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Letter to the Editor

Migraine associated with psychosocial factors such as catastrophizing, anxiety and stress

Erlene Roberta Ribeiro dos Santos[1], Iris Milleyde da Silva Laurentino[1], Antonio Flaudiano Bem Leite[2], Juliana Ramos de Andrade[1], Marcelo Moraes Valença[1]

[1]Federal University of Pernambuco, Recife, Pernambuco, Brazil
[2]Pernambuco Health Department, Recife, Pernambuco, Brazil

Erlene Roberta Ribeiro dos Santos
erlene.santos@ufpe.br

Introduction
Migraine is a prevalent and disabling neurological disorder characterized by recurrent episodes of intense headache, often accompanied by nausea, photophobia, and phonophobia. Beyond its neurovascular and genetic nature, migraine is influenced by psychosocial factors that modulate symptom severity and frequency. Among these, pain catastrophizing, anxiety, and stress are highly relevant due to their impact on clinical outcomes and quality of life. This narrative review aims to synthesize the current literature on the influence of these psychosocial factors in migraine.

Methodology
This is a narrative literature review focused on the relationship between migraine and the psychosocial factors pain catastrophizing, anxiety, and stress. A search was conducted in the databases PubMed, Web of Science, and the Virtual Health Library (VHL) using the keywords: "catastrophizing" AND "anxiety" AND "migraine".

Results
Pain catastrophizing is associated with increased pain intensity, reduced treatment response, and greater disability in individuals with migraine. Anxiety is a prevalent comorbidity that exacerbates symptoms through hyperactivation of limbic circuits. Stress acts as both a trigger and perpetuating factor, particularly in individuals with low adaptive capacity. These three factors interact dynamically, forming a biopsychosocial triad that contributes to migraine chronification and diminished quality of life.

Conclusion
Psychosocial variables significantly influence the course and burden of migraine. Their identification and management through integrative care strategies and public health initiatives are essential to improving clinical outcomes and reducing the societal impact of migraine.

Keywords:
Migraine
Catastrophizing
Anxiety
Stress

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Introduction

Migraine is a prevalent and disabling neurological disorder characterized by recurrent attacks of moderate to severe headache, often accompanied by nausea, photophobia, and phonophobia. While traditionally classified as a neurovascular condition, migraine is now recognized as a complex, chronic, and genetically influenced disorder whose manifestations are modulated by environmental and psychosocial factors (1,2).

Among these factors, pain catastrophizing, anxiety, and stress play a critical role in the frequency, intensity, and chronicity of migraine episodes. Pain catastrophizing refers to a maladaptive cognitive-emotional pattern characterized by rumination, magnification of pain, and feelings of helplessness (3). Individuals with high levels of catastrophizing tend to report greater pain intensity, increased use of analgesics, reduced functional capacity, and poorer clinical outcomes (4–7).

Anxiety and stress are also highly prevalent among migraine sufferers and share overlapping neurobiological pathways that influence both pain perception and emotional regulation (10,13). Repeated exposure to these factors may lead to dysfunctional anticipatory mechanisms—such as hypervigilance or fear of pain—which further exacerbate the clinical picture (12,15,16).

Understanding how these psychosocial variables interact with migraine pathophysiology is essential, not only to improve clinical management but also to guide preventive strategies and public health policies. Despite growing attention to these associations, few narrative reviews have integrated the multidimensional impact of catastrophizing, anxiety, and stress in migraine. This review aims to explore and synthesize current evidence on the influence of these psychosocial factors in migraine, providing insight into their clinical relevance and implications for care.

Methodology

This is a narrative literature review focused on the relationship between migraine and psychosocial factors such as pain catastrophizing, anxiety, and stress. A search was conducted in the databases PubMed, Web of Science, and the Virtual Health Library (BVS). The search strategy included the keywords: "catastrophizing", AND "anxiety", AND "migraine". Studies published between 1995 and 2024 were considered. Priority was given to peer-reviewed articles, reviews, and relevant clinical or experimental studies addressing the biopsychosocial aspects of migraine. No formal inclusion or exclusion criteria were applied, given the exploratory nature of this review.

Psychosocial Factors in Migraine

Pain Catastrophizing

Pain catastrophizing is a well-documented cognitive-emotional response that involves three core dimensions: rumination (persistent focus on pain), magnification (exaggeration of pain threat), and helplessness (perceived inability to manage pain) (3). In individuals with migraine, these patterns are associated with increased pain intensity, greater functional disability, higher use of analgesics, and reduced treatment responsiveness (4–7).

The impact of catastrophizing extends beyond pain perception, influencing mood, sleep, and quality of life. Studies show that patients who score high on the Pain Catastrophizing Scale (PCS) tend to experience more frequent and severe migraine attacks, particularly in chronic migraine. Furthermore, catastrophizing often coexists with anxiety and depression, contributing to the complex neuropsychological burden experienced by migraine patients.

Anxiety

Anxiety is one of the most prevalent comorbidities in migraine and is associated with increased attack frequency, anticipatory pain, and treatment resistance (10,15). The pathophysiology of anxiety involves hyperactivation of the limbic system, particularly the thalamus, amygdala, and prefrontal cortex, which process threatening stimuli and regulate emotional responses (Figure 1). In migraine patients, this neural circuitry often becomes sensitized, leading to heightened vigilance and impaired modulation of both pain and emotion. These patients tend to develop an anxious anticipatory state prior to migraine attacks, contributing to central sensitization and emotional distress.

