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Prevalence and Clinical Spectrum of Abnormal Uterine Bleeding in Reproductive-Age and Perimenopausal Women: A cross-sectional study from a tertiary care centre in South India

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ABSTRACT

Background: Abnormal uterine bleeding (AUB) occurs in 1030 percent of women during their fertility and is the least cause of gynecological inpatient worldwide reproductive years and has significant effects on the quality of life and health-care use. FIGO PALM-COEIN system offers an acceptable structure to categorize AUB etiologies and manage them. The purpose of this study was to define the occurrence rates of abnormal menstrual cycles and the prevalence rates of PALM-COEIN categories in women of reproductive age and perimenopausal women presenting with AUB.

Methods: The study was a cross-sectional study based in a hospital (Department of Obstetrics and Gynaecology, Chettinad Hospital and Research Institute) in July-December 2025. Women aged 15 years old through non-pregnancy-related AUB were recruited consecutively (n=200) at the ages of 15 to 55 years. A structured proforma was used to take sociodemographic information, menstrual history, examination, laboratory tests, ultrasonography, and endometrial sample where necessary. Figure 1 FIGO AUB System 1 was used to classify menstrual patterns, and PALM-COEIN (System 2) was used to designate etiologies. The use of descriptive statistics and chi-square tests were used.

Results: One hundred and twenty women (60) out of 200 (100) women were of reproductive age and 80 (40) were perimenopausal. The most common pattern was that of heavy menstrual bleeding (48%), prolonged bleeding (16%), intermenstrual bleeding (11%), frequent-cycle (10%), infrequent-cycle (9%), and a considerably abnormal cycle (6%). Out of the 52 percent in the structural causes (PALM), the leading causes were leiomyoma (20 percent), polyps (12 percent), adenomyosis (11 percent), and malignancy/hyperplasia (9 percent). Non-structural causes of COEIN included 48 percent, mostly ovulatory dysfunction (19 percent) and endometrial (12 percent) causes. Perimenopausal women were found to have structural etiologies that was much higher than ovulatory dysfunction that was more common in women of reproductive age (23 v 13; p=0.04).

Conclusion: In this tertiary-care population, heavy menstrual bleeding and leiomyoma-related cause of AUB were the most common clinical/etiological patterns with an obvious transition to structural causes of PALM in perimenopause. The prevention of misdiagnosis and the necessity to use age-specific assessment plans are increased by a systematic use of the FIGO PALM-COEIN.

Keywords: Abnormal uterine bleeding, PALM-COEIN, heavy menstrual bleeding, perimenopause, leiomyoma, ovulatory dysfunction

INTRODUCTION

Abnormal uterine bleeding (AUB), defined as uterine bleeding of abnormal volume, duration, frequency, or regularity in the absence of pregnancy, is one of the most common gynecological complaints worldwide [1,2]. Population-based estimates suggest that 10–30% of women in the reproductive years experience AUB at some point, with heavy menstrual bleeding (HMB) alone affecting approximately 14–25% of women [3–5]. Beyond its physical impact, AUB is associated with anemia, reduced work productivity, psychosocial distress, and increased health-care utilization and costs [4,6].Historically, terminology such as “menorrhagia,” “metrorrhagia,” and “dysfunctional uterine bleeding” was used inconsistently, limiting comparability between studies and hindering evidence-based guidelines. To address this, the International Federation of Gynecology and Obstetrics (FIGO) introduced standardized systems for nomenclature (System 1) and etiologic classification (System 2) of AUB in nongravid women of reproductive age [1,2]. The PALM-COEIN system—polyps, adenomyosis, leiomyoma, malignancy and hyperplasia; coagulopathy, ovulatory dysfunction, endometrial, iatrogenic, and not otherwise classified—distinguishes structural (PALM) from non-structural (COEIN) causes and has been widely endorsed by FIGO and ACOG [1–3,7,10].

Several reviews and guidelines now advocate routine use of PALM-COEIN in both clinical practice and research [3,4,7,9,10]. However, the relative contribution of individual PALM-COEIN categories varies across populations and care settings, influenced by age distribution, comorbidities, contraceptive use, and access to diagnostic modalities [4,6–8,11,12]. Studies from Europe and North America frequently report leiomyomas and ovulatory dysfunction as leading causes of AUB [4,11,12], whereas Indian and other low- and middle-income country data show a substantial burden of anemia, delayed presentation, and limited access to minimally invasive diagnostics [6–8,13,15].

