

Endometrial Study by Transvaginal Sonography and Its Correlation with Histopathology in Abnormal Uterine Bleeding in the Perimenopausal Age Group

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Abstract: Background: Abnormal uterine bleeding (AUB) is common during perimenopause and may result from benign cyclical changes, structural uterine lesions, endometrial hyperplasia or carcinoma. Transvaginal sonography (TVS) is an effective initial investigation, but histopathology remains the definitive diagnostic method. Aim: To correlate endometrial findings and thickness on TVS with histopathological findings in perimenopausal women with AUB. Methods: This cross-sectional study included 100 women aged 39–51 years presenting with AUB at Sardar Patel Medical College and Associated Group of P.B.M. Hospitals, Bikaner, from October 2025 to April 2026. Clinical evaluation and TVS were followed by dilatation and curettage with histopathological examination. Associations were analysed using the chi-square test, with $p < 0.05$ considered significant. Results: Most women were aged 43–46 years (42%), and regular heavy bleeding was the commonest presentation (39%). Fibroid uterus was the most frequent TVS finding (36%). Endometrial thickness was 5–8 mm in 47%, 9–12 mm in 33%, and >12 mm in 13%. Histopathology showed proliferative endometrium in 40%, secretory endometrium in 33%, disordered endometrium in 10%, polyps in 6%, hyperplasia without atypia in 4%, hyperplasia with atypia in 2%, atrophic endometrium in 3%, and carcinoma in 1%. Endometrial thickness correlated significantly with histopathology ($p < 0.001$). TVS findings also correlated significantly with histopathology ($p = 0.001$). Conclusion: TVS is a valuable first-line method for evaluating AUB. Increased endometrial thickness, warrants histopathological assessment to exclude premalignant and malignant pathology.

Keywords: Abnormal uterine bleeding; perimenopause; transvaginal sonography; endometrial thickness; histopathology; endometrial hyperplasia

1. Introduction

Abnormal uterine bleeding (AUB) is common during perimenopause and may result from hormonal imbalance or structural lesions.^[1,2,3] Although most causes are benign, endometrial hyperplasia and carcinoma must be excluded.^[4,5,6,7] Transvaginal sonography (TVS) is a useful initial, non-invasive investigation for assessing uterine pathology and endometrial thickness, but histopathology remains the gold standard.^[7,8] This study correlated TVS findings with histopathology in perimenopausal women with AUB and evaluated the diagnostic usefulness of TVS^[9,10].

2. Aim and Objectives

Aim

To compare transvaginal sonographic findings with histopathology in detecting endometrial lesions responsible for abnormal uterine bleeding in perimenopausal women.

- To describe the menstrual abnormalities and sonographic endometrial patterns in perimenopausal women with AUB.
- To correlate endometrial thickness and morphology on TVS with histopathological findings.

- To evaluate the role of TVS as an initial investigation and identify patients requiring invasive endometrial assessment.

3. Materials and Methods

This cross-sectional study was conducted in the Department of Obstetrics and Gynaecology, Sardar Patel Medical College and Associated Group of P.B.M. Hospitals, Bikaner, Rajasthan, from 1 October 2025 to 30 April 2026. After approval from the institutional ethics committee and written informed consent, 100 women aged 39–51 years presenting with AUB were enrolled by simple random sampling.

Women were eligible when they had abnormal uterine bleeding and agreed to participate. Patients outside the specified age range, pregnant women, those with active genital tract infection, thyroid disease, bleeding disorders, anticoagulant use, or systemic illness capable of altering the bleeding pattern were excluded. A detailed history was recorded, including bleeding pattern, duration, drug exposure, obstetric history and previous medical or surgical illness. General, abdominal, speculum and bimanual examinations were performed. Relevant investigations

included complete blood count, glycaemic assessment, liver and renal function tests, thyroid profile, viral markers and coagulation profile. TVS was performed with an empty bladder. Uterine morphology and lesions such as fibroids, adenomyosis, polyps and endometrial hyperplasia were documented. All participants subsequently underwent dilatation and curettage under aseptic precautions. Curettings obtained from the uterine walls and fundus were preserved in 10% formalin and examined histopathologically. Sampling was timed according to the bleeding pattern whenever feasible. Student's t test and the chi-square test were applied as appropriate, and a two-sided p value below 0.05 was considered statistically significant.

