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BMI as a Determinant of Menstrual Health: A Comparative Analysis Across Weight Categories

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Abstract: Obesity is an excessive accumulation of adipose tissue in the body. Obese women are at increased risk of developing various metabolic, endocrine, and gynaecological problems, including menstrual dysfunction and subfertility. **Objectives:** The objective of the study was to determine the association of body mass index with menstrual cycle abnormalities in young women. **Methods:** This study was conducted in Hail from September 2025 to February 2026, with a sample size of 315 participants. The data were collected using a pre-designed questionnaire from young women aged 18-35 years living in Hail who had no prior gynaecological disease. The questionnaire included demographic information, details of their menstrual cycle, and any associated problems. Participants were asked about their weight (kg) and height (cm), and their BMI was calculated. These indices were then analysed statistically using SPSS version 22. The 95% confidence level and confidence intervals were employed. The chi-square test was used to assess the association between obesity indices and menstrual problems. P<0.05 will be considered significant. Multivariable logistic regression analyses were conducted for all menstrual outcomes to identify independent associations between BMI and menstrual characteristics. **Results:** BMI showed significant associations with multiple menstrual parameters. Higher BMI was linked to greater cycle irregularity, altered cycle duration, and disrupted cycle frequency. Obese participants exhibited the highest rates of irregular, shortened, and prolonged cycles. Dysmenorrhea severity also varied by BMI, with pain patterns shifting across weight categories. Multivariable logistic regression demonstrated that higher BMI independently predicted lower odds of irregular cycles (AOR 0.70, 95% CI 0.50–0.93) and reduced dysmenorrhea (AOR 0.95, 95% CI 0.92–0.99), while cycle length decreased slightly with increasing BMI. No significant associations were observed for menstrual flow, intermenstrual bleeding, or cycle frequency after adjustment. **Conclusion**: This study demonstrates that BMI is significantly associated with multiple menstrual cycle abnormalities. This research could help identify targeted treatments for women with abnormal BMI and menstrual dysfunction, potentially improving reproductive health. It supports that weight management should be a key part of menstrual health treatments.

Key Words: Obesity, Body Mass Index, Menstrual Irregularities

INTRODUCTION

Obesity remains an important health concern worldwide, and its consequences go further than metabolic problems to include unfavourable effects on female reproductive and menstrual health. The prevalence of obesity in Saudi Arabia is 35%, which is significantly higher than the rest of the world, with a global average of 13%[1]. A national survey in 2015, taken by 4758 participants, demonstrated that women were twice as likely to be obese as men. The indicators of socioeconomic position, physical activity, sedentary behaviour, diet, and smoking had no influence on the sex differences observed in obesity[2-3],. Another 2005 survey showed that the region with the highest prevalence of obesity in Saudi Arabia was Hail, at 33.9%, highlighting the need for further investigation in this region [4]. Menstrual problems are also highly prevalent in Saudi Arabia, with painful periods reported in 87% of women and with heavy menstrual bleeding reported at high rates in many clinical samples [5].

Obesity has been linked with both heavy menstrual bleeding and dysmenorrhea. Severe heavy menstrual bleeding, defined as that resulting in a low haemoglobin level causing clinical anaemia, was found to be more prevalent

in obese women than in those of normal BMI [6]. The relationship between BMI and dysmenorrhea has been described as a U-shaped curve, showing a marked predominance in individuals who are underweight and in individuals who are obese [7]. Obesity has been shown to alter levels of some hormones important for reproductive functioning. A high level of testosterone and FAI, and lower levels of SHBG were found to be linked to the menstrual irregularities seen in obese women [8]. The elevation or resistance to the hormone leptin due to excess adiposity found in obese women can alter hypothalamic- pituitary signaling and ovarian production of hormones, contributing to menstrual abnormalities[9].

Numerous studies have confirmed a significant association between obesity and menstrual problems across different populations. However, evidence specific to Saudi women of reproductive age, especially those residing in the Hail region where obesity rates are alarmingly high, remains scarce. To fill this critical gap, we conducted a cross-sectional survey to estimate the prevalence of menstrual abnormalities across BMI categories, and to determine the independent strength of the obesity-menstrual problem association after adjusting for potential confounders.

