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Pattern of Abnormal Uterine Bleeding among Perimenopausal Women in Erbil City

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ABSTRACT

Background: *Abnormal uterine bleeding (AUB) is an epidemic, painful condition among perimenopausal women and an indicator of the quality of life with reproductive health problems. The pattern and precipitating factors should be defined to guide early diagnosis and treatment. The objective of this study was to determine the pattern of abnormal uterine bleeding and precipitating demographic and clinical factors among perimenopausal women in Erbil city based on the FIGO PALM-COEIN classification system.* ***Methods:*** *In this cross-sectional study, Four hundred perimenopausal women aged between forty and fifty five years old, attending gynecology clinics in Erbil, were investigated. The data were collected with structured interviews and clinical examination. The etiologies of AUB were divided according to the PALM-COEIN classification. Statistical tests applied were chi-square tests and multinomial logistic regression to detect associations between patterns of bleeding and some variables.* ***Results:*** *Mixed bleeding (23.3%) was the most prevalent AUB type, followed by metrorrhagia (20.8%) and polymenorrhea (12.0%). Based on the FIGO classification, endometrial disorders (36.5%), leiomyomas (24.0%), and ovulatory dysfunction (16.0%) were the main etiologies. Bleeding patterns had no significant correlations with factors like age, BMI, marital status, education level, parity, gravidity, and use of contraceptives ($p < 0.05$). Multinomial logistic regression determined BMI, gravidity, and use of IUD as independent predictors of bleeding type.* ***Conclusion:*** *Perimenopausal women of Erbil with abnormal uterine bleeding are controlled by various reproductive and sociodemographic factors. Early diagnosis and standardized evaluation according to FIGO criteria are the keys to proper management and prevention of the gynecological disease burden.*

Keywords: Abnormal Uterine Bleeding, Perimenopausal Women, PALM-COEIN Classification, Reproductive Health.

Article Information

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INTRODUCTION

AUB (abnormal uterine bleeding) is the most common gynecologic complaint among women [1]. This circumstance is especially true during the perimenopausal phase, which occurs before menopause and is characterized by fluctuating hormones and irregular menstrual periods [2]. Disorders of the HP-O axis are central to perimenopause, typically occurring between the ages of 40 and 55 [3]. These alterations often affect the menstrual schedule, such as increased bleeding or absence of ovulation [4]. AUB is reported to affect 10%–30% of women of reproductive age globally, with this percentage rising to nearly half among perimenopausal women [5]. Factors such as age, hormonal status, and community-level sociodemographic elements influence the etiology and features of AUB. The most common causes of perimenopausal hemorrhage include anovulatory bleeding, fibroids, endometrial hyperplasia, and, in some cases, endometrial cancer [6, 7]. Abnormal bleeding can significantly disrupt the lives of many women, leading to anemia, fatigue, decreased productivity, and psychological distress [8, 9].

Although AUB is prevalent in this age group, there is insufficient understanding of its patterns and etiologies in Iraq, particularly in the Kurdistan region. Without local epidemiological data, addressing issues related to productivity, diagnosis, treatment, and patient counseling becomes challenging. Additionally, the understanding and reporting of menstruation-related disorders in local communities are influenced by cultural practices, access to healthcare facilities, and health-seeking behavior [10, 11]. Many women face social obligations that hinder their access to adequate medical care, exacerbating their suffering. Understanding how AUB manifests in this area would be beneficial for providing optimal clinical advice and public health measures tailored to the needs of local women. The International Federation of Gynecology and Obstetrics (FIGO) introduced the PALM-COEIN classification to create a consistent diagnosis of AUB by integrating both structural and non-structural causes. The PALM-COEIN classification includes Polyp, Adenomyosis, Leiomyoma, Malignancy, and Hyperplasia (PALM); and Coagulopathy, Ovulatory dysfunction, Endometrial, and Iatrogenic factors (COEIN). The COEIN classification has not yet been fully established [6]. This classification has been applied in clinical and research settings worldwide, potentially improving the diagnostic rate of AUB etiology. However, the prevalence and application of this classification in low- and middle-income countries (LMICs), including Iraq, remain poorly understood.

There is a notable deficiency of research concerning the reproductive health of women in the Kurdistan Region. This gap in research demonstrates the importance of conducting well-designed studies to investigate the patterns and causes of AUB in perimenopausal women. The objectives of this work are to identify common etiologies for AUB and improve diagnostic accuracy, treatment options, and overall women's health education from the onset of puberty through the menopausal transition.

