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PALM-COEIN Classification of Abnormal Uterine Bleeding among Women of Reproductive Age in a Tertiary Care Centre of Eastern Nepal

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Abstract

Aims: Abnormal Uterine Bleeding (AUB) is a highly prevalent condition with complex underlying condition. The absence of standardized definitions and uniform criteria for describing menstrual symptoms has posed challenges in investigation and management of the case. This study was conducted to categorize the causes of AUB among Nepalese women of reproductive age using the PALM-COEIN classification system (provided by FIGO) and to describe the bleeding patterns exhibited by them.

Methods: A descriptive cross-sectional study was conducted among 139 women of reproductive age group visiting out-patient care in a tertiary care hospital with complaints of abnormal uterine bleeding. The causes of AUB were classified before treatment using the PALM-COEIN system.

Results: The mean age of patients was 37.9 ± 10.1 years, with 57.6% of them aged 38 years or more. Structural causes accounted for 31% of the AUB cases, while non-structural causes were present in 69% of them. AUB-O was the most frequent finding 91(65.5%) among the patients, followed by AUB-L in 19 (13.7%) women and AUB-A in 11 (7.9%) women. More than half of the patients (54.7%) were anemic, and hypothyroidism was seen in 14.2% of them.

Conclusion: Non-structural causes of AUB particularly ovulatory dysfunction contributed to major cause of AUB. Evidence of various etiological causes of AUB among Nepalese women based on this PALM-COEIN system can provide uniformity in investigation and management of such cases.

Introduction

Abnormal uterine bleeding (AUB) in reproductive-age women may be defined as vaginal bleeding abnormal in duration, frequency, or amount and is experienced by approximately one-third of all women throughout their lifetime¹. The prevalence of AUB varies in different populations, with the overall prevalence reported between 10% and 30%^{2,3}. This disorder impairs quality of life, and can be effectively managed medically in most cases.

The investigation and management of abnormal uterine bleeding (AUB) among nongravid women of reproductive age has been hampered both by confusing and inconsistently applied nomenclature and by the lack of standardized methods for investigation and categorization of the various potential etiologies. The International Federation of Gynecology and Obstetrics (FIGO), thus, proposed a classification system on 2011 which includes structural and nonstructural causes of AUB given by PALM COEIN system¹ and is now being widely used⁴. The diagnosis of AUB depends on the comprehensive assessment of the medical history, clinical examination combined with blood tests and ultrasound or hysteroscopic examination. AUB without hysterectomy are diagnosed on the basis of structural changes while endometrial hyperplasia and malignancy are diagnosed by endometrial biopsy⁵. This system of

classification helps in selecting appropriate treatment for the women with different causes of menstrual bleeding. This study was thus, conducted to categorize the causes of AUB among Nepalese women of reproductive age using the PALM-COEIN classification system.

Methods

A descriptive cross-sectional study was conducted among women of reproductive age group visiting Out-Patient Care in Birat Medical College Teaching Hospital, a tertiary care centre in eastern Nepal with complaints of abnormal uterine bleeding from July 2021 to September 2022.

The study was conducted after receiving ethical approval from Institutional Review Committee of BMCTH, and informed written consent was obtained before participation from all the participants. All the patients were managed as per the department protocols.

Women aged 15 to 55 years; with AUB having any of the complains of menstrual cycle less than 24 days or more than 38 days, irregular menstruation, cycle to cycle variation of more than 20 days during 12 months, duration of flow more than 8 days, volume of monthly blood loss less than 5 ml or more than 80ml were included in the study. Those with complains of vaginal bleeding caused by pregnancy and pregnancy related factors; or by vaginitis, cervical diseases; or bleeding before menstruation and post-menopausal bleeding were excluded from the study.

The sample size of 139 women was based on prevalence of ovulatory dysfunction among causes to be 57.7% based on study by Yu sun et.al in China ⁴, at 5% significance level, 15% relative margin of error and inflation by 10% to adjust for non-responders.

All the patients visiting the hospital with complains of abnormal uterine bleeding were assessed for eligibility, and consenting eligible patients were included in the study till the sample size

was met.

Information on background characteristics of the patients, menstrual history details and hemoglobin level along with thyroid function tests were collected from the patient in a proforma by interviewing the patient and from the biochemical reports of the patient.

