

FIGO PALM–COEIN Classification of Abnormal Uterine Bleeding in Saudi Women

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Abstract

Background: Abnormal uterine bleeding (AUB) is a significant concern in women's health. However, there is limited research on its prevalence and characteristics in Saudi Arabia.

Objectives: To determine the prevalence of AUB in a gynecology outpatient setting in Saudi Arabia and to categorize the cases of AUB according to the FIGO classification.

Methods: This retrospective study included all Saudi female patients who presented to the Obstetrics and Gynecology clinic at King Khalid University Hospital, Riyadh, Saudi Arabia, over a 2-year period, except those who were pregnant. Data regarding demographics, BMI, clinical symptoms, laboratory tests, ultrasound results, and histopathology findings was collected. Cases of AUB were classified using the FIGO PALM-COEIN system.

Results: A total of 2724 patients were included, of which 44.6% had AUB. The most common presentations of AUB were irregular cycles (59.3%) and heavy bleeding (12.8%), and the most affected group was the reproductive age group (19-39 years). Obesity was identified as a significant risk factor. AUB-O (ovulatory disorder; functional cause) was the most prevalent (23%), followed by AUB-L (leiomyomas, 18%; structural cause) and AUB-P (polyps, 8.8%). Specific AUB patterns correlated with ultrasonographic findings, with heavy bleeding associated with polyps, adenomyosis, and leiomyomas. AUB patients had lower hemoglobin levels, indicating potential health impacts.

Conclusions: The study found that nearly half of all women presenting with gynecological complaints in Riyadh, Saudi Arabia, have AUB. According to the FIGO classification, functional causes of AUB were more prevalent than structural causes. Further research is necessary to explore underlying causes of AUB and its long-term health implications.

Keywords: Abnormal, FIGO, gynecology, health, PALM-COEIN, uterine bleeding, Saudi Arabia

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INTRODUCTION

Abnormal uterine bleeding (AUB) is defined as any deviation from the normal menstrual cycle. Various factors

are considered when describing a menstrual cycle, such as regularity, duration, frequency, volume, and instances

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of non-menstrual bleeding, which include intermenstrual bleeding, postcoital bleeding, or post-menopausal bleeding.^[1] The volume of blood loss in each cycle is described as the heaviness of flow and is classified as heavy menstrual bleeding when there is a mean blood loss of >80 mL per cycle.^[2] The most frequent pattern of AUB is polymenorrhea, characterized by increased frequency of menstruation.^[3]

AUB is one of the most common complaints in women presenting to gynecology clinics, with a prevalence of 10%–30%.^[4] In the United States, it has been estimated that 1.4 million women per year report AUB.^[5] Worldwide, the prevalence rate of AUB ranges from 4% and 52% and approximately half of these cases show no evidence of an underlying pathology. The most common causes of AUB with an underlying pathology are uterine fibroids and polyps. Malignancy, in the form of endometrial carcinoma, accounts for <0.01% of women who present to primary care physicians with AUB.^[6]

The Fédération Internationale de Gynécologie et d'Obstétrique (FIGO) has designed the PALM-COEIN (Polyp, Adenomyosis, Leiomyoma, Malignancy and Hyperplasia, Coagulopathy, Ovulatory Disorders, Endometrial Disorders, Iatrogenic Causes, and Not Classified) classification system for causes of AUB in reproductive ages.^[7] When categorized by age groups, chronic endometritis is frequently observed in women of reproductive age, hormonal imbalance and endometrial hyperplasia in perimenopausal age, and endometrial polyp and endometrial carcinoma in postmenopausal age. Research indicates that hormonal imbalance is the most common pathological cause of AUB, while endometrial carcinoma is the least common.^[3]

In the FIGO classification system (PALM-COEIN), adenomyosis is one of the most challenging conditions to diagnose and treat due to its complex pathogenesis and variability in presentation.^[8] Women with a history of infertility and pelvic tenderness are over three times more likely to experience AUB compared with those without these conditions, while women with cervical tumors are six times more likely and those with pelvic tenderness or adhesions are three times more likely to experience spotting.^[9] In addition, uterine fibroids, age, and racial group are associated with a higher likelihood of heavy menstrual bleeding (HMB), with psychological wellbeing possibly influencing responses; however, the causative roles and potential for modification of these factors remain unclear.^[10]