The present study aims to illustrate the patterns of abnormal uterine bleeding (AUB) in perimenopausal women from the Kurdistan Region of Iraq. Additionally, it evaluates the distribution of AUB using the PALM-COEIN classification system to explore potential associations with clinical, hormonal, and demographic factors. The findings from this study may contribute to the development of gynecologic policies in the region and enhance health policymaking related to women's reproductive health issues.

METHODS

Study Design

An observational cross-sectional study design was adopted to determine the etiology and pattern of perimenopausal AUB in the Kurdistan Region, Iraq. To determine the prevalence, types, and causes of AUB, we collected information at a single point in time with a cross-sectional design.

Study Setting and Duration

Erbil was selected to participate in the study, which was implemented in large public and private gynecology outpatient clinics and hospitals across the Kurdistan Region, Iraq. The data was gathered for three months, from January to March 2025.

Study Population

Perimenopausal women aged 40-55 years with symptoms of AUB were the population focused on. The diagnosis of perimenopause was made clinically, based on menstrual irregularities, vasomotor symptoms and hormonal evidence of declining ovarian function.

Inclusion Criteria

1. Women in the 40–55 age range.
2. Those with AUB disturbances, since any change in a regular cycle frequency, duration, and volume is abnormal.
3. Patient consent and consent to enroll.

Exclusion Criteria

1. Women who are expecting.
2. Women who are on anticoagulant drug use or have a history of bleeding disorders.
3. Women who have had previous endometrial ablation or hysterectomy.
4. Incomplete medical records.

Sample Size and Sampling Technique

Then the formula that was used to estimate the minimum sample size according 95% of confidence interval and 50% source proportion of abnormal uterine bleeding (biggest) among those in the perimenopause age range is p=0.5, with a margin of error equal to 5%; $d = Z^2 \times p(1–p) / d^2$. This resulted in a sample of 384 women, which was elongated to be rounded off at 400 to account for non-respondents and missing data. Convenience sampling was utilized to recruit all potential participants visiting gynecology clinics throughout the study period.

Data Collection Instrument and Process

Data were collected in response to the previous questionnaire [7]. Data was collected by means of clinical records abstraction and a structured interviewer-administered questionnaire. The questionnaire included the following sections: *Residence, employment, educational status, age and marital status.*

A value on the history of menstruation and reproduction: menarche, parity, menstrual regularity, bleeding length, and bleeding amount. The type and pattern of bleeding (menorrhagia, metrorrhagia, polymenorrhea, etc.) are clinical manifestations of AUB. *Diagnostic Work-Up: Results of Endometrial Biopsy, Transvaginal Ultrasonography, Pelvic Examination, and other appropriate studies.*

AUB is classified by the FIGO PALM-COEIN system.

Data Analysis

The demographic characteristics and AUB patterns were described by means, standard deviations, frequencies, and percentages. We use Chi-square test to explore associations between bleeding patterns and clinical or sociodemographic features. Ordinal regression was then applied to control for the factors. Statistical significance was set at $p<0.05$. The data were coded and analyzed using SPSS version 27.

Ethical Considerations

Ethical clearance was obtained from the Research Ethics Committee of the College of Medicine at Hawler Medical University. Written informed consent from the patients was waived. Participants were informed that their participation was voluntary, and they could withdraw from the study at any time without consequence; confidentiality was protected throughout the entire study.

RESULTS

Totally, 400 women answered the questions. Age distribution indicates most of the participants were in the age group 40–44 years (43.8%), followed by 45–49 years (34.3%), and then 50–55 years (22.0%). For body mass index (BMI), many women were overweight (40.5%) or obese (40.3%), with only 19.3% in the underweight or normal category.

In marital status, most participants were married (90.5%), although a minor percentage were divorced or widowed (9.5%). In terms of employment status, (65.3%) were employed and (34.8%) were not. In educational status, (38.5%) of the participants had completed primary education, (29.5%) had intermediate education, and (32.0%) had completed college education and beyond (Table 1).