METHODS

This community-based cross-sectional study was conducted in the Hail region of Saudi Arabia from September 2025 to February 2026.

The sample size was calculated using Cochran's Formula

$$n_0=(Z^2 \cdot p \cdot (1-p))/e^2$$

With a 95% confidence interval, a 5% margin of error and a p-value less than 0.05.

The calculated sample size was 385, but we had to stop data collection at 315 due to time constraints, as students had to finish their research project within the semester.

The study population comprised 315 reproductive-aged women, aged 18-35, who were non-pregnant, non-lactating, and not using any hormonal treatment.

Data Collection

Data were collected from young women (aged 18-35) living in Hail. Fourth-year medical students, who were members of the research team, collected the data after explaining the study's purpose to the women, reassuring them about privacy, and confirming their willingness to participate before enrolling them. The participants themselves completed the pre-designed questionnaires. The questionnaire included demographics and a detailed menstrual cycle history, covering age at menarche, cycle regularity, number of bleeding days, cycle length, amount of bleeding, and dysmenorrhea. They were asked about their weight in kg and height in cm to calculate the body mass index. Women who were pregnant, lactating, or using any form of contraception were excluded from the study. Moreover, women with any gynaecological and endocrine disorders were also excluded from the study. A Google Form was created for the study questionnaire, and the link was shared on social media. The form was restricted to a single response. When the data collection period ended, the data were downloaded from Google Forms and imported into SPSS for detailed analysis.

Statistical Analysis

The Statistical Package for Social Sciences (SPSS version 22; SPSS Inc., Chicago, IL) was used for data analysis. Descriptive analysis was conducted to examine the frequency and percentages, means, and SDs of the study variables. The prevalence of obesity among study participants was calculated. The participants were divided into four BMI-based categories. Underweight with BMI below 18.5, Normal weight_with BMI between 18.5 and 24.9, Overweight with BMI between 25 and 29.9 and Obese with BMI 30 and above. Chi-square analysis in crosstabulation was applied to check the statistical significance of the relationships. Binary logistic regression was used when the dependent variable had two categories (e.g., IMB, clots, cycle regularity). The model estimated the regression coefficient (B), Odds Ratio (Exp(B)), and 95% Confidence Interval. Ordinal regression (Proportional Odds Model) was used for dependent variables with three or more ordered categories (e.g., dysmenorrhea severity, flow, cycle length, frequency) across BMI as a continuous variable.

Ethical Consideration

Informed consent was obtained from each participant, and only those willing to participate completed the forms. The questionnaire did not include any personal identity information. Our study protocol confirms the 2013 Declaration of Helsinki. Ethical approval (H-2025-338) was obtained from the ethical committee of the University of Hail, Saudi Arabia, and data collection began after approval.

RESULTS

The data comprised 315 young, reproductive-age women. Demographic characteristics of the respondents are provided in Table 1. Overall, the cohort is young, highly educated, and largely student-based, with sufficient diversity in BMI and measured characteristics to support a meaningful analysis of weight-related menstrual disturbances.

As shown in Table 1, the sample consists predominantly of young, university-educated, unmarried women, which shapes the interpretability of menstrual-health patterns. Women aged 18–24 constituted nearly four-fifths of the cohort (79.4%), with similarly high proportions being students (74%) and university-educated (79%). Menarche timing was largely typical, with 92% reporting onset between 10 and 15 years.

Cycle-pattern deviations were present but not extreme. Irregular cycles affected roughly one in four (24.1%), and 10% experienced infrequent cycles (>35 days). Although most reported normal cycle length, 9.8% had prolonged

Table 1: Descriptive Demographic Characteristics of the Participants (n = 315)

