JK SCIENCE pISSN: 0972-1177

ORIGINAL ARTICLE

Understanding Causes of Abnormal Uterine Bleeding in Perimenopausal Women: A Prospective Observational Study Using the FIGO PALM COEIN Classification System

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Abstract

Background: Abnormal uterine bleeding (AUB) is prevalent among perimenopausal women, necessitating accurate diagnosis for effective management. The FIGO PALM COEIN classification system aids in identifying underlying causes of AUB.**Aim:** This study aims to categorize AUB causes in perimenopausal women using the FIGO PALM COEIN classification system.**Study Design:** A hospital-based prospective observational study was conducted involving 200 perimenopausal women aged 40 and above, within one year of menopause, presenting with complaints of AUB to the gynecology department at AVMC.**Methods:** Clinical diagnosis using the FIGO PALM COEIN system, supplemented by investigations and endometrial sampling, was conducted. Data were analyzed using descriptive statistics.**Results:** Participants (mean age: 45-50 years) predominantly presented with leiomyoma (41.5%), followed by polyps (23%), endometrial abnormalities (17.5%), malignancies/hyperplasia (9%), and ovulatory dysfunction (6%). Adenomyosis, iatrogenic causes, and coagulopathy were less common. Normal ultrasonography results were observed in 40.5% of cases. Endometrial hyperplasia (24.5%) and adenocarcinoma (15.09%) were detected histologically. Polyps (18.5%)and fibroids (8.5%) were identified via ultrasonography.**Conclusion:**The study underscores diverse AUB causes in perimenopausal women and advocates for ultrasonography incorporation in initial assessments, followed by endometrial sampling when indicated. PALM components played a significant role in categorizing AUB clinically, with leiomyoma as the primary cause. However, histological testing revealed a higher prevalence of PALM-related causes.

Keywords:
PALM and COEIN, Peri-menopausal Women, and Ultrasonography, Abnormal Uterine Bleeding

Introduction

The medical community has recognized the need for clear and easily understandable terminology to describe irregular uterine bleeding symptoms in recent years. To address this, the International Federation of Gynaecology and Obstetrics (FIGO) introduced the PALM-COEIN system[1], which provides a structured classification. The PALM system categorizes structural uterine anomalies such as polyps, adenomyosis, malignancy, leiomyoma, endometrial hyperplasia, and endometrial cancer. On the other hand, the COEIN system classifies non-uterine functional variations such as coagulopathy, ovulatory dysfunction, endometrial pathology, iatrogenic, and

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Manuscript Received: 20.02.2024; **Revision Accepted**: 30.04.2024;

Published Online First: 10 Oct, 2024

Open Access at: https://journal.jkscience.org

Cite this article as: Sowmiya DS, Varghese J, Shanmugham D, Nagarajan P. Understanding Causes of Abnormal Uterine Bleeding in Perimenopausal Women: A Prospective Observational Study Using the FIGO PALM COEIN Classification System. JK Science 2024; 26(4):236-41

unclassified causes. By using the PALM-COEIN system, clinicians can better identify the underlying reasons for abnormal uterine bleeding in women[2]. Moreover, this system identifies multiple contributing factors that may influence the management of abnormal uterine bleeding[3]. This is crucial for managing women with abnormal uterine bleeding in the perimenopausal age group[4].

Abnormal uterine bleeding is characterized by variations in the menstrual cycle, bleeding duration, and volume, or a combination of these factors. Interestingly, the incidence of abnormal uterine bleeding is similar among adolescents and perimenopausal women, but it is more prevalent during the perimenopausal period [5]. Structural causes of abnormal uterine bleeding include conditions such as adenomyosis, fibroids, polyps, or neoplasia[6]. Diagnosis usually involves a comprehensive medical history, physical examination, and pelvic assessment, with subsequent diagnostic tests like ultrasound and histology recommended based on initial findings. In the past, terms like menorrhagia, metrorrhagia, and dysfunctional uterine bleeding were used to describe abnormal uterine bleeding, but they lacked precise definitions, making it difficult to communicate a patient's medical condition [7]. It is worth noting that abnormal uterine bleeding is distinct from bleeding originating from the cervix or lower vaginal tract.