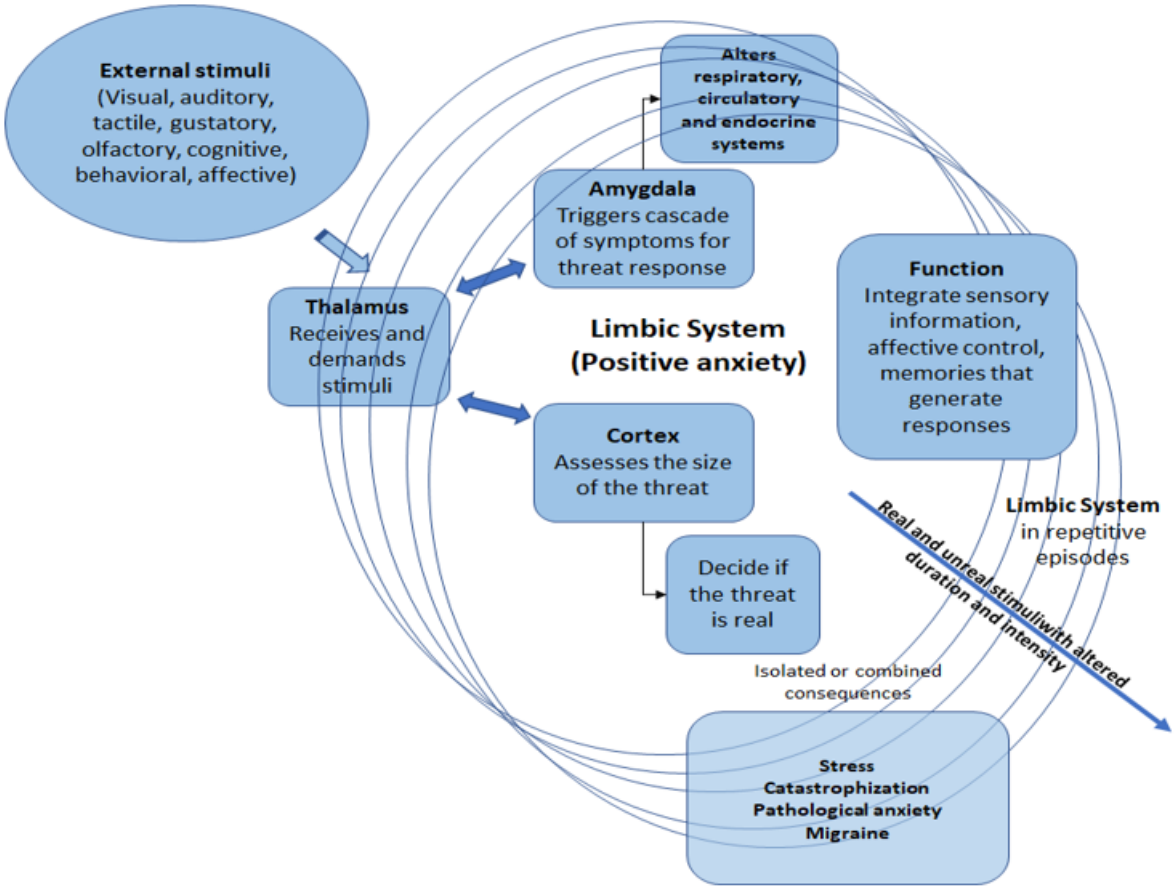

Figure 1. Elements involved in the process of neuropathophysiology of positive anxiety, negative anxiety alone or combined with psychosocial factors and migraine.

Stress

Stress is both a trigger and a perpetuating factor in migraine, particularly in individuals with poor coping mechanisms. Emotional or physiological stressors can activate the hypothalamic-pituitary-adrenal (HPA) axis, alter neurotransmitter balance, and lower the threshold for pain (18,21).

In young individuals, stress is especially relevant due to their often-limited adaptive capacity, making them more vulnerable to psychosomatic manifestations, including migraine (22). Chronic stress leads to a state of hyperarousal and behavioral avoidance, reinforcing pain cycles and increasing the risk of migraine chronification. Moreover, stress frequently interacts with anxiety and catastrophizing, reinforcing a vicious cycle of dysregulation that impairs quality of life and complicates clinical management.

Interactions and Clinical Implications

Catastrophizing, anxiety, and stress rarely occur in isolation. Their interaction forms a biopsychosocial triad that modulates pain perception, emotional regulation, and behavioral responses in migraine. Together, these factors intensify the subjective experience of pain, disrupt treatment adherence, and impair the ability to recover between episodes. Identifying and addressing these components in clinical practice can improve outcomes and reduce the risk of progression from episodic to chronic migraine. Cognitive-behavioral interventions, mindfulness-based therapies, and stress management techniques have shown promising results in modulating these psychosocial variables.

Conclusion

In conclusion, psychosocial factors such as pain catastrophizing, anxiety, and stress significantly contribute to the burden of migraine, exacerbating symptoms and impairing patients' daily functioning and quality of life. These findings underscore the need for multidisciplinary strategies that integrate mental health and pain management approaches.

Public health initiatives should prioritize prevention, early identification of psychosocial risk factors, and targeted interventions. Furthermore, future cost-effectiveness studies are essential to support investment in comprehensive care models aimed at mitigating the long-term personal and societal impact of migraine.

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Erlene Roberta Ribeiro dos Santos
https://orcid.org/0000-0003-3334-3408
Iris Milleyde da Silva Laurentino
https://orcid.org/0000-0002-7558-5870
Antonio Flaudiano Bem Leite
https://orcid.org/0000-0002-8719-5562
Juliana Ramos de Andrade
https://orcid.org/0000-0002-5445-8872
Marcelo Moraes Valença
https://orcid.org/0000-0003-0678-3782

Authors contribution: ERRS: conceptualization, supervision, writing – original draft; IMSL: writing – original draft; AFBL: conceptualization, writing – original draft, writing – review & editing; JRA: writing – original draft, writing – review & editing; MMV: writing – original draft, writing – review & editing

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