4. Results

A total of 100 perimenopausal women were evaluated. The largest age group was 43–46 years (42%), followed by 47–51 years (38%). Nearly half were para >2 (49%), 64% resided in rural areas, and 52% were overweight or obese. Regular heavy bleeding was the commonest presentation (39%), followed by regular frequent heavy bleeding (29%), intermenstrual bleeding (19%) and irregular heavy bleeding (13%).

On TVS, fibroid uterus was the most frequent finding (36%), followed by bulky uterus (20%), normal uterus (18%), adenomyosis (10%), endometrial polyp (9%) and endometrial hyperplasia (7%). Endometrial thickness was 5–8 mm in 47% and 9–12 mm in 33%; 13% had thickness above 12 mm.

Histopathology most commonly showed proliferative endometrium (40%) and secretory endometrium (33%). Disordered endometrium was found in 10%, endometrial polyp in 6%, hyperplasia without atypia in 4%, hyperplasia with atypia in 2%, atrophic endometrium in 3%, and endometrial carcinoma in 1%; one sample was inadequate.

Endometrial thickness showed a strong association with histopathological findings ($p < 0.001$). Proliferative and secretory patterns were concentrated within the 5–12 mm

range, whereas hyperplasia and carcinoma were strongly associated with increase endometrial thickness. Age was significantly associated with histopathology ($p = 0.016$), with hyperplasia, atrophy and carcinoma occurring more often in 47–51 age group. Significant associations were also observed between symptoms and endometrial thickness ($p = 0.039$), symptoms and histopathology ($p = 0.021$), and overall TVS and histopathological findings ($p = 0.001$). These findings support TVS as an effective first-line assessment while confirming the need for tissue diagnosis in women with thickened or suspicious endometrium.

Table 1: Distribution of Cases according to Age

Age Group (Years)	No. of Cases	Percentage
39–42	20	20%
43–46	42	42%
47–51	38	38%
Total	100	100%

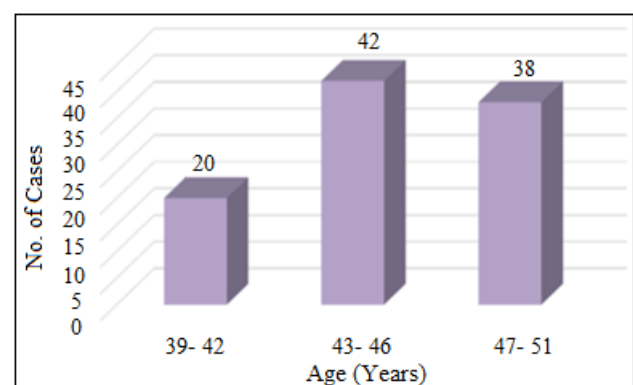


Table 2: Distribution of Cases According to Symptoms

Symptoms	No. of Cases	Percentage (%)
Regular heavy bleeding	39	39%
Regular frequent heavy bleeding	29	29%
Intermenstrual bleeding	19	19%
Irregular heavy bleeding	13	13%
Total	100	100%