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The perimenopausal period is a particularly vulnerable phase, characterized by increasing anovulatory cycles, fluctuating sex steroid levels, and an age-related rise in structural pathology such as fibroids, adenomyosis, and endometrial polyps [4,8,12]. Perimenopausal AUB also serves as a warning sign for endometrial hyperplasia and malignancy, and guidelines recommend a low threshold for endometrial sampling in women aged ≥40–45 years with AUB [9,10,14]. Despite this, real-world implementation in resource-constrained settings remains inconsistent.

Indian studies have documented a high prevalence of AUB in both reproductive-age and perimenopausal women, with HMB as the most common presentation and leiomyoma and ovulatory dysfunction among the predominant etiologies [6,7,13]. However, relatively few investigations have systematically examined both the full clinical spectrum of abnormal menstrual patterns and the PALM-COEIN distribution, directly comparing reproductive-age and perimenopausal women within the same cohort.

The present study therefore aimed (1) to estimate the prevalence of distinct abnormal menstrual patterns among women presenting with AUB to a tertiary-care center, and (2) to classify the etiologies of AUB according to the FIGO PALM-COEIN system, comparing reproductive-age and perimenopausal women. By applying standardized FIGO definitions and comprehensive clinical, imaging, and histopathologic evaluation, this study seeks to provide context-specific evidence to inform age-tailored diagnostic and management strategies in Indian gynecologic practice.

One of the most common gynecologic complaints is abnormal uterine bleeding, which is considered to be abnormal uterine bleeding of abnormal volume, duration, frequency, or regularity in the absence of pregnancy. It has been estimated by Population that 10-30 percent of women in the reproductive age undergo AUB at some time, whereby heavy menstrual bleeding (HMB) occurs to about 14-25 percent of women. In addition to its direct physical impact, AUB is linked to anemia, a reduction in the work productivity, psychosocial distress, and high health-care expenditures. In the past, different terms like menorrhagia and dysfunctional uterine bleeding were used inconsistently, which could not compare studies and clinical practice. To overcome this, International Federation of Gynecology and obstetrics (FIGO) formulated a system of standardized nomenclature (System 1), and etiologic classification (System 2) of AUB in nongravid women of reproductive age. PALM-COEIN acronym, which stands as polyps, adenomyosis, leiomyoma, malignancy and hyperplasia; coagulopathy, ovulatory dysfunction, endometrial, iatrogenic and not otherwise classified, is used to differentiate structural (PALM) and non-structural (COEIN) causes, and has been commonly supported by professional organizations such as ACOG and FIGO.

Several narrative reviews and guidelines now advocate routine use of PALM-COEIN in clinical and research settings. However, the distribution of individual PALM-COEIN categories varies across populations, influenced by age structure, comorbidities, contraceptive use, and access to diagnostic modalities. Studies from Europe and North America report leiomyomas and ovulatory dysfunction as leading etiologies, whereas Indian and other low- and middle-income country cohorts frequently demonstrate higher burdens of anemia and delayed presentations.

The perimenopausal period is a particularly vulnerable window, characterized by anovulatory cycles, fluctuating estrogen levels, and an age-related rise in structural pathology such as polyps, adenomyosis, and fibroids. Perimenopausal AUB is also a red flag for endometrial hyperplasia and malignancy, necessitating systematic evaluation. Guidelines recommend careful triage of women ≥40–45 years with AUB for endometrial sampling, but real-world implementation in resource-constrained settings can be inconsistent.

Indian data highlight substantial AUB burdens in both reproductive-age and perimenopausal women, with reported AUB prevalence around 17–18% and heavy menstrual bleeding as the most common presentation. Tertiary-care studies have described varying distributions of PALM-COEIN etiologies, with ovulatory dysfunction and leiomyoma frequently ranking among the top causes. Yet relatively few studies have systematically contrasted the full menstrual pattern spectrum and PALM-COEIN distribution between reproductive and perimenopausal age groups within the same cohort.Understanding these age-stratified patterns is critical for rational diagnostic algorithms, judicious use of imaging and histopathology, and appropriate counseling on medical versus surgical options. The present study therefore aimed (1) to estimate the prevalence of distinct abnormal menstrual patterns among women presenting with AUB to a tertiary-care center, and (2) to classify the etiologies of AUB according to the FIGO PALM-COEIN system, comparing reproductive-age and perimenopausal women. By applying standardized definitions and comprehensive evaluation, this work seeks to contribute context-specific evidence to inform clinical decision-making in Indian gynecologic practice.

