Headache Medicine

Original

Pain catastrophizing and suicidal ideation in migraine

Rebeca Veras de Andrade Vieira[1], Juliane Prieto Peres Mercante[2], Talita Souza Perboni[3], Walkyria Busato Will[4], Vanise Grassi[1,5,6,7], Liselotte Menke Barea[1,5], Renata Gomes Londero[8,9], Juliana Burges Sbicigo[10], Luciane Benvegnú Piccoloto[11]

[1]Santa Casa of Porto Alegre, Porto Alegre, Rio Grande do Sul, Brazil
[2]University of São Paulo, São Paulo, São Paulo, Brazil
[3]Curitiba Institute of Neurology, Curitiba, Paraná, Brazil
[4]Pontifical Catholic University of Paraná, Curitiba, Paraná, Brazil
[5]Federal University of Health Sciences of Porto Alegre, Porto Alegre, Rio Grande do Sul, Brazil
[6]Pontifical Catholic University of Rio Grande do Sul, Porto Alegre, Rio Grande do Sul, Brazil
[7]São Lucas Hospital, Pontifical Catholic University of Rio Grande do Sul, Porto Alegre, Rio Grande do Sul, Brazil
[8]Hospital de Clínicas de Porto Alegre, Department of Neurology, Porto Alegre, Rio Grande do Sul, Brazil
[9]Moinhos de Vento Hospital, Porto Alegre, Rio Grande do Sul, Brazil
[10]La Salle University, Porto Alegre, Rio Grande do Sul, Brazil
[11]Federal University of Santa Maria, Santa Maria, Rio Grande do Sul, Brazil

✉

Rebeca Veras de Andrade Vieira
rebecavieirapsico@gmail.com

Introduction
The literature has highlighted the relevance of investigating cognitive responses to pain and suicidal ideation in patients with migraine.

Objective
To examine associations between symptoms of depression, anxiety, pain catastrophizing and suicidal ideation in these patients.

Methods
A total of 149 adult individuals diagnosed with migraine according to the International Classification of Headache Disorders – 3rd Edition (2013) criteria from three specialized outpatient clinics in the Southern region of Brazil participated in this study completed measures assessing pain catastrophizing, depression and anxiety.

Results
The group with suicidal ideation exhibited higher levels of depression, anxiety, magnification, and helplessness, with effect sizes ranging from d = 0.62 to d = 1.32, compared to the group without suicidal ideation.

Conclusions
These results underscore the importance of assessing mental health symptoms in migraine patients taking into account psychiatric comorbidities and cognitive responses to pain.

Introduction

Migraine is a primary headache disorder widely recognized for its high prevalence and significant impact on the quality of life (1). In Brazil, the estimated prevalence among adults is 15.2% (2), although the onset and impact of the condition can already be observed during childhood and adolescence (3). Despite being considered one of the most disabling diseases worldwide (4,5), migraine often remains underdiagnosed and inadequately treated.

The literature has underscored the importance of screening for risk factors associated with migraine chronification, including psychiatric comorbidities (6). Psychological assessment in patients with migraine includes evaluating beliefs about self-efficacy and illness locus of control, treatment adherence, the identification and management of migraine triggers, psychiatric comorbidities, sleep disturbances, medication overuse and cognitive distortions— particularly pain catastrophizing (7). Pain catastrophizing has been identified in the literature as a mediating variable between mood and migraine (8), and as a factor associated with analgesic overuse and headache-related disability (9).

Pain catastrophizing can be conceptualized as a cognitive response to pain in which individuals may feel helpless, have difficulty diverting attention away from the pain, and perceive the experience as highly threatening (10). Assessment and intervention targeting pain catastrophizing within the context of migraine treatment represent a central component of psychotherapeutic approaches grounded in cognitive-behavioral therapy (CBT) (11). Based on the cognitive model, measuring and restructuring this and other potential cognitive distortions related to migraine management are essential for treatment effectiveness. In the Brazilian context, Pain Catastrophizing Scale (12) and Headache-related Cognitive Distortions Questionnaire (13,14) have demonstrated satisfactory psychometric properties for the assessment of pain catastrophizing.