Table 1: The Distribution of Participants by Key Sociodemographic Variables (N = 400)

Variable	Frequency	Percent (%)
Age Group		
40–44	175	43.8
45–49	137	34.3
50–55	88	22.0
Total	**400**	**100.0**
BMI Classification		
Normal or underweight	77	19.3
Overweight	162	40.5
Obese	161	40.3
Total	**400**	**100.0**
Marital Status		
Widow or divorced	38	9.5
Married	362	90.5
Total	**400**	**100.0**
Employment Status		
No	139	34.8
Yes	261	65.3
Total	**400**	**100.0**
Education Level		
Primary	154	38.5
Intermediate	118	29.5
College and higher education	128	32.0
Total	**400**	**100.0**

Most of the women were more than two in parity (81.3%), while just 18.8% were two or fewer live births. Gravidity was also high among participants, with 83.3% being more than two times pregnant, while just 9.5% were never pregnant. In history of abortion, 70.8% of the women were never previously pregnant with an abortion, but 29.3% had been pregnant with one or more abortions. IUD use was prevalent, with 54.5% of the interviewees reporting a family history of IUD use and 45.5% reporting that they had never used an IUD. The family history of bleeding disorders was not uncommon, as was reported by 9.0% of the interviewees, while 91.0% did not have such a history. For patterns of bleeding, 42.0% had no abnormal bleeding, while 23.3% had mixed bleeding, 20.8% metrorrhagia, 12.0% polymenorrhagia, and a small percentage (2.0%) menorrhagia (Table 2).

Table 2: The Distribution of Participants by Reproductive and Clinical Characteristics (N = 400).

Variable	Frequency	Percent (%)
Parity Classification		
≤2	75	18.8
>2	325	81.3
Total	**400**	**100.0**
Gravida		
No	38	9.5
≤2	29	7.2
>2	333	83.3
Total	**400**	**100.0**
Abortion History		
No	283	70.8
Yes	117	29.3
Total	**400**	**100.0**
Use of IUD		
No	182	45.5
Yes	218	54.5
Total	**400**	**100.0**
Family History		
No	364	91.0
Yes	36	9.0
Total	**400**	**100.0**
Type of Bleeding		
None	168	42.0
Menorrhagia	8	2.0
Metrorrhagia	83	20.8
Polymenorrhea	48	12.0
Mixed	93	23.3
Total	**400**	**100.0**

Figure 1 illustrates the percentage distribution of number of abortions among the research participants. Most women (70.8%) reported no history of abortion, meaning that induced or spontaneous abortions were not a common experience among these women. Fewer participants indicated a history of abortion, with 14.2% reporting they had one abortion, and 15.0% reporting they had more than one abortion.

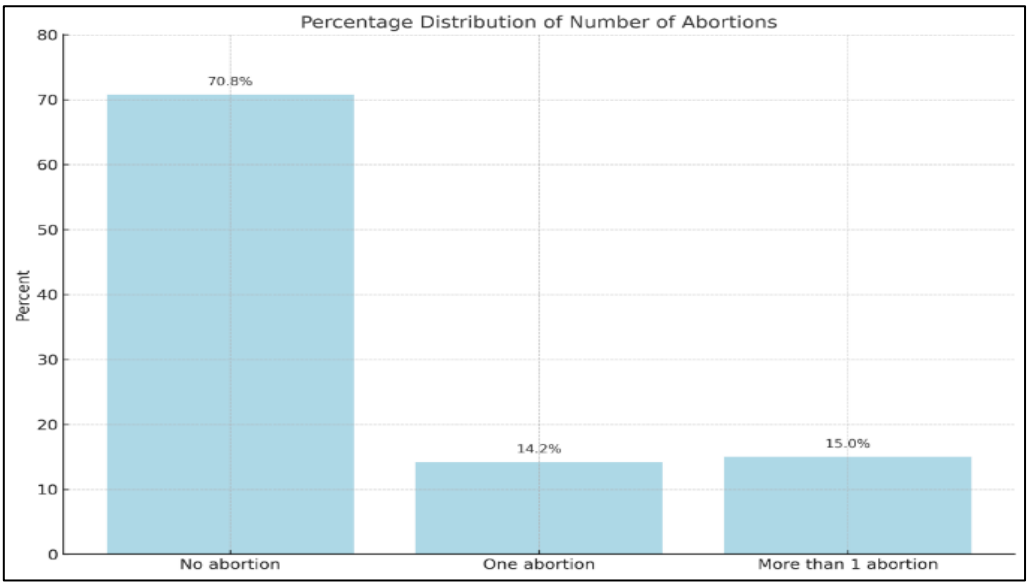

Figure 1. Distribution of number of abortions.

Structural causes (PALM) made up a great majority of the cases, with the most frequent being leiomyoma (fibroids) at 24.0% of the study sample. This was followed by endometrial polyps at 11.0%, adenomyosis at 5.8%, and malignancy or endometrial hyperplasia at 2.5% of the cases. Among the non-structural etiologies (COEIN), endometrial pathologies were the most common category among the study participants at 36.5%. Ovulatory pathologies were also extremely common and accounted for 16.0% of cases. There were some other less common COEIN etiologies such as coagulopathies at 0.8% and iatrogenic causes such as drug- or device-related etiologies at 1.3%. Notably, 8.0% of the study participants did not belong to any PALM or COEIN category (Table 3).

