e-ISSN: 0975-9506, p-ISSN: 2961-6093

Available online on www.ijpqa.com

International Journal of Pharmaceutical Quality Assurance 2026; 17(1); 481-487

Original Research Article

A Study of the Pattern of Abnormal Uterine Bleeding in Reproductive-Age Women

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Received: 16-12-2025 / Revised: 10-01-2026 / Accepted: 30-01-2026

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Conflict of interest: Nil

Abstract:

Background: Abnormal uterine bleeding (AUB) is a common gynecological problem among reproductive-age women, significantly affecting health and quality of life. It involves variations in menstrual frequency, duration, and volume, with multifactorial etiology.

Aim: To study the pattern, clinical presentation, and underlying causes of AUB in reproductive-age women attending a tertiary care hospital in Bihar.

Methodology: This prospective observational study included 100 women aged 15–49 years over eight months. Data were collected using a structured proforma, including clinical, laboratory, ultrasonographic, and histopathological findings. Cases were classified using the PALM-COEIN system and analyzed using SPSS.

Results: AUB was most common in women aged 40–49 years (46%). Metrorrhagia (38%) was the predominant pattern. Leiomyoma (26%) was the most frequent ultrasound finding. According to PALM-COEIN classification, leiomyoma (26%) and ovulatory disorders (22%) were leading causes. Histopathology showed predominantly proliferative (34.3%) and secretory (25.7%) endometrium, with minimal malignancy (1.4%).

Conclusion: AUB is more prevalent in perimenopausal women, with irregular bleeding patterns predominating. Structural causes, especially leiomyoma, are most common, though functional causes are also significant, highlighting the need for comprehensive evaluation.

Keywords: Abnormal uterine bleeding, PALM-COEIN, leiomyoma, metrorrhagia, reproductive age.

DOI: 10.25258/Ijpqa.17.1.73

Introduction

Abnormal uterine bleeding (AUB) is a major clinical entity and one of the most frequent gynecological complaints in reproductive-age women. It is generally defined as any deviation from the normal menstrual pattern, including alterations in the frequency, duration, and volume of menstrual bleeding [1]. These changes can take the form of heavy menstrual bleeding (HMB), intermenstrual bleeding, polymenorrhea, or oligomenorrhea; all can have a significant impact on a woman's quality of life.

Abnormal uterine bleeding (AUB) and its subgroup, heavy menstrual bleeding, are common conditions affecting 14–25% of women of reproductive age worldwide [2]. In Indian perspective, high burden may be even higher in resource constrained states like Bihar as poor nutritional status, lack of access to healthcare, anemia, early marriage and high parity all can contribute to adverse maternal reproductive health outcome. Such conditions often compound menstrual irregularities and delay timely diagnosis and treatment. AUB has not only an impact on physical health but can also significantly affect the social, emotional, and economic dimensions of a woman's life causing impaired productivity as well absenteeism and poor quality of life [3].

Clinically AUB is classified as acute or chronic. Acute AUB is characterized by an episode of significant bleeding that necessitates immediate intervention to halt further blood loss and stabilize the individual. Chronic AUB was described as abnormal uterine bleeding with respect to volume, regularity and/or timing that has occurred for most of the preceding six months [4]. It is important to distinguish between these forms, as it will direct both diagnostic work-up and management strategies.

The age and reproductive phases of AUB are heterogeneous [5,6]. During the reproductive age, a normal menstrual cycle is generally defined in terms of frequency (24–35 days), regularity (±5 days) and duration (2–7 days) [7]. But population-based studies have shown a broader range of menstrual patterns as well, along with the fact that deviations from these norms do not in themselves necessarily represent pathology. However, continuous or extreme divergences require interpretation to uncover the reason behind it.

The causes of AUB are multifactorial and may occur in any of the levels of the hypothalamic pituitary-ovarian axis or associated with structural conditions within the uterus [8]. Hormonal imbalances — especially conditions that affect ovulation, are a leading cause in women of reproductive age. Furthermore, pelvic pathologies like fibroids, polyps, adenomyosis and malignancies play an important role in aberrant bleeding patterns. Menstrual cycle irregularity, particularly during the transitional perimenopause phase, is commonly due to either anovulation or erratic follicular development. Affecting women in reproductive age (younger): Differentiating the causes between younger and older women can often be very helpful; polycystic ovarian syndrome (PCOS), thyroid dysfunction, coagulation disorders are important considerations.

