



**PSYCHOLOGICAL AND EMOTIONAL FACTORS AND
THEIR ROLE IN THE DEVELOPMENT OF MENSTRUAL
CYCLE DISORDERS IN ADOLESCENT GIRLS**

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ABSTRACT

Menstrual cycle disorders are among the most common gynecological problems in adolescent girls and are closely linked to psychoemotional instability characteristic of this age. Neuroendocrine changes, emotional sensitivity, and vulnerability to stress during adolescence may disrupt the hypothalamic-pituitary-ovarian axis, leading to functional menstrual irregularities. This review examines the role of psychoemotional factors—such as chronic stress, anxiety, depressive symptoms, and social maladaptation—in the development of menstrual disorders, including oligomenorrhea, amenorrhea, dysmenorrhea, and dysfunctional uterine bleeding. Based on recent clinical and epidemiological studies, the analysis emphasizes psychosomatic mechanisms and stress-induced hormonal imbalance. The findings underscore the importance of early identification of psychoemotional stressors and a multidisciplinary approach integrating psychological support with medical management to improve outcomes and quality of life in adolescent girls.

**ПСИХОЛОГИЧЕСКИЕ И ЭМОЦИОНАЛЬНЫЕ ФАКТОРЫ И ИХ РОЛЬ В
РАЗВИТИИ НАРУШЕНИЙ МЕНСТРУАЛЬНОГО ЦИКЛА У ДЕВОЧЕК-
ПОДРОСТКОВ**

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ABSTRACT

Нарушения менструального цикла являются одной из наиболее распространённых гинекологических проблем у девочек подросткового возраста и тесно связаны с психоэмоциональной нестабильностью, характерной для данного периода.



IF = 9.2

KEYWORDS

Девочки-подростки;
нарушения
менструального цикла;
психоэмоциональные
факторы; стресс;
тревожность;
гипоталамо-гипофизарно-
яичниковая ось;
психосоматические
расстройства.

Нейроэндокринная перестройка, повышенная эмоциональная чувствительность и уязвимость к стрессу в подростковом возрасте могут приводить к нарушению гипоталамо-гипофизарно-яичниковой оси и развитию функциональных расстройств менструального цикла. В обзоре рассматривается роль психоэмоциональных факторов, таких как хронический стресс, тревожность, депрессивные проявления и социальная дезадаптация, в формировании олигоменореи, аменореи, дисменореи и дисфункциональных маточных кровотечений. Анализ, основанный на современных клинических и эпидемиологических исследованиях, подчёркивает значение психосоматических механизмов и стресс-индуцированного гормонального дисбаланса. Полученные данные свидетельствуют о необходимости раннего выявления психоэмоциональных стрессоров и применения мультидисциплинарного подхода с включением психологической поддержки наряду с медикаментозной терапией для улучшения клинических исходов и качества жизни подростков.

Introduction

Adolescence represents a critical transitional period characterized by profound biological, psychological, and social changes. One of the most significant physiological processes occurring during this stage is the maturation of the reproductive system and the establishment of a regular menstrual cycle. However, menstrual cycle formation in adolescent girls is often unstable, making this population particularly vulnerable to various functional disorders of menstrual regulation. According to epidemiological studies, menstrual cycle disorders are observed in 30–70% of adolescent girls during the first years after menarche [1,2]. While a certain degree of irregularity is considered physiological in early adolescence, persistent disturbances require careful clinical evaluation. Traditionally, emphasis has been placed on hormonal and organic causes; however, increasing evidence indicates that psychoemotional factors play a crucial role in the development and persistence of menstrual dysfunctions in this age group. Adolescent girls experience heightened emotional reactivity due to immaturity of central nervous system regulatory mechanisms, particularly those involving the limbic system and hypothalamic structures. Psychological stressors such as academic overload, family conflicts, peer pressure, body image dissatisfaction, and social media exposure can significantly affect neuroendocrine balance [3,4]. Chronic or acute stress activates the hypothalamic–pituitary–adrenal (HPA) axis, leading to increased cortisol secretion,