Table 3: The Distribution of Participants by PALM and COEIN classification (N = 400)

Variable	Frequency	Percent (%)
PALM		
Polyp	44	11.0
Adenomyosis	23	5.8
Leimyoma	96	24.0
Malignancy and hyperplasia	10	2.5
COEIN		
Coagulopathy	3	0.8
Ovulatory disorder	64	16.0
Endometrial disorder	146	36.5
Iatrogenic	5	1.3
Not classified	32	8.0

Hypertension was present in 30.0% of the females, while 70.0% had no history of high blood pressure. Likewise, diabetes mellitus was found in 29.3% of the patients, with most (70.7%) being non-diabetic. On the other hand, thyroid disorders were quite rare, occurring in

just 3.3% of the females, while 96.7% had no thyroid condition. In terms of lipid metabolism, 26.0% of the patients experienced hyperlipemia and 74.0% did not report a rise in lipid level (Figure 2).

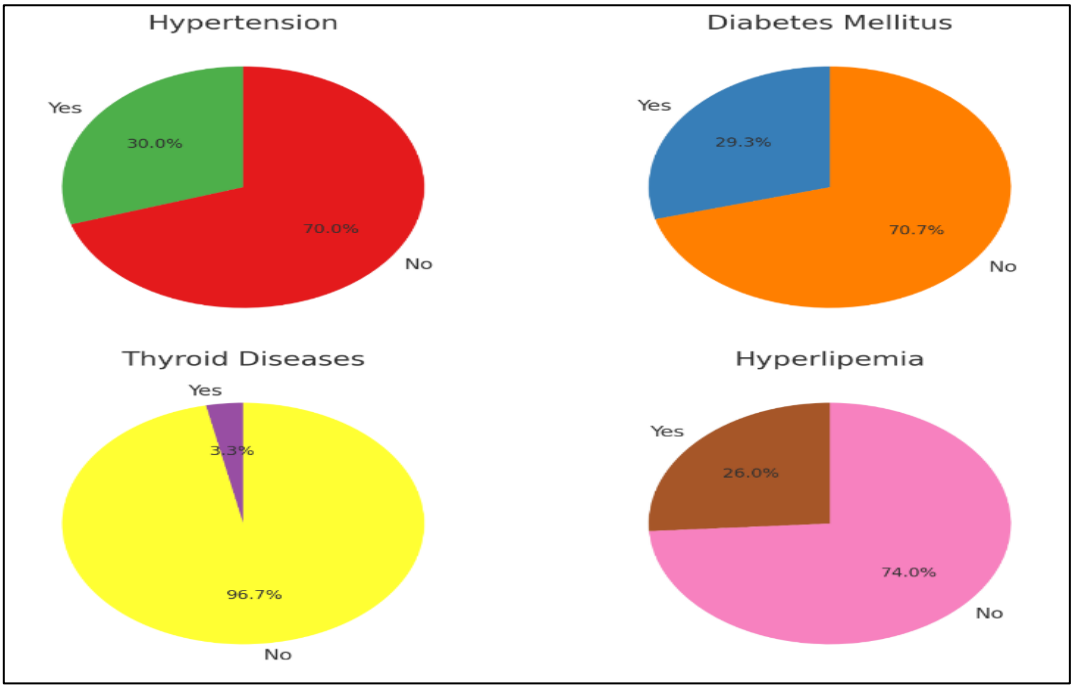

Figure 2. Distribution of chronic diseases among participants.

As it can be observed, 59.0% of the women had no history of using contraceptive drugs and 41.0% had a positive past history of using contraceptive drugs (Figure 3).