Our current study aims to contribute to the growing knowledge of abnormal uterine bleeding in perimenopausal women. he primary objective of this study is to investigate the utility of PALM COIEN in identifying the cause of abnormal uterine bleeding in perimenopausal women seeking care at the AVMC gynecology outpatient department.In embarking on the present study, we endeavor to contribute to the growing body of knowledge surrounding abnormal uterine bleeding in perimenopausal women. Our research efforts aim to make meaningful contributions to gynecology and obstetrics, with the ultimate goal of promoting women's health and well-being.

Study Design and Study Area: A hospital-based prospective observational study was conducted at Aarupadai Veedu Medical College and Hospital (AVMC&H) from February 2021 to October 2022. AVMC&H, located in puducherry, serves as a tertiary care center with a specialized Department of Obstetrics and Gynaecology.

Sample Collection: Participants were recruited from the outpatient department of the hospital, with a total of 200 perimenopausal patients included in the study.

Inclusion Criteria: Women aged 40 years or older presenting with Abnormal Uterine Bleeding and sought care at the Department of Gynaecology at AVMC&H, demonstrating their willingness to participate, were included in the study.

Exclusion Criteria: Exclusion criteria encompassed pregnant women, patients experiencing bleeding originating from the lower genital tract, hormone-producing ovarian tumors. Conditions such as carcinoma cervix, cervicitis, vaginal carcinoma, vaginitis, vulval varicose veins, and vulvar carcinoma were also grounds for exclusion.

Sampling Strategy: Participants were consecutively recruited from the outpatient department based on their eligibility criteria to ensure a representative sample of perimenopausal women seeking care at AVMC&H during the study period.

Ethical Considerations:Ethical approval for the study was obtained vide IECNo.AU/IEC/2020/169 from the Institutional Ethics Committee of AVMC&H. Informed consent was obtained from all participants before enrollment in the study, ensuring their voluntary participation and confidentiality of their data.

Data Collection: Patient data encompassed demographic details, clinical information, including menstrual history, obstetric history, the presence of any concomitant conditions, and a comprehensive general and systemic examination. A thorough gynecological examination, including per-speculum and bimanual pelvic examination, was conducted to rule out organic pathology.

Diagnostic Procedures: All patients underwent both transvaginal and transabdominal sonography to further assess their condition. Following the clinical findings and ultrasound, each case was categorized according to the PALM-COEIN classification system.

Interobserver Reliability: To ensure consistency among examiners, regular training sessions were conducted, and inter observer reliability assessments were performed periodically.

Hysteroscopic-guided Endometrial Biopsies: For patients with transvaginal ultrasonography indicating an endometrial thickness exceeding 8 mm in perimenopausal women or more than 4 mm in postmenopausal women, hysteroscopic-guided endometrial biopsies were performed. The obtained specimens were sent for histopathological analysis to confirm the diagnosis.

Quality Control Measures: Quality control measures included regular calibration of ultrasound equipment and standardized protocols for data collection and diagnostic procedures.

Data Analysis:

Data analysis was carried out using on a Windows 10 platform. Descriptive statistics were used to summarize demographic and clinical characteristics, and inferential statistics were employed to analyze associations between variables.

Limitations:

Limitations of the study included the single-center design, which may limit the generalizability of the findings, and the potential for selection bias due to the exclusion of certain patient populations.

Results:

A total of 200 perimenopausal patients with abnormal uterine bleeding were enrolled in the study. The mean age of the participants ranged between 45 to 50 years, with the majority falling within the age group of 45-50 years. All patients were multiparous, with a higher proportion having a Parity 2 Living 2 [P2L2] status. Additionally, most participants were categorized as overweight, with a BMI falling within the range of 25-30 kg/m². *Table 1* provides a comprehensive overview of the demographic and clinical characteristics of the study participants. It depicts the age distribution, parity status, age at menarche, BMI distribution, and patterns of bleeding among the patients. The pattern of bleeding among the study participants varied, as illustrated in Table 1. Approximately 43.5% of patients reported heavy menstrual bleeding with regular cycles, indicating a consistent and substantial flow of menstrual blood. Conversely, 26.5% of patients experienced heavy bleeding with irregular cycles, suggesting erratic hormonal fluctuations or underlying pathology. Intermenstrual bleeding and frequent bleeding were reported in 14.5% and 15.5% of patients, respectively, highlighting the diverse manifestations of abnormal uterine bleeding.