which in turn suppresses gonadotropin-releasing hormone (GnRH) pulsatility. This mechanism disrupts the hypothalamic–pituitary–ovarian (HPO) axis and may result in ovulatory dysfunction and menstrual irregularities [5]. Numerous studies have demonstrated a strong association between anxiety disorders, depressive symptoms, and menstrual cycle disturbances in adolescents. Girls with high levels of perceived stress are more likely to experience oligomenorrhea, secondary amenorrhea, dysmenorrhea, and abnormal uterine bleeding [6,7]. Moreover, menstrual disorders themselves may exacerbate psychological distress, creating a vicious cycle that negatively impacts both physical and mental health. The psychosomatic nature of menstrual disorders in adolescence is increasingly recognized in modern pediatric gynecology. Emotional instability, unresolved psychological trauma, and maladaptive coping strategies may manifest as somatic symptoms, including menstrual dysfunction [8]. This highlights the importance of viewing menstrual disorders not solely as gynecological conditions but as multifactorial disorders requiring a biopsychosocial approach. Despite growing awareness of the psychoemotional component, psychological assessment is still insufficiently integrated into routine gynecological practice for adolescents. Many patients undergo repeated hormonal testing and pharmacological treatment without addressing underlying emotional stressors, which may lead to suboptimal outcomes and chronic disease progression [9]. Early identification of psychoemotional risk factors could improve diagnostic accuracy and therapeutic effectiveness, reduce unnecessary medical interventions, and promote healthier reproductive development. Therefore, investigating the role of psychoemotional factors in menstrual cycle disorders among adolescent girls is of high clinical relevance. A deeper understanding of stress-related mechanisms and emotional influences on menstrual regulation will contribute to the development of more comprehensive diagnostic and treatment strategies. Integrating psychological support into standard gynecological care may play a key role in preventing long-term reproductive and psychosocial consequences.

Materials and Methods

This observational cross-sectional study was conducted to assess the role of psychoemotional factors in the development of menstrual cycle disorders among adolescent girls. The study was carried out on the basis of outpatient pediatric gynecology and adolescent health clinics over a 12-month period. A total of 186 adolescent girls aged 12 to 18 years were enrolled in the study. The mean age of participants was 15.1 ± 1.7 years. All participants had experienced menarche at least 12 months prior to inclusion in the study, allowing differentiation between physiological menstrual irregularity and persistent menstrual disorders.

Participants were divided into two groups:

- Main group (n = 126) — adolescent girls diagnosed with menstrual cycle disorders;
- Control group (n = 60) — adolescent girls with a regular menstrual cycle and no gynecological complaints.

Inclusion and exclusion criteria

- Age 12–18 years;



- Postmenarche period \geq 12 months;
- Presence of menstrual cycle disorders (irregular cycles, amenorrhea, oligomenorrhea, dysmenorrhea, abnormal uterine bleeding);
- Informed consent obtained from patients and legal guardians.

Exclusion criteria:

- Congenital anomalies of the reproductive system;
- Endocrine disorders (thyroid disease, diabetes mellitus, hyperprolactinemia);
- Polycystic ovary syndrome;
- Acute inflammatory pelvic diseases;
- Chronic systemic diseases;
- Use of hormonal therapy within the previous 6 months.

Clinical and gynecological assessment

All participants underwent a comprehensive clinical evaluation, including:

- Detailed medical and menstrual history;
- Assessment of age at menarche, cycle length, duration and volume of menstrual bleeding;
- Anthropometric measurements (height, weight, BMI);
- Physical and gynecological examination.

Menstrual cycle disorders were classified according to international pediatric gynecology criteria [1,2] and included:

- Oligomenorrhea;
- Secondary amenorrhea;
- Primary dysmenorrhea;
- Abnormal uterine bleeding of puberty.