MATERIALS AND METHODS

Study design and setting

This was a hospital-based, cross-sectional observational study conducted in the Department of Obstetrics and Gynaecology, Chettinad Hospital and Research Institute (CHRI), a tertiary-care teaching hospital in South India. The study was carried out over six months, from 1 July 2025 to 31 December 2025.

Study population and eligibility

Women aged 15–55 years presenting to the gynecology outpatient department or emergency services with complaints suggestive of AUB were screened for eligibility. AUB was defined as uterine bleeding outside normal parameters of frequency (24–38 days), regularity, duration (≤8 days), or volume, in accordance with FIGO System 1.

Inclusion criteria were:

- Non-pregnant women aged 15–55 years, and
- Presence of any of the following:
  - Menstrual cycle length >38 days or amenorrhea,
  - Variation in cycle length >8–10 days between the shortest and longest cycles,
  - Duration of bleeding >8 days,

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- Subjective heavy bleeding interfering with activities or quality of life,
- Intermenstrual bleeding (cyclical or random).

Exclusion criteria were:

- Vaginal bleeding related to confirmed pregnancy or pregnancy-related complications,
- Women unable or unwilling to provide informed consent or assent (with guardian consent for those <18 years).

Consecutive eligible women who consented were enrolled until the sample size was reached.

Sample size

The minimum sample size for estimating proportions in a prevalence study was calculated using the formula:
$n=Z2p(1-p)d2n = \frac{Z^{2} p (1-p)}{d^{2}}$n=d2Z2p(1−p)
where $Z = 1.96$ for 95% confidence, $p = 0.15$ (assumed prevalence of AUB 15%), and $d = 0.05$ (absolute precision). This yielded a minimum of 196 participants; a final target of 200 women was set to account for incomplete data.

Data collection and clinical evaluation

A pre-tested structured proforma was used as the data collection tool. Some of these variables were age, parity, educational status, body mass index (BMI), comorbidities (diabetes, hypertension, thyroid disorders, coagulopathies), and current medications such as hormonal therapies and anticoagulants.

A comprehensive menstrual history included menarche age, length of cycle, intermenstrual cycle irregularity, flow length, subjective experience of heavy blood flow (clots or flooding), intermenstrual or postcoital bleeding and dysmenorrhea. The patterns of bleeding were categorized under FIGO frequency, regularity, duration and volume.

All women underwent general examination, abdominal and pelvic examination (speculum and bimanual), and pregnancy testing where appropriate. Investigations included complete blood count, coagulation profile where indicated, thyroid function tests, and transabdominal or transvaginal ultrasonography. Endometrial sampling by pipelle biopsy or dilatation and curettage was performed in women ≥40 years, those with persistent AUB despite initial therapy, ultrasound abnormalities, or risk factors for endometrial pathology, in line with guideline recommendations.

Classification of AUB

Each case was assigned a primary etiologic category according to the FIGO PALM-COEIN system (System 2) based on clinical, imaging, and histopathologic findings where available.

- Structural causes (PALM) included:
  - Polyps (AUB-P),
  - Adenomyosis (AUB-A),
  - Leiomyoma (AUB-L; subcategorized when feasible),
  - Malignancy and hyperplasia (AUB-M).
- Non-structural causes (COEIN) included:
  - Coagulopathy (AUB-C),
  - Ovulatory dysfunction (AUB-O),
  - Endometrial causes (AUB-E),
  - Iatrogenic (AUB-I),
  - Not otherwise classified (AUB-N).

When more than one potential etiology was present, the dominant clinical contributor was selected after consultant review.

Statistical analysis

The information was placed into a spreadsheet and was analyzed with the help of standard statistical software (SPSS, version 25). Summary of continuous variables was done as mean standard deviation (SD) or as median (interquartile range) depending on the case. The frequencies and percentages were used to show categorical variables. Descriptive statistics were used to compute the prevalence of various menstrual patterns and PALM-COEIN etiologies in the whole cohort, and by dividing it into reproductive- (15 40 years) and perimenopausal (41 55 years) groups. The correlation of age group and the structural or non-structural causes was evaluated with chi-square or Fisher exact test. The p-value of less than 0.05 was significant.

