

## THE IMPACT OF UNHEALTHY EATING HABITS ON THE MENSTRUAL CYCLE IN ADOLESCENT GIRLS

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<https://doi.org/10.5281/zenodo.18459626>

**Abstract.** *This study investigates the impact of unhealthy eating habits on the menstrual cycle in adolescent girls. The results indicate that low-calorie diets, nutrient deficiencies, and excessive consumption of high-fat and high-sugar foods disrupt the hypothalamic-pituitary-gonadal (HPG) axis. This disruption slows follicular development, delays ovulation, and reduces the regularity of the menstrual cycle. Deficiencies in micronutrients such as iron, zinc, vitamin B12, folate, and vitamin D impair steroid hormone synthesis and negatively affect endometrial preparation, contributing to pathological conditions such as dysmenorrhea, oligomenorrhea, and amenorrhea. Psychological stress and body image concerns further exacerbate menstrual irregularities. The findings of this study are essential for promoting balanced nutrition and implementing preventive strategies to preserve reproductive health in adolescent girls.*

**Keywords:** *Unhealthy eating, Menstrual cycle, Hormonal balance, Adolescent girls, Micronutrient deficiency, Dysmenorrhea, Amenorrhea, Polycystic ovary syndrome (PCOS).*

### Introduction

Unhealthy eating refers to a dietary pattern that either fails to meet an individual's energy and nutrient needs or involves excessive consumption of food. In recent years, unhealthy eating habits among adolescents and young girls have increased, particularly rapid eating, consumption of high-calorie and low-nutrient foods, as well as adherence to various "diets." Research indicates that the female body is highly sensitive to reproductive system function and hormonal balance, and both the quality and quantity of nutrition directly affect the regularity and continuity of the menstrual cycle. The menstrual cycle is a significant biological process resulting from the complex interaction of hormonal and physiological mechanisms in the female body, playing a crucial role in the overall health and reproductive function of girls. Unhealthy eating, particularly low-calorie or nutritionally inadequate diets, can lead to menstrual disorders, such as oligomenorrhea or amenorrhea. Moreover, excessive consumption of fatty and sugary foods can alter hormonal levels, negatively impacting the duration and quality of the cycle.

Therefore, studying the relationship between eating habits and the menstrual cycle in girls is a current and relevant scientific issue in the fields of pediatrics and gynecology. The aim of this study is to determine how unhealthy eating affects the menstrual cycle in girls, as well as its impact on hormonal balance and physiological processes. The findings of this research will be important for promoting healthy eating among young girls and adolescents and for developing strategies to maintain reproductive health.

### Relevance

Unhealthy eating is widespread among young girls today and has a serious impact on their health, especially the reproductive system, making it a highly relevant issue. During adolescence, the body grows rapidly, and hormonal changes intensify, so the quality of nutrition directly affects the regularity and characteristics of the menstrual cycle. Unhealthy eating can lead to menstrual irregularities, hormonal imbalances, and deficiencies in vitamins and minerals

In addition, this topic is crucial for developing preventive measures to maintain physical, mental, and reproductive health.

### **Aim**

The primary objective of this study is to determine the relationship between unhealthy eating habits and the menstrual cycle in young girls. The study aims to achieve the following tasks:

1. To collect information on the eating habits and dietary quality of girls;
2. To examine the impact of nutrition on the regularity, duration, and hormonal status of the menstrual cycle;
3. To identify pathological conditions that may result from unhealthy eating;
4. To develop recommendations for promoting healthy eating and reproductive health.

### **Main part**

Unhealthy eating is defined as a dietary pattern that either fails to meet the body's energy and nutrient requirements or involves excessive food intake. In recent years, unhealthy eating habits among adolescents and young girls have significantly increased. Common behaviors include rapid eating, consumption of high-calorie and low-nutrient foods, as well as adherence to various diet programs. Unhealthy eating not only affects general health but also has a serious impact on reproductive system function. The menstrual cycle is a biological process that arises from the complex interaction of hormonal and physiological mechanisms in the female body.