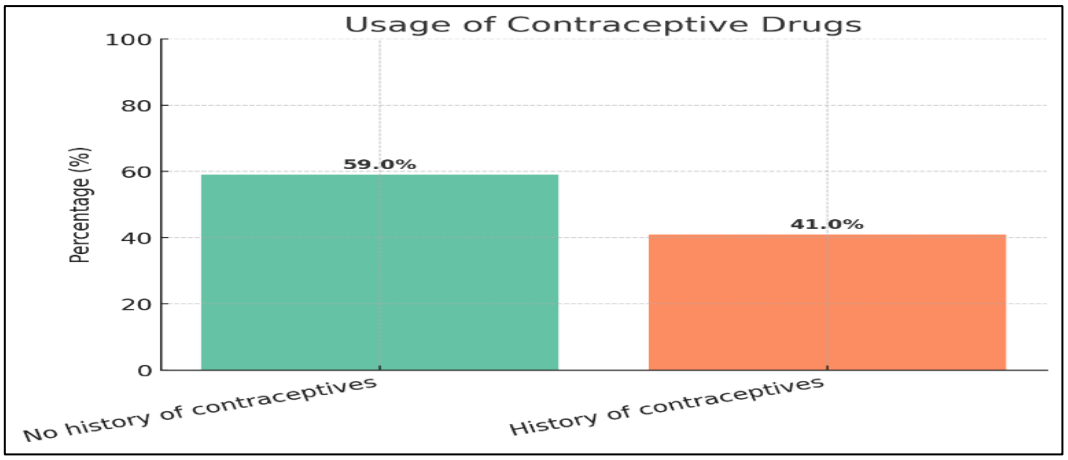

Figure 3. Distribution of contraceptive medications among participants.

The findings reveal statistically significant associations between the types of bleeding and all five demographic factors under investigation: age group, BMI, marital status, employment condition, and level of education ($p < 0.05$). Age group was significantly correlated with the pattern of bleeding ($p < 0.001$). Women in the age group 40–44 years had more frequent polymenorrhagia (22.9%) and metrorrhagia (18.9%), whereas 45–49 years had the highest percentage of mixed bleeding (43.1%). Women aged 50–55 years mainly reported not having

any bleeding (58.0%) and metrorrhagia (26.1%), whereas other bleeding patterns presented with lower frequency. Body mass index (BMI) also differently influenced ($p < 0.001$). Underweight or normal BMI women most frequently presented with polymenorrhagia (46.8%) and no bleeding (33.8%). The greatest metrorrhagia (32.1%) and mixed bleeding (38.9%) frequencies were noted in overweight women, while obese women presented with a significantly larger proportion of no bleeding (64.0%).

There was a strong association between marital status and bleeding pattern ($p < 0.001$). Divorced or widowed women had a highly predominant percentage of no bleeding (71.1%) with very low presence of the other forms of bleeding. Married women, however, had a more mixed pattern in which metrorrhagia (22.4%), mixed bleeding (23.5%), and polymenorrhagia (13.3%) were more prevalent. AUB was highly correlated with employment status ($p = 0.003$). In the unemployed women, metrorrhagia was the most common pattern of bleeding (25.2%), while in the employed women, the relatively more cases of polymenorrhagia (16.5%) and fewer instances of metrorrhagia (18.4%) were found. Finally, bleeding pattern was highly correlated with educational level ($p < 0.001$). Metrorrhagia (34.4%) and no bleeding (37.0%) were most prevalent among primary-educated women, while greater polymenorrhagia (31.3%) and no bleeding (50.0%) were observed in the college-educated or above categories. Interestingly, menorrhagia was not observed in the college-educated group (Table 4)

Table 4. Association between bleeding pattern and demographic characteristics (N=400).

Variable	None (%)	Menorrhagia (%)	Metrorrhagia (%)	Polymenorrhagia (%)	Mixed (%)	P value
Age groups						
40-44	79 (45.1%)	3 (1.7%)	33 (18.9%)	40 (22.9%)	20 (11.4%)	
45-49	38 (27.7%)	5 (3.6%)	27 (19.7%)	8 (5.8%)	59 (43.1%)	
50-55	51 (58.0%)	0 (0.0%)	23 (26.1%)	0 (0.0%)	14 (15.9%)	<0.001
BMI						
Normal/ Underweight	26 (33.8%)	2 (2.6%)	3 (3.9%)	36 (46.8%)	10 (13.0%)	
Overweight	39 (24.1%)	2 (1.2%)	52 (32.1%)	6 (3.7%)	63 (38.9%)	
Obese	103 (64.0%)	4 (2.5%)	28 (17.4%)	6 (3.7%)	20 (12.4%)	<0.001
Marital status						
Widow /Divorced	27 (71.1%)	1 (2.6%)	2 (5.3%)	0 (0.0%)	8 (21.1%)	<0.001
Married	141 (39.0%)	7 (1.9%)	81 (22.4%)	48 (13.3%)	85 (23.5%)	
Employee condition						
Unemployed	60 (43.2%)	4 (2.9%)	35 (25.2%)	5 (3.6%)	35 (25.2%)	
Employed	108 (41.4%)	4 (1.5%)	48 (18.4%)	43 (16.5%)	58 (22.2%)	0.003
Level of education						
Primary Education	57 (37.0%)	6 (3.9%)	53 (34.4%)	5 (3.2%)	33 (21.4%)	