AUB can lead to severe anemia and other medical complications, significantly impacting patients' quality of life. AUB remains one of the most common indications for hysterectomy in developing countries, despite 40% of cases not being associated with a definitive pathology.^[11] Several risk factors have been identified that increase the risk of AUB, including age, obesity, infertility, unopposed estrogen with an intact uterus, diabetes mellitus, hypertension, nulliparity, and tamoxifen use.^[12] There is some evidence showing variable prevalence in different ethnic groups.^[5,13]

Previous data on the prevalence and causes of AUB in Saudi Arabia and the Middle East area revealed rates between 17.8% and 22%, with obesity, stress, hormonal contraceptive use, and polycystic ovary syndrome being reported as significant factors.^[14-16] However, from Saudi Arabia, there is a lack of data reporting the prevalence of AUB using the FIGO PALM-COEIN classification system. The aim of this study was to determine the prevalence of AUB in a gynecology outpatient setting from Saudi Arabia and to categorize the cases according to the FIGO PALM-COEIN classification system.

METHODS

Study design, setting, and participants

This retrospective included all Saudi female patients who presented to the Obstetrics and Gynecology clinic at King Khalid University Hospital (KKUH), which is a tertiary academic hospital in Riyadh, Saudi Arabia, over a 2-year period (2015-2017). The study excluded all patients who were pregnant.

The study was approved by the Institutional Review Board. KKUH obtains a general written consent from all patients informing them that their data may be used for research purposes and guarantees patient confidentiality.

Variables, outcomes, and classifications

All data were extracted from the electronic medical records by trained medical students, interns, and residents. The extracted variables included age, body mass index (BMI), chief complaints, results of ultrasound and laboratory investigations, including hemoglobin (Hb), and thyroid-stimulating hormone (TSH), and results of Pap smear and endometrial biopsy. Complete blood count, TSH, and gynecology ultrasound are part of the usual investigation for AUB at KKUH. Cases with suspected coagulopathy (such as bleeding tendency, failed treatments, or patients presenting after menarche) are referred to hematologists for further investigation. The outcome variable was prevalence of AUB in the gynecology

outpatient setting. Patients with AUB were categorized according to a FIGO classification (PALM-COEIN).^[7] Differences in age groups, BMI, and hemoglobin levels in AUB and non-AUB patients were assessed.

Statistical analysis

Statistical analysis was performed using SPSS version 26 (IBM Corporation, Armonk, NY, USA). Categorical variables are presented as frequencies and percentages. Pearson's Chi-square test was used to compare two independent categorical variables. Logistic regression was used to assess the predictors of AUB.

RESULTS

The study included 2724 Saudi patients, of which 1216 (44.6%) had AUB. The most common pattern of AUB was an irregular cycle (53.3%), followed by heavy bleeding (12.8%) [Table 1]. Most AUB patients were in the reproductive age group (aged 19–39; 47.7%). There was no difference in the BMI among patients with AUB and those with other complaints; the majority of AUB patients were obese (47.6%) and overweight (25.6%). Abnormalities in hemoglobin, thyroid panel, ultrasound, and histopathology were significantly associated with AUB ($P = <0.001$) compared with non-AUB patients [Table 2].

The FIGO classification of the patients are shown in Table 3. The most common group was AUB-O (abnormal uterine bleeding-ovulatory disorder) (23%), followed by AUB-L (leiomyoma) (18%), AUB-P (polyp) (8.8%), and AUB-M (malignancy and hyperplasia) (5.6%). The least common groups were AUB-E (endometrial disorders) (1%) and AUB-A (adenomyosis) (0.3%). There were no cases of AUB-C (coagulopathy) and AUB-I (iatrogenic). Notably, AUB-N (not classified) accounted for 43.4% of all AUB cases. The most common complaint was irregular bleeding in patients with AUB-O (61%) and heavy bleeding in those with AUB-L (30%).