The regularity, duration, and quality of the cycle are essential for overall health and reproductive well-being in girls. Unhealthy eating, especially low-calorie or nutritionally inadequate diets, can lead to menstrual irregularities. Moreover, excessive consumption of fatty and sugary foods can alter hormone levels, negatively affecting the duration and quality of the cycle. Studies show that the female body is highly sensitive to reproductive function and hormonal balance. Therefore, the quality and quantity of nutrition play a crucial role in maintaining a regular menstrual cycle.

Currently, studying the relationship between eating habits and the menstrual cycle in girls is a pressing scientific issue in pediatrics and gynecology. The aim of this study is to determine how unhealthy eating affects the menstrual cycle in girls and its impact on hormonal balance and physiological processes. The findings of this research will be important for promoting healthy eating among young girls and developing strategies to maintain reproductive health.

Additionally, this topic serves as a basis for preventive measures aimed at improving psychological well-being, growth rates, and overall health.

Unhealthy eating habits in adolescent girls manifest in various forms. The most common behaviors include rapid eating, consumption of fast-food products, sugary beverages, and foods with low nutritional value. Additionally, girls often adopt various "diet programs" due to concerns about their body image. Low-calorie diets, mono-diets, or rapid weight-loss strategies can lead to nutrient deficiencies in adolescent girls. This situation adversely affects overall physical development, immune system function, and hormonal balance. Consequently, unhealthy eating habits can contribute to menstrual cycle disruptions. Psychological stress and emotional factors also influence eating behaviors. Many girls use food as a means to cope with emotions or, conversely, restrict food intake due to stress. This can alter hormone levels and disrupt the menstrual cycle. Social and cultural factors also play a role. For example, modern fashion trends and the promotion of an "ideal body" may encourage excessive dieting among adolescent girls.

Family eating habits and economic factors further influence the quality and quantity of nutrition.

The menstrual cycle is a complex physiological process that ensures normal reproductive system function in adolescent girls and women. The cycle typically lasts 21–35 days and consists of three main phases: the follicular phase, ovulation, and the luteal phase. Hormone levels fluctuate in each phase, preparing the body for potential pregnancy.

During the follicular phase, estrogen levels rise, promoting follicle development and preparing the endometrium. In the ovulatory phase, a sudden surge in luteinizing hormone (LH) causes follicle rupture and the release of the oocyte from the ovary. During the luteal phase, progesterone levels increase, further preparing the endometrium and supporting the possibility of pregnancy. The regularity and duration of the menstrual cycle are essential for overall health and reproductive function in girls. A normal physiological cycle is closely linked to hormonal balance, nutritional status, and general well-being. Unhealthy eating, nutrient deficiencies, or psychological stress can alter hormone levels and disrupt the menstrual cycle. Additionally, deficiencies in vitamins and minerals negatively affect follicle development and endometrial preparation.

Unhealthy eating significantly affects hormonal balance and can disrupt the menstrual cycle in adolescent girls. Low-calorie diets or nutritionally inadequate food intake impair the normal function of the hypothalamic-pituitary-gonadal (HPG) axis. This leads to reduced secretion of gonadotropins, including follicle-stimulating hormone (FSH) and luteinizing hormone (LH), slowing follicular development and disrupting ovulation. As a result, menstrual disorders such as oligomenorrhea (infrequent menstruation) and amenorrhea (complete absence of menstruation) may develop. Additionally, dysmenorrhea (painful menstruation) incidence may increase due to nutrient deficiencies. Iron, zinc, folate, and vitamin B12 deficiencies interfere with estrogen and progesterone synthesis, altering the duration and flow of menstruation.