Variable	None (%)	Menorrhagia (%)	Metrorrhagia (%)	Polymenorrhagia (%)	Mixed (%)	P value
Intermediate	47 (39.8%)	2 (1.7%)	24 (20.3%)	3 (2.5%)	42 (35.6%)	<0.001
College & Higher	64 (50.0%)	0 (0.0%)	6 (4.7%)	40 (31.3%)	18 (14.1%)	

Parity was highly associated with bleeding pattern ($p < 0.001$). Polymenorrhagia (25.3%) and mixed bleeding (24.0%) were prevalent among women with parity ≤2. However, those with more than two offspring had a higher percentage of metrorrhagia (24.0%) and none (41.8%) and lower percentages of polymenorrhagia (8.9%). Gravidity was also highly correlated with type of bleeding ($p < 0.001$). No pregnancy history had the highest prevalence of polymenorrhagia (50.0%) and mixed bleeding (31.6%), whereas >2 pregnancies were found to have metrorrhagia (23.4%) and mixed bleeding (23.7%).

As per the history of abortion, those who never had an abortion history most often experienced no bleeding (49.5%) and metrorrhagia (17.7%), but those with abortion history were prevalent in mixed bleeding (37.6%) and metrorrhagia (28.2%). There was a strong correlation with IUD use ($p < 0.001$). There was greater metrorrhagia among the nonusers of IUD (30.2%) than the IUD users (12.8%), whereas there was mixed bleeding in the IUD users (28.0%). Interestingly, the family history of bleeding was most related to bleeding pattern ($p < 0.001$).

Women with negative family history most manifested no bleeding (44.5%) and mixed bleeding (23.9%), whereas women with positive family history were most frequently loaded with metrorrhagia (58.3%). Lastly, bleeding pattern showed a strong association with history of contraceptive use ($p = 0.004$). There was no history of contraceptive use more associated with mixed bleeding (25.8%) and no bleeding (44.9%), while history of contraceptive use showed increased percentage of metrorrhagia (29.3%) (Table 5).

BMI was the predictor as per the results. Women with normal or underweight BMI had 10.72-fold greater odds of AUB than obese women (95% CI: 4.92–23.38, $p < 0.001$), whereas overweight women had 8.75-fold greater odds (95% CI: 5.03–15.21, $p < 0.001$). Gravidity was also strongly correlated. Women who were never pregnant were 11.79 times more likely to have AUB compared with women having two or more pregnancies (95% CI: 2.47–56.37, $p = 0.002$). Divorced or widowed status was also significantly lower in risk for AUB (OR = 0.14, 95% CI: 0.06–0.37, $p < 0.001$) compared with married women. Employment status mattered: women who were unemployed had 1.85 times increased odds of having AUB compared to women who were employed (95% CI: 1.02–3.35, $p = 0.043$). For educational level, primary or lower education significantly elevated the risk of AUB (OR = 2.45, 95% CI: 1.21–4.96, $p = 0.013$), while intermediate education was not significant. Women who had no history of abortion had 50% reduced chances of AUB than those with a history of abortion (OR = 0.50, 95% CI: 0.30–0.83, $p = 0.008$). The same was reported for the non-use of intrauterine devices (IUDs), which had 60% reduced chances compared to users of IUDs (OR = 0.40, 95% CI: 0.23–0.69, $p = 0.001$). Contrary to expectations, women with no family history of bleeding had 3.28 times greater chances of AUB compared to women with a family history (95% CI: 1.56–6.87, $p = 0.002$), indicating a likely negative relationship. Other parameters like age groups, parity, lower

gravidity, and history of contraceptive usage failed to demonstrate statistically significant associations with abnormal uterine bleeding ($p > 0.05$) (Table 6).

Table 5. Association between bleeding pattern and obstetric history (N=400).

