



Original Article

Clinical Patterns and Associated Risk Factors of Abnormal Uterine Bleeding in Reproductive-Age Women: A Cross-Sectional Study

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ABSTRACT

Background: Abnormal uterine bleeding is a frequent gynaecological complaint among reproductive-age women and reflects structural, endocrine, metabolic, haematological, or iatrogenic disorders. Identifying the dominant bleeding patterns and associated risk factors supports timely investigation and individualized care.

Objectives: To describe the clinical patterns of abnormal uterine bleeding and determine the factors associated with heavy menstrual bleeding among reproductive-age women.

Methods: This hospital-based cross-sectional study included 100 nonpregnant women aged 18–45 years who presented with abnormal uterine bleeding at Government Medical College and General Hospital, Siddipet, Telangana, India, from February to July 2025. Sociodemographic, menstrual, clinical, laboratory, and ultrasonographic findings were recorded. Associations with heavy menstrual bleeding were assessed using the Chi-square test, and odds ratios with 95% confidence intervals were calculated.

Results: The mean age was 32.8 ± 7.1 years, and the mean body mass index was 25.6 ± 4.3 kg/m². Heavy menstrual bleeding was the predominant pattern in 42.0%, followed by irregular bleeding in 24.0% and prolonged bleeding in 16.0%. Overweight or obesity was present in 58.0%, polycystic ovary syndrome in 22.0%, thyroid dysfunction in 18.0%, and uterine fibroids in 16.0%. Anaemia occurred in 24.0%. Heavy menstrual bleeding was significantly associated with age above 35 years, overweight or obesity, polycystic ovary syndrome, thyroid dysfunction, and uterine fibroids. Multiparity showed no significant association.

Conclusion: Heavy menstrual bleeding was the leading presentation. Older reproductive age, excess body weight, endocrine disorders, and uterine fibroids were important associated factors, supporting integrated clinical, laboratory, and ultrasonographic assessment.

Keywords: abnormal uterine bleeding; heavy menstrual bleeding; reproductive-age women; obesity; polycystic ovary syndrome; uterine fibroids.

INTRODUCTION

Abnormal uterine bleeding (AUB) describes uterine bleeding in a nonpregnant woman that differs from expected menstrual parameters in frequency, regularity, duration, or volume. The condition includes heavy menstrual bleeding, irregular bleeding, prolonged bleeding, intermenstrual bleeding, and other clinically important alterations in menstrual loss. Standardized terminology is essential because older terms, including menorrhagia, metrorrhagia, and dysfunctional

uterine bleeding, were applied inconsistently across clinical practice and research. The International Federation of Gynecology and Obstetrics (FIGO) therefore introduced contemporary definitions for normal and abnormal menstrual bleeding and recommended symptom-based descriptions that are understandable, reproducible, and clinically relevant.¹

The FIGO PALM-COEIN system classifies the potential causes of AUB into structural and nonstructural categories. Structural causes include polyp, adenomyosis, leiomyoma, and malignancy or hyperplasia, whereas nonstructural causes comprise coagulopathy, ovulatory dysfunction, endometrial disorders, iatrogenic factors, and entities not otherwise classified.² Subsequent revisions refined both the description of bleeding symptoms and the classification of underlying causes, recognizing that more than one contributing disorder can coexist in the same woman.³ Contemporary evaluation consequently requires a systematic assessment of menstrual characteristics, pregnancy status, anaemia, endocrine function, medication exposure, and pelvic anatomy.⁴

AUB is clinically important because it affects physical health, emotional well-being, sexual functioning, social participation, and work productivity.⁵ Persistent or excessive bleeding can produce iron deficiency and anaemia, while chronic uncertainty regarding the timing and intensity of bleeding can substantially reduce quality of life and increase healthcare utilization.⁶ The presentation and underlying contributors differ across age groups. Ovulatory dysfunction and polycystic ovary syndrome are prominent among younger women, whereas adenomyosis, endometrial polyps, and leiomyomas become increasingly relevant during the later reproductive years. Obesity, thyroid dysfunction, contraceptive use, coagulation disorders, and other systemic conditions can further modify menstrual patterns.

A structured hospital-based assessment is particularly valuable in settings where women often seek care after symptoms have persisted for several months. Clinical pattern recognition can guide the selection of laboratory tests and imaging, identify women at risk of anaemia, and distinguish patients requiring further endometrial or specialist evaluation. Although established diagnostic frameworks are available, local data describing symptom patterns and associated factors remain necessary because patient characteristics, healthcare access, contraceptive practices, and the distribution of endocrine and structural disorders vary between populations.