The causes were then classified according to FIGO PALM-COEIN classification system. The "PALM" classification is structural and assessed visually (imaging and histopathological tests), whereas the "COEIN" classification is nonstructural. (table 1)

Table 1: PALM-COEIN classification of abnormal uterine bleeding

PALM (Structural causes)	COEIN (Non-structural causes)
1. Polyp	1. Coagulopathy
2. Adenomyosis	2. Ovulatory dysfunction
3. Leiomyoma	3. Endometrial
4. Malignancy and hyperplasia	4. Iatrogenic
	5. Not otherwise classified

All the entered data was entered in Microsoft excel, which was cleaned, coded and exported to Statistical Package for Social Sciences (SPSS) version 16 for analysis. Descriptive statistics was applied to describe the categorical variables in frequency and percentage. The continuous variables have been reported with mean with standard deviation or media with quartiles based on whether or not the data follow normal distribution.

Result

This study included total of 139 patients ranging from age of 15 to 55 years, with a mean ($\pm$ sd) age of 37.9 ± 10.1 years. The mean ($\pm$ sd) BMI was 24.46 ± 4.58 kg/m² and most of them (83.5%) were multiparous. (table 2)

Table 2: Background characteristics of patients with abnormal uterine bleeding (n = 139)

Characteristics	Frequency	Percentage
Age	≤ 19 years	8
	19 - <38 years	51
	≥ 38 years	80
	Mean $\pm$ SD (min, max) years	37.91 $\pm$ 10.11 (15, 55)
Height	Mean $\pm$ SD (min, max) cm	152.56 $\pm$ 6.92 (112, 166)
Weight	Mean $\pm$ SD (min, max) kg	56.72 $\pm$ 10.15 (35, 101)

Table 2 Continue

BMI	<18.5 kg/m ²	7	5.0
	18.5 - <25 kg/m ²	72	51.8
	25 - <30 kg/m ²	50	36.0
	≥30 kg/m ²	10	7.2
	Mean ± SD (min, max) kg/m ²	24.46 ± 4.58 (16.53, 42.10)	
Parity	Nulliparous	23	16.5
	Multiparous	116	83.5
District	Morang	68	48.9
	Sunsari	56	40.3
	Jhapa	6	4.3
	Others	9	6.5

Most of the patients (92.8%) reported to have regular cycle duration of less than one month whereas 13 (9.4%) presented with cycle-to-cycle variation among 41% of them. Nearly half with chronic AUB. (table 3). (45.3%) patients presented with acute onset of bleeding with

Table 3: Menstrual history among the patients with abnormal uterine bleeding (n = 139)

Characteristics		Frequency	Percentage
Age of menarche	9 - <15 years	120	86.3
	15 years and more	19	13.7
	Mean ± SD (min, max) years	13.19 ± 1.66 (9, 19)	
Menstrual history	Regular	129	92.8
	Irregular	10	7.2
Frequency of menstrual cycle	Frequent	45	32.4
	Normal	71	51.1
	Infrequent	23	16.5
Cycle to cycle variation	No	82	59.0
	Yes	57	41.0
Duration of menstrual flow	7 days or less	53	38.1
	More than 7 days	86	61.9
	Median (Q1, Q3) [Min, Max] days	10 (5, 15) [2, 60]	
Number of pads used per day	Median (Q1, Q3) [Min, Max] days	3 (3, 5) [1, 20]	
Duration of bleeding history	Less than 1 month	63	45.3
	1 - <6 months	47	33.8
	6 months - <1 year	13	9.4
	≥1 year	16	11.5
Dysmenorrhoea	No	90	64.7
	Yes	49	35.3

More than half of the patients were anemic (with severe anemia in 20.1%). The hemoglobin level had a mean($\pm$ sd) of 10.7 ± 3.3 gm/dl, and ranged from 1.4 to 19.1gm/dl (table 4). Thyroid

function disorders was seen in 15.7% (21/134) of the patients, while most of them (14.2%) being hypothyroid. (table 5)

Table 4: Hemoglobin level among the patients (n = 139)

Characteristics		Frequency	Percentage
Hemoglobin level	Normal (Hb ≥ 12 gm $\downarrow$ dl)	63	45.3
	Mild anemia (Hb 11 - 11.9 gm $\downarrow$ dl)	19	13.7
	Moderate anemia (Hb 8 - 10.9gm $\downarrow$ dl)	29	20.9
	Severe anemia (Hb < 8 gm $\downarrow$ dl)	28	20.1
	Mean $\pm$ SD (min, max) gm/dl	10.68 $\pm$ 3.31 (1.4, 19.1)	
Total		139	100

