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THE IMPACT OF MIGRAINE IN CHILDREN AND ADOLESCENTS ON THE DEVELOPMENT OF MENTAL DISORDERS

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ABSTRACT

Objective: Migraine is a common cause of pain in children and adolescents. There has been a consistent rise in the number of diagnoses over the years, which means that the problem is becoming progressively more frequent. The increase in psychiatric diagnoses in children and adolescents, we have raised a question whether there is a connection between these two issues.

Methods: Materials and methods An electronic literature search was performed using PubMed. Search terms included “migraine”, “depression”, “anxiety” “bipolar disease”, “obsessive-compulsive disorder”, “anorexia”, “attention deficit hyperactivity disorder”, “insomnia”, “children”, “adolescents”, “psychiatric disorders” as keywords. The review focused on articles published in English and Polish from their inception until 2025.

Key Findings: Migraine frequently co-occurs with symptoms of anxiety and depression. A higher incidence of bipolar disorder, OCD, and ADHD has been reported in children with migraine. It is possible that migraine and these conditions share common pathophysiological substrates. Experiencing chronic pain in childhood is also associated with sleep and eating difficulties, reducing the quality of life of paediatric patients.

Conclusion: We present statistics on the co-occurrence of these disorders with migraine, as well as reports on the possibility of common pathophysiological substrates and mutual connections, which indicate a significant impact of migraine on the development of mental disorders. However, still more research is needed to obtain valid information on the discovered relationships that would surely help to create more effective and targeted treatment and certainly provide whole-person care for young patients.

KEYWORDS

Migraine, Children, Adolescents, Paediatric, Psychiatric Disorders, Comorbidities

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Introduction

Migraine is a common cause of pain in children and adolescents. Based on extensive research from 2020, headaches were the second cause of DALY in the 10-24 age group¹. Furthermore, when narrowing the group to adolescent females aged 15-18, headaches were the leading cause of DALY². The condition also affects younger children as the onset of development of migraine may take place earlier in childhood³. This clearly illustrates the scale of the problem and indicates this condition as a cause of disability in children and adolescents, which is obviously associated with limitations in their daily functioning, such as attendance at school or building relationships with family members and friends. As a result, it significantly worsens child development and quality of life. Going further, an even newer study published last year classified the 25 most important global causes of YLD (years lived with disability) and revealed that headaches ranked high in third place⁴. Yet specialists strongly believe that migraine, despite indisputable evidence and reports on its impact on children's health, is not treated with sufficient attention. Emphasis is placed on further research, which includes deepening the knowledge of etiology, as well as improving methods of prevention and treatment⁵. In addition, there has been an increase in the incidence of migraine in recent years. In China, a general upward trend in migraine incidence has been demonstrated over a 30-year period (1990-2019), while adolescents were identified as a high risk group⁶. Yet at the same time, a sharp upward trend in mental health disorders has been noticed. Many reports warn that the magnitude of the problem, which was intensified by the COVID-19 pandemic, seems to be growing year by year, reflecting the condition of children's mental health⁷⁻⁹, which in turn prompts questions and a search for the reasons for such a set of circumstances. In this paper, we address the co-occurrence of migraine in children and adolescents with a wide range of psychiatric comorbidities, such as depression, anxiety disorder, bipolar disease, ADHD, eating disorders and insomnia, and present a summary of the research done on the topic.

Anxiety and Depressive Symptoms Co-Occurrence With Migraine

It is well established that migraine frequently co-occurs with symptoms of anxiety and depression. Children and adolescents with migraine demonstrate a significantly higher risk of developing anxiety disorders and depressive disorders than their peers without migraine¹⁰. The true nature of the co-occurrence of these neurological conditions and mental disorders still remains unknown. But there are a few hypotheses that seek to explain this phenomenon. Studies have demonstrated that the association of migraine with anxiety and depression has its source in pathological brain development, trauma and prevalent stress, pathological function of neurotransmitters or is hereditary¹¹. The development of depression or an anxiety disorder increases the likelihood of a migraine occurring and vice versa¹². Science continues to confirm that there is a 2.5 times greater risk of major depressive disorder recurrence in patients suffering from migraine^{10,13,14}. The comorbidity of depression and migraine has proven to be caused by shared genetic influences in about 20% of patients¹⁵. An increased frequency of headaches is not only a risk factor for the development of depression, but may also lead to a lower quality of life. Studies conducted between 2010 and 2021 showed a 0.3% increase in age-standardized YLD rate (years of healthy life lost due to disability), yet did not indicate any meaningful progress in the treatment of migraines⁴. The risk of developing a condition comorbid to migraine is also high in the case of anxiety disorder¹⁶. Managing chronic pain and the challenges associated with its effective control are key factors that lead to increased anxiety¹⁷. In people with migraine, anxiety is mostly manifested by avoidance, fear of the next migraine attack (pre-emptive fear), fear of pain caused by migraine (cephalalgiphobia) or a fear of trigger factors that cause avoidance of cognitive exertion (cogniphobia)¹⁸. The anticipatory fear of pain and other symptoms associated with migraine is often a contributing factor in the development of anxiety-related disorders. The risk of developing these disorders is twice as low in healthy control groups¹⁰. Diseases associated with anxiety may impair the effectiveness of pain therapy. Severe depressive symptoms may reduce the positive results of migraine treatment^{10,11}. There is insufficient scientific evidence to confirm that treatment of mental diseases such as depression in children and adolescents has any effect on reducing the risk of migraine development¹⁹. Armed with increased knowledge on the association between migraine and its psychiatric comorbidities, physicians could introduce optimized treatment strategies that would prevent the progression of migraines to a chronic stage. Routine psychiatric evaluations should become a standard in the health care of children and adolescents, especially for those exposed to environmental adversity¹⁰. In the future, there should be more research efforts into children's mental disorders for the appropriate prevention of migraine and its comorbidities during the crucial period of brain development in childhood and adolescence.