Variable	Categories	Frequency (n) %
Age	18-24	250(79.4)
	25-29	24(7.6)
	30-35	41(13)
Education	middle or less	14(4.4)
	High school	47(14.9)
	University	249(79)
	Postgraduate	5(1.6)
Work status	Student	233(74)
	Working	33(10.5)
	Housewife	49(15.6)
Marital status	single	256(81.3)
	Married	54(17.1)
	Separated	5(1.6)
Age of menarche	Before 10 years	15(4.8)
	10-12 years	137(43.5)
	13-15 years	154(48.9)
	16-18 years	8(2.5)
	after 18 years	1(0.3)
Cycle regularity	irregular	76(24.1)
	regular	239(74.9)
Cycle Duration	less than 3 days	2(0.6)
	3-5 days	103(32.7)
	6-7 days	179(56.8)
	more than 7 days	31(9.8)
Cycle frequency	less than 21 days	44(14)
	21-35 days	238(75.6)
	more than 35 days	31(9.8)
Cycle flow	scanty	37(11.7)
	normal	251(79.7)
	Heavy	27(8.6)
Clots	No	165(52.4)
	Yes	150(47.6)
IMB	No	281(89.0)
	Yes	34(10.8)
Dysmenorrhea	Mild	101(32.1)
	Moderate	155(49.2)
	Severe	54(17.1)

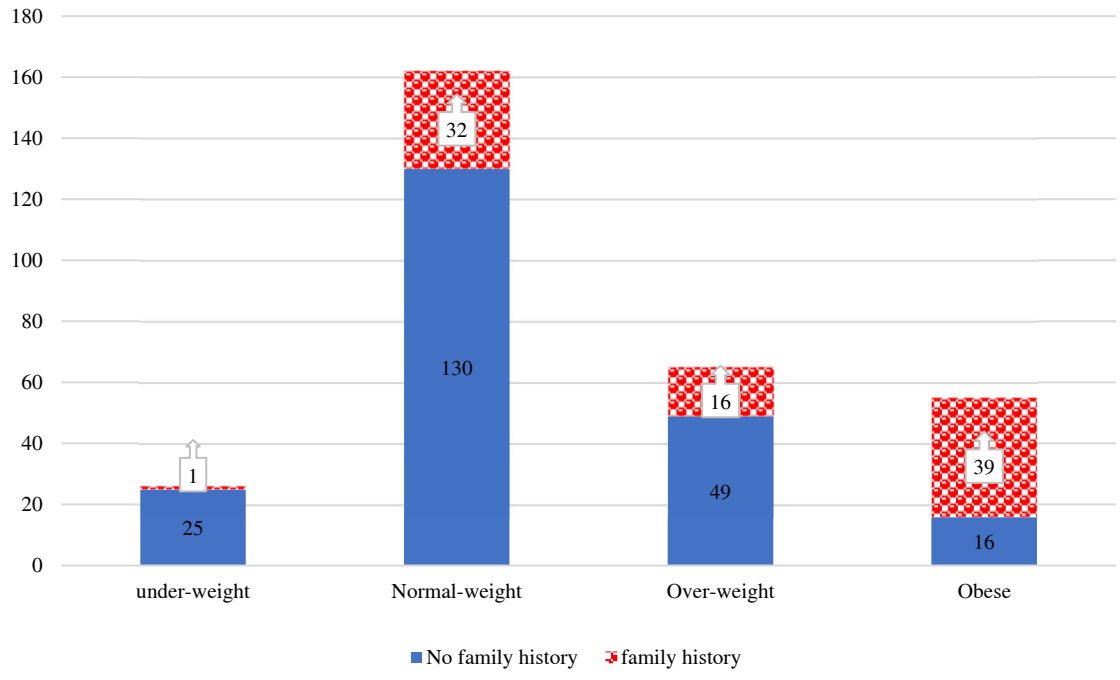

Figure 1: Distribution of Obesity History among First-Degree Relatives across Participant BMI Categories

Table 2: Association between BMI and Menstrual Cycle Parameters among Participants

