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THE ROLE OF STRESS IN THE DEVELOPMENT OF HEADACHES IN CHILDREN: A NARRATIVE REVIEW

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ABSTRACT

Headaches are among the most common neurological disorders in the pediatric population and represent a significant health problem affecting the quality of life, social functioning, and academic performance of children and adolescents. Increasing attention has been directed toward the role of psychosocial factors, particularly stress, in the development and exacerbation of headache disorders.

The aim of this study was to review current literature regarding the role of stress in the development and exacerbation of headaches in children and adolescents.

A literature review was conducted using publications available in the PubMed and PubMed Central (PMC) databases. Studies concerning pediatric populations published between 2020 and 2025 were included. Review articles, observational studies, and clinical studies investigating the relationship between stress and headache occurrence in children and adolescents were analyzed.

The reviewed literature demonstrated a significant association between stress and both migraine and tension-type headaches. The most frequently identified stressors included academic demands, family-related problems, interpersonal difficulties, and chronic emotional tension. The studies also highlighted the importance of sleep disturbances, anxiety and depressive symptoms, and maladaptive coping strategies. Potential biological mechanisms linking stress and headaches include dysregulation of the hypothalamic–pituitary–adrenal axis and activation of the autonomic nervous system.

Stress is an important factor influencing the occurrence and course of headaches in children and adolescents. Early identification of stress-related factors and the implementation of preventive and therapeutic interventions, including both pharmacological treatment and psychological support, may contribute to reducing headache frequency and severity while improving the quality of life of pediatric patients.

KEYWORDS

Stress, Headache, Migraine, Tension-Type Headache, Children, Adolescents, Mental Health

CITATION

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Introduction

Headaches are among the most common neurological complaints in the pediatric population and constitute a significant clinical problem affecting the functioning of children and adolescents [1,2]. Their prevalence increases with age, reaching the highest rates during adolescence [3]. Among primary headache disorders, migraine and tension-type headache are the most prevalent conditions, often leading to a reduced quality of life, limitations in social activities, poorer academic performance, and increased school absenteeism [1,3].

The etiology of headaches in children is multifactorial and includes genetic, neurobiological, environmental, and psychosocial factors [1,4]. In recent years, increasing attention has been paid to the role of stress as a potential trigger and exacerbating factor of headaches during childhood and adolescence [4,5]. Both acute and chronic stress are considered important contributors, resulting from academic demands, family-related problems, interpersonal difficulties, and persistent emotional tension [4,6].

Available studies indicate a significant association between stress and both migraine and tension-type headaches in children and adolescents [5,7]. The mechanisms underlying this relationship include dysregulation of the hypothalamic–pituitary–adrenal (HPA) axis, activation of the autonomic nervous system, increased muscle tension, sleep disturbances, and the coexistence of anxiety and depressive disorders [2,5,8].

Contemporary literature also highlights the frequent coexistence of headaches with mental health disorders, particularly anxiety, depression, and maladaptive coping strategies [2,4]. Children suffering from migraine and tension-type headaches are more likely to exhibit elevated psychological distress and greater difficulties in emotional regulation [2,4,5].

The aim of this study was to analyze current literature regarding the role of stress in the development and exacerbation of headaches in children and adolescents.

Materials and Methods

This study employed a narrative literature review methodology focusing on the role of stress in the development and exacerbation of headaches in children and adolescents. Scientific publications available in the PubMed and PubMed Central (PMC) databases, as well as in peer-reviewed scientific journals, were analyzed [1–10].

The literature search was conducted using keywords related to the study topic, including: *stress*, *headache*, *migraine*, *tension-type headache*, *children*, *adolescents*, *pediatric headache*, and *stress coping*. Publications concerning pediatric populations published between 2020 and 2025 and available in English were included. The analysis incorporated full-text review articles, observational studies, and clinical studies investigating the relationship between stress and headache occurrence in children and adolescents, as well as publications addressing biological, psychological, and environmental mechanisms associated with this phenomenon [1–10].

Studies focusing exclusively on adult populations, publications unrelated to the topic of interest, and duplicate sources were excluded from the analysis.

Results

The analysis of the available literature demonstrated a significant association between stress and the occurrence as well as exacerbation of headaches in the pediatric population [2,4,5]. In most of the analyzed studies, stress was identified as one of the most common triggering factors for migraine attacks and a significant contributor to the severity of tension-type headaches [4–7].