Variable	None (%)	Menorrhagia (%)	Metrorrhagia (%)	Polymenorrhea (%)	Mixed (%)	P value
Parity						
≤2	32 (42.7%)	1 (1.3%)	5 (6.7%)	19 (25.3%)	18 (24.0%)	<0.001
>2	136 (41.8%)	7 (2.2%)	78 (24.0%)	29 (8.9%)	75 (23.1%)	
Gravidity						
No	4 (10.5%)	0 (0.0%)	3 (7.9%)	19 (50.0%)	12 (31.6%)	<0.001
≤2	25 (86.2%)	0 (0.0%)	2 (6.9%)	0 (0.0%)	2 (6.9%)	
>2	139 (41.7%)	8 (2.4%)	78 (23.4%)	29 (8.7%)	79 (23.7%)	
Abortion						
No Abortion	140 (49.5%)	3 (1.1%)	50 (17.7%)	41 (14.5%)	49 (17.3%)	
Yes Abortion	28 (23.9%)	5 (4.3%)	33 (28.2%)	7 (6.0%)	44 (37.6%)	
Using IUD						
No IUD	68 (37.4%)	4 (2.2%)	55 (30.2%)	23 (12.6%)	32 (17.6%)	<0.001
Yes IUD	100 (45.9%)	4 (1.8%)	28 (12.8%)	25 (11.5%)	61 (28.0%)	
Family history for bleeding						
No Family History	162 (44.5%)	7 (1.9%)	62 (17.0%)	46 (12.6%)	87 (23.9%)	<0.001
Yes Family History	6 (16.7%)	1 (2.8%)	21 (58.3%)	2 (5.6%)	6 (16.7%)	
History of using contraceptive						
No	106 (44.9%)	7 (3.0%)	35 (14.8%)	27 (11.4%)	61 (25.8%)	0.004
Yes	62 (37.8%)	1 (0.6%)	48 (29.3%)	21 (12.8%)	32 (19.5%)	

Table 6. Adjusted factors for bleeding pattern.

Variable	OR	P value	95% CI
Age=40–44	0.61	0.141	[0.31-1.18]
Age=45–49	1.26	0.500	[0.64-2.48]
Age=50-55*			
BMI = Normal/Underweight	10.72	<0.001	[4.92-23.38]
BMI = Overweight	8.75	<0.001	[5.03-15.21]
BMI= Obese*			
Marital Status = Widow/Divorced	0.14	<0.001	[0.06-0.37]
Marital status= Married*			
Employed = No	1.85	0.043	[1.02-3.35]
Employed= Yes*			
Education = Primary or Lower	2.45	0.013	[1.21-4.96]
Education = Intermediate	1.57	0.169	[0.82- 3.00]
Education = College and higher*			
Parity ≤ 2	0.71	0.618	[0.18- 2.78]
Parity > 2*			
Gravida = No	11.79	0.002	[2.47- 56.37]
Gravida ≤ 2	0.29	0.175	[0.05- 1.74]
Gravida > 2*			
Abortion = No	0.50	0.008	[0.30- 0.83]
Abortion = Yes*			
Using IUD = No	0.40	0.001	[0.23- 0.69]
Using IUD = Yes*			
Family History = No	3.28	0.002	[1.56- 6.87]
Family History = Yes*			
History of contraceptive use = No	1.11	0.679	[0.69- 1.78]
History of contraceptive use = Yes*			
*Considered Reference			

DISCUSSION

The present study provides new evidence on the sociodemographic, reproductive, and clinical factors predicting abnormal uterine bleeding (AUB) in 400 women aged 40-55 years from the Kurdistan Region. AUB was defined using the FIGO PALM-COEIN classification, and logistic regression was performed to identify related predictors. Besides indicating the direction of the trends in AUB occurrence, findings underscore the importance of several socioeconomic and biological risk factors. One of the interesting results was that endometrial disorder (36.5%) and leiomyomas (24.0%) were common etiologies of AUB. This is concordant with a worldwide pattern that both conditions represent the most common structural and non-structural disorder in uterine bleeding, particularly during perimenopausal period [1,8]. Second, the relatively high and significant occurrence of ovulatory failures (16.0%) in this group corroborates with studies in which hormonal axis interference happens more often as reproductive age increases [9].

Obesity was an independent predictor for AUB, where underweight/normal BMI females had 10.72 (p underweight had odds of obstructed system compared to the obese ones [1]. This surprising discovery might suggest that subjects with moderate and low BMI values run a higher risk of harboring functional uterine pathology due to hormonal manipulation or metabolic dysfunction still not well understood. There exists a wealth of literature that supports an association between AUB and obesity; they found heavy bleeding was very strongly correlated with obesity, which is heavily associated [10,11], but regional variation in diet and health behavior may moderate this group.

Gravidity was also a good predicting variable, with never-pregnant females being significantly (P = 0.002, OR = 11.79) more at risk for AUB than those who had three or more pregnancies. This might represent evidence of a repeated cycling of the endometrium brought about by pregnancy with protective effects [12,13]. Additionally, a history of abortion was significantly associated with higher AUB when compared to no previous history of abortion previous reports suggested that postabortion uterine trauma or hormonal alterations can lead to a predisposition for bleeding disorders [14].