Menstrual cycle parameters	BMI classification				p-value Asymptomatic significance 2-sided
	Under- weight	Normal weight	Overweight	Obese	
Cycle regularity					0.031
Irregular	7(27%)	29(18%)	19(29%)	20(36%)	
Regular	19(73%)	133(82%)	46(71%)	35(64%)	
Cycle duration					0.003
less than 3 days	1(3.8)	0(0)	0(0)	1(1.8)	
3-5 days	3(11.5)	57(35.2)	17(26.2)	25(45.5)	
6-7 days	15(57.7)	91(56.2)	43(66.2)	24(43.6)	
more than 7 days	7(26.9)	14(8.6)	5(7.7)	5(9.1)	
Cycle frequency					0.001
<21 days	7(26.9)	17(10.5)	7(10.8)	11(20)	
21-35 days	15(57.7)	137(84.6)	50(76.9)	31(56.4)	
>35 days	4(15.4)	7(4.3)	8(12.3)	12(21.8)	
Menstrual Flow					0.029
scanty	0(0)	18(11.1)	11(16.9)	8(14.5)	
normal	25(96.2)	132(81.5)	50(76.9)	37(67.3)	
Heavy	1(3.8)	12(7.4)	4(6.2)	10(18.2)	
Intermenstrual bleeding					0.034
No	21(80.8)	150(92.6)	59(90.8)	44(80)	
Yes	5(19.2)	12(7.4)	6(9.2)	11(20)	
Dysmenorrhea					0.015
Mild	5(19.2)	44(27.2)	29(44.6)	26(47.3)	
Moderate	16(61.5)	90(55.6)	26(40)	18(32.7)	
Severe	5(19.2)	28(17.3)	10(15.4)	11(20)	
Family history of obesity					0.000
No	25(96.2)	130(80.2)	49(75.4)	16(29.1)	
Yes	1(3.8)	32(19.8)	16(24.6)	39(70.9)	
Age of menarche					0.690
Before 10 years	2(7.7)	10(6.2)	2(3.1)	1(1.8)	
10-12 years	9(34.6)	67(41.4)	33(50.8)	25(45.5)	
13-15 years	14(53.8)	80(49.4)	28(43.1)	29(52.7)	
16-18 years	1(8.4)	5(3.1)	2(3.1)	0(0)	

bleeding (>7 days). Flow abnormalities were modest in prevalence—11.7% scanty, 8.6% heavy—yet the high rate of clotting (47.6%) stands out as a clinically relevant marker of abnormal uterine bleeding physiology. Intermenstrual bleeding occurred in 10.8%, again indicating a non-trivial burden of cycle disruption.

Pain symptoms were substantial: dysmenorrhea was common, with 17.1% reporting severe and 49.2% moderate pain, underscoring a major functional impact despite not being a timing abnormality.

BMI distribution showed wide variability (mean 24.7, SD 5.4; range 13.8–40.6). Importantly, 38% were overweight or obese, providing sufficient heterogeneity to explore associations between adiposity and menstrual irregularity.

A clear variation in BMI distribution was observed among the participants. More than half of the sample (51.4%) fell within the normal weight range. The proportions of underweight, overweight, and obese individuals were 8.3%, 20.6%, and 17.5%, respectively. Crosstabulation descriptive analysis of the history of obesity in first-degree relatives showed a highly significant association with body mass index (p-value <0.001). A positive family history was overwhelmingly more common among obese participants (70.9%) compared with19.8% in normal-weight women and 24.6% in overweight women. Underweight participants had the lowest prevalence, 3.8%. This strong gradient suggests a potential interaction between the genetic predisposition to obesity and weight-related menstrual problems, as shown in Figure 1.

Table 2 explored the association between menstrual cycle characteristics and body mass index (BMI) categories. The findings demonstrate several statistically significant relationships, suggesting that BMI influences multiple dimensions of menstrual health.

Cycle irregularity increased progressively with BMI ($p = 0.031$), peaking in obese and overweight women, and was lowest in normal-weight participants. Cycle duration also varied significantly by BMI ($p = 0.003$), with obese women showing a higher prevalence of both shortened and prolonged cycles, indicating greater cycle-length variability at higher BMI levels. Cycle frequency demonstrated a strong BMI gradient ($p = 0.001$): normal-weight women had the highest proportion of normal frequency (84.6%), whereas obese women showed marked dysregulation, with nearly equal proportions reporting infrequent (20%) and frequent cycles (21.8%). Intermenstrual bleeding showed a U-shaped pattern across BMI ($p = 0.034$), with rates highest among obese and underweight women while lowest among normal-weight participants. Menstrual flow characteristics also differed significantly ($p = 0.029$), with heavy bleeding more common in obese compared with normal and overweight groups. Dysmenorrhea showed a significant BMI association ($p = 0.015$). Severe pain was most frequent

