Original Article

# An Observational Study On Etiological Distribution of Abnormal Uterine Bleeding Among the Perimenopausal Women at A Tertiary Care Centre

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## Abstract

**Background:** Abnormal uterine bleeding (AUB) is a frequent gynecologic issue in the perimenopause period, and is linked to substantial physical, psychological and social morbidity. The etiology of AUB is very complex and can be broadly divided into structural causes and non-structural causes according to the classification system presented by FIGO PALM – COEIN. Knowing the distribution of these is important for proper diagnosis and management. The objective of the present study was to identify distribution of etiological factors and to assess their association with demographic, clinical and histopathological findings in women who presented with abnormal uterine bleeding during perimenopause in a tertiary care centre. **Material and Methods:** The study was an observational study done at Government RDBP Jaipuria Hospital, Jaipur, Rajasthan, in the Department of Obstetrics and Gynaecology, MTNL from January 2025 toJanuary 2026. 110 women who were between the ages of 40 and 55, and had been presenting with AUB, were entered. Laboratory tests, clinical examination, ultrasound and histopathological examination were performed. The classification of etiologies was conducted by the FIGO PALM–COEIN system. The data were analysed in SPSS version 26.0. **Results:** The majority of participants were aged 40–45 years [68 (61.8%)] and multiparous [77 (70.0%)]. Heavy menstrual bleeding was the most common presentation [47 (42.7%)]. Moderate anemia was observed in 43 (39.1%) women, while hypothyroidism was the most frequent comorbidity [17 (15.5%)]. Histopathological examination revealed proliferative endometrium in 48 (43.6%) cases. According to the PALM–COEIN classification, leiomyoma was the predominant etiology [63 (57.3%)], followed by ovulatory dysfunction [14 (12.7%)], endometrial causes [11 (10.0%)], adenomyosis [10 (9.1%)], and polyps [8 (7.3%)]. **Conclusion:** AUB in perimenopausal women is predominantly caused by leiomyoma and commonly presents as heavy menstrual bleeding with associated anemia. Proliferative endometrium is the most frequent histopathological finding. Comprehensive evaluation using the PALM–COEIN classification facilitates accurate etiological diagnosis and guides appropriate management strategies in this population. **Keywords:** Abnormal uterine bleeding; Perimenopause; PALM–COEIN classification; Leiomyoma; Endometrial histopathology.

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## Introduction

One of the most frequently presented gynaecological symptoms is Abnormal uterine bleeding (AUB) and is a leading reason for women to visit their GP for or to be admitted to hospital.[1] Perimenopause is the transitional period before menopause, which is associated with a gradual decrease in ovarian function and changes in hormone levels.[2] These hormonal changes often lead to changes in the normal menstrual cycle, including changes in menstrual flow in terms of flow rate, time of flow, regularity, and flow amount.[3] This induces a great deal of physical pain, along with social, psychological and quality-of-life issues in affected women, AUB in this period.[4]

AUB occurs at a much higher rates during perimenopause, with up to 50% being reported at this time.[1,5] It affects a broad range of bleeding symptoms such as heavy periods, longer periods, intermenstrual bleeding and excessive periods.[6] Bleeding that does not stop or doesn't stop for long enough can lead to iron-deficiency anemia, tiredness, decreased work productivity, and higher health care use.[7] As there has been a rise in lifespan, and the significant number of women are living a considerable period in post-reproductive age, AUB has become a public health problem demanding early detection and treatment.[8,9]

AUB can have various causes, including nonstructural and structural factors. The International Federation of Gynecology and Obstetrics (FIGO) proposed the PALM–COEIN classification system to standardise the terms and for better clinical evaluation. The non-structural causes include Coagulopathy (C), Ovulatory dysfunction (O), Endometrial causes (E), Iatrogenic causes (I) and Not yet classified entities (N).[10,11] To pick up the right treatment options and avoid

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unnecessary surgery, the underlying cause must be identified, which is possible through a detailed clinical assessment, imaging tests and histopathology evaluation.[12]

Perimenopausal women also have a high prevalence of AUB, but the profile of AUBs etiologies, menstruation, histopathology and comorbidity have varied between different cohorts. Recognizing these patterns regionally is essential to enhance diagnosis and management. Hence, the present study was aimed to find the etiological distribution of AUB among women visited at perimenopause age at a Tertiary care centre and to assess its association with age, parity, menstrual history, endometrial histopathology, haemoglobin status and other associated co-morbidities.

