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Original Research Article

Prevalence of menstrual cycle disorders among anaemic patients in selected hospitals: a cross-sectional study

Ananya H. S.*, Ajjayya B. K., Abhishek R. K., Shobha A. M., Yogananda R.

Department of Pharmacy Practice, SJM College of Pharmacy, Chitradurga, Karnataka, India

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***Correspondence:**
Dr. Ananya H. S.,
E-mail: ananyahs01@gmail.com

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ABSTRACT

Background: The menstrual cycle (MC) is a regular physiological process during a female's reproductive years, typically lasting 21 to 35 days. MC disorders and anaemia are major global health challenges affecting women. Chronic or heavy blood loss from menstrual irregularities significantly elevates the risk of anaemia. Objectives were to determine the prevalence of MC disorders among anaemic patients, evaluate the relationship between MC disorders and the severity of anaemia, and assess the impact of body mass index (BMI) and age.
Methods: A six-month cross-sectional observational study was conducted across selected hospitals in Chitradurga among 138 female patients aged 12-50 years with a confirmed diagnosis of anaemia (Hb<12 g/dl). Data concerning demographics, clinical history, and laboratory investigations were analysed using descriptive and inferential statistics.
Results: Among the 138 Anaemic participants, 68.1% experienced a MC disorder. Dysmenorrhea was the most common condition (34.8%), followed by oligomenorrhea (15.9%) and menorrhagia (13.8%). Anaemia severity was split between mild (41.3%) and moderate (41.3%), with 17.4% presenting with severe anaemia. A statistically significant association was established between MC disorders and the severity of anaemia ($p<0.001$). Furthermore, both age ($p=0.019$) and BMI ($p=0.007$) significantly influenced the presence of MC disorders.
Conclusions: MC disorders are highly prevalent among Anaemic patients, with heavy menstrual bleeding (HMB) showing a direct and significant link to lower haemoglobin levels.

Keywords: Menstrual cycle, Menstrual disorders, Anaemia, Prevalence

INTRODUCTION

The menstrual cycle (MC) is a typical process that includes the release of blood from the uterus through the vagina and occurs at more or less regular month-to-month intervals during the reproductive age of females.[1] The ovarian cycle regulates the cyclic release of progesterone and oestrogen as well as the development and release of eggs. The uterine cycle controls how the uterine lining (womb) is maintained and ready to receive an embryo. These cycles typically run between 21 and 35 days, with a median duration of 28 days. They are coordinated and occur concurrently. MCs last for around 30 to 45 years, with menarche (the start of the first period) often occurring around the age of 12.[2]

Phases of MC

Menstrual phase (Your period)

The menstrual phase of your cycle refers to the period when the uterine lining or endometrium is expelled through the vagina as blood. This phase is commonly known as a period and typically lasts between 3 to 7 days.

Follicular phase

The follicular phase marks the beginning of the MC. It starts on the first day of your period and may continue for up to 13 or 14 days. Changes in hormone levels result in the thickening of the uterine lining, and follicles develop

on the ovaries' surface, with usually only one follicle maturing into an egg.

Ovulation cycle phase

Ovulation occurs when a mature egg is released from a woman's ovaries, typically once a month, about two weeks prior to your next expected period. Engaging in unprotected intercourse around this ovulation period increases the chances of successful conception.

Luteal phase

After ovulation, the egg moves through the fallopian tubes toward the uterus. During this time, the uterine lining continues to thicken in preparation for a potential pregnancy. If conception takes place, your next period will not occur. If you do not become pregnant, menstruation will proceed as usual, and the MC will restart.[3]