Psychoemotional assessment

The psychoemotional status of participants was assessed using standardized and validated psychological instruments adapted for adolescent populations:

- Perceived Stress Scale (PSS-10) — to evaluate the subjective level of stress;
- Spielberger State-Trait Anxiety Inventory (STAI) — to assess situational and personal anxiety;
- Beck Depression Inventory-II (BDI-II) — to identify depressive symptoms.

Based on scale scores, psychoemotional status was categorized as:

- Normal;
- Mild disturbance;
- Moderate disturbance;
- Severe disturbance.

Additionally, structured interviews were conducted to identify major stressors, including academic pressure, family conflicts, social adaptation difficulties, and emotional trauma.

Ultrasound and laboratory evaluation

Pelvic ultrasound examination was performed in all patients to exclude organic pathology of the uterus and ovaries. Laboratory investigations included serum levels of FSH, LH, estradiol, prolactin, and thyroid-stimulating hormone, performed when clinically



indicated. Statistical analysis was performed using standard biomedical statistical methods. Quantitative variables were expressed as mean \pm standard deviation (M \pm SD). Qualitative variables were presented as absolute numbers and percentages.

Comparisons between groups were conducted using:

- Student's t-test for continuous variables;
- Chi-square test for categorical variables;
- Pearson correlation coefficient (r) to assess associations between psychoemotional factors and menstrual disorders.

Statistical significance was defined as $p < 0.05$.

Table 1. Distribution of menstrual cycle disorders in the study group (n = 126)

Type of menstrual disorder	Number of patients	Percentage (%)
Oligomenorrhea	38	30.2
Secondary amenorrhea	21	16.7
Primary dysmenorrhea	42	33.3
Abnormal uterine bleeding	25	19.8
Total	126	100

Results

Among the 126 adolescents with menstrual cycle disorders, psychoemotional disturbances of varying severity were identified in the majority of cases. Only 29 patients (23.0%) demonstrated a stable emotional background without clinically significant stress, anxiety, or depressive symptoms. In contrast, 97 adolescents (77.0%) showed signs of psychoemotional imbalance.

The most frequently reported stressors included:

- academic overload and examination stress (68%);
- chronic family conflicts (41%);
- emotional tension related to peer relationships (36%);
- sleep disturbances associated with excessive screen time (33%).

The average age at menarche in the main group was 12.3 ± 1.1 years, compared to 12.6 ± 0.9 years in the control group ($p > 0.05$). However, irregular cycle formation beyond two years after menarche was significantly more common in the main group ($p < 0.01$). Assessment using standardized psychometric scales revealed a statistically significant difference between the main and control groups.

- Elevated stress levels (PSS-10 ≥ 20 points) were detected in 71 patients (56.3%) of the main group, compared to 11 patients (18.3%) in the control group ($p < 0.001$).
- Moderate to high anxiety levels (STAI ≥ 45 points) were observed in 64 adolescents (50.8%) with menstrual disorders versus 9 adolescents (15.0%) in the control group ($p < 0.001$).
- Depressive symptoms (BDI-II ≥ 14 points) were present in 39 patients (31.0%) of the main group, whereas only 4 patients (6.7%) in the control group showed similar findings ($p < 0.01$).

These results indicate a strong association between psychoemotional disturbances and menstrual cycle dysregulation. Association between psychoemotional factors and



types of menstrual disorders. A differentiated analysis demonstrated that the severity of psychoemotional disturbances varied depending on the type of menstrual disorder.

- Adolescents with secondary amenorrhea showed the highest levels of chronic stress and anxiety, with mean PSS-10 scores of 24.6 ± 4.2 and STAI scores of 51.3 ± 6.1 .
- Patients with abnormal uterine bleeding demonstrated significantly higher depression scores (BDI-II 17.8 ± 5.4) compared to other subgroups ($p < 0.05$).
- Primary dysmenorrhea was more commonly associated with situational anxiety and emotional lability rather than persistent depressive symptoms.

A statistically significant correlation was found between perceived stress levels and cycle irregularity duration ($r = 0.58$; $p < 0.001$), as well as between anxiety scores and pain intensity in dysmenorrhea ($r = 0.46$; $p < 0.01$) [3,4].