## Materials and Methods

The study was done in the Department of Obstetrics and Gynaecology, Government RDBP Jaipuria Hospital, RUHS College of Medical Sciences, Jaipur, Rajasthan from January 2025 to January 2026 with approval from the Institutional Research Review Board and the Institutional Ethics Committee. The study was conducted to assess the etiological distribution of AUB in perimenopausal patients and to look at the relationship of AUB with demographic, clinical and histopathological profile. All participants were given written informed consent before enrolment.

The women in the study ranged between the ages of 40 and 55 years, and were admitted to the hospital with the symptom of abnormal uterine bleeding, such as prolonged or heavy bleeding, intermenstrual bleeding, or irregular periods. All women, including nulliparous and parous, who were willing to participate were included. Pregnant women or those >55 years, or with severe systemic illness, adnexal pathology, pregnancy-related bleeding disorders, uterine prolapse or unwilling to provide consent were excluded. The sample size was calculated using the following formula: $N = 4pq/d^2$, where P = the prevalence of metrorrhagia (28.88%) based on a previous study, and d = absolute precision (9%). A minimum sample size of 101 was called for and 110 were called afterwards, to account for the 10% of non-response.

In the study period, 110 eligible women registered in a consecutive manner. A structured proforma was used to record detailed demographic and clinical data such as age, parity, economic status, menstrual history, obstetric history, medical history and presenting symptoms. Complete clinical examination and appropriate investigations were done in all participants. Laboratory investigations consisted of complete blood count, blood sugar, thyroid function tests, coagulation profile, liver and renal function tests, blood grouping and urine examination. Uterine abnormalities were investigated using imaging studies, such as transabdominal and transvaginal ultrasonography. Further imaging (MRI and/or computed tomography [CT]) was performed as indicated clinically. In cases where it was necessary, histopathological evaluation included an endometrial biopsy, dilatation and curettage, cervical biopsy or Pap smear examination to establish the underlying diagnosis.

The etiological classification of AUB was made using the FIGO PALM–COEIN classification, and their distribution based on age, parity, socioeconomic status, menstrual pattern, haemoglobin level, co-morbidities and endometrial histopathological findings was analysed.

The data collected was entered into the Microsoft Excel software and analyzed with Statistical Package for the Social Sciences (SPSS) version 26.0 software. The data for categorical variables were summarised using frequencies and percentages. Continuous variables were summarised using mean and standard deviation where applicable. The Chi-square test was used to check the association between categorical variables. The p value of <0.05 was determined to be a statistically significant value.

## Results

Among the 110 perimenopausal women with abnormal uterine bleeding (AUB), the majority belonged to the 40–45 years age group, accounting for 68 (61.8%) participants, followed by 31 (28.2%) women aged 46–50 years and 11 (10.0%) aged 51–55 years. Most participants were multiparous, with 77 (70.0%) having parity between 1 and 3, while 29 (26.4%) had parity ≥4 and only 4 (3.6%) were nulliparous. Regarding socioeconomic status, the largest proportion belonged to the lower socioeconomic class [47 (42.7%)], followed by upper lower [22 (20.0%)], upper middle [20 (18.2%)], lower middle [19 (17.3%)], and upper class [2 (1.8%)]. [Table 1]

**Table 1: Baseline Characteristics of Perimenopausal Women with AUB (n = 110)**

| Variable | Category | N (%) |
|---|---|---|
| Age (years) | 40–45 | 68 (61.8%) |
| | 46–50 | 31 (28.2%) |
| | 51–55 | 11 (10.0%) |
| Parity | Nulliparous | 4 (3.6%) |
| | 1–3 | 77 (70.0%) |
| | ≥4 | 29 (26.4%) |
| Socio-economic class | Upper | 2 (1.8%) |
| | Upper middle | 20 (18.2%) |
| | Lower middle | 19 (17.3%) |
| | Upper lower | 22 (20.0%) |
| | Lower | 47 (42.7%) |

Heavy menstrual bleeding was the most common menstrual abnormality, reported by 47 (42.7%) women, followed by heavy and prolonged bleeding in 32 (29.1%), intermenstrual bleeding in 17 (15.5%), and frequent bleeding in 14 (12.7%).

