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Association Between Dietary Habits and Heavy Menstrual Bleeding Among Early Adult Women in Karachi: A Cross-Sectional Study

ABSTRACT

Background: Heavy menstrual bleeding (HMB) is a common gynecological concern in early adulthood that can adversely impact quality of life. Emerging evidence suggests that dietary habits may influence menstrual health. **Objective:** This study aimed to determine the prevalence of HMB among women aged 19–30 years and assess its association with dietary behaviors. **Methods**: A cross-sectional study was conducted in Karachi, Pakistan, from August 2023 to January 2024. A total of 288 women aged 19–30 years were recruited using non-probability purposive sampling. Data were collected via the validated SAMANTA questionnaire to assess menstrual characteristics and a structured dietary habits questionnaire. Descriptive statistics and chi-square tests were used to evaluate the association between food habits and HMB using SPSS version 29. **Results**: The mean age of participants was 22.8 ± 2.8 years. The prevalence of self-reported HMB was 27.1%. Among participants with HMB, 69.5% consumed sugary drinks weekly and 48.2% reported weekly meal skipping. Additionally, 89.9% consumed high-calorie foods weekly. A significant association was observed between HMB and the intake of high-calorie foods ($p = 0.015$), sugary drinks ($p = 0.051$), fried foods ($p = 0.054$), meal skipping ($p = 0.032$), and limited physical activity ($p = 0.013$). **Conclusion**: The study identified a significant association between unhealthy dietary habits and heavy menstrual bleeding in early adult women. These findings highlight the need for nutritional education and behavioral interventions to promote reproductive health during early adulthood.

Keywords: *Heavy menstrual bleeding, dietary habits, early adulthood, nutrition, reproductive health, cross-sectional study*

INTRODUCTION

Early adulthood, typically defined as ages 18 to 30, represents a critical phase of physiological, psychological, and behavioral development. It is during this stage that women often begin to experience or recognize patterns in their reproductive health, including menstruation-related disorders such as heavy menstrual bleeding (HMB) (1). HMB, also known as menorrhagia, is clinically defined as menstrual blood loss exceeding 80 mL per cycle or menstrual duration longer than seven days, and it significantly interferes with daily activities and overall well-being (2).

While the clinical prevalence of HMB is estimated to range from 3% to 5%, population-based studies suggest it may affect up to 50% of women of reproductive age (3). HMB accounts for a substantial portion of abnormal uterine bleeding (AUB), which contributes to 18–30% of gynecological consultations and is a major reason for over 300,000 annual hysterectomies in the United States alone (4). Several etiological factors have been linked to HMB, including adenomyosis, uterine fibroids or polyps, pelvic inflammatory disease, anovulation, non-hormonal intrauterine device (IUD) usage, and inherited bleeding disorders. If left unmanaged, HMB can result in iron deficiency, anemia, fatigue, and reduced physical performance, affecting both reproductive and general health outcomes (3).

Dietary patterns are a modifiable risk factor that has gained attention in the context of reproductive health. Adequate intake of macro- and micronutrients—including iron, folate, and vitamin B12—plays a vital role in hematopoiesis and hormonal regulation. Poor nutrition, including excessive intake of ultra-processed and high-calorie foods or frequent meal skipping, can worsen menstrual irregularities and increase the risk of HMB (5). Notably, iron deficiency from inadequate dietary intake may exacerbate blood loss and lead to symptomatic anemia. Lifestyle shifts during early adulthood, including increased autonomy and exposure to unhealthy eating environments, further compound these risks. For example, in the United States, nearly 45% of adults aged 20–39 consume fast food daily, which is associated with higher BMI, insulin resistance, and metabolic dysregulation (6). Similar patterns have been observed in South Asia, where young women increasingly rely on convenient but nutrient-deficient foods. One study from rural India reported that 70.6% of adolescent girls experienced HMB, with strong correlations to dietary insufficiencies (3). Despite the rising prevalence of HMB and dietary shifts among young women, limited research in Pakistan has explored this association. Evaluating the relationship between food habits and menstrual health may provide an opportunity for preventive intervention and long-term health promotion. Establishing healthy dietary practices early in adulthood can contribute to better reproductive outcomes, fewer menstrual complications, and improved quality of life. The present study aims to determine the prevalence of heavy menstrual bleeding among early adult women in Karachi and

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investigate its association with specific dietary habits and lifestyle behaviors. The findings may contribute to targeted educational strategies and inform public health policies addressing menstrual health through nutrition.

MATERIAL AND METHODS

This descriptive cross-sectional study was conducted in Karachi, Pakistan, over a six-month period from August 2023 to January 2024. The objective was to determine the prevalence of heavy menstrual bleeding (HMB) and its association with dietary patterns among early adult women. Data were collected through an online self-administered survey shared across academic institutions and professional groups. The target population included women aged 19 to 30 years residing in Karachi. Participants were recruited using a non-probability purposive sampling technique. Inclusion criteria comprised women within the specified age range, regardless of marital or parity status. Exclusion criteria included women with known hormonal disorders such as polycystic ovary syndrome (PCOS), thyroid dysfunction, pelvic pathologies such as fibroids or endometriosis, psychiatric illness, bleeding disorders, current pregnancy, or use of anticoagulant medication. Ethical approval was obtained from the Institutional Review Board of the College of Physiotherapy, Jinnah Postgraduate Medical Centre, Karachi, and all participants provided informed written consent prior to inclusion in the study.