The literature has provided evidence that psychiatric disorders occur in patients with migraine at significantly higher rates than in the general population, with mood and anxiety disorders being the most common (15–17). A recent review study (18) highlighted several hypotheses regarding the underlying mechanisms of this association, including serotonergic dysfunction, medication overuse, allostatic load, and behavioral factors such as pain-related appraisals and avoidance behaviors.

Longitudinal studies have demonstrated a bidirectional relationship between migraine and major depressive disorder, meaning that the presence of one condition increases the likelihood of the other. Furthermore, individuals with migraine are 2.2 to 4 times more likely to experience depression compared to those without the condition (19).

Additionally, a distinction is observed between individuals with chronic and episodic migraine, with those suffering from chronic migraine showing significantly higher mean levels of depression (17).

A meta-analysis (19) reported a modest but significant association between migraine and suicidal ideation, even after adjusting for confounding variables. These findings, combined with the importance of assessing and treating mood and anxiety disorders in migraine, highlight the need for continued empirical investigation into other variables that may influence the documented association between migraine and suicidal ideation (19).

Suicidal ideation is among a range of suicidal behaviors that encompass thoughts, plans, and suicide attempts. Although many individuals experience such thoughts, they may not share them or are asked about their presence by health care professionals. Discussing these thoughts with a trained professional can alleviate the distress they cause and serve as an entry point for a broadly mental health care, including possible associated mood and anxiety disorders. Furthermore, evidence in the literature suggests that cognitive-behavioral therapy is effective in reducing suicidal ideation (20–22).

The aim of the present study is to compare levels of pain catastrophizing and other clinical variables in migraine patients with and without suicidal ideation.

Methods

This study is part of a larger research project entitled "Cognitive distortions, locus of control, and self-efficacy in migraine." A total of 149 adult individuals diagnosed with migraine according to the International Classification of Headache Disorders – 3rd Edition (2013) (23) criteria participated in this study. Participants were recruited from three specialized outpatient clinics in the Southern region of Brazil. Informed consent was obtained from each participant prior to the administration of the assessment instruments. Each hospital granted approval through its respective Research Ethics Committee. Exclusion criteria included the presence of medical conditions documented in patient records that could impair understanding or the completion of the assessment instruments.

Instruments

Sociodemographic questionnaire. This questionnaire aimed to characterize the sample by collecting information on age, marital status, education level, occupation, family income, and headache treatment.

Pain Catastrophizing Scale. The instrument was originally developed by Sullivan et al.(10) to assess catastrophizing as a type of cognitive response to pain. Catastrophizing is considered a single construct evaluated through three dimensions: magnification, rumination, and helplessness. In Brazil, the scale was adapted and validated by Sehn et al.(12), demonstrating satisfactory levels of internal consistency, with Cronbach's alpha coefficients ranging from 0.86 to 0.93 across the magnification, rumination, and helplessness subscales.

PHQ-9. This instrument is used to assess depression according to the criteria of the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV). Validity evidence was established by Kroenke et al.(24). In Brazil, the instrument was validated by Osório et al.(25). The PHQ-9 consists of nine items rated on a 4-point Likert scale ranging from 0 (not at all) to 3 (nearly every day). Total scores range from 0 to 27, with a score of 10 or above considered indicative of major depression.

GAD-7. This instrument is used to assess anxiety according to the criteria of the Diagnostic and Statistical Manual of Mental Disorders (DSM-IV). The measure was developed by Spitzer et al.(26) and validated by Löwe et al.(27). It consists of seven items rated on a 4-point Likert scale from 0 (not at all) to 3 (nearly every day). Total scores range from 0 to 21, with scores of 10 or higher considered indicative of anxiety disorders (28).

Procedures

Participants were selected from patients registered at three specialized outpatient clinics in the Southern region of Brazil and were contacted according to their scheduled appointment order at the hospital outpatient services from April 2016 to March 2017. Data collection was computerized using an online data collection tool named Surveymonkey, which included the Informed Consent Form and all other instruments. This platform generated a link for participants to complete the survey provided to them prior to their medical appointment.