Assessment of haemoglobin levels revealed that 43 (39.1%) women had moderate anemia (7–9.9 g/dL), 39 (35.5%) had mild anemia (10–11 g/dL), 12 (10.9%) had severe anemia (<7 g/dL), and only 16 (14.5%) had haemoglobin levels

above 11 g/dL. Among associated comorbidities, hypothyroidism was the most common, affecting 17 (15.5%) women, followed by hypertension in 16 (14.5%), obesity in 11 (10.0%), and diabetes mellitus in 8 (7.3%). [Table 2]

**Table 2: Clinical Characteristics and Comorbidities (n = 110)**

| Variable | Category | N (%) |
|---|---|---|
| Menstrual irregularity | Heavy menstrual bleeding | 47 (42.7%) |
| | Heavy and prolonged bleeding | 32 (29.1%) |
| | Intermenstrual bleeding | 17 (15.5%) |
| | Frequent bleeding | 14 (12.7%) |
| Haemoglobin level (g/dL) | >11 | 16 (14.5%) |
| | 10–11 | 39 (35.5%) |
| | 7–9.9 | 43 (39.1%) |
| | <7 | 12 (10.9%) |
| Comorbidity | Hypothyroidism | 17 (15.5%) |
| | Hypertension | 16 (14.5%) |
| | Obesity | 11 (10.0%) |
| | Diabetes mellitus | 8 (7.3%) |

Histopathological evaluation of endometrial samples demonstrated that proliferative endometrium was the predominant pattern, observed in 48 (43.6%) women. Secretory endometrium was noted in 30 (27.3%) cases, while endometrial hyperplasia was identified in 24 (21.8%). Less common findings included endometrial polyps in 4 (3.6%), atrophic endometrium in 2 (1.8%), irregular shedding in 1 (0.9%), and endometrial carcinoma in 1 (0.9%) patient. [Table 3]

**Table 3: Endometrial Histopathological Pattern (n = 110)**

| Pattern | N (%) |
|---|---|
| Proliferative | 48 (43.6%) |
| Secretory | 30 (27.3%) |
| Hyperplastic | 24 (21.8%) |
| Polyp | 4 (3.6%) |
| Atrophic | 2 (1.8%) |
| Irregular shedding | 1 (0.9%) |
| Endometrial carcinoma | 1 (0.9%) |

According to the FIGO PALM–COEIN classification, leiomyoma was the most frequent etiology of AUB, accounting for 63 (57.3%) cases. Ovulatory dysfunction was identified in 14 (12.7%) women, followed by endometrial causes in 11 (10.0%), adenomyosis in 10 (9.1%), and polyps in 8 (7.3%). Malignancy and iatrogenic causes were relatively uncommon, each contributing 2 (1.8%) cases. No cases of coagulopathy or unclassified AUB were observed in the present study. [Table 4]

**Table 4: Etiological Distribution According to PALM–COEIN Classification (n = 110)**

| Etiology | N (%) |
|---|---|
| Leiomyoma (L) | 63 (57.3%) |
| Ovulatory dysfunction (O) | 14 (12.7%) |
| Endometrial causes (E) | 11 (10.0%) |
| Adenomyosis (A) | 10 (9.1%) |
| Polyp (P) | 8 (7.3%) |
| Malignancy (M) | 2 (1.8%) |
| Iatrogenic (I) | 2 (1.8%) |
| Coagulopathy (C) | 0 (0.0%) |
| Not classified (N) | 0 (0.0%) |

Analysis of age-wise distribution of PALM–COEIN categories showed that most etiologies were concentrated in the 40–45 years age group. Leiomyoma was the predominant etiology across all age groups, occurring in 39 women aged 40–45 years, 17 aged 46–50 years, and 7 aged 51–55 years ($p<0.001$). Ovulatory causes were significantly more frequent among younger perimenopausal women, with 12 of 14 cases occurring in the 40–45 years age group ($p<0.001$). Significant associations with age were also observed for polyps ($p=0.042$), adenomyosis ($p=0.038$), and endometrial causes ($p=0.009$), whereas malignancy and iatrogenic causes did not show statistically significant age-related differences. [Table 5]

**Table 5: Distribution of PALM–COEIN Etiologies According to Age Group**

| Etiology | 40–45 years | 46–50 years | 51–55 years | P-value |
|---|---|---|---|---|
| Polyp | 5 | 3 | 0 | 0.042 |
| Adenomyosis | 6 | 3 | 1 | 0.038 |
| Leiomyoma | 39 | 17 | 7 | <0.001 |
| Malignancy | 0 | 1 | 1 | 0.157 |
| Ovulatory | 12 | 2 | 0 | <0.001 |

| | | | | |
|---|---|---|---|---|
| Endometrial | 5 | 4 | 2 | 0.009 |
| Iatrogenic | 1 | 1 | 0 | 0.317 |