Table 3: Adjusted ORs Derived for Menstrual Characteristics across BMI

Menstrual cycle characteristics	Adjusted OR	P-value	95% CI	
			Lower	Upper
Cycle regularity	0.70	0.015	0.50	0.93
Dysmenorrhea	0.95	0.016	0.92	0.99
IMB	1.05	0.123	0.99	0.123
Flow	1.00	0.918	0.95	1.05
Cycle Length	0.95	0.018	0.91	0.99
Cycle frequency	1.03	0.289	0.98	1.08

among obese, while moderate pain predominated in the underweight group. Notably, the proportion reporting no dysmenorrhea increased steadily with BMI, reaching 47.3% in obese participants.

Analysis of menstrual characteristics across BMI revealed several significant associations shown in Table 3. Higher BMI was associated with improved cycle regularity, with women of higher BMI showing 30% lower odds of irregular cycles (adjusted OR 0.70, 95% CI 0.50–0.93, p = 0.015). BMI also demonstrated a modest but significant inverse relationship with dysmenorrhea (adjusted OR 0.95, 95% CI 0.92–0.99, p = 0.016). Cycle length decreased slightly with increasing BMI (adjusted OR 0.95, 95% CI 0.91–0.99, p = 0.018). No significant associations were observed for intermenstrual bleeding, menstrual flow, or cycle frequency, as their confidence intervals crossed 1.00 and p-values exceeded 0.05.

DISCUSSION

The demographic profile of our study is predominantly young, with 79.4% aged 18 to 24. They are highly educated and single, representing a specific group of university-attending women. Importantly, this cohort shows significant diversity in body mass index (BMI), with a mean of 24.7 and a standard deviation of 5.4. The participants span various categories, including underweight, normal, overweight, and obese individuals. This range is essential since 38% of participants fall into the overweight or obese categories, enabling a meaningful investigation into the link between elevated BMI and menstrual dysfunction. Additionally, the occurrence of self-reported menstrual irregularities is striking, with 24.1% experiencing irregular cycles. A significant number also report infrequent cycles at 10%, prolonged bleeding at 9.8%, and abnormal flow. The high rates of dysmenorrhea are concerning, with 66.3% reporting moderate to severe pain. This highlights the noteworthy burden of menstrual-related symptoms in this young, seemingly healthy population.

The results of this analysis align with existing research and highlight areas requiring further study within this demographic. The prevalence of irregular cycles, at 24.1%, aligns with global estimates of menstrual issues among women of reproductive age [10]. The significant number of participants who are overweight or obese offers a chance to examine how excess body fat may affect menstrual cycles. There is a well-known connection between increased body fat and hormonal imbalances like hyperestrogenism, which can lead to oligomenorrhea and other irregularities. On the other hand, the presence of underweight participants, defined as a minimum BMI of 13.8, allows us to explore how low energy availability affects menstrual function. Overall, the characteristics of this group confirm that menstrual problems are widespread. The sample is diverse enough to enable a meaningful analysis of weight-related factors contributing to these issues.

In our study, we found a strong association between a family history of obesity among first-degree relatives and participants' BMI classification (p<0.001). We noted that 70.9% of obese participants reported a positive family history, while only 19.8% of normal-weight women did. This suggests a significant genetic and/or shared environmental risk in this group. This result is consistent with other large studies showing that obesity has a strong hereditary component. It indicates that a person's risk of obesity increases significantly with the number of affected relatives [11]. This strong family tendency matters clinically. Genetic risk for obesity often leads to menstrual health issues, including insulin resistance, changes in adipokine secretion, and chronic low-grade inflammation[12].

For women with a positive family history, these metabolic tendencies may be worsened by lifestyle factors. This combination increases their risk of obesity and its effects on the hypothalamic-pituitary-ovarian (HPO) axis. Therefore, when assessing a young woman for menstrual irregularities, doctors should look at her current BMI and her family's obesity patterns. This could help identify those who are more likely to gain weight and experience related metabolic issues. These individuals might benefit from early lifestyle changes [13].