MC disorders are generally categorized as irregular uterine bleeding, ovarian issues, pain, and other symptoms associated with premenstrual syndrome (PMS). Irregular uterine bleeding encompasses alterations in bleeding patterns, such as variations in cycle length (e.g., oligomenorrhea and amenorrhea) and changes in the duration or volume of bleeding (e.g., HMB). Luteal phase deficiency (LPD) and anovulation are disorders that indicate subtle ovarian dysfunction; although these conditions might not present notable alterations in bleeding patterns, on-going ovarian suppression can result in oligomenorrhea and amenorrhea. Dysmenorrhea (i.e., painful menstruation), PMS, and premenstrual dysphoric disorder (PMDD) are MC disorders characterized by adverse symptoms related to the MC, which can lead to considerable impairment during or prior to menstruation.[4] Research indicates that a significant number of females of reproductive age experience health issues related to menstruation. Menstrual complications not only impose an economic strain but also rank among the primary reasons for missed work and decreased academic performance among young women. Dysmenorrhea stands out as one of the most common menstrual problems affecting adolescents and can render some women bed-bound. A review by Devis et al revealed that between 20% and 90% of adolescent girls reported suffering from dysmenorrhea, with nearly 15% of those experiencing it severely.[5] MCs can be influenced by several factors such as age, ethnicity, family background, smoking habits, physical activity levels, and diet. Stress is a significant factor that can lead to menstrual irregularities, and research has shown a link between stress and various menstrual issues, including heavy bleeding, infrequent periods, painful periods, and PMS.[6] Endometriosis is a long-lasting gynaecological condition commonly linked to painful and heavy menstrual periods as well as infertility. Women suffering from endometriosis might experience significant blood loss during their MCs because of endometrial-like tissue located outside the uterus that also undergoes cyclical bleeding.[7]

METHODS

Study design

It was a cross-sectional observational study.

Study setting and duration

Study conducted at outpatient and OBG and General Medicine departments of selected hospitals in Chitradurga.

Study period

Study conducted over a six-month duration from 21/04//2025 to 26/09/2025.

Study population

Female patients aged 12 to 50 years with a confirmed diagnosis of anaemia (Hb <12 g/dL).

Inclusion criteria

Females aged 12-50 years, diagnosed with anaemia, and willing to provide informed consent were included in study.

Exclusion criteria

Pregnant or lactating women, individuals with a history of hysterectomy or ovarian removal, and patients with a known diagnosis of PCOS or other endocrine disorders were excluded from the study.

Procedure

A total of 138 female patients presenting to the hospital departments underwent evaluation. Data collection involved structured patient interviews for demographic details, anthropometric measurements (height and weight for BMI determination), detailed clinical and menstrual history, and verification of laboratory investigations (specifically haemoglobin levels). Patients meeting the selection criteria were enrolled after obtaining written informed consent.

Ethical approval

Approved by the Institutional Ethics Committee of SJM College of Pharmacy, Chitradurga (Ref. No: SJMCP/537/2025-26).

Statistical analysis

Data were analysed using descriptive and inferential statistics. Associations between categorical variables were assessed using the Chi-square test, Fisher-Freeman-Halton exact test, while differences in haemoglobin levels across menstrual disorder categories were evaluated using the

Kruskal-Wallis test. Binary logistic regression was utilized to analyse the impact of age and BMI, with significance set at $p<0.05$.

RESULTS

Demographic and anthropometric distribution

Out of 138 participants evaluated:

Age distribution

The majority of patients belonged to the 40-50 years group (47.8%), followed by 30-39 years (31.9%), and 19-29 years (20.3%) as shown in Figure 1.

BMI distribution

Normal weight was observed in 42.8% of participants, followed by overweight (34.8%), underweight (15.9%), and obese (6.5%) as in Figure 2.

Prevalence of MC disorders

An overall prevalence of 68.1% (94 patients) for MC disorders was recorded among the Anaemic cohort. Dysmenorrhea was the most prevalent condition at 34.8%, followed by oligomenorrhea (15.9%), menorrhagia (13.8%), and amenorrhea (3.6%) as shown in Figure 3.

Severity of anaemia and correlation

Participants showed an even split between mild (41.3%) and moderate (41.3%) anaemia, with severe anaemia accounting for 17.4%. Menorrhagia was predominantly found among patients with severe anaemia, whereas mild cases frequently presented with normal cycles or simple dysmenorrhea. A statistically significant association was confirmed between MC disorders and the severity of Anaemia using both Chi-square ($\chi^2=19.415$, $p<0.001$) and Fisher's exact tests (Test value=51.233, $p<0.001$) as shown in Table 1.

Kruskal-Wallis testing demonstrated that mean haemoglobin ranks were highest in participants with normal MCs (90.34) and lowest in those experiencing menorrhagia (23.24). The analysis revealed a statistically significant difference in haemoglobin levels among the different categories of MC disorder ($H=38.138$, $df=4$, $p<0.001$) as shown in Table 2.