Parity-wise analysis revealed significant associations between parity and several PALM–COEIN categories. Leiomyoma was most common among women with parity 1–3, accounting for 46 of 63 cases, followed by 15 cases among women with parity ≥4 (p<0.001). Adenomyosis showed a higher prevalence among women with parity ≥4, contributing 6 of 10 cases (p=0.002). Endometrial causes were predominantly observed in women with parity 1–3, accounting for 9 of 11 cases (p<0.001), while ovulatory dysfunction was also significantly associated with parity (p=0.013). No significant parity-related differences were noted for polyps, malignancy, or iatrogenic causes. [Table 6]

**Table 6: Distribution of PALM–COEIN Etiologies According to Parity**

| Etiology | Nulliparous | Parity 1–3 | Parity ≥4 | P-value |
|---|---|---|---|---|
| Polyp | 0 | 6 | 2 | 0.184 |
| Adenomyosis | 0 | 4 | 6 | 0.002 |
| Leiomyoma | 2 | 46 | 15 | <0.001 |
| Malignancy | 0 | 1 | 1 | 0.317 |
| Ovulatory | 2 | 10 | 2 | 0.013 |
| Endometrial | 0 | 9 | 2 | <0.001 |
| Iatrogenic | 0 | 1 | 1 | 0.317 |

Evaluation of menstrual bleeding patterns according to PALM–COEIN classification demonstrated that leiomyoma was the leading cause across all bleeding patterns, contributing 30 cases of heavy menstrual bleeding, 18 cases of heavy and prolonged bleeding, and 15 cases presenting with intermenstrual or frequent bleeding (p<0.001). Ovulatory dysfunction and endometrial causes were also significantly associated with menstrual irregularities, with heavy menstrual bleeding being their predominant presentation (p=0.003 and p=0.005, respectively). Adenomyosis showed an equal distribution between heavy menstrual bleeding and heavy and prolonged bleeding (4 cases each; p=0.008), while polyps were more commonly associated with intermenstrual or frequent bleeding (p=0.037). [Table 7]

**Table 7: Distribution of PALM–COEIN Etiologies According to Menstrual Pattern**

| Etiology | HMB | Heavy & Prolonged | Intermenstrual/Frequent | P-value |
|---|---|---|---|---|
| Polyp | 1 | 1 | 6 | 0.037 |
| Adenomyosis | 4 | 4 | 2 | 0.008 |
| Leiomyoma | 30 | 18 | 15 | <0.001 |
| Malignancy | 1 | 0 | 1 | 0.148 |
| Ovulatory | 7 | 4 | 3 | 0.003 |
| Endometrial | 4 | 4 | 3 | 0.005 |
| Iatrogenic | 0 | 1 | 1 | 0.289 |

The distribution of endometrial histopathological patterns varied significantly across PALM–COEIN categories. Leiomyoma was predominantly associated with proliferative endometrium [32 (50.8%)] and secretory endometrium [18 (28.6%)] (p<0.001). Among women with ovulatory dysfunction, hyperplastic and secretory patterns were equally common, occurring in 5 cases each (p=0.011). Endometrial causes were mainly associated with proliferative endometrium [5 (45.5%)] and hyperplasia [3 (27.3%)] (p=0.009). Adenomyosis predominantly demonstrated proliferative and hyperplastic changes, whereas all polyp-related cases showed either polypoidal, proliferative, or secretory endometrium. The two malignancy cases corresponded to atrophic endometrium and endometrial carcinoma, respectively. [Table 8]

**Table 8: Distribution of PALM–COEIN Etiologies According to Endometrial Histopathology**

| Etiology | Hyperplastic | Proliferative | Secretory | Polyp | Atrophic | Irregular Shedding | Carcinoma | P-value |
|---|---|---|---|---|---|---|---|---|
| Polyp | 0 | 2 | 2 | 4 | 0 | 0 | 0 | 0.024 |
| Adenomyosis | 3 | 4 | 3 | 0 | 0 | 0 | 0 | 0.018 |
| Leiomyoma | 13 | 32 | 18 | 0 | 0 | 0 | 0 | <0.001 |
| Malignancy | 0 | 0 | 0 | 0 | 1 | 0 | 1 | 0.342 |
| Ovulatory | 5 | 4 | 5 | 0 | 0 | 0 | 0 | 0.011 |
| Endometrial | 3 | 5 | 1 | 0 | 1 | 1 | 0 | 0.009 |
| Iatrogenic | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0.275 |

