



Impulsivity in migraine and in medication overuse headache – a literature review

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Edited by:
Marcelo Moraes Valença

Keywords:
Migraine disorders
Medication overuse headache
Impulsivity
Impulsive behavior
Impulsiveness

Abstract

Introduction

Psychiatric symptoms and analgesic overuse may contribute to migraine chronification. Impulsivity is a common symptom in several psychiatric disorders that can potentiate substance overuse, including analgesics. Dopamine has been associated with migraine pathophysiology and impulsivity.

Objective

This review aims to assess the current knowledge about the potential association between migraine and impulsivity.

Methods

PubMed and LILACS were queried using relevant descriptors related to migraine and impulsivity.

Results

Five articles were selected; however, none revealed a significant correlation between migraine and impulsivity. This lack of correlation was verified in different migraine subtypes (with or without aura, chronic, or episodic).

Conclusion

The heterogeneity in patient grouping and diverse impulsivity assessment tools of the studies precluded definitive conclusions. The Barratt Impulsivity Scale (BIS-11) was the most frequently used tool. Given the paucity of data and the potential impact on migraine management, further studies are crucial to elucidate the potential association between migraine and impulsivity.



Introduction

Migraine is a frequent and disabling condition. The presence of psychiatric comorbidities and medication overuse in migraine patients are associated with increased risk of chronic migraine.^{1,2} Several studies evaluated the presence of psychiatric symptoms and psychiatric disorders in migraine patients. These conditions are associated with migraine worsening, more difficult management of migraine, less effective pain regulation, and diminished quality of life.^{3,4}

Impulsivity is symptom characterized by a predisposition towards taking immediate, unplanned action in response to external or internal stimuli without consideration for the negative consequences to oneself or to others.⁵ This symptom occurs in various disorders including substance abuse, depression with or without suicidal ideation, bipolar disorder, attention deficit hyperactivity disorder (ADHD), and borderline personality disorder.^{5,6} Some of these conditions have previously been associated to a higher risk of migraine chronification in migraine sufferers.^{7,8} Therefore, it is possible to hypothesize that impulsivity may have some role in migraine chronification.

Dopamine is associated with impulsivity, subjects with high impulsivity levels according to the Barratt Impulsivity Scale (BIS-11) have higher dopaminergic transporter availability.⁹ Increased impulsivity occurs after the administration of dopaminergic agonists.¹⁰ Increased dopaminergic activity has also been implicated in the pathophysiology of migraine and dopaminergic antagonists can improve symptoms of a migraine attack.¹¹ Considering the dopamine role in impulsivity and migraine it is reasonable to investigate if there is a potential association between these conditions.

The aim of this study was to review the current literature assessing impulsivity in patients with migraine.

Methods

This descriptive study entailed a literature review conducted through comprehensive searches on prominent online medical research platforms, specifically PubMed and LILACS. The search strategy involved utilizing the keywords ("Migraine" OR "chronic migraine" OR "migraine impact" OR "medication overuse headache" OR "analgesic abuse") AND ("impulsive behavior" OR "impulsivity" OR "impulsive symptoms"). Additionally, the Mesh tool in PubMed was utilized with search terms (("Migraine Disorders"[Mesh] OR "Migraine without Aura"[Mesh] OR "Migraine with Aura"[Mesh]) OR "Prescription Drug Overuse"[Mesh]) AND ("Impulsive Behavior"[Mesh]).

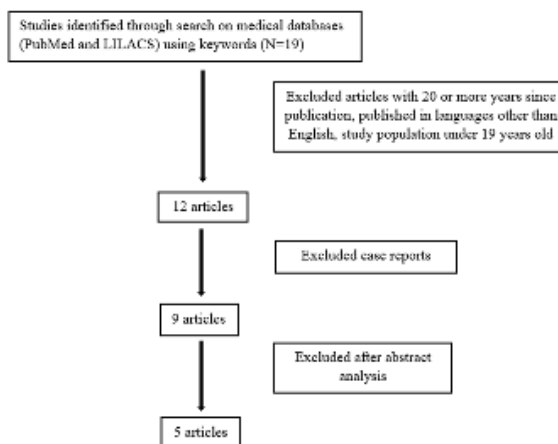
The study filtered articles published in English within the

last twenty years, focusing on adult populations and excluding case reports. Abstracts were evaluated for relevance to the study's objectives. Subsequently, the selected articles underwent analysis to determine study type, the correlation observed between migraine and impulsivity, and the methodologies employed in assessing impulsivity.

Results

The initial search utilizing the specified keywords yielded 19 articles. Following the applied filters, 12 articles met the criteria. The exclusion of case reports reduced the count to 9 articles. Abstract analysis resulted in the exclusion of 4 articles not related to migraine or medication overuse headache (Figure 1).

Figure 1. Article selection flowchart



Each of the five chosen articles were prospective cross-sectional studies performed on patient cohorts within specialized clinical facilities dedicated to headache management. Three articles employed the BIS-11 to assess impulsivity, while one utilized the Plutchik scale for impulsivity evaluation. One of the articles used the Salamanca screening test.

The following paragraphs contain descriptive information about these studies (Tables 1 and 2):

Santos et al.¹² conducted an analysis of impulsivity within a cohort of 210 patients. Among these, 70 presented with migraine and medication overuse headache, 70 had migraine without medication overuse, and 70 were controls without migraine. Employing the BIS-11 assessment tool, the study authors did not observe a statistically significant difference in the prevalence of impulsivity across the investigated groups.