Ethical considerations

Before the study was initiated, the study protocol was approved by the Institutional Ethics Committee at Chettinad Hospital and Research Institute. The informed consent of all participants was taken in written form; assent and guardian consent of minors also was taken. Anonymity was guaranteed by using a coded identification and participation was not mandatory with the option to pull out at any point without affecting the continuity of care. The severe anemia or a suspicion of malignancy were also dealt with based on the institutional protocols or were referred.

RESULTS

Baseline characteristics

A total of 200 women with non-pregnancy-related AUB were included. The mean age was 37.9 ± 8.3 years (range 16–55). One hundred and twenty (60%) were classified as reproductive-age (15–40 years) and 80 (40%) as perimenopausal (41–55 years). Most participants were multiparous (72%), and 31% had at least one chronic medical comorbidity, most commonly hypertension (18%) and type 2 diabetes (14%).

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Table 1. Sociodemographic and baseline clinical characteristics of women with AUB (n = 200)

Characteristic	Reproductive age n=120	Perimenopausal n=80	Total n=200
Mean age, years (±SD)	32.5 ± 5.6	47.3 ± 3.2	37.9 ± 8.3
Parity ≥2	78 (65.0%)	66 (82.5%)	144 (72.0%)
BMI ≥25 kg/m²	42 (35.0%)	40 (50.0%)	82 (41.0%)
Hypertension	14 (11.7%)	22 (27.5%)	36 (18.0%)
Type 2 diabetes mellitus	10 (8.3%)	18 (22.5%)	28 (14.0%)
Known thyroid disorder	12 (10.0%)	10 (12.5%)	22 (11.0%)
Hemoglobin <10 g/dL	40 (33.3%)	32 (40.0%)	72 (36.0%)

Women with AUB in this cohort were predominantly multiparous and in their thirties or forties, with nearly two-fifths classified as perimenopausal. Over one third were overweight or obese, and cardiometabolic comorbidities were common, particularly in the perimenopausal group. The high prevalence of anemia reflects the cumulative impact of chronic or heavy bleeding and underscores the need for routine hematologic assessment and concurrent correction of nutritional and systemic risk factors during AUB evaluation.

Clinical menstrual patterns

Heavy menstrual bleeding was the most frequent presenting pattern (48%), followed by prolonged bleeding with normal cycle frequency (16%). Intermenstrual bleeding alone or in combination occurred in 11% of women. Abnormalities of frequency included frequent cycles (10%) and infrequent cycles (9%), while 6% reported markedly irregular, unpredictable cycles.

Table 2. Distribution of abnormal menstrual patterns among women with AUB (n = 200)

Menstrual pattern*	n (%)
Heavy menstrual bleeding (normal frequency)	96 (48.0)
Prolonged bleeding (>8 days, normal frequency)	32 (16.0)
Intermenstrual bleeding	22 (11.0)
Frequent cycles (<24 days)	20 (10.0)
Infrequent cycles (>38 days)	18 (9.0)
Markedly irregular cycles	12 (6.0)

Nearly half of the cohort experienced heavy but otherwise regularly timed menstruation, consistent with the dominance of heavy menstrual bleeding patterns reported in global and Indian literature. Prolonged bleeding and intermenstrual spotting formed sizable subgroups, together accounting for more than one quarter of cases. Although abnormalities of cycle frequency were less common overall, they were particularly prominent among younger women with suspected ovulatory dysfunction, emphasizing the value of a structured bleeding pattern history in etiologic triage.

PALM-COEIN etiologic distribution

Overall, structural PALM causes accounted for 52% (n=104) of AUB cases, while non-structural COEIN causes accounted for 48% (n=96).