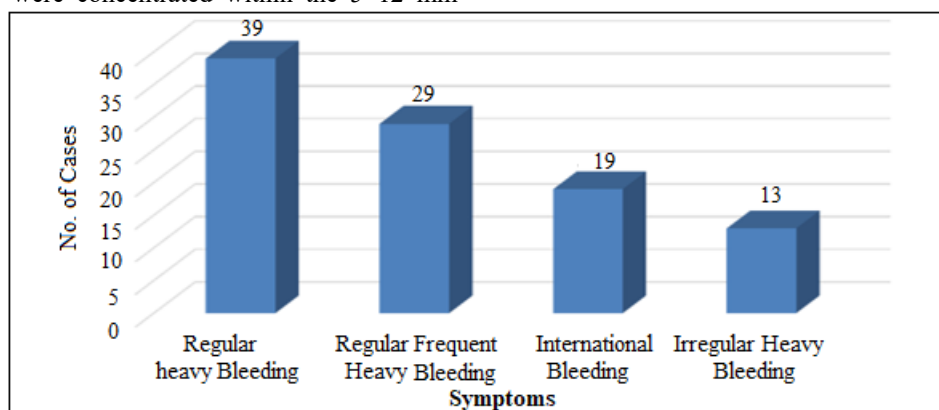


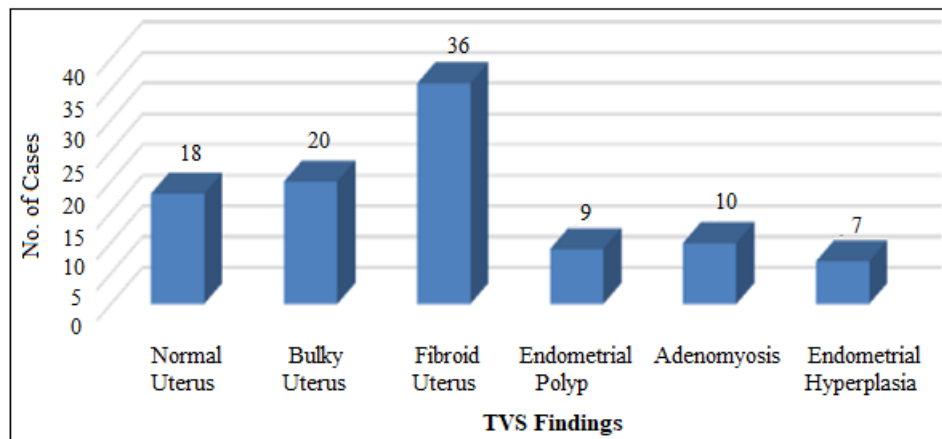
Table 3: Distribution of Cases According to TVS Findings

TVS Findings	No. of Cases	Percentage (%)
Normal uterus	18	18%
Bulky uterus	20	20%
Fibroid uterus	36	36%
Endometrial polyp	9	9%
Adenomyosis	10	10%
Endometrial hyperplasia	7	7%
Total	100	100%

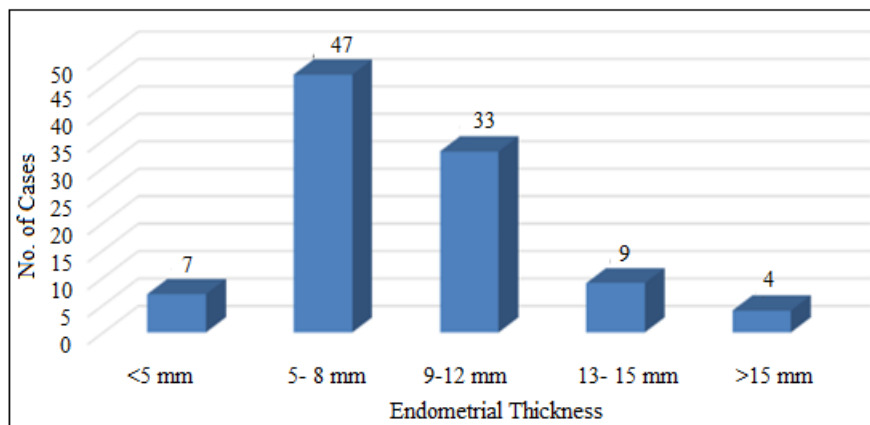
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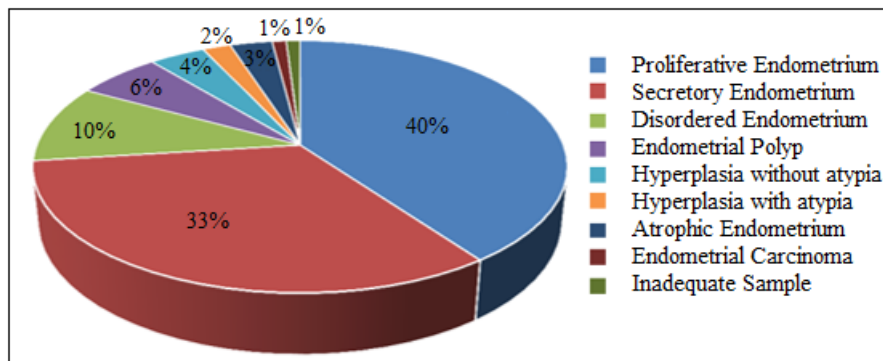
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**Table 4:** Distribution of Cases According to Endometrial Thickness by TVS