Table 2 outlines the distribution of abnormal uterine bleeding according to the PALM-COEIN classification system. Leiomyomas, or uterine fibroids, were the most prevalent structural abnormality, affecting 41.5% of patients. Polyps were identified in 23% of patients. Endometrial pathology, including hyperplasia and malignancy, accounted for 17.5% of cases, warranting further investigation and management.

Ultrasound and Pathology Findings

Table 3 presents the ultrasound [USG] and histopathological findings of the study participants, providing insight into the structural and anatomical abnormalities contributing to abnormal uterine bleeding.

Table 1 : Demographic and Clinical Data of Study Participants

Age	No. of patients [N=200]	Percentage %
40-45	40	20
45-50	160	80
Parity		
P1L1	55	27.5
P2L2	103	51.5
P3L3	11	5.5
P4L4	31	15.5
Age at Menarche		
Less than 14 years	162	86
Above 14 years	28	14
Type of bleeding pattern		
Heavy menstrual bleeding - regular cycles	87	43.5
Heavy menstrual bleeding - irregular cycles	53	26.5
Intermenstrual bleeding	29	14.5
Frequent bleeding	31	15.5
BMI		
20-25 kg/m^2	64	32%
25-30 kg/m^2	98	49%
30 & above	38	19%
Dysmenorrhoea		
Congestive	187	93.5%
Spasmodic	13	6.5%

Normal USG results were observed in 30.5% of patients, suggesting the absence of detectable structural abnormalities. However, fibroids were detected in 28.5% of patients, indicating their significant prevalence and potential role in causing abnormal bleeding. Adenomyosis, thickened endometrium, and polyps were also identified in varying proportions of patients, highlighting the diverse range of underlying pathologies contributing to abnormal bleeding. Histopathological analysis revealed various findings, including hyperplasia, adenocarcinoma, and inflammatory conditions, underscoring the importance of histological examination in diagnosing and managing

Table 2: Classification of Study Participants Based on PALM COEIN System

PALM COEIN	No. of patients [200]	Percentage %
AUB-P [Polyp]	26	13
AUB-A [Adenomyosis]	23	11.5
AUB-L [Leiomyomas]	83	41.5
AUB-M [Malignancy and hyperplasia]	18	9.1
AUB-C [coagulopathy]	01	0.5
AUB-O [Ovulatory]	12	06
AUB-E [Endometrial]	35	17.5
AUB-I [Iatrogenic]	02	01
AUB-N [Not yet classified]	0	0

Table 3: USG & Pathology Findings of Study Participants

USG	No. of patients [200]	Percentage %
Normal	61	30.5
Fibroid	57	28.5
Adenomyosis	11	5.5
Thickened endometrium	34	17
Polyp	37	18.5
Histopathology	**N=53**	**Percentage %**
Secretory phase	12	22.64
Proliferative phase	1	1.8
Hyperplasia	13	24.5
Adenocarcinoma	8	15.09
Inflammatory	5	9.4
Proliferative phase with dilatation of glands	3	5.6
Atrophic	11	20.75

abnormal uterine bleeding. *Table 4* examines the correlation between USG diagnosis and clinical findings, providing insight into the accuracy and reliability of diagnostic modalities in identifying underlying pathology. A significant difference was observed between clinical diagnosis of endometrial polyps and USG findings (p = 0.003), indicating the utility of ultrasound in detecting these structural abnormalities. However, no significant difference was found for leiomyomas (p = 0.534) or adenomyosis (p = 0.231), suggesting that the clinical examination per se can diagnose these conditions, which can be confirmed by ultrasound.

Table 4 Correlation between USG Diagnosis and Clinical Diagnosis: [n=200]

	USG	Clinical Findings	P value
Leiomyomas	28.5%	41.5%	0.534
Polyp	18.5%	23.0%	0.003
Adenomyosis	5.5%	1.5%	0.231

Discussion

Abnormal uterine bleeding (AUB) presents a significant concern in gynecology, particularly among perimenopausal women, constituting a substantial portion of outpatient visits . Our study aimed to delve into the underlying causes of AUB in this demographic, utilizing a clinical correlation approach with a sample size of 200 cases. The adoption of the PALM-COEIN classification system served as a cornerstone in this endeavor, offering a structured framework for precise diagnosis. However, it's imperative to stress the necessity of additional investigations to ensure accurate identification, especially in perimenopausal women, where medical disorders and pre-cancerous/cancerous lesions must be meticulously evaluated.