The other significant factor that was negatively associated with AUB was marital status; divorce or being widowed served as a protective factor (OR = 0.14, p 2-fold increase odds (OR = 2.45, p =.013) of having AUB than the well-educated ones. This is consistent with the general literature, including previous results suggesting that lower education is associated with poor reproductive health [15]. Education is expected to influence knowledge on gynecological health as well as health-seeking practice [16].

IUD use was particularly associated with increased AUB risk. Nonuse of IUD was associated with 60% reduced AUB risk (OR = 0.40, p = 0.001), consistent with prior findings that copper IUDs may lead to increased menstrual flow and cramping in some women [17]. "But this does not necessarily mean that the IUDs caused a reduction in fibroid risk; instead, we cannot rule out reverse causality that of the women having been prescribed an IUD as treatment for heavy periods" [18].

On the contrary, women without family history for bleeding disorder were 3.28 times more likely to have AUB compared to those with family history (OR = 3.28, p =0.002). This is in contrast to most studies that arrive at a conclusion of positive family history contributing to AUB, especially for disorders of coagulation such as von Willebrand disease [8,19]. This may be due to under-reporting, or lack of knowledge on family history by the participant.

PALM COEIN causes dominance of symptoms that was clinically like findings in other

international studies. The very high rate of endometrial dysfunction (36.5%) as a COEIN cause, however, is remarkable and provides support for the idea that hormone imbalance in perimenopausal women can be a significant problem. Moreover, among the enrolled participants, only 0.8% were diagnosed with coagulopathy, which is much lower than reported elsewhere, likely due to diagnostic testing restrictions or clinical recognition [20].

There is robust pattern in research studies when studying the relationship between demographic variables and bleeding patterns. For instance, polymenorrhagia was common among both younger age groups and women with normal BMI, whereas mixed/metrorrhagia bleeding was common in older (age greater than 38) patients and overweight subjects. They also confirm the entanglement of aging, metabolic condition, and hormonal control [21].

The major strength of this study is that it involves a relatively high number of subjects (N = 400), ensuring the robustness and statistical power of the study. The FIGO PALM-COEIN classification was potentially more sensitive for identifying characteristics which may be associated with AUB, although not exclusive to restriction, and made the findings comparable with other international studies. In addition, this study included a broad spectrum of demographic, reproductive and clinical variables to allow multifactorial analysis on regression models to obtain relevant predictors in AUB patterns. The structured questionnaire and collection of clinical data of a known age-group (40–55 years) of perimenopausal women in the city of Erbil provided an accurate picture about this risk population. However, there are some limitations. First, the cross-sectional nature of the design did not permit conclusions on causality between risk factors and bleeding patterns. Second, there might be recall bias due to self-reported family history and reproductive history. Third, the study was conducted in a single city, and this may limit the generalizability of results to other contexts with different healthcare systems or backgrounds. Finally, diagnostic confirmation of some COEIN components, such as coagulopathy, would not be confirmed in most instances due to lack of high-tech laboratory tests, underestimating, therefore, the rate estimation.

CONCLUSION

Ultimately, the current study identified various patterns of perimenopausal abnormal uterine bleeding in women within Erbil City, and their leading causes were endometrial disease, leiomyoma, and ovulatory dysfunction. Patterns of bleeding had significant correlation with various demographic and reproductive variables including, age, body mass index (BMI), marital status, working status, education level, gravidity, parity, and the history of oral contraceptive pill use. These findings illustrate the complex interplay of social and biological factors in influencing menstrual well-being as women transition n through menopause. High frequency of non- structural causes demands careful clinical evaluation, especially in women with abnormal or heavy menstrual bleeding.

Local health services should strengthen reproductive health education for midlife women and highlight early consultation regarding the menstrual abnormality. Training of healthcare professionals (physicians) to apply diagnostic and management schemas (ie, PALM-COEIN) will help standardize diagnosis and treatment. Moreover, more refined diagnosis, especially around endocrinologic and coagulative disorders, is indispensable for clear categorization and treatment. Longitudinal study design and hormone assays/imaging are needed in future studies to validate these findings and investigate cause-and-effect relationships. They are crucial to enhancing the standard of living for women

and decreasing the burden of untreated gynecologic disease in this setting.

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Ethical approval

The present study which is conducted by authors (Intisar Shahab Mohammed and Jwan Muhammad Zangana) was approved by the local Department of Community Medicine, College of Medicine Ethic Committee at Hawler Medical University.

Statement of Permission and Conflict of Interests

The authors declare that they have obtained all necessary permissions required for conducting this research.

The authors also declare that there is *no conflict of interest* regarding the publication of this paper.

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