Tanik et al.¹³ conducted a study examining anger and impulsivity among a cohort of 95 patients, being 31 individuals diagnosed with migraine with aura, 24 with migraine without aura, and a control group of 40 healthy individuals. Impulsivity evaluation was carried out with BIS-11. No significant difference in impulsivity was detected across the groups.

Muñoz et al.¹⁴ assessed mood disorders and impulsivity within a cohort of 155 patients, of which 51 with episodic migraine and 104 with chronic migraine, of which 74 had medication overuse. Impulsivity evaluation was carried out

with Plutchik Impulsivity Scale. No association between impulsivity and migraine was found.

Muñoz et al.¹⁵ assessed personality traits in 164 migraine patients. Salamanca Screening Test was used to assess personality traits. No significant association between migraine and impulsivity was found.

Radat et al.¹⁶ assessed¹⁷ patients with medication overuse headache, 19 with episodic migraine, and 17 healthy controls. Impulsivity was assessed with BIS-11. No statistically significant differences in impulsivity were observed between the groups.

Table 1. Study synthesis

Author (year)	Study type	Population (N)	Impulsivity assessment tool	Correlation between migraine and impulsivity	Correlation between migraine type and impulsivity
Santos et al. ¹⁶ (2020)	Prospective, cross-sectional	210	BIS-11	Not statistically significant	Not statistically significant
Tanik et al. ¹⁷ (2020)	Prospective, cross-sectional	95	BIS-11	Not statistically significant	Not statistically significant
Muñoz et al. ¹⁸ (2016)	Prospective, cross-sectional	155	Plutchik Impulsivity Scale	Not statistically significant	Not statistically significant
Radat et al. ²⁰ (2013)	Prospective, cross-sectional	51	BIS-11	Not statistically significant	Not statistically significant

Table 2 – Average and standard deviation of scores in impulsivity scales

Author (year)	Scale	Groups	p
Santos et al. ¹⁶ (2020)	BIS-11*	Migraine: 43,5 ±12 (N=70) Migraine with medication overuse: 41,4 ±12 (N=70) Control: 46,6 ± 12 (N=70)	p=0,636
Tanik et al. ¹⁷ (2020)	BIS-11*	Migraine with aura: 56,7 ±7,4 (N=31) Migraine without aura: 58,6 ±6,6 (N=24) Control: 57,1 ±7,4 (N=40)	p=0,592
Muñoz et al. ¹⁸ (2016)	Plutchik Impulsivity Scale**	Chronic migraine with medication overuse: 14,8 ±6,3 (N=74) Chronic migraine without medication overuse: 13,8 ±7,3 (N=30) Episodic migraine: 13,1 ±6,8 (N=51)	p value not informed
Radat et al. ²⁰ (2013)	BIS-11*	Migraine with medication overuse: 58 ±7,7 (N=17) Episodic migraine: 57,2 ±9,8 (N=19) Control: 59 ±6,7 (N=17)	p=0,226

* BIS-11 scored from 30 to 120, with higher impulsivity in higher scores

** Plutchik Impulsivity Scale scored from 0 to 45, with higher impulsivity in higher scores



Discussion

The review highlights a scarcity of substantial information about the association between migraine and impulsivity. None of the selected articles found a significant association between migraine and impulsivity, irrespective of distinct migraine subtypes. Therefore, despite the comorbid relationship between migraine and several psychiatric disorders that have impulsivity as a frequent and important symptom, with the potential to worsen both the migraine condition and the mental condition, the possible association between the symptom of impulsivity itself with migraine has not yet been sufficiently assessed. In patients with ADHD, which has impulsivity as one of its central symptoms, it is known that there is an increased prevalence of migraine, however, it is still unclear whether this condition can lead to a worsening of migraine or vice versa.^{17,18} More studies are needed to better understand the relationship between impulsivity and migraine.

Medication overuse has a role in the progression of migraine, potentially contributing to chronification.² Two-thirds of patients experiencing medication overuse headache met the DSM-IV criteria for substance abuse.¹⁹ It is well known that impulsivity significantly increases the susceptibility to substance abuse.¹⁰ It would be reasonable to assume the existence of an association between impulsivity and medication overuse headache. However, with the available information to date it is not possible to confirm or to rule out this association.

Barratt Impulsivity Scale (BIS-11) was the most common tool for evaluating impulsivity in this review. This scale underwent translation and cultural adaptation for Brazilian adults, being a valid assessment tool for assessing impulsivity in the Brazilian population.^{20,21} Therefore, future national studies evaluating the association between impulsivity, migraine, and medication overuse headache will be able to rely on a validated tool in this sense.

Conclusion

This review showed that no previous study found a significant correlation between impulsivity, migraine, and medication overuse headache. As impulsivity is relevant in the clinical context of various psychiatric conditions comorbid with migraine, including substance abuse, this association needs to be better understood. Considering that the management of impulsivity may require specific interventions, especially regarding the regulation of dopaminergic pathways, better knowledge of impulsivity in the context of migraine can provide potentially useful therapeutic information.

Conflict of interest: None of the authors have any conflict of interest for this article.

Author's contribution: BPMG, substantial contributions to the conception and design of the work, acquisition, analysis, and interpretation of data for the work, and drafting the work, and final approval of the version to be published, and agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved; RBD, substantial contributions to the conception and design of the work; analysis and interpretation of data for the work, and reviewing the work critically for important intellectual content; and final approval of the version to be published, and agreement to be accountable for all aspects of the work in ensuring that questions related to the accuracy or integrity of any part of the work are appropriately investigated and resolved.

Funding: no funding was provided for this work.

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