Impact of age and BMI

Binary logistic regression established that both BMI ($\chi^2=7.392$, $p=0.007$) and age ($\chi^2=5.526$, $p=0.019$) significantly influence the presence of MC disorders, though low Nagelkerke R^2 values (0.073 and 0.055, respectively) indicate that additional multifactorial variables contribute to these conditions (Table 3).

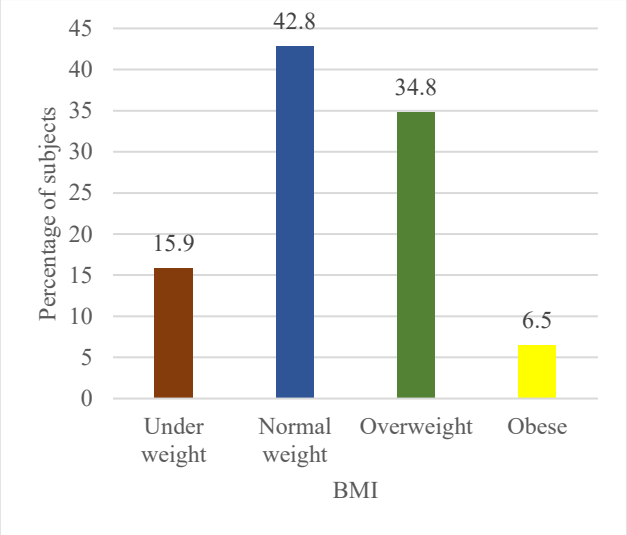


Figure 1: Age wise distribution.

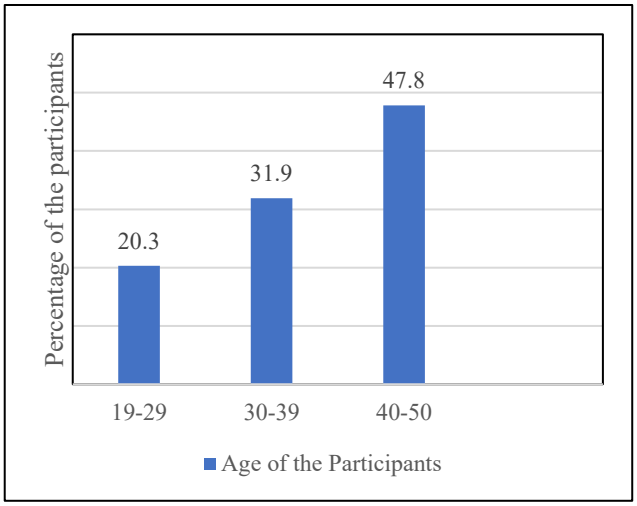


Figure 2: Distribution according to BMI.

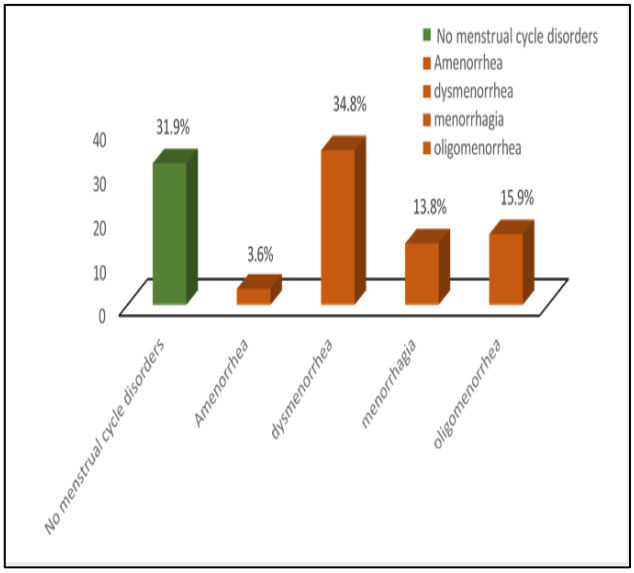


Figure 3: Distribution of MC disorder.

Table 1: Distribution of association between MC disorder and severity of anaemia.

MC disorder categorization	Statistical test used	Test value	Df	P value
Yes/ No (Binary)	Chi-square	19.415	2	<0.001
Amenorrhea, dysmenorrhea, menorrhagia, oligomenorrhea (Detailed)	Fisher-Freeman-Halton exact test	51.233	-	<0.001

Table 2: Comparison of haemoglobin level across categories of MC disorders.