DISCUSSION

AUB is a common gynecological complaint globally, but its prevalence, causes, and impact remain understudied in Saudi Arabia. This study offers valuable insight into the patterns of AUB in a Saudi context, highlighting variations in healthcare-seeking behavior. While global studies estimate that AUB accounts for approximately 10%–30%^[6,7] of gynecology outpatient visits, this is notably higher in Saudi Arabia (44%). Furthermore, risk factors such as obesity are more prevalent in the Saudi population.

Table 1: Presenting complaints of the study population

Total patients (N=2724)	n (%)
AUB (N=1216; 44.6%)	
Irregular cycle	689 (53.3)
Frequent (polymenorrhagia)	7 (0.3)
Infrequent (oligomenorrhea)	37 (1.4)
Prolonged cycle	17 (0.6)
Heavy cycle	350 (12.8)
Light cycle (hypomenorrhea)	7 (0.3)
Postcoital bleeding	23 (0.8)
Postmenopausal bleeding	86 (3.2)
No AUB (n=1508; 55.4%)	
Pelvic pain/dysmenorrhea/dyspareunia	214 (7.8)
Pregnancy complication (abortion, ectopic)	71 (2.6)
Infertility/seeking pregnancy	267 (9.8)
Contraception	167 (6.1)
Urinary symptoms (dysuria, incontinence, UTI)	73 (2.6)
Pelvic organ prolapse	27 (1.0)
Masses (abdominal, vulvar/vaginal masses/cysts)	42 (1.5)
Vulvar, genital complains (vaginal discharge, itchiness, other vaginal/genital)	227 (8.3)
High androgen symptoms (acne, hirsutism)	16 (0.6)
Amenorrhea	91 (3.3)
Menopausal symptoms (vaginal dryness, hot flashes)	15 (0.9)
Asymptomatic/screening	272 (10.0)
No gynecological complaint	26 (1.0)

AUB – Abnormal uterine bleeding; UTI – Urinary tract infection

The use of the PALM-COEIN classification has improved diagnostic clarity by providing the advantage of considering the etiology of AUB and avoiding the confusion and overlap of old terminology used for nonpregnancy-related bleeding.^[13] In our study, functional causes of AUB, particularly ovulatory disorders (AUB-O), were more prevalent than structural causes such as leiomyoma (AUB-L). This contrasts with data from the USA, where AUB-L and AUB-P are more common.^[12] This variation could be influenced by factors such as ethnic background, environmental conditions, and lifestyle.^[12] For example, the high rates of obesity in our population may contribute to the increased prevalence of AUB-O.

Our study shows similarities with other research from the Middle East that has used the FIGO classification. Regional studies report leiomyomas as being responsible for 23%–32% of AUB cases, ovulatory dysfunction for 20%–28%, and endometrial causes for 18%–20%.^[14,15] In comparison, our findings show AUB-L and AUB-O as the leading causes among Saudi patients (23% and 18%, respectively). However, a notable portion of our cohort was in the “Not Classified” category, underscoring the need for further investigation to better understand less commonly identified causes of AUB.

In women with a history of breast cancer, hormonal treatments, particularly with tamoxifen or aromatase inhibitors, are known to affect the endometrium and can lead to AUB.^[17] In addition, a study emphasized

Table 2: Demographic and investigation findings in patients with abnormal uterine bleeding and without abnormal uterine bleeding patients

Parameter	No AUB (N = 1508) n (%)	AUB (N = 1216) n (%)	P (Pearson's Chi-square test)
Age			
≤18	31 (2.1)	52 (4.3)	<0.001
19-39	874 (57.9)	580 (47.7)	
40-50	319 (21.1)	385 (31.6)	
>50	238 (15.7)	171 (14)	
Missing data	46 (3.2)	28 (2.4)	
BMI			
Underweight	39 (2.6)	36 (3.0)	0.091
Normal	284 (18.8)	239 (19.7)	
Overweight	444 (29.4)	312 (25.6)	
Obese	655 (43.4)	579 (47.6)	
Missing data	86 (5.8)	50 (4.1)	
Hb level			
<12	270 (17.9)	358 (29.4)	<0.001
≥12	902 (59.8)	650 (53.5)	
Not done	336 (22.3)	208 (17.1)	
TSH level			
<0.5	33 (2.2)	24 (2.0)	<0.001
0.5-5	806 (53.4)	757 (62.3)	
>5	80 (5.3)	79 (6.5)	
Not done	589 (39.1)	356 (29.3)	
Pap smear			
Normal	397 (26.3)	392 (32.2)	0.003
Abnormal	25 (1.7)	21 (1.7)	
Not done	1086 (72.0)	803 (66.0)	
Ultrasound findings			
Normal	1025 (68.0)	632 (52.0)	<0.001
Not normal	482 (32.0)	582 (48.0)	
Not done	1 (0.0)	2 (0.0)	
Histopathology			
Normal	1413 (93.7)	1097 (90.2)	<0.001
Not normal	89 (6.0)	115 (9.5)	
Not done	6 (0.3)	4 (0.3)	