To standardize terminology, diagnosis and classification of AUB, the International Federation of Gynecology and Obstetrics (FIGO) proposed in 2011 the PALM-COEIN classification system. This classification divides the AUB causes into two parts: the structural and non-structural causes. The PALM (Polyps, Adenomyosis, Leiomyoma, and Malignancy) group comprises structural defects that can be detected with imaging modalities or histopathological examination [9]. In contrast, the COEIN group includes non-structural causes, such as coagulopathy, ovulatory dysfunction, possible endometrial causes of infertility (such as a receptive uterine environment), iatrogenic factors and other known and unknown causes not otherwise classified. This classification significantly enhances the clinical management of AUB through a reproducible and standardized method of assessment.

A combination of clinical analysis, imaging, and laboratory investigations is used for the diagnostic evaluation of AUB. Ultrasonography commonly is the first-line investigation, being a non-invasive, accessible diagnostic tool which can identify structural changes. It is particularly helpful in recognizing uterine fibromatosis, dilatation of the ending face and exploratory processing for ovarian disease. However, hysteroscopy is the gold standard for uterine cavity evaluation since it allows visualization and targeted biopsy of intrauterine lesions [10]. Moreover, histopathological assessment of endometrial biopsies from curettage or aspiration is still an important factor in identifying the cause of AUB, especially if malignancy or hyperplasia is suspected [11].

In states like Bihar where health care resources are limited and the awareness about menstrual health is low, AUB continues to be underreported and undertreated. Delays in accessing medical care are compounded by cultural taboos, lack of education, and socioeconomic constraints. As a result, a number of women show up at advanced stages with problems like severe anemia or underlying pathology. Clarifying the pattern and etiology of AUB in these settings is important for guiding appropriate intervention, improving diagnosis, and facilitating better patient care.

Furthermore, exploring the pattern of AUB in a tertiary care hospital setting reflects important insights into the clinical profile as well as etiologic and diagnostic measurements among affected women. It further aids in referring them to a study investigating whether artefacts enable classification systems like PALM-COEIN to be used outside of the context for which they were created. In the Indian perspective, such studies are invaluable, as demographics and health status varies across regions resulting in divergent disease patterns and mode of healthcare delivery.

Hence, the current study seeks to observe and analyze the pattern of abnormal uterine bleeding in reproductive-age women attending a tertiary care hospital in Bihar, India. Furthermore, by examining clinical presentations, underlying causes and diagnostic findings, this study aims to shed light on the characteristics of AUB in our local population and help inform timely development of management strategies.

Methodology

Study Design: This study was designed as a prospective observational study aimed at evaluating the pattern of abnormal uterine bleeding (AUB) among reproductive-age women presenting to a tertiary care center.

Study Area: The study was conducted in the Department of Obstetrics and Gynecology at Darbhanga Medical College and Hospital (DMCH), Laheriasarai, Darbhanga, Bihar, India.

Study Duration: The study was carried out over a period of eight months from March 2025 to October 2025.

Sample Size: A total of 100 patients diagnosed with abnormal uterine bleeding were included in the study. The sample size was determined based on the number of patients presenting during the study period and fulfilling the inclusion criteria.

Study Population: The study population consisted of women in the reproductive age group, typically

between 15 and 49 years, who presented with complaints of abnormal uterine bleeding either in the gynecology outpatient department or were admitted to the gynecology ward of the hospital.

Data Collection: Data were collected using a predesigned and structured proforma. Detailed information regarding demographic characteristics, menstrual history including pattern, duration, and amount of bleeding, as well as obstetric, medical, and surgical history was recorded. All patients underwent thorough general physical and gynecological examination. Relevant laboratory investigations including complete hemogram, thyroid function tests, liver function tests, renal function tests, fasting blood sugar, coagulation profile, and viral markers were performed. In addition, imaging and diagnostic procedures such as pelvic ultrasonography, hysteroscopy where indicated, and histopathological examination of endometrial samples were carried out, and findings were documented systematically.