The present study was undertaken to describe the sociodemographic and clinical profile of reproductive-age women presenting with AUB at a tertiary-care government hospital. The primary objective was to determine the predominant clinical patterns of AUB. The secondary objectives were to identify associated endocrine, metabolic, structural, haematological, and iatrogenic factors and to examine their associations with heavy menstrual bleeding.

Methodology

Study design and setting: This hospital-based cross-sectional study was conducted in the Department of Obstetrics and Gynaecology, Government Medical College and General Hospital, Siddipet, Telangana, India. The institution is a tertiary-care government teaching hospital providing outpatient, emergency, inpatient, laboratory, imaging, and operative gynaecological services to urban and rural populations. The study was performed from February 2025 to July 2025.

Study population and eligibility criteria: Nonpregnant women aged 18–45 years who presented with bleeding that was abnormal in frequency, regularity, duration, or volume were eligible. Symptoms were described using standardized FIGO terminology and evaluated within the PALM-COEIN framework.^{2–4} Women were assessed for haemodynamic stability before enrolment in accordance with established guidance for acute AUB.⁸ Women with pregnancy-related bleeding, bleeding within six weeks after childbirth, postmenopausal bleeding, known genital tract malignancy, severe systemic illness preventing assessment, or incomplete data were excluded.

Sample size and sampling: The minimum sample size was estimated using $n = Z^2pq/d^2$. An anticipated proportion of 50% was selected to provide the maximum sample requirement, with a 95% confidence level and 10% absolute precision. The calculated sample was 96.04 and was rounded to 100. Eligible participants were recruited consecutively until the sample was achieved. Complete data were available for all enrolled women.

Data collection and assessment: After written informed consent, data were recorded using a predesigned form. Variables included age, residence, parity, height, weight, menstrual pattern, symptom duration, associated symptoms, hormonal medication use, and copper intrauterine contraceptive device use. Body mass index was calculated as weight in kilograms divided by height in metres squared and categorized as underweight, normal, overweight, or obese. Heavy menstrual bleeding was identified from the participant's report of excessive menstrual loss that interfered with physical, social, emotional, or material quality of life.^{1,7} General, abdominal, and pelvic examinations were performed.

Investigations: Complete blood count, haemoglobin concentration, urine pregnancy testing, thyroid function testing, and pelvic ultrasonography were obtained. Coagulation tests were requested when the clinical history suggested a bleeding

disorder. Anaemia was defined as haemoglobin below 12 g/dL and categorized by severity. Ultrasonography was used to identify uterine fibroids, adenomyosis, endometrial polyps, and ovarian morphology. Polycystic ovary syndrome was diagnosed using accepted clinical, biochemical, and ultrasonographic criteria after excluding relevant alternative disorders.⁹ Thyroid dysfunction was classified from laboratory findings and clinical assessment.

Outcome measures and statistical analysis: The primary outcome was the distribution of predominant AUB patterns. Secondary outcomes included associated conditions and factors related to heavy menstrual bleeding. Data were analysed using IBM SPSS Statistics, version 26.0. Continuous variables were expressed as mean $\pm$ standard deviation and categorical variables as frequencies and percentages. Pearson's Chi-square test assessed associations. Odds ratios with 95% confidence intervals were calculated from 2×2 tables. A two-sided p-value below 0.05 was statistically significant.

Ethical considerations: Approval was obtained from the Institutional Ethics Committee of Government Medical College, Siddipet. Written informed consent was obtained from every participant, and confidentiality was maintained.

RESULTS

A total of 100 reproductive-age women presenting with abnormal uterine bleeding were enrolled in the study. Complete clinical, laboratory, and ultrasonographic data were available for all participants, and no participant was excluded from the final analysis. The mean age was 32.8 ± 7.1 years, with an age range of 18–45 years. Most participants were aged 26–35 years (43.0%), followed by 36–45 years (38.0%). The mean body mass index was 25.6 ± 4.3 kg/m². Thirty-four participants were overweight, while 24 were obese. Half of the participants were multiparous (Table 1).