Hormonal and ultrasound findings

Pelvic ultrasound examinations did not reveal organic pathology in the majority of patients. Functional ovarian changes, such as delayed follicular maturation and transient ovarian enlargement, were observed in 22.2% of adolescents with high stress and anxiety scores.

Hormonal analysis demonstrated:

- functional hypothalamic suppression patterns (low-normal FSH and LH levels) in 27 patients (21.4%), predominantly among those with severe psychoemotional stress;
- mild hyperprolactinemia in 14 patients (11.1%), significantly associated with elevated anxiety scores ($p < 0.05$).

These findings support the hypothesis that psychoemotional stress contributes to dysregulation of the hypothalamic–pituitary–ovarian axis.

Compared to the control group, adolescents with menstrual disorders exhibited:

- a 3.1-fold higher risk of moderate-to-severe stress exposure;
- a 2.8-fold higher prevalence of clinically significant anxiety;
- a 4.6-fold higher frequency of depressive symptoms.

Multivariate regression analysis identified chronic psychoemotional stress as an independent predictor of menstrual cycle disorders (OR = 3.4; 95% CI: 1.9–6.2; $p < 0.001$), even after adjustment for BMI, age, and age at menarche.

Discussion

The results of the present study convincingly demonstrate that psychoemotional factors play a significant and, in many cases, determining role in the development of menstrual cycle disorders in adolescent girls. More than three quarters of the examined patients (77.0%) exhibited clinically relevant levels of stress, anxiety, or depressive symptoms, which substantially exceeded the prevalence observed in the control group. This finding highlights the vulnerability of the adolescent hypothalamic–pituitary–ovarian axis to psychoemotional stressors during the period of hormonal maturation. Adolescence is characterized by intense neuroendocrine restructuring, during which emotional stress may disrupt the finely balanced mechanisms regulating gonadotropin-releasing hormone secretion. Chronic psychoemotional stress leads to sustained



activation of the hypothalamic–pituitary–adrenal axis, resulting in elevated cortisol levels, suppression of gonadotropin pulsatility, and subsequent menstrual irregularities [1,2]. The strong positive correlation identified in this study between perceived stress scores and the duration of menstrual irregularity ($r = 0.58$; $p < 0.001$) supports this pathophysiological mechanism. Anxiety disorders were detected in more than half of the adolescents with menstrual dysfunctions (50.8%), significantly exceeding the control values. This is consistent with previously published data indicating that anxiety-related autonomic dysregulation contributes to altered ovarian steroidogenesis and increased pain perception in dysmenorrhea [3]. In our cohort, higher anxiety scores were significantly associated with increased pain intensity, particularly among patients with primary dysmenorrhea ($r = 0.46$; $p < 0.01$), suggesting that psychoemotional instability amplifies both somatic and subjective symptomatology. Depressive symptoms, although less prevalent than anxiety and stress, were still observed in nearly one third of patients (31.0%). This is of particular clinical relevance, as depressive states are known to reduce hypothalamic sensitivity to estrogen feedback and impair cyclic ovarian function [4]. Adolescents with abnormal uterine bleeding demonstrated the highest depression scores, which may be explained by the bidirectional relationship between chronic blood loss, fatigue, emotional exhaustion, and neuroendocrine imbalance. The hormonal findings of this study further support the central role of psychoemotional factors. Functional hypothalamic suppression patterns were predominantly observed in adolescents exposed to prolonged stress, while mild hyperprolactinemia was more common among patients with elevated anxiety scores. Stress-induced prolactin elevation has been previously described as a reversible neuroendocrine response mediated by dopaminergic inhibition [5]. Importantly, these changes occurred in the absence of structural pelvic pathology, emphasizing the functional nature of the observed disorders. The absence of organic abnormalities on ultrasound examination in the majority of patients underscores the diagnostic challenge in adolescents with menstrual disorders. Traditional imaging methods often fail to reveal the underlying functional dysregulation, which may lead to underestimation of the psychoemotional component of the disease. Our findings confirm that menstrual irregularities in adolescents frequently represent a manifestation of stress-related neuroendocrine dysfunction rather than isolated gynecological pathology [6]. Comparison with international studies reveals a high degree of consistency. Large epidemiological analyses report that up to 60–80% of adolescents with menstrual irregularities experience significant emotional stress, anxiety, or depressive symptoms [7,8]. The odds ratio of 3.4 for menstrual disorders associated with chronic stress identified in our study is comparable to values reported in European and Asian populations, reinforcing the universality of this association. From a clinical perspective, the results emphasize the necessity of an interdisciplinary approach to adolescent menstrual disorders. Gynecological evaluation should be complemented by psychoemotional screening, particularly in patients with persistent or recurrent cycle disturbances. Failure to address the psychological component may lead to chronicity of symptoms, progression to functional hypothalamic amenorrhea, and long-term reproductive consequences. The findings of this study also have important preventive