The procedures used in this study posed no potential risk to the physical, psychological, or moral integrity of the participants. However, if any participant experienced discomfort during the study, they were free to withdraw at any time. A direct benefit of participating in the study was the opportunity for patients to reflect on their relationship with their treatment and condition, as well as on their physical and psychological health. Ethical principles for research involving human subjects were respected throughout all stages of the study, in accordance with Brazilian regulations, based on Resolution 466/2012 of the National Health Council (CNS/MS/CONEP). This project was submitted to the Research Ethics Committee of each hospital where the study was conducted.

Data analysis

As an initial step, descriptive statistical procedures were employed to provide a comprehensive overview of the sociodemographic characteristics. The sample was divided into two groups: with and without suicidal ideation, based on responses to item nine of the PHQ-9 ("Thoughts that you would be better off dead or of hurting yourself in some way"). Participants who responded with 1 (several days), 2 (more than half the days), or 3 (nearly every day) were classified as presenting suicidal ideation. Student's t-tests were conducted using SPSS version 24.0, adopting a significance level of 5%. Effect sizes were reported according to Cohen's (11) guidelines.

Results

The sociodemographic and clinical characteristics of the sample are presented in Table 1. Descriptive analysis revealed that 18.8% (n = 28) of the patients reported suicidal ideation within the past two weeks. When comparing individuals with and without suicidal ideation, those with suicidal ideation showed statistically significant differences in symptoms of depression, anxiety, magnification, helplessness, and overall pain catastrophizing scores, compared to those without suicidal ideation. Furthermore, these differences demonstrated moderate to large effect sizes, with the corresponding Cohen's *d* values ranging from 0.62 to 1.32. The mean differences between groups for each variable are detailed in Table 2. The number os patients included in the calculation varied in each measure due to some missing values.

Table 1. Sociodemographic characteristics of the sample (n=149)

Sex	Female 130 (88.4%); Male 17 (11.6%)
Age	44.05 (12,8)
Educacional level f (%)	Elementary = 52 (35.3%); High school = 51 (34.7%); Technical degree = 11 (7.5%); Undergraduate degree = 19 (10.9%); Postgraduate degree= 14(9.6%)
Income (in minimum wages)	Up to 1 minimum wage =15 (10.2%); 1 to 3=69 (46.9%); 3 to 5=43 (29.3%); 5 to 10=13 (8.8%); More than 10= 7(4.8%)
Laboral status	Employed= 69 (46.9%); Unemployed= 78 (53.1%)
Marital status	Single = 37 (25.2%); Married = 60 (40.8%); Living with partner= 28 (19%); Divorced = 17 (11.6%); Widowed = 5 (3.4%)

Note: Data are presented as percentages for each variable (%), except for age, which is presented as Mean (SD)

Table 2. Mean differences in clinical variables between groups with and without suicidal ideation

Variables	n	M (SD); Range	n		Total	t value; Cohen's d, 95%CI
		Without ideation		With ideation		
PHQ	108	8.42(5.42); 0-24	28	15.60(5.54);2-24	9.89(6.16);0-24	**t=-6.22(134); p<.001, d=1.32; [.88,1,76]**
GAD-7	108	8.94(5.66);0-21	28	15.35(5.50);5-21	10.21(6.15);0-21	**t=-5.38(134); p<.001, d=1.14; [.70,1,58]**
Rumination	106	13.65(3.90);6-20	27	15.85(3.76);6-20	14.08(3.93); 6-20	t=-2.63(131); p=.009, d=.57; [.14-0,99]
Magnification	106	9.34(3.24);3-15	27	11.62(2.68);3-15	9.81(3.24); 3-15	**t=-3.36(131); p<.001, d=.73; [.30-1,16]**
Helplessness	106	18.17(5.88);6-30	27	21.74(5.50);7-30	18.86(5.92);6-30	**t=-2.85(131); p=.005, d=.62; [.19,1,04]**
PCS	106	41.17(12.00);19-65	27	49.22(10.50);21-65	42.76(12.04);19-65	**t=-3.19(131); p=.002, d=.69; [.25,1.18]**

PHQ-9 excluding item 9 (suicidal ideation); GAD-7 Generalized Anxiety Disorder; PCS= Pain catastrophizing scale; SD = standard deviation.