The sample size was calculated to be 288 participants, based on prevalence estimates of HMB in similar populations, with a 95% confidence interval and 5% margin of error. Data were collected using the validated SAMANTA questionnaire to identify HMB symptoms, including duration of bleeding, frequency of pad changes, and clot passage. Dietary habits were assessed using a structured questionnaire, which captured the frequency of intake of high-calorie foods, sugary drinks, fried foods, fruits, vegetables, dairy, and meat. Additional lifestyle variables such as meal skipping and weekly exercise frequency were also recorded. Anthropometric measurements, including height and weight, were self-reported and used to calculate BMI based on World Health Organization classifications. To minimize selection and reporting bias, pilot testing was conducted with 20 participants to ensure clarity of the survey. Anonymity was maintained, and incomplete responses were excluded. Data were entered and analyzed using IBM SPSS version 29. Descriptive statistics were used to summarize demographic data, dietary patterns, and prevalence of HMB. Associations between dietary and lifestyle variables and HMB were assessed using the chi-square test, with a p-value less than 0.05 considered statistically significant.

RESULTS

A total of 288 women aged between 19 and 30 years participated in the study, with a mean age of 22.8 ± 2.8 years. The majority were unmarried (86.5%), while 12.8% were married and 0.7% divorced. Regarding body mass index (BMI), 58.3% had a normal BMI, 18.1% were underweight, 16.3% were overweight, and 7.3% were classified as obese. The prevalence of self-reported heavy menstrual bleeding (HMB) was 27.1% (n = 78) (Figure 1). Among participants with HMB, 58.3% reported bleeding for three or more days, 43.1% experienced staining of clothing, and 41.3% avoided routine activities due to frequent pad changes. In addition, 23.6% reported menstrual duration exceeding seven days per cycle.

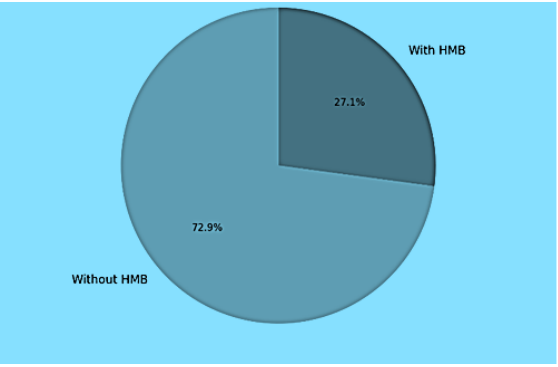
Analysis of dietary behavior showed that 89.9% of participants consumed high-calorie foods at least once per week, 69.5% consumed sugary drinks weekly, and 84.4% reported frequent fried food consumption. Weekly meal skipping was reported by 48.2% of participants, and 46.5% engaged in physical activity at least once per week (Figure 2). A statistically significant association was found between HMB and high-calorie food consumption ($p = 0.015$), meal skipping ($p = 0.032$), and reduced frequency of exercise ($p = 0.013$). The relationship between HMB and consumption of sugary drinks ($p = 0.051$) and fried foods ($p = 0.054$) approached statistical significance. These associations are summarized in Table 1. The prevalence of heavy menstrual bleeding (HMB) among participants is depicted in Figure 1, where 27.5% of the surveyed individuals reported experiencing HMB, while 72.5% did not report such symptoms. This indicates that more than one-fourth of the participants are affected by a condition known to influence quality of life, iron status, and general wellbeing. The substantial proportion of individuals with HMB suggests a need to explore possible contributory factors, including dietary habits, which may play a role in menstrual health.

Table 1. Association between Dietary and Lifestyle Factors and Heavy Menstrual Bleeding (N = 288)

Variable	HMB Absent (n)	HMB Present (n)	χ^2	p-value
Skip meals/week			8.775	0.032
Never	113	36		
1–2 days	77	15		
5–7 days	5	8		

Variable	HMB Absent (n)	HMB Present (n)	χ^2	p-value
Consume meat/day			9.853	0.020
Never	49	27		
1–2 servings	123	34		
3–4 servings	36	13		
>4 servings	2	4		
Exercise/week			10.850	0.013
Never	103	51		
1–2 days	58	8		
3–4 days	29	13		
5–7 days	20	6		
High-calorie food/week			10.535	0.015
Never	16	13		
1–2 days	137	59		
3–4 days	23	4		
5–7 days	4	5		
Sugary drinks/week			7.782	0.051
Never	64	24		
1–2 days	110	32		
3–4 days	33	17		
5–7 days	3	5		
Fried food/week			7.660	0.054
Never	15	7		
1–2 days	94	22		
3–4 days	87	39		
5–7 days	14	10		

Dietary patterns of the participants are illustrated in Figure 2, which shows a high frequency of consumption of unhealthy food categories. Specifically, 88% of participants reported regular intake of high-calorie foods, 74% consumed sugary drinks, and 86% frequently ate fried foods. These eating habits may potentially exacerbate inflammatory and hormonal imbalances, both of which are linked in literature to the severity and frequency of menstrual irregularities, including HMB.