Regarding migraine, the most frequently reported sources of stress included academic demands, emotional tension, family conflicts, achievement pressure, interpersonal problems, and sleep disturbances [5–7]. Studies suggest that children and adolescents exposed to chronic stress experience a higher frequency of headache episodes, greater symptom severity, and an increased risk of developing chronic headache disorders [2,5].

In the case of tension-type headaches, particular emphasis was placed on the role of chronic psychological tension, emotional difficulties, and coexisting anxiety disorders [4]. Increased muscle tension, impaired emotional regulation, and alterations in pain modulation mechanisms were also identified as important contributing factors [1,4].

The analyzed studies additionally revealed a frequent coexistence of headaches with mental health disorders, particularly symptoms of anxiety, depression, and maladaptive stress-coping strategies [2,5]. Pediatric patients suffering from migraine and tension-type headaches were more likely to demonstrate elevated psychological distress and greater difficulties in adaptation [2,4].

Several publications highlighted potential biological mechanisms linking stress with headache development, including dysregulation of the hypothalamic–pituitary–adrenal axis, activation of the autonomic nervous system, neuroendocrine disturbances, and sleep disorders [1,2,8].

The reviewed literature also emphasized that effective management of stress-related factors may reduce headache frequency and improve the quality of life of pediatric patients. Authors stressed the importance of non-pharmacological interventions such as health education, sleep hygiene improvement, and psychological support [8–10].

Discussion

The literature analyzed in this review indicates that stress plays a significant role in the etiopathogenesis of headaches in children and adolescents [2,4,5]. The findings suggest that stress may function both as a trigger for individual headache episodes and as a factor contributing to the chronification of symptoms [5,7].

Particularly strong associations have been observed in migraine, where stress remains one of the most frequently reported precipitating factors [5–7]. Furthermore, chronic exposure to stress may increase the sensitivity of the nervous system to pain stimuli, resulting in a higher frequency and severity of headache episodes [1,2].

Tension-type headache also occupies an important place in the analyzed literature. Its development has been linked to chronic psychological stress, increased muscle tension, and coexisting emotional difficulties [4].

These findings confirm the multifactorial nature of the relationship between stress and headaches during childhood and adolescence.

Psychiatric comorbidity represents another important issue. Children suffering from migraine and tension-type headaches more frequently exhibit symptoms of anxiety, depression, and less adaptive coping strategies [2,5]. These observations may indicate a bidirectional relationship between emotional disturbances and headache disorders.

The findings presented by Gelfand [8] and Park et al. [9] suggest that contemporary management of pediatric headache patients should include not only symptomatic treatment but also the identification of psychosocial factors that may influence the course of the disease. Increasing emphasis is being placed on an interdisciplinary approach involving cooperation among physicians, psychologists, parents, and the school environment in order to reduce the impact of stress on a child's functioning.

The results of the present review indicate that effective headache management in children should encompass not only pharmacological treatment but also an assessment of psychosocial factors affecting disease progression. The implementation of psychological interventions, educational programs, and lifestyle modifications may contribute to reducing headache frequency and improving the quality of life of pediatric patients [5,8–10]. Particular importance is attributed to health education, improvement of sleep hygiene, the development of adaptive stress-coping strategies, and the provision of appropriate psychological support. Such a multidimensional approach may reduce the negative impact of stress on daily functioning and decrease the risk of chronic headache disorders.

A limitation of this review is the inclusion of studies characterized by heterogeneous research methodologies, which may hinder direct comparisons of findings. Nevertheless, the available evidence consistently indicates the significant role of stress as a factor influencing the occurrence and course of headaches in the pediatric population.

Conclusions

1. Stress plays a significant role in the development and exacerbation of headaches in children and adolescents [2,4,5].

2. Both migraine and tension-type headaches show a strong association with psychosocial factors, particularly emotional stress, academic stress, and chronic psychological tension [4–7].

3. The relationship between stress and headaches is multifactorial and results from the interaction of biological and psychological mechanisms, including dysregulation of the hypothalamic–pituitary–adrenal axis, sleep disturbances, and the coexistence of anxiety and depressive disorders [1,2,8].

4. Early identification of stress-related factors and the implementation of preventive and therapeutic interventions, including both pharmacological treatment and psychological support, may contribute to reducing headache frequency and severity while improving the quality of life of affected children [5,8–10].

5. Further research is needed to better understand the mechanisms underlying the relationship between stress and headaches and to evaluate the effectiveness of stress-reduction interventions in the pediatric population.

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