Discussion

The results of this study indicated that, in an outpatient sample of patients with migraine, 18.8% (n=28) exhibited suicidal ideation, as assessed by the final item of the Patient Health Questionnaire (PHQ-9). Furthermore, a significant difference in mean scores of depression, anxiety, and pain catastrophizing was observed between migraine patients with and without suicidal ideation.

Beyond the observed group differences, pain catastrophizing may play a key role in amplifying depressive and anxiety symptoms in patients with migraine, as maladaptive cognitive appraisals of pain are closely linked to feelings of helplessness, hopelessness, and persistent negative affect. This cognitive pattern may contribute to emotional dysregulation, increasing vulnerability to mood and anxiety disorders. Thus, catastrophizing represents an important psychological mechanism linking migraine-related pain to broader mental health outcomes.

The high prevalence of psychiatric comorbidities in migraine underscores the importance of clinicians and researchers considering psychological aspects in these patients, as well as the need to propose appropriate therapeutic strategies. In addition to the elevated comorbidity rates between migraine and conditions such as depression and anxiety, the literature highlights the relevance of investigating these conditions due to their high prevalence in the general population, their occurrence primarily in young adults, and their considerable impact on occupational and social functioning. Moreover, the therapeutic implications of migraine associated with depression or other mood disorders as comorbidities further support this integrated clinical approach (1).

Given the results, it becomes evident that healthcare professionals should pay close attention to the assessment of suicidality in patients with migraine, with the aim of prevention and identifying the level of risk to which the patient may be exposed. A study conducted by Tripp et al.(29) investigated predictors of suicidal ideation behavior in women with interstitial cystitis/bladder pain syndrome revealed that, although pain catastrophizing contributed to the explained variance in the tested regression model, when depression was included as a variable, only depression acted as a predictor of suicidal ideation in the multivariable analyses. Similarly, a study by Kowal et al.(30) evaluating the effectiveness of a multidisciplinary program for patients with chronic pain showed that patients with high suicidal ideation scores at baseline differed from those without suicidal thoughts in both pre-treatment and post-treatment measures of depression and pain catastrophizing. Moreover, patients with high suicidal ideation exhibited greater pain catastrophizing and perceived burden compared to those with low suicidal ideation. In the same study, a reduction in suicidal ideation was observed in both the high and low suicidal ideation groups, supporting the hypothesis that participation in interdisciplinary treatment programs for chronic pain can be effective in reducing suicidal ideation in these patients.

The findings of the present study have important clinical implications and support the adoption of an integrated approach to migraine management that systematically incorporates the assessment of emotional symptoms, suicidal ideation, and cognitive responses to pain. The higher levels of depression, anxiety, and pain catastrophizing observed among patients with suicidal ideation suggest a profile of increased psychological vulnerability, which may negatively influence treatment adherence and response to pharmacological interventions alone. In this context, pain catastrophizing should be regarded not only as a correlate of distress but also as a potentially modifiable therapeutic target, the early identification of which may inform cognitive-behavioral interventions within multidisciplinary headache care. Moreover, the routine use of brief screening instruments for depression, anxiety, and suicidal ideation in specialized headache settings may facilitate early risk identification and timely referral for appropriate psychological or psychiatric care, thereby contributing to preventive strategies and the delivery of more effective, patient-centered interdisciplinary treatment.