Categories of MC disorder	N	Mean rank	Kruskal-Wallis H	Df	P value
Normal	44	90.34	38.13	4	<0.001
Amenorrhea	5	54.90			
Dysmenorrhea	48	69.54			
Menorrhagia	19	23.24			
Oligomenorrhea	22	71.00			

Table 3: Association of age and BMI with MC disorder.

Variables	Chi-square (χ^2)	Df	P value	Nagelkerke R^2
Age (in years)	5.526	1	0.019	0.055
BMI	7.392	1	0.007	0.073

DISCUSSION

The present study was conducted to determine the prevalence of MC disorders among anaemic patients in selected hospitals, Chitradurga, and to assess the association between menstrual disorders and anaemia severity.

A total of 138 participants were included in this study. The majority belonged to the 40-50 years age group (47.8%), followed by 30-39 years (31.9%). In contrast, Ansong et al reported a higher proportion of participants in the 21-25 years age group (49.75%), indicating differences in the age distribution of the study populations.[12]

Regarding BMI, most participants had normal weight (42.8%), followed by overweight (34.8%), underweight (15.9%) and obesity (6.5%). Similarly, Dars et al reported that 69% of participants had normal BMI, suggesting that normal body weight was predominant in both studies.[19]

MC disorders were observed in 68.1% of participants, with dysmenorrhea being the most common (34.8%), followed by oligomenorrhea (15.9%), menorrhagia (13.8%) and amenorrhea (3.6%). These findings indicate that menstrual abnormalities were common among the anaemic patients included in our study. In comparison, Kannan et al reported menorrhagia in 14% and oligomenorrhea in 6.3% of participants, showing a similar prevalence of menorrhagia but a lower prevalence of oligomenorrhea compared with our findings.[26] Begum et al reported dysmenorrhea in 60.9% of college students, which was higher than the prevalence observed in our study.[23]

Regarding anaemia severity, mild and moderate anaemia were equally prevalent (41.3%), while severe anaemia was observed in 17.4% of participants. However, Tanwar et al reported mild, moderate and severe anaemia in 43.25%, 31.75% and 8%. The higher proportion of moderate and severe anaemia in our study highlights the importance of early identification and appropriate management of anaemia.[16]

Most participants experienced menstrual flow for 1-3 days (57.2%), followed by 4-5 days (36.2%). In comparison, Verma et al reported that 68.4% of participants experienced menstrual flow for 3-5 days. This difference may be related to variations in the study population and menstrual characteristics.[22] Regarding sanitary pad usage, 57.2% used 1-3 pads per day, while 32.6% used 4-7 pads and 10.1% used 8-10 pads per day.

Previous research by Baig et al highlighted the relationship between menstrual abnormalities, blood loss, haemoglobin levels and BMI. These findings emphasize the importance of evaluating menstrual health in women with anaemia.[1]

Importantly, the present study demonstrated a statistically significant association between MC disorders and the severity of anaemia. This finding highlights the need for regular menstrual health assessment, early diagnosis and appropriate management of anaemia to reduce associated complications.

CONCLUSION

In conclusion, this cross-sectional study demonstrates that MC disorders are highly prevalent among anaemic female patients, affecting 68.1% of the participants. The most common disorder was dysmenorrhea (34.8%), followed by oligomenorrhea (15.9%) and menorrhagia (13.8%). A statistically significant relationship was confirmed

between MC disorders and the severity of anaemia ($p<0.001$), with patients suffering from menorrhagia displaying the lowest haemoglobin levels. Additionally, both age and BMI were found to be significant predictors and physiological influencers of menstrual health, though they accounted for only a small portion of the variance. These findings underscore the urgent need for routine health screenings, nutritional education, and accessible reproductive health services to address the heavy toll of these interlinked conditions on women's well-being. The connection between heightened menstrual blood loss and reduced iron stores is well established, with menorrhagia frequently leading to iron deficiency and subsequent anaemia. This study is designed to evaluate the prevalence of MC disorders among female anaemic patients, assess associated risk factors, and examine the impact of age and BMI. Anticipated benefits of investigating these underlying causes include early detection and treatment, improved patient outcomes, reduced morbidity, and the development of targeted clinical intervention.

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