Inclusion Criteria

- All women of reproductive age presenting with abnormal uterine bleeding in OPD or admitted to the gynecology ward during the study period
- Patients willing to participate and provide informed consent

Exclusion Criteria

- Patients with pregnancy-related complications, including:
    - Threatened miscarriage
    - Incomplete miscarriage
    - Missed miscarriage
    - Ectopic pregnancy
- Gestational trophoblastic disease
- Women not willing to participate in the study

Procedure

All eligible patients presenting with abnormal uterine bleeding were identified and enrolled in the study. A detailed clinical history was obtained followed by comprehensive physical and gynecological examination. Appropriate laboratory and imaging investigations were performed as per clinical indication. Patients were categorized based on the pattern of abnormal uterine bleeding, such as menorrhagia, metrorrhagia, polymenorrhea, and oligomenorrhea, and further evaluated using the PALM-COEIN classification system wherever applicable. Endometrial sampling and histopathological evaluation were performed in selected cases. All findings were recorded systematically for further analysis.

Statistical Analysis: The collected data were entered into Microsoft Excel and subsequently analyzed using Statistical Package for the Social Sciences (SPSS) software version 25. Descriptive statistics such as mean, standard deviation, frequencies, and percentages were used to summarize the data. The results were presented in the form of tables and charts, and appropriate statistical tests such as the Chi-square test were applied where necessary. A p-value of less than 0.05 was considered statistically significant."

Result

Table 1 presents the age distribution of 100 cases, showing that the majority of patients were in the 40–49 years age group, accounting for 46 cases (46%), followed by 30–39 years with 28 cases (28%). The 20–29 age group comprised 12 cases (12%), while those aged ≥50 years accounted for 10 cases (10%). The least represented group was <20 years, with only 4 cases (4%). Overall, the findings indicate that abnormal uterine bleeding was most common among women in the perimenopausal age group (40–49 years).

Table 1: Age distribution (n=100)

Age (in years)	N (%)
<20	4 (4%)
20–29	12 (12%)
30–39	28 (28%)
40–49	46 (46%)
≥50	10 (10%)

Table 2 shows the pattern of abnormal uterine bleeding (AUB) among 100 cases, indicating that metrorrhagia was the most common presentation, observed in 38 cases (38%). This was followed by polymenorrhoea in 18 cases (18%) and menorrhagia in 16 cases (16%). Menometrorrhagia accounted for 12 cases (12%), while oligomenorrhoea and hypomenorrhoea were less frequent, seen in 9 (9%) and 7 cases (7%) respectively. Overall, irregular and frequent bleeding patterns predominated in the study population.

Table 2: Pattern of AUB (n=100)	
Pattern of AUB	**N (%)**
Metrorrhagia	38 (38%)
Polymenorrhoea	18 (18%)
Menorrhagia	16 (16%)
Menometrorrhagia	12 (12%)
Oligomenorrhoea	9 (9%)
Hypomenorrhoea	7 (7%)

Table 3 presents the ultrasound findings among 100 cases, showing that leiomyoma was the most common finding, observed in 26 cases (26%), followed by increased endometrial thickness in 18 cases (18%) and PCOS in 15 cases (15%). Adenomyosis was identified in 14 cases (14%), while endometrial polyps were seen in 10 cases (10%). A normal ultrasound scan was reported in 12 cases (12%), indicating no detectable abnormalities, and ovarian cysts were the least common finding, present in 5 cases (5%). Overall, the results suggest that structural uterine abnormalities, particularly leiomyoma and endometrial changes, were the predominant ultrasound findings in the study population.