Table 1. Sociodemographic and baseline characteristics of the participants (N = 100)

Characteristic	Category	Frequency	Percentage
Age, years	Mean $\pm$ SD	32.8 ± 7.1	—
Age group	18–25 years	19	19.0
	26–35 years	43	43.0
	36–45 years	38	38.0
Residence	Rural	58	58.0
	Urban	42	42.0
Body mass index, kg/m ²	Mean $\pm$ SD	25.6 ± 4.3	—
Body mass index category	Underweight	8	8.0
	Normal weight	34	34.0
	Overweight	34	34.0
	Obese	24	24.0
Parity	Nulliparous	22	22.0
	Primiparous	28	28.0
	Multiparous	50	50.0

Heavy menstrual bleeding was the most common predominant clinical pattern, observed in 42 (42.0%) participants. Irregular menstrual bleeding was reported by 24 (24.0%) women, while prolonged menstrual bleeding occurred in 16 (16.0%). Ten participants presented with intermenstrual bleeding, and eight reported postcoital bleeding. Symptoms had persisted for more than six months in 40 (40.0%) participants. Dysmenorrhoea was the most frequent associated symptom, followed by fatigue, passage of blood clots, pelvic pain, and dizziness (Table 2).

Table 2. Clinical patterns and associated symptoms of abnormal uterine bleeding (N = 100)

Clinical characteristic	Category	Frequency	Percentage
Predominant bleeding pattern	Heavy menstrual bleeding	42	42.0
	Irregular menstrual bleeding	24	24.0
	Prolonged menstrual bleeding	16	16.0
	Intermenstrual bleeding	10	10.0
	Postcoital bleeding	8	8.0
Duration of symptoms	<3 months	28	28.0
	3–6 months	32	32.0
	>6 months	40	40.0
Associated symptoms*	Dysmenorrhoea	46	46.0
	Fatigue	44	44.0
	Passage of blood clots	38	38.0
	Pelvic pain	28	28.0

	Dizziness	26	26.0
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*Multiple associated symptoms could be reported by the same participant.

Polycystic ovary syndrome was identified in 22 (22.0%) participants and was the most frequent endocrine or metabolic condition. Thyroid dysfunction was detected in 18 (18.0%) women, including hypothyroidism in 15 and hyperthyroidism in three. Uterine fibroids were observed in 16 (16.0%) participants, while adenomyosis and endometrial polyps were found in 10 (10.0%) and eight (8.0%), respectively. Twelve participants were using hormonal preparations, and 10 had a copper-containing intrauterine contraceptive device (Table 3).

The mean haemoglobin concentration was 11.6 ± 1.7 g/dL. Anaemia was detected in 24 (24.0%) participants. Of these, 14 had mild anaemia, eight had moderate anaemia, and two had severe anaemia.

Table 3. Clinical conditions and risk factors identified among the participants (N = 100)

Associated condition or risk factor	Frequency	Percentage
Overweight or obesity	58	58.0
Polycystic ovary syndrome	22	22.0
Thyroid dysfunction	18	18.0
Uterine fibroid	16	16.0
Current hormonal medication use	12	12.0
Adenomyosis	10	10.0
Copper intrauterine contraceptive device use	10	10.0
Endometrial polyp	8	8.0
Suspected coagulation abnormality	3	3.0
Anaemia	24	24.0

Heavy menstrual bleeding was significantly more frequent among women aged above 35 years than among younger women (55.3% versus 33.9%; $\chi^2 = 4.43$, $p = 0.035$). A significant association was also observed between heavy menstrual bleeding and overweight or obesity ($\chi^2 = 7.43$, $p = 0.006$). Women who were overweight or obese had approximately three times higher odds of heavy menstrual bleeding than women who were underweight or had normal body weight.

Polycystic ovary syndrome, thyroid dysfunction, and uterine fibroids were each significantly associated with heavy menstrual bleeding. The strongest association was observed for uterine fibroids, with an odds ratio of 3.76. Multiparity was not significantly associated with heavy menstrual bleeding ($\chi^2 = 1.48$, $p = 0.224$) (Table 4).

Table 4. Association of selected risk factors with heavy menstrual bleeding

Risk factor	HMB present, n = 42	HMB absent, n = 58	χ^2 value	Odds ratio (95% CI)	p-value
Age >35 years	21	17	4.43	2.41 (1.05–5.52)	0.035
Overweight or obesity	31	27	7.43	3.24 (1.37–7.65)	0.006
Polycystic ovary syndrome	14	8	5.42	3.13 (1.17–8.36)	0.020
Thyroid dysfunction	12	6	5.48	3.47 (1.18–10.19)	0.019
Uterine fibroid	11	5	5.60	3.76 (1.20–11.83)	0.018
Multiparity	24	26	1.48	1.64 (0.74–3.66)	0.224

Overall, heavy menstrual bleeding was the predominant clinical presentation. Increased body mass index, age above 35 years, polycystic ovary syndrome, thyroid dysfunction, and uterine fibroids were significantly associated with heavy menstrual bleeding in the study population.