## Discussion

The present study evaluated the etiological distribution and clinicopathological profile of abnormal uterine bleeding (AUB) among 110 perimenopausal women attending a tertiary care centre. The majority of women belonged to the 40–45 years age group (68 [61.8%]) and were multiparous (77 [70.0%]). Similar observations have been reported by Kumari et al., who found that 65.6% of women with AUB were aged 40–45 years, while Singh et al. reported a predominance of multiparous women among affected patients.[13,14] It appears that early

perimenopause is a critical time in which the onset of menstrual disturbances is more related to ongoing hormone and reproductive changes over time (usually accumulation). Furthermore, the present study respondents were majority of the lower socioeconomic profile which is also mentioned by Kumari et al. as women belonging to the lower socioeconomic status group of respondents are more affected by AUB.[13]

The most common clinical presentation was heavy bleeding (47 [42.7%]) and the second most common presentation was heavy and prolonged bleeding (32 [29.1%]). Heavy menstrual bleeding is the most common symptom cited by Singh et al. 67.8%, by Mitra et al. 52% and by Gedala et al. 63.5% of patients with DUB had this symptom.[14-16] The moderate (43; 39.1%) and severe (12; 10.9%) anemia seen in the present study was indicative of chronic blood loss. The same has been found by S.K. Kumari et al. and Vimalambigai et al. who found that one of the most important complications of AUB is anemia, which has a negative impact on the morbidity of the patient and their quality of life.[13,17]

The pathology findings were a proliferative endometrium (48 women, 43.6%), secretory endometrium (30 women, 27.3%) and endometrial hyperplasia (24 women, 21.8%). These studies yielded results similar to those reported by Kumari et al. who reported the presence of proliferative endometrium in 43.3 % of the cases and Singh et al. who also reported the most common histological types as proliferative and hyperplastic in perimenopausal AUB.[13,14] In the present study, a very low frequency of endometrial carcinoma (1 [0.9%]) was found, which is similar to previous studies conducted in India thus underlining the need for regular endometrial sampling in perimenopausal women to ensure early detection of premalignant and malignant lesions, which might benefit from surgical intervention.

The most common etiology, according to the FIGO PALM–COEIN classification, was leiomyoma (63, 57.3%), followed by ovulatory dysfunction (14, 12.7%), endometrial causes (11, 10.0%), adenomyosis (10, 9.1%) and polyps (8, 7.3%). The Leiomyoma predominance has been reported by Samantara [45.6%], Mitra [42] and Singh [36.8] and has been demonstrated to be the most frequent structural cause of AUB in perimenopausal women.[14,15,18] The significant correlation found between leucomyoma and HMB and between anemia and proliferative endometrium in the present study, however, corroborates its significant role in the disease burden. The most common non-structural cause was identified as ovulatory dysfunction which is consistent with the observations of Sahu et al. and Singh et al., where the process is one of hormonal instability of perimenopause.[14,19]

Some other associated comorbidities were also present in the present study – hypothyroidism (17 [15.5%]), hypertension (16 [14.5%]), obesity (11 [10.0%]) and diabetes mellitus (8 [7.3%]). The same associations between AUB and metabolic and endocrine disorders have been reported by Vimalambigai et al,[14] Singh et al,[17] and Zhang et al.[20] The results of this study reflect AUB's multifactorial nature, in addition to the gynaecological evaluation, and emphasize the need for a more holistic evaluation of AUB. In conclusion, the present study confirmed that leiomyoma is the most common cause of perimenopausal AUB, and hormonal dysfunction, endometrial abnormalities, anemia and metabolic comorbidities are all important in the clinical presentation and severity of the disease.

## Conclusion

The problem of abnormal uterine bleeding in perimenopausal women is a complex disorder with multiple clinical and hematological implications. The present study was found to be more prevalence of AUB among lower income group women, and mostly among women from early perimenopausal age group. Heavy menstrual bleeding was the most common clinical presentation, and was associated with elevated anemia prevalence. The FIGO PALM–COEIN classification showed leiomyoma as the leading of all causes with the rest being ovulatory dysfunction, endometrial causes, adenomyosis and polyps. The most frequently detected histopathological features were proliferative endometrium and associated comorbidities were hypothyroidism, hypertension, obesity and diabetes mellitus. The findings of this study highlight the importance of a comprehensive work-up – clinical assessment, imaging, histopathology and assessment of associated medical diseases – to help diagnose and manage AUB in perimenopausal women.

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### Conflicts of interest

There are no conflicts of interest.

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