Table 3: Ultrasound findings (n=100)		
Ultrasound findings	**N**	**Percentage (%)**
Leiomyoma	26	26%
Normal scan	12	12%
Increased endometrial thickness	18	18%
PCOS	15	15%
Adenomyosis	14	14%
Endometrial polyp	10	10%
Ovarian cyst	5	5%

Table 4 presents the distribution of cases according to the PALM-COEIN classification (n=100), showing that leiomyoma was the most common cause, accounting for 26 cases (26%), followed by ovulatory disorders in 22 cases (22%) and endometrial hyperplasia in 18 cases (18%). Adenomyosis was observed in 14 cases (14%), while polyps accounted for 10 cases (10%). Less frequent causes included endometrial disorder (endometritis) in 3 cases (3%), and malignancy, iatrogenic causes, and not otherwise classified categories each in 2 cases (2%). Coagulopathy was the least common, seen in only 1 case (1%). Overall, structural causes (PALM) and non-structural causes (COEIN) both contributed significantly, with leiomyoma and ovulatory disorders being the leading etiologies.

Table 4: PALM-COEIN classification (n=100)		
PALM-COEIN category	**N**	**Percentage (%)**
Polyp	10	10%
Adenomyosis	14	14%
Leiomyoma	26	26%
Endometrial hyperplasia	18	18%
Malignancy	2	2%
Coagulopathy	1	1%
Ovulatory disorder	22	22%
Endometrial disorder (endometritis)	3	3%
Iatrogenic	2	2%
Not otherwise classified	2	2%

Table 5 presents the histopathological patterns observed in 70 cases, showing that proliferative endometrium was the most common finding, seen in 24 cases (34.3%), followed by secretory endometrium in 18 cases (25.7%). Disordered proliferative endometrium accounted for 9 cases (12.9%), while benign polyps were observed in 8 cases (11.4%). Less frequent findings included simple hyperplasia without atypia in 4 cases (5.7%), chronic endometritis in 3 cases (4.3%), and atrophic endometrium in 2 cases (2.9%). Rare conditions such as simple hyperplasia with atypia and malignancy were each reported in only 1 case (1.4%). Overall, the majority of cases showed normal cyclical endometrial patterns, with relatively few instances of premalignant or malignant lesions.

Table 5: Histopathological pattern (n=70)		
Histopathological pattern	**N**	**Percentage (%)**
Proliferative endometrium	24	34.30%
Secretory endometrium	18	25.70%
Disordered proliferative endometrium	9	12.90%
Benign polyp	8	11.40%
Chronic endometritis	3	4.30%
Atrophic endometrium	2	2.90%
Simple hyperplasia without atypia	4	5.70%
Simple hyperplasia with atypia	1	1.40%
Malignancy	1	1.40%

Discussion

This study found that abnormal uterine bleeding (AUB) was most common in the 40–49 years age group (46%) followed by the 30–39 years group (28%) indicating a notable predominance of perimenopausal age range. This finding correlates with the findings observed by Sinha et al. (2018) [12] and Choudhury and Nath (2020) [13], also cited the highest incidence of AUB in women aged between 40 and 49 years which supports the well-established relationship between hormonal aberrations of the perimenopausal period with exaggerated menstrual irregularity. In contrast, although the proportion in our study is somewhat higher than that found in these studies, this difference may be due to different sample sizes, demographic characteristics and health-seeking behaviour. In contrast with Speroff & Fritz, (2020) [7], who indicated that the younger age group most commonly presented with AUB due to anovulatory cycles and coagulopathies, possibly underreported or less frequently evaluated in tertiary care settings, we see a relatively minor proportion of patients aged under 20 years overall only accounting for 4% of our sample."

In terms of bleeding patterns in our study, the commonest presentation was metrorrhagia (38%), followed by polymenorrhoea (18%) and menorrhagia (16%). Unlike Nair and Mallikarjuna (2015) [14], where menorrhagia served as the commonest symptom. Such discrepancies could reflect regional differences in symptom recognition by patients or differences in study definitions. However, the majority of patterns of irregular and frequent bleeding found in our study seem to fit with the pathophysiological understanding we have described above as put forth by Speroff & Fritz, (2020) [7], that anovulation causes unpredictable endometrial shedding leading to further problems regarding irregular bleeding. Moreover, many bleeding patterns associated with certain underlying pathology (for example—heavy menstrual bleeding in case of leiomyoma or intermenstrual bleeding with endometrial polyp) have been laid down already [8] (Sedhai & Shrestha, 2012). Hence our results support the notion that clinical manifestation may suggest important hints about the subclinical basis but is not diagnostic for it without further investigations.

