	No. of Patients	Percentage	No. of Patients	Percentage	No. of Patients	Percentage	No. of Patients	Percentage	No. of Patients
Normal	15	53.57	10	35.71	3	10.71	0	0.00	28
Fibroid	0	0.00	5	20.83	13	54.17	6	25.00	24
Adenomyosis	1	12.50	1	12.50	6	75.00	0	0.00	8
Endometrial hyperplasia	0	0.00	3	42.86	2	28.57	2	28.57	7
Endometrial polyp	0	0.00	3	100.00	0	0.00	0	0.00	3
Ovarian cyst	2	50.00	2	50.00	0	0.00	0	0.00	4
Fibroid + Adenomyosis	0	0.00	0	0.00	0	0.00	2	100.00	2
Fibroid + cyst	0	0.00	0	0.00	0	0.00	3	100.00	3
Fibroid + polyp	0	0.00	0	0.00	0	0.00	2	100.00	2
PCOD	4	44.44	3	33.33	2	22.22	0	0.00	9
Total	22	24.44	27	30.00	26	28.89	15	16.67	90

findings suggest a positive association between increasing BMI and endometrial thickness.

Endometrial thickness was predominantly 10–14.9 mm (45.56%). Normal USG findings were associated with lower thickness, whereas fibroids, adenomyosis, PCOD, and hyperplasia were more frequent with increased thickness. Endometrial hyperplasia occurred exclusively in the 15–19.9 mm group, while combined lesions were observed only with thickness ≥ 20 mm.

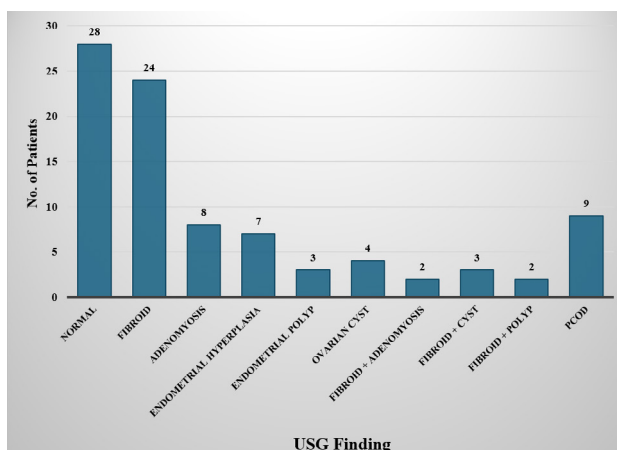


Figure 1: Distribution of patients according to Ultrasonographic (USG) Findings.

Most patients were aged 30–34 years (30.00%). Normal USG findings predominated in younger women, particularly 20–29 years. Fibroids, the most common abnormality, were mainly observed in women aged 35–39 years, while adenomyosis and combined pathologies were more frequent in older age groups. PCOD was common among younger women.

DISCUSSION

Abnormal uterine bleeding (AUB) is a common gynecological problem affecting women's quality of life. Endometrial thickness measured by transvaginal ultrasonography is an important tool for detecting underlying endometrial pathology. This study evaluated the relationship between endometrial thickness and AUB in reproductive-age women to improve diagnosis and management.

Heavy menstrual bleeding was the most common symptom (41.11%), followed by irregular heavy bleeding (30.00%) and intermenstrual bleeding (22.22%). Similarly, Verma A et al[10] reported heavy menstrual bleeding in 38.37%, irregular heavy bleeding in 25.58%, and intermenstrual bleeding in 18.60%. Yadava PA et al. observed heavy menstrual bleeding in 76.4% and intermenstrual bleeding in 24.6% of patients.[11]

Normal ultrasonography findings were most common (31.11%), followed by fibroid uterus (26.67%), PCOD (10.00%), adenomyosis (8.89%), and endometrial hyperplasia (7.78%). Prabhudev P et al. reported endometrial hyperplasia as the most frequent finding, with adenomyosis and fibroids also common. Fadadu S et al. observed normal findings in 54.17% and endometrial hyperplasia in 61.82% of patients.[12-13]

Endometrial thickness was most commonly 10–14.9 mm (45.56%), with higher values observed among overweight and obese women. Kumari P et al.¹⁴ reported a significant association between endometrial thickness >10.5 mm, increased BMI, and endometrial pathology. Modak R et al. also found significantly greater endometrial thickness among overweight and obese women, particularly those presenting with menorrhagia ($p < 0.001$).[15]

Most patients had endometrial thickness of 10–14.9 mm, while pathological lesions were associated with higher thickness values. Prabhudev P et al. reported the strongest association between endometrial hyperplasia and increased endometrial thickness, with adenomyosis and fibroids showing moderate thickening. Mishra P et al. observed normal USG findings most commonly, whereas thickened endometrium was frequently associated with abnormal lesions.[12,16]

Normal USG findings were most common (31.11%), while fibroid uterus (26.67%) was the predominant abnormality. Most patients had endometrial thickness of 10–14.9 mm (45.56%), with a mean thickness of 13.28 ± 4.03 mm. Prabhudev P et al. reported endometrial hyperplasia frequently associated with 10–14.9 mm thickness. Mishra P et al. found abnormal findings significantly more common with endometrial thickness ≥ 14.20 mm ($p < 0.001$).[12,16]

CONCLUSION

The present study demonstrated a significant association between endometrial thickness and abnormal uterine bleeding in reproductive-age women. Most patients had moderately increased endometrial thickness and presented with heavy menstrual bleeding. Higher thickness values were associated with fibroid uterus, adenomyosis, endometrial hyperplasia, PCOD, and increased BMI. Ultrasonographic assessment of endometrial thickness proved to be a valuable non-invasive diagnostic tool.

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