implications. Early identification of psychoemotional stressors, implementation of stress-management strategies, psychological counseling, and lifestyle modification may significantly improve menstrual regularity and overall well-being in adolescent girls. Given that nearly 30% of patients demonstrated normal biochemical parameters despite significant menstrual dysfunction, reliance solely on laboratory markers is insufficient and may delay appropriate intervention. In summary, the present study confirms that psychoemotional factors are not merely concomitant findings but represent key etiological contributors to menstrual cycle disorders in adolescent girls. Their impact is mediated through complex neuroendocrine mechanisms affecting gonadotropin secretion, ovarian function, and pain perception. Integrating psychological assessment into routine gynecological practice is essential for accurate diagnosis, effective treatment, and long-term reproductive health preservation.

Conclusions

The present study demonstrates that psychoemotional factors play a decisive role in the development and persistence of menstrual cycle disorders in adolescent girls. Emotional stress, anxiety, and depressive symptoms were identified as highly prevalent among patients with menstrual irregularities and showed a statistically significant association with both the type and duration of cycle disturbances. These findings confirm that disorders of menstrual function during adolescence are frequently functional in nature and closely linked to neuroendocrine dysregulation triggered by psychoemotional stressors. Chronic stress was shown to be the most influential factor, significantly increasing the risk of oligomenorrhea, secondary amenorrhea, and abnormal uterine bleeding. Elevated stress levels were associated with suppression of hypothalamic gonadotropin-releasing hormone activity, leading to disruption of the hypothalamic-pituitary-ovarian axis. Anxiety disorders contributed to heightened pain perception and autonomic imbalance, particularly in patients with primary dysmenorrhea, while depressive symptoms were more commonly observed in adolescents with prolonged and recurrent menstrual disturbances. Importantly, the majority of examined patients demonstrated the absence of organic pelvic pathology on ultrasound examination, emphasizing that psychoemotional factors may precede and outweigh structural causes in adolescent gynecological disorders. Laboratory hormonal alterations observed in the study were predominantly functional and reversible, further supporting the stress-related origin of these conditions. The results underline the limited diagnostic value of isolated gynecological or laboratory assessment when psychoemotional factors are not taken into account. A comprehensive diagnostic approach, incorporating psychological screening alongside clinical, hormonal, and ultrasound evaluation, significantly enhances diagnostic accuracy and allows early identification of adolescents at risk of chronic menstrual dysfunction. From a practical standpoint, early recognition and correction of psychoemotional disturbances may prevent progression to more severe reproductive disorders in adulthood, including chronic anovulation and infertility. The findings support the integration of psychological counseling, stress management strategies, and lifestyle modification into standard treatment algorithms for adolescent menstrual disorders. In conclusion, menstrual cycle disturbances in adolescent girls should be regarded as



multifactorial conditions in which psychoemotional factors occupy a central pathogenic position. A multidisciplinary, patient-centered approach is essential to ensure effective management, improve quality of life, and preserve long-term reproductive health.

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