Our analysis showed a strong link between BMI and cycle regularity (p=0.031). The highest rate of irregular cycles was found in obese participants (36%), followed by overweight women (29%). Normal-weight women had the lowest rate (18%). This increase in menstrual irregularity with rising BMI matches findings from a large study by Wei and colleagues in 2009 and a recent study in 2025[8,14].

The strong link between BMI and cycle frequency (p = 0.001) supports this mechanistic idea. Normal-weight women had the highest percentage of normal cycle frequency at 84.6%. This percentage dropped to 76.9% in overweight women and 56.4% in obese women. Obese women also had a higher occurrence of oligomenorrhea (cycles longer than 35 days) at 21.8% and polymenorrhea (cycles shorter than 21 days) at 20%. This indicates that obesity leads to broader disruption of cycle timing, rather than a single effect. This two-way disturbance may show

how hormonal changes related to body fat interact with follicular development and ovulation. Another study found that women with high BMI tend to have longer cycles than those with normal BMI[15]. The differences may be due to the participants' age groups and other demographic factors.

Cycle duration differed significantly across BMI categories (p=0.003). Obese participants had the highest rates of both shortened (<3 days) and prolonged (>7 days) menstrual bleeding. These findings matter because abnormal bleeding patterns can lower quality of life and suggest underlying endometrial issues. The link between obesity and prolonged bleeding may come from endometrial hyperplasia caused by unopposed estrogen exposure, a known result of anovulatory cycles in obese women [16]. On the other hand, the shortened bleeding episodes among underweight participants (26.9% reported >7 days, though the small sample sizes require cautious interpretation) may indicate endometrial atrophy due to low estrogen levels. This aligns with the known issue of hypothalamic amenorrhea in women with low body weight [17].

The study found a significant link between BMI and menstrual flow (p=0.029). Heavy bleeding was most common among obese participants (18.2%) compared to women with normal weight (7.4%) and overweight women (6.2%). This result supports earlier research showing that obese women have a higher risk of heavy menstrual bleeding (HMB). Several factors contribute to this connection. Chronic anovulation in obese women causes the endometrium to grow without the right amounts of progesterone for proper transformation. This leads to a thickened endometrium that is unstable and prone to heavy, irregular shedding[18]. An in vitro study found that obesity creates a more inflammatory local environment in the endometrium during menstruation. This may slow down the repair of the endometrium and increase menstrual blood loss [19].

The observation that limited flow was most common among overweight (16.9%) and obese (14.5%) participants, rather than underweight women as one might expect, is interesting and deserves more study. This could show the diversity within the overweight and obese groups. For instance, women with PCOS often have oligomenorrhea and limited flow. Additionally, those with subclinical hypothyroidism, which is more common in obese populations, can also experience changes in menstrual flow[20]. Another possibility is that this finding is affected by the small number of underweight participants (n = 26), which reduces the ability to identify differences in this group.

A noteworthy finding was the strong link between BMI and intermenstrual bleeding (IMB) (p = 0.034), which showed a U-shaped pattern. Both underweight (19.2%) and obese (20%) participants had about double the prevalence of IMB compared to normal-weight (7.4%) and overweight (9.2%) women. This relationship suggests that extremes of body weight, in either direction, may increase the risk of breakthrough bleeding in women. In underweight women, IMB may indicate hypothalamic issues, leading to estrogen fluctuations that are not sufficient to maintain endometrial health. In obese women, it's likely due to unopposed estrogen effects and lack of ovulation. However, Itoi et al. found that both overweight and obese women had higher risks of IMB compared to those with normal BMI [14].

The relationship between BMI and dysmenorrhea in our study was complex and statistically significant (p = 0.015). Severe dysmenorrhea occurred more often among obese (20%) and underweight (19.2%) participants compared to overweight women (15.4%). Moderate dysmenorrhea was most common in the underweight group (61.5%) and decreased as BMI increased. Remarkably, the number of women reporting mild or no pain rose with BMI, reaching 47.3% in the obese category. This pattern indicates differences in pain experience among BMI categories and may reflect competing physiological factors.