TSH – Thyroid-stimulating hormone; Hb – Hemoglobin;
AUB – Abnormal uterine bleeding; BMI – Body mass index

Table 3: Distribution of cases according to the FIGO PALM-COEIN classification on ultrasound and histopathology

Category	Number of cases (%)
P (polyps)	107 (8.8)
A (adenomyosis)	4 (0.3)
L (leiomyomas)	219 (18)
M (malignancy/hyperplasia)	67 (5.6)
O (ovulatory disorders)	279 (23)
E (endometrial disorders)	12 (1)
N (Not classified)	528 (43.4)

the importance of distinguishing between benign and malignant causes of AUB in breast cancer survivors to avoid underestimation.^[18] However, in the current study, data regarding treatment and malignancy were not available, which is a limitation, and thus these should be considered in future studies. This also highlights the need for better management protocols for these patients.

AUB has been shown to significantly impact the quality of life.^[5] The high rates of AUB observed in our hospital may

reflect a positive healthcare-seeking behavior in this region. However, a European study found that nearly half of the patients with heavy menstrual bleeding never consulted a physician,^[19] indicating that many cases remain untreated in the broader community. Raising awareness about AUB, including its definition, risk factors, and the importance of timely medical intervention, is crucial for improving patient outcomes.

Our study also found that menstrual irregularity was the most common presenting complaint, followed by heavy cycles. This aligns with global data showing that irregular cycles are typically associated with ovulatory disorders. In contrast, hypomenorrhea (light cycles) was the least common complaint. Ultrasound findings have revealed that polyps, adenomyosis, and leiomyomas are commonly associated with heavy cycles, while irregular cycles are more indicative of polycystic ovaries, supporting the diagnosis of ovulatory dysfunction.^[7] This aligns with the FIGO classification and highlights the importance of imaging in identifying the underlying causes of AUB.

In terms of hematological effects, hemoglobin levels were found to be <12 g/dL in a significantly higher number of AUB patients than non-AUB patients. While most AUB patients presented with normal hemoglobin levels, this could be due to the prevalence of irregular rather than heavy cycles or early diagnosis before the bleeding significantly affected the hemoglobin levels. Obesity remains a key risk factor for AUB. Although our study found no statistically significant correlation between BMI and AUB, other studies have found that higher BMI increases the likelihood of AUB.^[5,7] Given the high prevalence of obesity in Saudi Arabia, weight management and menstrual health education should be emphasized as part of AUB management strategies.

CONCLUSION

In Saudi patients, the most common cause of AUB is ovulatory dysfunction, followed by leiomyoma, with adenomyosis being less common. The association between higher BMI and AUB suggests integrating weight management in treatment strategies. Notably, >40% of the cases were in the “Not Classified” category, highlighting the need for further investigation to better understand less commonly identified causes of AUB.

Ethical considerations

The study was approved by the Institutional Review Board of King Saud University (Ref. no.: 18/0150/IRB), Riyadh,

Saudi Arabia. The study adhered to the principles of the Declaration of Helsinki, 2013.

Peer review

This article was peer-reviewed by two independent and anonymous reviewers.

Data availability statement

The data that support the findings of this study are available from the corresponding author upon reasonable request.

Author contributions

Conceptualization: A.A.K.; Methodology: A.A.K.; Data analysis: B.A.D.; Writing—original draft preparation: B.A.D.; Writing – review and editing: L.A.D.; Supervision: L.A.D.

All authors have read and agreed to the published version of the manuscript.

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Conflicts of interest

There are no conflicts of interest.

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