DISCUSSION

The present study characterized AUB among 100 reproductive-age women attending a tertiary-care government hospital. Heavy menstrual bleeding was the leading clinical pattern, affecting 42.0% of participants, followed by irregular and prolonged bleeding. This distribution confirms that excessive menstrual loss remains a major reason for seeking gynaecological care, although the relative frequency of individual patterns differs across populations. A Chinese cross-sectional study using the FIGO framework reported substantial variation in AUB causes and symptom patterns across reproductive age groups, while a national Japanese survey demonstrated a close relationship between bleeding symptoms and the PALM-COEIN categories.^{10,11} Differences in referral pathways, age composition, definitions, and access to diagnostic testing probably contribute to variation between studies.

The high proportion of participants with symptoms lasting longer than six months indicates delayed presentation or prolonged conservative management before specialist assessment. Dysmenorrhoea, fatigue, passage of clots, pelvic pain, and dizziness frequently accompanied AUB. These manifestations reflect both the local uterine disorder and the systemic consequences of recurrent blood loss. The observed anaemia prevalence of 24.0% is clinically relevant because heavy menstrual bleeding is a recognized cause of iron depletion, impaired physical performance, and reduced quality of life.^{6,12} Routine haemoglobin assessment and timely correction of iron deficiency should therefore form part of the evaluation of women with persistent or heavy bleeding.

Overweight or obesity was identified in 58.0% of participants and was significantly associated with heavy menstrual bleeding. Excess adiposity can contribute to ovulatory dysfunction, altered peripheral oestrogen metabolism, endometrial instability, and prolonged unopposed oestrogen exposure. Polycystic ovary syndrome was present in 22.0% and showed a significant association with heavy menstrual bleeding. Although irregular or infrequent menstruation is common in polycystic ovary syndrome, episodes of prolonged or heavy bleeding can follow extended anovulatory intervals and excessive endometrial proliferation. Current international guidance emphasizes careful assessment of menstrual irregularity, metabolic risk, and endometrial health in affected women.⁹

Thyroid dysfunction was detected in 18.0% of participants and was independently associated with heavy menstrual bleeding in the bivariate analysis. Thyroid hormone disturbances can alter ovulation, sex hormone binding, coagulation, and endometrial function, producing a broad spectrum of menstrual abnormalities.¹³ The predominance of hypothyroidism within this subgroup is consistent with its recognized relationship with excessive or irregular uterine bleeding. These findings support thyroid function testing when AUB occurs with suggestive symptoms, irregular cycles, weight change, or infertility.

Uterine fibroids were present in 16.0% and demonstrated the strongest observed association with heavy menstrual bleeding. Leiomyomas can increase endometrial surface area, impair uterine contractility, disturb venous drainage, and alter local haemostatic mechanisms.¹⁴ Age above 35 years was also associated with heavy menstrual bleeding, plausibly reflecting the increasing frequency of structural uterine disease during later reproductive life. Multiparity was not significantly associated, suggesting that current metabolic, endocrine, and structural factors were more informative than parity alone. Overall, the findings reinforce the value of combining standardized symptom description with laboratory testing and pelvic ultrasonography rather than relying on bleeding history in isolation.

Limitations

This study was conducted at a single tertiary-care hospital with a modest sample, limiting representativeness beyond the local referral population. Consecutive hospital-based recruitment excluded women who did not seek medical care. Bleeding volume was based on participant-reported clinical patterns rather than objective menstrual blood-loss measurement. The cross-sectional design prevents temporal or causal interpretation. Multivariable regression was not performed, so residual confounding between metabolic, endocrine, and structural factors remains possible.

CONCLUSION

Heavy menstrual bleeding was the predominant pattern of abnormal uterine bleeding among reproductive-age women attending this tertiary-care hospital. More than half of the participants were overweight or obese, and substantial proportions had polycystic ovary syndrome, thyroid dysfunction, uterine fibroids, or anaemia. Age above 35 years, excess body weight, polycystic ovary syndrome, thyroid dysfunction, and uterine fibroids were significantly associated with heavy menstrual bleeding, whereas multiparity was not associated. These findings support a structured evaluation combining standardized menstrual history, body mass index assessment, haemoglobin estimation, thyroid testing, and pelvic ultrasonography. Early recognition of modifiable and treatable factors can improve diagnostic precision, reduce anaemia, and guide individualized clinical management for affected women.

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