A population-level study found that women with severe dysmenorrhea had a higher average BMI than those with mild or moderate symptoms, even after considering other factors [21]. Another study showed that the link between BMI and dysmenorrhea matches longitudinal data. Both underweight and obese women had much higher chances of reporting dysmenorrhea compared to women of normal weight[22].

Conversely, the finding that many obese women reported minimal pain aligns with research suggesting that obesity may be associated with altered pain processing or endogenous analgesic mechanisms. Alternatively, this may reflect the heterogeneity within obese populations, including differences in central versus peripheral fat distribution, which have differential metabolic and inflammatory profiles [23]. The finding that many obese women reported minimal pain fits with research suggesting that obesity might change how pain is processed or how the body manages pain naturally. This could also show the variety within obese populations and the differences in the central versus peripheral fat distribution, which leads to different metabolic and inflammatory profiles [23]

The multivariable logistic regression analyses revealed that higher BMI is significantly associated with improved cycle regularity, reduced dysmenorrhea, and slightly shorter cycle length, while showing no significant associations with intermenstrual bleeding, flow volume, or cycle frequency. These findings are paradoxical given the well-established link between obesity and menstrual dysfunction, suggesting a potential J-shaped or U-shaped relationship where both underweight and extreme obesity are detrimental. At the same time, moderate BMI may confer relative benefits.[6,7], The inverse association with dysmenorrhea aligns with the prostaglandin hypothesis, and the improved regularity may reflect hormonal stabilisation in populations with a high prevalence of low BMI. However, the cross-sectional design, reliance on self-reported data, and lack of hormonal measurements limit causal inference. Clinically, these results should be interpreted cautiously; while they may support weight restoration in underweight patients, they

should not be misconstrued as endorsing weight gain in already overweight or obese individuals, given the broader metabolic risks [24].

Strengths and Limitations

The main strength of this study is its thorough assessment of various menstrual cycle parameters across the entire BMI range. This allows for the identification of both simple and complex relationships. The important findings regarding six menstrual characteristics highlight the significant impact of body weight on reproductive function.

This analysis has several limitations that must be acknowledged. First, the cross-sectional design precludes any inference of causality; we can only report associations, not determine whether BMI alters menstrual patterns or vice versa. Second, the reliance on self-reported menstrual data (length, flow, dysmenorrhea severity) introduces recall bias and subjectivity, which may have attenuated the associations, particularly for flow. Third, we did not have data on hormonal profiles (e.g., oestradiol, testosterone, or progesterone), which are critical for elucidating the mechanistic pathways underlying these correlations. Finally, the dataset's specific BMI distribution and ethnic composition may limit the generalizability of our findings to other populations.

Additionally, the study's mainly young, educated, student-based sample could limit the extent to which these findings apply to larger populations. Still, this demographic is important since menstrual issues often occur during early reproductive years.

These findings have vital clinical implications. Healthcare providers should regularly check BMI when evaluating women with menstrual problems and acknowledge that underweight and obese women are both at a higher risk for various menstrual disturbances. The strong link between obesity and several issues, such as irregular cycles, abnormal frequency, heavy bleeding, intermenstrual bleeding, and severe menstrual pain, supports the idea that weight management should be a key part of menstrual health treatments. With 38% of our group classified as overweight or obese, there is a significant opportunity for intervention at the population level. Similarly, underweight women who report menstrual issues should be assessed for nutritional deficiencies, eating disorders, or conditions linked to low body weight.

Future research should look into whether losing weight in obese women or gaining weight in underweight women normalizes menstrual parameters. It should also examine whether having a family history of obesity affects these relationships. Our research could help identify targeted treatments for weight-related menstrual dysfunction, potentially improving reproductive health and long-term metabolic outcomes for women across different weight categories.

CONCLUSION

This study demonstrates that BMI is significantly associated with multiple menstrual cycle abnormalities. Obesity significantly emerges as a risk factor for menstrual irregularities, heavier flow, and abnormal cycle frequency. Underweight participants also show specific vulnerabilities, particularly in intermenstrual bleeding and dysmenorrhea. This research could help identify targeted treatments for weight-related menstrual dysfunction, potentially improving reproductive health and long-term metabolic outcomes for women across different weight categories.

Conflict of Interest

The authors showed no conflict of interest.

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