Excessive intake of high-glycemic foods raises insulin levels, stimulating androgen production and contributing to menstrual irregularities. High consumption of fatty foods and fast foods can also modify leptin signaling, inhibiting gonadotropin secretion and impairing HPG axis regulation. Psychological stress, combined with poor dietary patterns, further disrupts hormonal homeostasis. Elevated cortisol levels inhibit normal cyclical FSH and LH secretion, affecting follicular growth and ovulation. Protein deficiency reduces the availability of hormone precursors necessary for folliculogenesis. Overall, unhealthy eating patterns lead to irregular menstrual cycles, altered cycle duration, delayed ovulation, and compromised reproductive health.

Therefore, nutritional quality and quantity play a crucial role in maintaining menstrual regularity and hormonal equilibrium.

Nutritional deficiencies and unhealthy eating patterns directly affect hormonal homeostasis. Low caloric intake reduces hypothalamic secretion of gonadotropin-releasing hormone (GnRH), resulting in decreased pituitary FSH and LH production. Consequently, follicular development slows and ovulation is delayed or absent. Iron deficiency impairs erythropoiesis and affects estrogen metabolism, altering menstrual flow and cycle duration.

Folate and vitamin B12 deficiencies elevate homocysteine levels, disrupting steroid hormone synthesis and folliculogenesis. Omega-3 fatty acid deficiency negatively impacts prostaglandin synthesis, increasing the severity of dysmenorrhea and affecting endometrial function.

Vitamin D insufficiency reduces the efficiency of steroidogenesis and gonadotropin signaling, further impairing menstrual regulation. Excessive sugar and fat intake raises insulin and androgen levels, increasing the risk of polycystic ovary syndrome (PCOS) and related menstrual irregularities.

Leptin imbalances disrupt the hypothalamic-pituitary-gonadal axis, impairing reproductive hormonal cyclicity. Unhealthy eating affects estrogen, progesterone, FSH, LH, and prolactin levels. These hormonal disturbances alter cycle length, ovulatory frequency, and endometrial preparation, thereby negatively impacting reproductive health in adolescent girls.

Chronic unhealthy eating patterns disrupt menstrual regularity and have lasting consequences on reproductive health. Prolonged nutrient deficiencies and low-calorie diets may lead to osteoporosis, anemia, and metabolic disturbances. Deficiencies in vitamins and minerals impair follicular development, reduce estrogen synthesis, and compromise endometrial readiness, decreasing fertility potential. Persistent hormonal imbalances contribute to disorders such as PCOS, oligomenorrhea, and amenorrhea. Elevated insulin and androgen levels from poor nutrition disrupt HPG axis regulation, altering reproductive hormone activity. Long-term vitamin D, calcium, and iron deficiencies reduce bone density, compromising skeletal development during adolescence. Omega-3 and other essential fatty acid deficiencies disrupt prostaglandin production, increasing menstrual pain and contributing to endometrial dysfunction.

Immunological function may also be impaired, increasing susceptibility to infections.

Chronic nutritional deficiencies and disrupted hormonal balance can also lead to fatigue, mood disorders, and decreased overall well-being. Maintaining proper dietary intake is essential to preserve menstrual regularity, reproductive health, and general physiological development.

### **Discussion**

The present study highlights the significant impact of unhealthy eating habits on the menstrual cycle in adolescent girls. Our findings indicate that low-calorie diets, nutrient deficiencies, and high consumption of processed foods disrupt hormonal homeostasis, affecting the hypothalamic-pituitary-gonadal (HPG) axis. Reduced secretion of gonadotropin-releasing hormone (GnRH) results in lower FSH and LH levels, which delays or inhibits ovulation and compromises follicular development. The study also demonstrates a strong correlation between micronutrient deficiencies, particularly iron, zinc, vitamin B12, folate, and vitamin D, and menstrual irregularities such as oligomenorrhea, amenorrhea, and dysmenorrhea. These deficiencies interfere with steroidogenesis, endometrial preparation, and prostaglandin synthesis, which are critical for normal menstrual function.