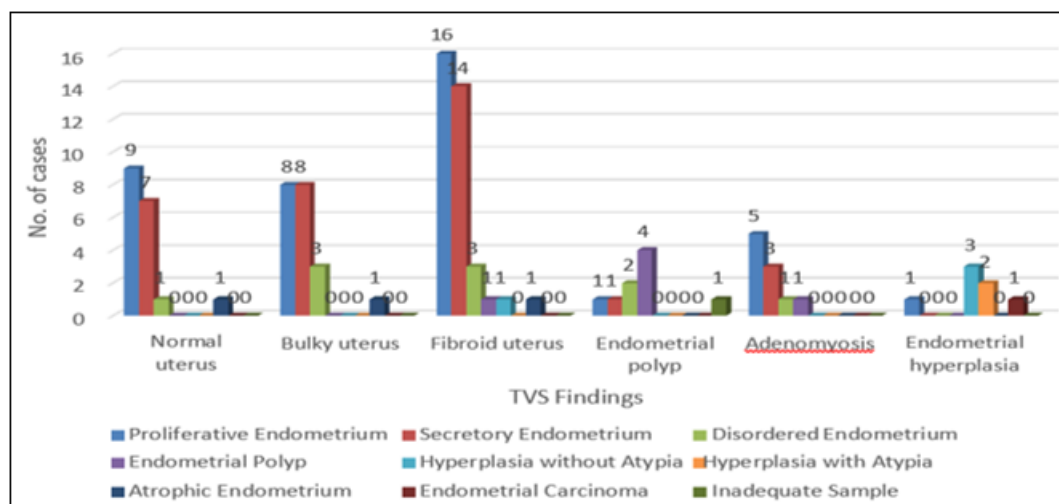
Endometrial Thickness	No. of Cases	Percentage (%)
<5 mm	7	7%
5–8 mm	47	47%
9–12 mm	33	33%
13–15 mm	9	9%
>15 mm	4	4%
Total	100	100%

**Table 5:** Distribution of cases according to Histopathological Findings

HPE Findings	No. of Cases	%
Proliferative endometrium	40	40%
Secretory endometrium	33	33%
Disordered endometrium	10	10%
Endometrial polyp	6	6%
Hyperplasia without atypia	4	4%
Hyperplasia with atypia	2	2%
Atrophic endometrium	3	3%
Endometrial carcinoma	1	1%
Inadequate sample	1	1%
Total	100	100%

**Table 6:** Correlation between TVS Findings and HPE Findings

TVS Findings	Proliferative Endometrium	Secretory Endometrium	Disordered Endometrium	Endometrial Polyp	Hyperplasia without Atypia	Hyperplasia with Atypia	Atrophic Endometrium	Endometrial Carcinoma	Inadequate Sample	
Normal uterus	9	7	1	0	0	0	1	0	0	
Bulky uterus	8	8	3	0	0	0	1	0	0	
Fibroid uterus	16	14	3	1	1	0	1	0	0	
Endometrial polyp	1	1	2	4	0	0	0	0	1	
Adenomyosis	5	3	1	1	0	0	0	0	0	10
Endometrial hyperplasia	1	0	0	0	3	2	0	1	0	7
Total	40	33	10	6	4	2	3	1	1	100



5. Discussion

The present study showed that heavy bleeding patterns were the most common presentation, accounting for 68% of cases. This was comparable to findings reported by Pillai and Begum et al.^[6,10].

Fibroid uterus was the most frequent TVS abnormality, observed in 36% of women. Pillai reported a higher rate, while Begum et al. reported a lower rate^[6,10]. The commonest endometrial thickness range was 5–8 mm (47%), similar to Pillai, whereas Sah et al. reported 10–12 mm as the predominant range^[6,12].

Proliferative endometrium was the leading histopathological finding (40%), followed by secretory endometrium (33%). Similar findings were reported by Pillai and Sah et al.^[6,12]. Endometrial carcinoma was detected in only 1% of cases, which was lower than previous studies^[6,10].

TVS findings showed significant correlation with histopathology ($p=0.001$), supporting its role as a first-line investigation.

6. Conclusion

Transvaginal sonography is a useful, accessible and non-invasive first-line investigation for perimenopausal women with abnormal uterine bleeding. It helps assess uterine morphology, focal lesions and endometrial thickness and identifies women requiring further evaluation.

Thus, TVS should be used for initial screening, while endometrial sampling should be performed in high-risk or suspicious cases to ensure early diagnosis and appropriate treatment.

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