Table 3. Table 1. Sociodemographic and baseline clinical characteristics of women with AUB (n = 200)

Characteristic	Reproductive age n = 120	Perimenopausal n = 80	Total n = 200	p-value*
Mean age, years (±SD)	32.5 ± 5.6	47.3 ± 3.2	37.9 ± 8.3	<0.001
Parity ≥2	78 (65.0%)	66 (82.5%)	144 (72.0%)	0.01
BMI ≥25 kg/m²	42 (35.0%)	40 (50.0%)	82 (41.0%)	0.03
Hypertension	14 (11.7%)	22 (27.5%)	36 (18.0%)	0.004
Type 2 diabetes mellitus	10 (8.3%)	18 (22.5%)	28 (14.0%)	0.006
Known thyroid disorder	12 (10.0%)	10 (12.5%)	22 (11.0%)	0.61
Hemoglobin <10 g/dL	40 (33.3%)	32 (40.0%)	72 (36.0%)	0.32

Leiomyoma became the predominant specific cause of AUB with ovulatory dysfunction and endometrial causes coming in close accord to the distributions seen in other tertiary-care cohorts using PALM-COEIN. The adenomyosis in combination with polyps contributes to the high rate of benign structural pathology. It is important to mention that close to 1 out of 10 women had either premalignant or malignant endometrial disease, which leads to the suggestion that histopathologic evaluation should be used in the targeted age groups and risk profiles in order to prevent false negatives.

Age stratified structural and non-structural causes.

Amongst women stratified by age group, the causes of structural PALM were much more common in perimenopausal women (65%) compared to those in reproductive-age women (44%; p=0.01). On the other hand, ovulatory failure was higher among women of reproductive age (23% vs 13; p=0.04).

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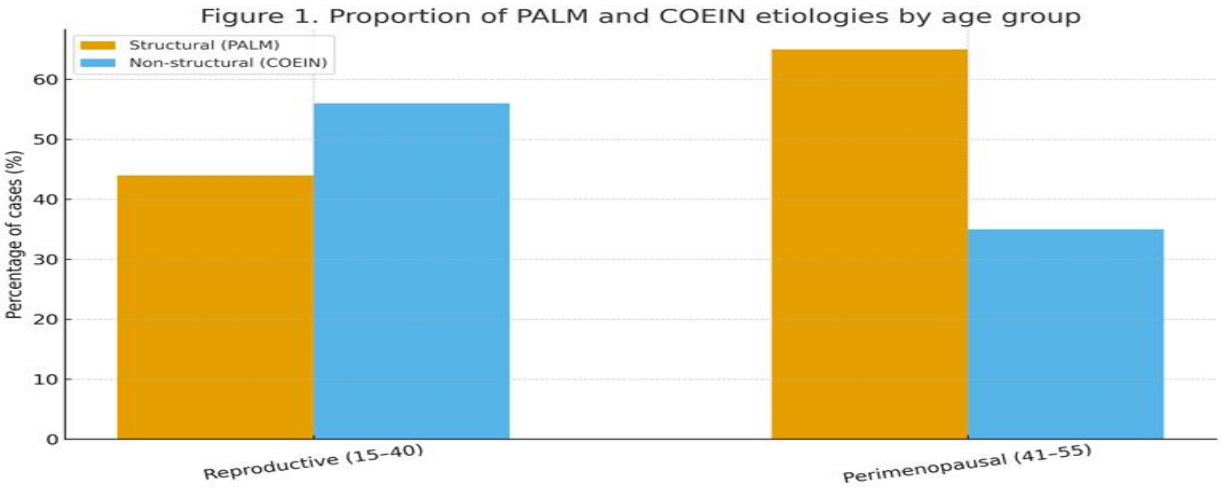
Table 4. Structural (PALM) versus non-structural (COEIN) etiologies by age group

Etiology group	Reproductive age n=120	Perimenopausal n=80	p-value
Structural (PALM)	53 (44.2%)	52 (65.0%)	0.01
Non-structural (COEIN)	67 (55.8%)	28 (35.0%)	
– Ovulatory dysfunction	28 (23.3%)	10 (12.5%)	0.04
– Other COEIN (C, E, I, N)	39 (32.5%)	18 (22.5%)	

There is a clear drift in perimenopausal women towards structural PALM etiologies, which matches with the expected age related build of fibroids, adenomyosis and endometrial premalignant lesions. By contrast, causes other than structural PCOS and ovulatory dysfunction were relatively more common among reproductive-aged women, indicative of variability in the hypothalamic–pituitary–ovarian axis and endocrine comorbidities. These age-related findings provide support to the guideline of earlier imaging and histologic evaluation for older women, and an increased focus on hormone-centered assessment in younger patients.