The lack of standardized terminology for characterizing AUB historically posed communication and clinical management challenges. The introduction of the PALM-COEIN system marked a significant advancement in addressing this issue, providing a globally recognized platform for effective communication among medical professionals, researchers, and patients worldwide[5, 6],thereby enhancing clinical care and research endeavors. Our study's demographic profile revealed a higher prevalence of AUB among perimenopausal obese women who were multiparous, aligning with previous research[7, 8]. Perimenopause, characterized by ovarian follicle

depletion and anovulatory cycles, correlates with heavy menstrual bleeding[9].

Assessing AUB in perimenopausal women is crucial due to its potential adverse effects on daily activities, medical complications, and the risk of fatal outcomes if left untreated. Symptoms of AUB in this population encompass heavy menstrual flow, frequent cycles, intermenstrual bleeding, dysmenorrhea, and amenorrhea followed by prolonged heavy bleeding[10]. In our investigation, a significant proportion of perimenopausal women presented with heavy menstrual bleeding within regular cycles, constituting 87 (43.5%) of the cohort, with fibroid uteri emerging as the predominant etiological factor, in accordance with prior studies [10]. This observation parallels the findings of Disha et al., who reported a similar prevalence of 52.5% [10]. Typically, fibroids exert minimal influence on menstrual cyclicity unless concomitant with anovulatory cycles. The PALM-COEIN classification system identified leiomyomas in 83(41.5%) of cases, consistent with the reports by Mishra et al. and Qureshi and Yusf [11, 12, 13]. Leiomyomas, benign proliferations of uterine smooth muscle, tend to remain asymptomatic, although submucosal and intramural variants may engender heavy menstrual bleeding.

Endometrial polyps emerged as the subsequent leading cause, affecting 26 (13%) of participants, aligning with the findings of Singh et al. and Archana Singh [14, 15]. Polyps often arise concomitantly with advancing underlying hyperplastic conditions, a trend noted in our study, where 98 (49%) of patients exhibited obesity. Ovulatory dysfunction contributed to 12 (6%) of cases in our cohort, divergent from Arihant et al.'s observations, where it constituted 30% of cases[16]. Ovulatory aberrations frequently manifest in the perimenopausal demographic due to the declining follicular pool and sporadic ovulation, prompted by elevated follicle-stimulating hormone (FSH) levels.

Adenomyosis was detected in 23(11.5%) of cases, exhibiting a predilection for multiparous women in their fourth and fifth decades. In selected cases lacking fertility aspirations but presenting with multiple polyps, placement of a levonorgestrel intrauterine system [LNG-IUS] was contemplated to forestall recurrence, a notion echoed by Rajani *et al.* [17]. Hysteroscopic resection remains the cornerstone therapeutic modality for addressing endometrial polyps. Malignant and hyperplastic transformations were noted in18 (9%) of patients, consistent with the observations by Mitra *et al.* [7]. The proclivity of obesity to potentiate hyperplasia progression to malignancy emanates from the peripheral conversion of androgens to estrogen.

Among the subset subjected to hysteroscopy-guided endometrial sampling [n=53], adenocarcinoma was identified in 8 (15.09%) and hyperplasia in 13(24.5%), mirroring the findings of Mishra et al., who reported a histopathological detection rate of 10.16%[11]. The study's limitations, namely the modest sample size and the omission of other risk factors for endometrial hyperplasia and carcinoma, underscore the potential for further refinement and augmentation of our findings.

Conclusion:

Our study highlights fibroid uteri as the primary cause of abnormal uterine bleeding (AUB) in perimenopausal women, with endometrial polyps, ovulatory dysfunction, and adenomyosis also contributing significantly. The PALM-COEIN classification system proves invaluable in categorizing AUB cases, facilitating comprehensive assessment and guiding tailored management approaches. Treatment should be individualized, considering symptom severity and patient characteristics, with histopathological confirmation essential for accurate diagnosis. Future research is required with generalisible population, focusing on long-term treatment efficacy, lifestyle interventions, molecular mechanisms, and personalized therapeutic targets to enhance patient care in this population.

Acknowledgement

The authors extend their gratitude to the Management, Dean, Director Medical Research, and IEC of Aarupadai Veedu Medical College & Hospital for their support.

Financial Support and Sponsorship: Nil

Conflict of interest: Nil

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