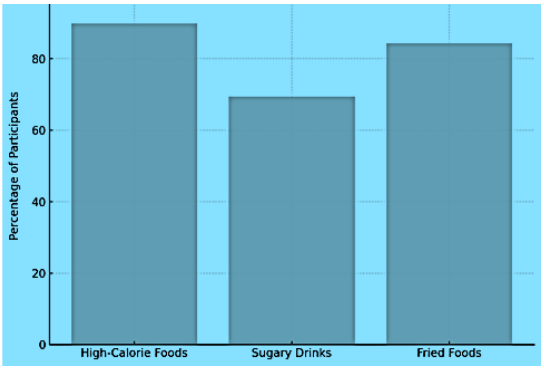


Figure 1 Prevalence of heavy bleeding and, Figure 2 weekly diet-wise classification.

DISCUSSION

This study aimed to evaluate the prevalence of heavy menstrual bleeding (HMB) among early adult women in Karachi and investigate its association with dietary habits. The findings revealed that 27.1% of participants experienced HMB, a prevalence consistent with population-based reports suggesting that HMB may affect up to 50% of reproductive-age women (3). While lower than some South Asian estimates (15), this figure underscores the public health significance of menstrual disorders in

young women. Participants with HMB reported longer bleeding duration (≥3 days), frequent staining of clothing, and activity avoidance—outcomes that reflect the functional impact of HMB on quality of life. These findings align with earlier research indicating that HMB is not merely a clinical issue but a factor that disrupts daily life, education, and productivity (4). Our results demonstrate a statistically significant association between HMB and certain dietary habits, notably frequent intake of high-calorie and fried foods, sugary drinks, and skipping meals. Women who skipped meals weekly or consumed high-calorie foods ≥3 days per week had significantly higher rates of HMB. These observations are consistent with prior studies showing that poor dietary patterns—such as irregular meal timing, insufficient iron intake, and high consumption of processed foods—can contribute to hormonal imbalances and impaired endometrial function, leading to abnormal uterine bleeding (5,7).

In particular, the frequent consumption of sugary drinks was associated with an increased prevalence of HMB, approaching statistical significance ($p = 0.051$). High-glycemic diets have been linked to increased inflammatory markers and insulin resistance, which can affect estrogen metabolism and worsen menstrual symptoms (16). Similarly, fried and ultra-processed foods may disrupt prostaglandin synthesis, exacerbating menstrual pain and flow irregularities (15). Physical inactivity was also associated with higher rates of HMB in our sample. Regular physical activity is known to support hormonal regulation, reduce oxidative stress, and improve metabolic health, which may contribute to more stable menstrual cycles (8). In our study, women who exercised regularly (≥3 days/week) reported fewer menstrual disturbances, supporting existing evidence on the protective role of an active lifestyle. Anthropometric data revealed that most participants had normal BMI (58.3%), while a smaller proportion were overweight (16.3%) or obese (7.3%). While no direct association between BMI and HMB was found in this analysis, previous studies have suggested that obesity is a risk factor for menstrual irregularities due to increased peripheral estrogen production and insulin resistance (9,10). Further investigation with larger samples may help elucidate this relationship.

This study adds to the growing literature on modifiable lifestyle factors influencing menstrual health in young women. Its strengths include the use of a validated tool (SAMANTA questionnaire), a clearly defined population, and consideration of multiple dietary and lifestyle variables. However, some limitations must be acknowledged. First, the cross-sectional design prevents causal inference. Second, self-reported data may introduce recall or reporting bias. Third, the reliance on online surveys may have excluded women without digital access, potentially limiting generalizability. Finally, biochemical markers such as hemoglobin or ferritin levels were not measured, which could have provided objective support for the symptomatology reported. Despite these limitations, the findings suggest meaningful associations that warrant further investigation. Public health strategies promoting dietary education, nutritional supplementation, and menstrual health awareness may help reduce the burden of HMB among young women. Moreover, primary care providers and physiotherapists working with women should incorporate routine menstrual health screening and offer dietary guidance as part of holistic care.

CONCLUSION

This study highlights a significant association between unhealthy dietary habits and heavy menstrual bleeding (HMB) among early adult women in Karachi. Frequent consumption of high-calorie foods, sugary drinks, fried items, and irregular meal patterns were found to be associated with increased prevalence of HMB, while regular physical activity was linked to reduced symptom severity. These findings underscore the importance of nutritional awareness and lifestyle modification as key components of menstrual health promotion. Early adulthood is a critical period for establishing long-term health behaviors, and integrating dietary education into women's health initiatives may contribute to improved reproductive outcomes and overall well-being. Future research using longitudinal designs and objective clinical markers is recommended to further clarify the causal pathways linking diet and menstrual disorders. Public health interventions and educational programs aimed at young women should prioritize accessible, evidence-based guidance on balanced nutrition and menstrual hygiene.

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