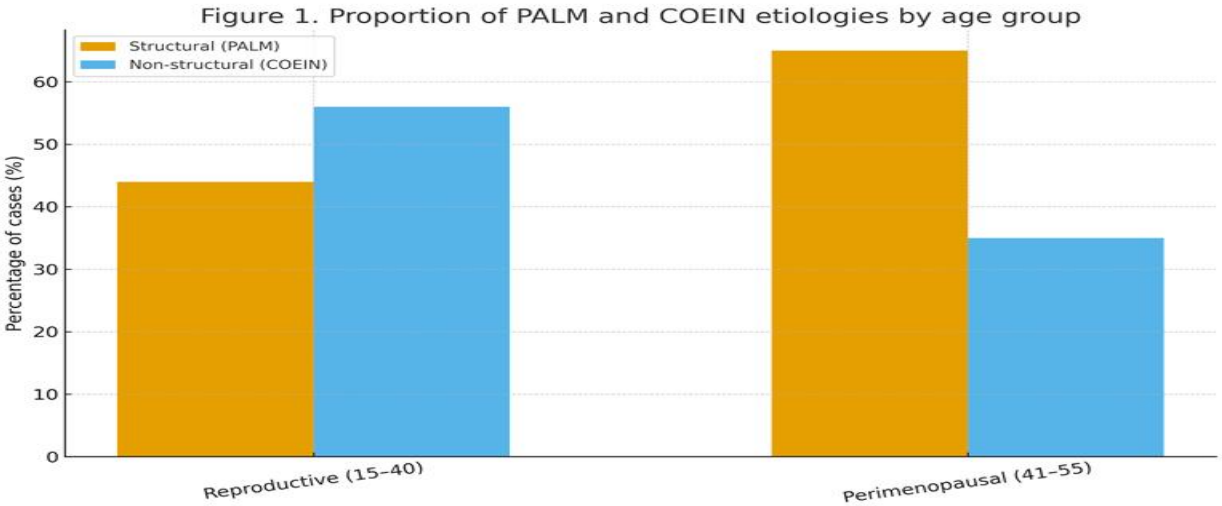
FIGURES

FIGURE 1. PROPORTION OF PALM AND COEIN ETIOLOGIES BY AGE GROUP



Graphic representation confirms the age related etiologic shift: non-structural causes are common in young women, whereas structural pathology is more prevalent during perimenopause. This trend is consistent with evidence from international studies that show increasing occurrence of fibroids, polyps, adenomyosis and endometrial neoplasia with older age whereas anovulatory conditions peak in the younger age groups. The figure therefore is consistent with a personalized diagnostic demarche based on structural investigation for older women and endocrine or functional exploration for younger patients.

FIGURE 2. DISTRIBUTION OF SPECIFIC PALM-COEIN CATEGORIES IN THE OVERALL COHORT (N=200)



The etiologic pie chart highlights that a small group of categories—leiomyoma, ovulatory dysfunction, and endometrial disorders—contribute nearly a half the AUB cases in this population (as also observed in Indian and global cohorts). biomedscidirect. com+1 Less common but clinically crucial groups, including malignancy/hyperplasia and coagulopathy are also present and should be ruled out in a systematic manner. These categories have serious prognostic implications and often require timely, even aggressive interventions.

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DISCUSSION

This cross-sectional study provides a detailed description of menstrual bleeding patterns and PALM-COEIN etiologies among reproductive-age and perimenopausal women with AUB at a tertiary-care hospital in South India. Heavy menstrual bleeding was the predominant clinical pattern, while leiomyoma, ovulatory dysfunction, and endometrial causes were the leading etiologic categories. Structural PALM causes were significantly more common in perimenopausal women, whereas non-structural COEIN causes, particularly ovulatory dysfunction, predominated in younger women.

The finding that nearly half of symptomatic women presented with heavy but otherwise regular menstruation is consistent with the global burden of heavy menstrual bleeding, which affects approximately one in five women and substantially impairs quality of life [3–5,15]. Indian studies similarly report heavy or prolonged bleeding as the most frequent complaint among women with AUB [6,7,13]. Misra and Srivastava observed heavy or prolonged bleeding in over 60% of women with AUB in a tertiary-care setting [7], while Vaidya et al. documented HMB as the dominant pattern among perimenopausal women, frequently associated with metabolic risk factors [6].