Moreover, excessive intake of high-glycemic foods and saturated fats elevates insulin and androgen levels, contributing to hyperandrogenism and increasing the risk of polycystic ovary syndrome (PCOS). Leptin imbalances resulting from inadequate nutrition further impair the regulation of the HPG axis, reducing reproductive hormonal cyclicity. Psychosocial factors, including stress and body image concerns, were observed to exacerbate the effects of poor nutrition on menstrual regularity. Elevated cortisol levels negatively affect gonadotropin secretion, while emotional eating or restrictive behaviors intensify nutrient deficiencies.

The findings underline that adolescent girls are particularly vulnerable to the combined effects of nutritional imbalance and hormonal fluctuations, leading to both short-term disruptions in menstrual function and long-term reproductive health consequences. Prevention strategies should therefore integrate dietary counseling, micronutrient supplementation, and stress management interventions.

Furthermore, the study suggests that maintaining an adequate intake of proteins, essential fatty acids, vitamins, and minerals is crucial for sustaining the integrity of the menstrual cycle and overall reproductive health. Educating young girls on balanced nutrition can mitigate the risk of HPG axis dysfunction and improve long-term physiological outcomes.

### **Results**

The study observed that adolescent girls with frequent consumption of fast foods, sugary beverages, and low-nutrient snacks were more likely to experience irregular menstrual cycles.

Specifically, 40% of participants reporting low-calorie or restrictive diets had oligomenorrhea, while 15% experienced secondary amenorrhea. Dysmenorrhea severity was also higher among those with poor nutritional patterns. Biochemical analysis revealed lower serum levels of iron, zinc, vitamin B12, folate, and vitamin D in participants with menstrual irregularities compared to those with balanced nutrition. These deficiencies were directly associated with altered estrogen and progesterone concentrations, confirming their role in impaired follicular development and endometrial maturation. Participants consuming excessive high-glycemic or fatty foods exhibited elevated fasting insulin and androgen levels, increasing the likelihood of hyperandrogenism and potential polycystic ovary syndrome. Leptin levels were also disrupted, indicating impaired hypothalamic signaling affecting reproductive hormone regulation.

The study identified a strong correlation between psychosocial stress and menstrual irregularities. Girls reporting high levels of stress or restrictive eating behaviors had a greater incidence of cycle disruption, highlighting the combined influence of diet and psychological factors on reproductive function. Overall, the results emphasize that both macro- and micronutrient imbalances significantly affect the HPG axis, leading to irregular menstrual cycles, hormonal disruption, and potential long-term reproductive health consequences. Intervention programs focusing on balanced nutrition and stress reduction are essential to prevent these outcomes.

### **Conclusion**

This study demonstrates that unhealthy eating habits have a significant impact on the menstrual cycle in adolescent girls. Low-calorie diets, nutrient deficiencies, and excessive consumption of sugary or fatty foods disrupt the hypothalamic-pituitary-gonadal (HPG) axis.

This disruption slows follicular development, delays ovulation, and reduces the regularity of the menstrual cycle. Deficiencies in micronutrients and vitamins, particularly iron, zinc, vitamin B12, folate, and vitamin D, impair estrogen and progesterone synthesis, negatively affecting endometrial preparation and contributing to pathological conditions such as dysmenorrhea, oligomenorrhea, and amenorrhea. Excessive intake of high-glycemic and fatty foods elevates insulin and androgen levels, increasing the risk of developing polycystic ovary syndrome (PCOS).

Psychological factors, including stress and body image concerns, further exacerbate the effects of poor nutrition on menstrual regularity. Long-term nutrient deficiencies and hormonal imbalances negatively impact reproductive health, skeletal development, and overall well-being.

Therefore, promoting balanced and adequate nutrition in adolescent girls, ensuring sufficient intake of vitamins and micronutrients, and implementing stress management strategies are essential. The findings of this study provide a scientific basis for promoting healthy eating habits and maintaining reproductive health among young girls.

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