Migraine as a Cause in The Development of Other Psychiatric Disorders:

1. Migraine and Bipolar Disorder

There appears to be a link in the co-occurrence of migraine and bipolar disease. Children with bipolar disease are at increased risk for migraine, moreover the risk is even higher than in adult patients and is estimated at 38.2%²⁰. Looking at the different types of bipolar disease, it has been shown that type II and not otherwise specified were more common in migraine minor patients than type I. Type II is more strongly associated with the depressive pole than type I, which corresponds with the findings that migraine is more significantly related to disorders with a depressive rather than a maniac component. It was discovered that the course of migraine is correlated with specific important clinical features including depressive symptoms and affective lability²⁰. Bipolar disease and migraine seem to have a number of common characteristics such as their episodic character, relation to family history and worsening due to stress²¹. It is also worth adding that there is an overlap in the pharmacological therapy used to treat the two diseases. Valproic acid could be a good example of such treatment²². Bipolar disease is a hereditary psychiatric disorder with a complex etiology²³, yet interestingly recent reports suggest that bipolar disorder and migraine may share a common pathophysiology involving calcium channel dysfunction²⁴. This discovery could confirm the thesis that these two diseases might have a lot in common, which could explain their comorbidity, similar features or shared treatment.

2. Migraine and Insomnia

Given that sleep disorders are a common issue among children²⁵, it seems that there is a possible correlation between the occurrence of such disorders and migraine. In Seattle, USA a group of researchers looked into the issue of insomnia among teenagers. It was shown that patients suffering from chronic pain, including migraine, were particularly exposed to symptoms of insomnia²⁶. Fallah et al. focused on the idea of treating migraine with melatonin. The significance of the hormone in the complex sleep process is well-known,

therefore there seems to be a connection between migraine and sleep. A study of a group of children aged 5-15 years showed that melatonin used for migraine treatment was safe, effective, tolerated well and presented no severe side effects. A 50% reduction in the monthly frequency of headaches was noted in 62.5% of children who received the treatment²⁷. A more recent study in Turkey involving 70 participants showed lower melatonin levels in migraine patients; however, the statistical difference was not significant, which is why the correlation between migraine and melatonin remains controversial²⁸. A study is currently underway involving a group of 180 adolescents, aiming to evaluate the effectiveness of sequential cognitive-behavioral therapy in the treatment of insomnia and pain in adolescents with migraine. It may provide new information and discoveries, and importantly, shed some new light on treatment methods, emphasizing therapeutic treatment in addition to the current pharmacological treatment²⁹.

3. Migraine and Eating Disorders

A Polish research center sought to collect data on the relationship between migraine and eating disorders (ED). Their findings have shown how little research there is on the topic, while suggesting the presence of a correlation between migraine and ED, i.e. anorexia nervosa and bulimia nervosa. They described the profile of a typical migraineur, which was associated with such personality traits as neuroticism, perfectionism and symptoms of obsessive-compulsive disorder. It accurately matched the profile of an ED patient³⁰. Additionally, there is a hypothesis that 5-HT may play an active role in the pathophysiology of both diseases. Extensive research has shown that migraine patients have disturbances in serotonergic neurotransmission. Serotonin levels are low between attacks and increase during a migraine attack³¹. Reduced serotonin availability has also been observed in patients with anorexia nervosa³². The connection between these diseases and 5-HT was mentioned by Chinese researchers, who indicated that the imbalance of these neurotransmitters may be associated with various behavioral dysregulations. According to their results, migraine without aura was associated with a high risk of developing anorexia³³.