The etiologic spectrum in our cohort aligns with other PALM-COEIN–based series. In an Indian retrospective study, ovulatory dysfunction was the most common cause, followed by leiomyoma and endometrial etiologies [7,13]. Our cohort showed leiomyoma and ovulatory dysfunction in comparable proportions, with notable contributions from adenomyosis and endometrial causes as well. Similar distributions have been reported in an underserved American inner-city population, where leiomyoma, ovulatory dysfunction, and endometrial causes comprised the majority of AUB diagnoses under PALM-COEIN [11]. Such concordance across diverse settings underscores the robustness and clinical utility of the FIGO classification framework [1–3].

The clear age gradient toward structural PALM etiologies in perimenopausal women observed in this study is biologically plausible and mirrors prior reports [4,8,12]. With advancing age, cumulative estrogen exposure, increasing prevalence of fibroids and adenomyosis, and a higher incidence of endometrial premalignant and malignant lesions contribute to a structural predominance [4,8,12,14]. Tian et al. showed that metabolic syndrome and obesity significantly increased the likelihood of perimenopausal AUB, with structural lesions frequently confirmed on imaging [8]. In our study, approximately one in ten women had endometrial hyperplasia or malignancy, reinforcing guideline recommendations to maintain a low threshold for endometrial sampling in women ≥40–45 years who present with heavy, prolonged, or irregular bleeding or who have additional risk factors [9,10,14].

Conversely, the higher prevalence of ovulatory dysfunction among reproductive-age women is consistent with reviews emphasizing the role of anovulatory cycles, polycystic ovary syndrome, thyroid dysfunction, and obesity in irregular or infrequent bleeding patterns in younger women [4,5,12]. Wouk and Helton highlighted that comprehensive endocrine assessment, including thyroid and prolactin testing and evaluation for polycystic ovary syndrome, is integral to the work-up of premenopausal AUB [5]. Our findings therefore support guideline-based recommendations to focus on functional and endocrine causes in younger women, while not neglecting structural evaluation when indicated [5,9,10].

A key strength of this study is the systematic application of FIGO AUB Systems 1 and 2, as recommended by FIGO and ACOG, which allowed standardized description of bleeding symptoms and etiologies and facilitated meaningful comparison with existing literature [1–3,9,10]. Prospective enrollment, use of ultrasound and histopathology where indicated, and age-stratified analyses further strengthen the internal validity of the findings.

However, some limitations should be acknowledged. Being a hospital-based study, the results cannot be directly generalized to the community; women with mild symptoms or barriers to care may be underrepresented. The modest sample size restricts more granular analysis of subgroups, such as detailed leiomyoma subtypes or interactions with metabolic syndrome. Coagulopathy may be underestimated because advanced hematologic testing was not universally performed, similar to other real-world cohorts [5,11]. Finally, the cross-sectional design precludes assessment of long-term outcomes, recurrence, and treatment effectiveness.

Despite these limitations, the study has clear clinical implications. The age-linked etiologic shift supports tailored diagnostic algorithms: structural pathology should be actively sought in perimenopausal women and in those with red-flag features, whereas endocrine and ovulatory disorders warrant focused evaluation in younger patients. Routine adoption of the PALM-COEIN framework in clinical documentation and research will improve data comparability and may reveal region-specific patterns that inform resource allocation and training priorities [1–3,11,13]. Future multicenter, longitudinal studies incorporating patient-reported outcomes and cost-effectiveness analyses are needed to refine diagnostic strategies and optimize management pathways for AUB in Indian and similar resource-constrained contexts.

CONCLUSION

In this tertiary-care cohort of reproductive-age and perimenopausal women with AUB, heavy menstrual bleeding was the predominant clinical pattern, while leiomyoma, ovulatory dysfunction, and endometrial disorders were the leading PALM-COEIN etiologies. Structural PALM causes were significantly more frequent in perimenopausal women, whereas nonstructural COEIN causes predominated in younger women, underscoring distinct age-related pathophysiologic profiles. Systematic application of FIGO AUB Systems 1 and 2 provided a coherent framework to link symptoms with etiologies and highlighted clinically important but numerically smaller categories such as malignancy and coagulopathy. These findings support age-stratified diagnostic approaches and reinforce the value of standardized classification in improving AUB care and research comparability.

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