Table 5: Thyroid function status among the patients (n = 134)

Characteristics		Frequency	Percentage
Thyroid Function (n = 134)	Hyperthyroidism	2	1.5
	Hypothyroidism	19	14.2
	Normal	113	84.3
Total		134	100.0

The prevalence of AUB using PALM COEIN classification is shown in table 6. Structural causes of bleeding was seen in 31%, while non-structural causes was seen in 69% of the patients. Ovulatory dysfunction (AUB-O) was the most frequent cause reported in two-third (65.5%) of the patients, followed by Leiomyoma (AUB-L) in 13.7%, and Adenomyosis (AUB-A) in 7.9%. No cases of coagulopathy as cause of AUB was found.

Table 6: PALM COEIN classification of abnormal uterine bleeding among the patients (n = 139)

SN	Classification	Frequency	Percentage
1	Polyp	9	6.5
2	Adenomyosis	11	7.9
3	Leiomyoma	19	13.7
4	Malignancy and hyperplasia	4	2.9
5	Coagulopathy	0	0
6	Ovulatory dysfunction	91	65.5
7	Endometrial	1	0.7
8	Iatrogenic	2	1.4
9	Not yet classified	2	1.4
Total		139	100.0

Discussion

The study reported the causes of AUB according to PALM COEIN classification system (by FIGO) among 139 patients presenting with AUB.

More than half of the women with AUB belonged to age group of 38 years or more, which is similar to the age distribution of patients reported in studies done in India ^{6,7}. This could be explained by the transition from ovulatory cycle to menopause, which begin as early as 39 years. There will be rise in FSH levels leading to increased ovarian follicular response and high estrogen levels. The accelerated loss of ovarian follicles causes episode of anovulation, leading to irregular, unpredicted pattern of bleeding ⁸.

Anemia was seen in more than half of the patients in our study with severe anemia in 20.1% and moderate anemia in 20.9%; which was higher than reported by study done by Matteson et al. in united states ⁹. The study included women visiting emergency with acute AUB alone, while our study included both acute and chronic AUB cases. Moreover, delayed health care seeking practices among people in our setting might have led to late presentation with manifestation of anemia among them compared to health care seeking in united states. Hypothyroidism is the most common endocrine disorder presenting with AUB as reported in our study and is consistent with evidence from other similar studies ^{10,11}.

This study has revealed nonstructural causes to predominate as the primary etiological factors in AUB, with AUB-O (ovulatory dysfunction) being the most prevalent affecting nearly 2/3rd of all patients. This finding is consistent with that reported by various literatures ^{4,12}. This study has reported AUB-E in 0.7% women, AUB-I in 1.4% and AUB-N in 1.4% of patients which is similar to the finding reported in study by Yu Sun et.al ⁴.

Although the study by Yu Sun et al had reported coagulopathies among 1.04%, no cases were reported in this study.

Nearly one third (31%) of women were reported to have structural causes of AUB, which is consistent with the finding of Yu Sun et al⁴. Uterine fibroids, another prevalent condition affecting women, was diagnosed among 13.7% of women which constituted to 44.1% cases among the structural causes. Previous studies have also reported uterine fibroids to affect 14 – 25%^{13,14} of cases similar to findings in this study. Furthermore, endometrial polyps, a common gynecological disease, accounted for 6.5% of AUB cases in this study similar to that reported in study by Dr. Avani Patel, et. al.¹⁵. However, other studies^{16,17} have reported higher rates of AUB-P to be around 20% - 30%, which might be due to reporting of asymptomatic polyp as well found incidentally.

This study, thus, represents the first clinical research on the etiology of AUB based on the FIGO classification, offering Nepalese data on AUB etiology in Nepalese women, which is expected to bring uniformity in diagnosis and management of such cases. The study however includes patients with AUB visiting a single tertiary centre in Eastern Nepal, and thus may not represent the actual proportion of causes of AUB in the population.

Conclusion

This study sheds light on the complex etiology of AUB in Nepalese women, with nonstructural causes, particularly ovulatory dysfunction, being the main contributing factors. These findings contribute to the understanding of AUB in this population and provide valuable insights for clinical management and future research endeavors.

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