4. Migraine and ADHD

Attention deficit hyperactivity disorder (ADHD) has become a crucial topic in recent years, as more and more diagnoses are being made in children, though this trend is not limited to this age group. In the USA, a long-term study conducted between 1997 and 2016 indicated a significant increase in the incidence of diagnosed ADHD; the trend was present in all groups studied by gender, age, ethnicity, etc. It was diagnosed in 10.2% of children and adolescents in the USA³⁴. In a different study conducted in 2015 in Australia, the worldwide occurrences of ADHD in children and adolescents was estimated at 7.2%³⁵. Nevertheless, the numbers and trends give a clear signal that the problem is undeniable, thus further investigation into the correlation between the occurrence of migraine and ADHD in childhood is justified. The comorbidity between the two discussed disorders was demonstrated, along with a number of risk factors associated with this correlation, such as male gender, headache frequency, prenatal exposure to tobacco and below average scholastic performance. There are reports suggesting a possible common pathophysiology, including dopamine dysregulation, abnormal functioning of the hypothalamic - pituitary - adrenal axis, disruptions in brain iron metabolism, to say nothing of genetic factors³⁶. A reversal of the relationship is also observed. Children diagnosed with ADHD suffer from migraine more often than those from the control group. In a group of over 100 ADHD patients in Turkey, it was found that 59% suffered from primary headache disorder, of which 26.5% met the criteria for migraine. It was suggested that children with frequent headaches are 2.6 times more likely to present features of hyperactivity and inattention, whereas children with ADHD are 2.4 times more likely to experience primary headache disorders³⁷.

5. Migraine and OCD

Obsessive-compulsive disorder (OCD) is a neuropsychiatric disorder whose exact etiology remains unknown despite increasing research in recent years. Symptoms include intrusive thoughts (obsessions) and repetitive behaviors (compulsions), which remarkably disrupt daily functioning and child development. It is also associated with substantial comorbidity^{38,39}. OCD prevalence in the paediatric population ranges from 3% to 4%⁴⁰⁻⁴². The onset of the disorder is most often described at the age of 10 on average with a predominance of diagnosis in boys. As adolescents mature, the differences between males and females tend to lower. Over 50% of patients report symptom onset before the age of 18³⁹. The results of a Brazilian study deserve a comment, as it was shown that in a group of 75 high school students with OCD, only 9.3% were aware of their diagnosis, and 6.7% received treatment⁴². Therefore it appears that OCD represents both a considerable burden

for young patients and a clinical challenge, given its tendency to be underdiagnosed. The links between migraine and OCD remain controversial. Pavone et al. showed that the occurrence of primary headache disorders in OCD patients did not differ considerably from the controls⁴³. However, Fernández de la Cruz et al. suggest a potential association between migraine and OCD. They describe that migraine in these patients was characterized by a severe course, it was more likely to be chronic than episodic, and that patients also suffered from tension-type headaches⁴⁴. It is worth adding that migraine patients may exhibit obsessive-compulsive traits. In a group of 106 patients with chronic migraine, 36% revealed these traits, with 23.7% presented repetitive behaviors and 31.5% presented obsessions⁴⁵. OCD still remains insufficiently researched, its etiology is unclear, and effective treatment is still being sought. At this point there is no possibility to establish a clear relationship between OCD and migraine. More research is needed in this area to provide a broader yet more precise understanding of the issue.

Methodology

Materials and methods An electronic literature search was performed using PubMed. Search terms included “migraine”, “depression”, “anxiety”, “bipolar disease”, “obsessive-compulsive disorder”, “anorexia”, “attention deficit hyperactivity disorder”, “insomnia”, “children”, “adolescents”, “psychiatric disorders” as keywords. The review focused on articles published in English and Polish from their inception until 2025.

Results:

This article illustrates frequent link between migraine and several psychiatric disorders. Depression and anxiety are the most common psychiatric co-morbidities with migraine. The risk of developing this disorders is 2,5 times greater in migraine patients in comparison to healthy control group. The co-occurrence of this disorders lowers the quality of life and potentially worsen migraine treatment.

The impact of migraine could also be found within other psychiatric conditions. Bipolar disorder may have a common pathophysiology with migraine relating to calcium channel dysfunction. The article finds high prevalence of insomnia, eating disorder, ADHD and OCD with migraine.

Discussion:

Scientific reports suggest a substantial influence of migraine on the development of mental disorders such as depression, anxiety, bipolar disorder or ADHD in children and adolescents. Chronic pain also increases the risk of sleep and eating disorders, which significantly affects patients' quality of life. An increasing number of children and adolescents are affected by migraine, accompanied by a growing prevalence of comorbid conditions. In light of scientific reports which indicate an increased risk of developing mental illnesses in young patients with migraine, it can be assumed that effective treatment of migraine will protect patients from developing comorbidities. Improving the quality of life and increasing the number of years lived in full health in children and adolescents with migraine should be a priority for physicians caring for such patients. Researchers do not as yet have a full understanding of the exact nature of the association between migraine and the development of comorbidities, therefore in-depth research should be conducted on the hypotheses explaining these relationships.

Conclusions:

The fundamental aim of this review article is to demonstrate the need for intensified research on migraine, along with the development of effective treatment strategies for children and adolescents and approaches that would detect the development of migraine or mental disease at an early stage and thus prevent multimorbidity. Further exploration and a wide-reaching search for new solutions in this domain could contribute to a more comprehensive approach to the subject matter of children's mental health, which has currently become an issue of paramount importance and a major public health concern of our times.

Disclosures

Authors do not report any disclosures.

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