The most common ultrasonographic finding in the present study was leiomyoma (26%) followed by increased endometrial thickness (18%) and polycystic ovarian syndrome (15%). These results are consistent with the known contribution of structural abnormalities to the aetiology of AUB. But this is different from studies by Sinha at al. (2018) [12] and Choudhury and Nath (2020) [13], with a normal ultrasound scan being the most common finding. This discrepancy might indicate a higher burden of detectable structural pathology in the subject population of our study, or possibly differences in referral patterns, with patients experiencing more severe or persistent symptoms being more likely to undergo imaging. The fact that adenomyosis (14%) and endometrial polyps (10%) were also present in our study reinforces the notion emphasized by Farquhar et al. (2003) [10] emphasizing transvaginal sonography role for AUB evaluation.

According to the PALM-COEIN system, leiomyoma (AUB-L) was the most common cause in our study, accounting for 26%, followed by ovulatory disorders (22%) and endometrial hyperplasia (18%). This trend is similar to other studies as uterine structural causes, especially leiomyomas are the main etiology of AUB in perimenopausal patients (Munro et al., 2011; Sinha et al., 2018) [5,12]; The prominent role of ovulatory disorders in our study mirrors previous findings on hormonal disruptions frequently noted during the reproductive and perimenopausal years. Nonetheless, the low percentage of malignancy (2%) in our study is somewhat reassuring and corroborates with several studies contributing to the existing literature indicating that malignant causes tend to be a minority of AUB cases especially in premenopausal women (Speroff & Fritz 2020) [7]. Minor contributions from coagulopathy (1%) and iatrogenic causes (2%) help demonstrate that less non-structural causes, while less common, remain clinically certain.

In our study, histopathological analysis showed that the common finding was proliferative endometrium

(34.3%) followed by secretory endometrium (25.7%) and disordered proliferative endometrium (12.9%). These results closely aligned with Kinake et al. which also described proliferative endometrium as the most common histological pattern (2021) [15]. The similarity implies that many of the AUB cases are related to hormonal imbalance resulting in anovulatory cycles and prolonged estrogen stimulation. The other endometrial proliferative lesion: benign endometrial polyps (11.4%) in our study population was also found to be present by others and is analogous with the presence of simple hyperplasia without atypia (5.7%) as they support unopposed estrogen in endometrium. However, the low frequency of atypical hyperplasia and malignancy (1.4% respectively) are corroborated by the general observation that majority endometrial changes of reproductive-age women are nonneoplastic in the nature (Bhatta & Sinha, 2012) [4]. The higher proportion of proliferative patterns in our findings compared with other studies is likely representative of the preponderance of ovulatory dysfunction in our study cohort.

Overall, the results of this study are mostly in agreement with the literature, especially concerning the percentage of AUB among women in perimenopausal age group, major role played by structural causes such as leiomyoma and prevalence of benign histopathological patterns. Nonetheless, other features such as the frequency of metrorrhagia as well as factors recognized by ultrasound are characterized through regional, demographic and methodological differences. These variations highlight the need for individualized evaluation using a combination of clinical, radiological, and histopathological parameters to precisely diagnose and manage menorrhagia in reproductive age women.

Conclusion

According to the current study menorrhagia was more prevalent and most common in late reproductive and perimenopausal age group indicating high association with advancing reproductive age when we compare all types of abnormal uterine bleeding (AUB). Irregular and frequent bleeding patterns were more common than reduced/ scanty flow presentations among the varying types of and clinical features associated with abnormal uterine bleeding. The most common finding was structural abnormalities, especially leiomyoma, while a substantial number of women showed functional causes such as ovulatory disorders on ultrasonography. The PALM-COEIN classification showed that the structural and non-structural aetiologies were similarly represented, with a slight a dominance of the former. The vast majority of cases showed normal cyclical histopathological endometrium, but a small fraction exhibited proliferative abnormalities (hyperplasia), benign lesions and some premalignant/malignant changes. AUB in reproductive-age women has multifactorial origins, with structural causes burdened by diagnosis and management, therefore obliterating the necessity of broad clinical, radiological and histopathological examination.

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