Although the present study meets the objectives proposed by the methodology, it is necessary to point out some limitations. The participants in this research were receiving specialized treatment for migraine, which may represent a sampling bias since most patients do not have access to specialized headache services. Another limitation concerns the bias related to how suicidal ideation was conceptualized and assessed, which may vary according to the way the phenomenon is described and the assessment measure applied. Although item 9 of the PHQ-9 has methodological limitations as a standalone measure of suicidal ideation, prior studies have demonstrated its predictive value for suicidality across different age groups. Moreover, the analysis was not stratified by disease severity (episodic vs. chronic). It is further suggested that future studies be conducted with patients from non-specialized centers, with larger samples, and including new types of analyses to clarify the observed mean differences between groups.

Conclusion

The results of the present study reinforce the importance of assessing mental health symptoms in patients with migraine, as well as cognitive responses to pain, aiming to provide appropriate multidisciplinary care for individuals diagnosed with migraine. Psychological assessment combined with cognitive-behavioral treatment of the variables investigated in this study may enhance healthcare and improve the quality of life of these individuals.

References

1. Burch RC, Buse DC, Lipton RB. Migraine. Neurol Clin 2019;37:631–49. Doi:10.1016/j.ncl.2019.06.001.
2. Queiroz L, Peres M, Piovesan E, Kowacs F, Ciciarelli M, Souza J, et al. A Nationwide Population-Based Study of Migraine in Brazil. Cephalalgia 2009;29:642–9. Doi:10.1111/j.1468-2982.2008.01782.x.
3. Arruda MA, Bigal ME. Migraine and migraine subtypes in preadolescent children. Neurology 2012;79:1881–8. Doi:10.1212/WNL.0b013e318271f812.
4. Peres MFP, Sacco S, Pozo-Rosich P, Tassorelli C, Ahmed F, Burstein R, et al. Migraine is the most disabling neurological disease among children and adolescents, and second after stroke among adults: A call to action. Cephalalgia 2024;44. Doi:10.1177/03331024241267309.
5. Steiner TJ, Stovner LJ, Vos T. GBD 2015: migraine is the third cause of disability in under 50s. J Headache Pain 2016;17:104. Doi:10.1186/s10194-016-0699-5.
6. Ahmed F, Gooriah R. OnabotulinumtoxinA for chronic migraine: a&nbsp;critical appraisal. Ther Clin Risk Manag 2015:1003. Doi:10.2147/TCRM.S76964.
7. Krimmel SR, Keaser ML, Speis D, Haythornthwaite JA, Seminowicz DA. Migraine disability, pain catastrophizing, and headache severity are associated with evoked pain and targeted by mind–body therapy. Pain 2022;163:e1030–7. Doi:10.1097/j.pain.0000000000002578.
8. Goli Z, Asghari A, Moradi A. Effects of Mood Induction on the Pain Responses in Patients with Migraine and the Role of Pain Catastrophizing. Clin Psychol Psychother 2016;23:66–76. Doi:10.1002/cpp.1939.
9. Barral E, Buonanotte F. Catastrofización ante el dolor y abuso de analgésicos en pacientes con migraña crónica. Rev Neurol 2020;70:282. Doi:10.33588/rn.7008.2020034.
10. Sullivan MJL, Bishop SR, Pivik J. The Pain Catastrophizing Scale: Development and validation. Psychol Assess 1995;7:524–32. Doi:10.1037/1040-3590.7.4.524.
11. Cohen J. Statistical power analysis for the behavioral sciences. 2nd ed. Lawrence Erlbaum Associates; 1988.
12. Sehn F, Chachamovich E, Vidor LP, Dall-Agnol L, Custódio de Souza IC, Torres ILS, et al. Cross-Cultural Adaptation and Validation of the Brazilian Portuguese Version of the Pain Catastrophizing Scale. Pain Medicine 2012;13:1425–35. Doi:10.1111/j.1526-4637.2012.01492.x.
13. Vieira RV de A, Kowacs F, Londero RG, Barea LM, Grassi V, Ligório IS, et al. Brazilian version of headache management self-efficacy scale. Headache Medicine 2021;12:247–54. Doi:10.48208/HeadacheMed.2021.36.
14. Vieira RV de A, Peterlin BL, Kowacs F, Londero RG, Barea LM, Grassi V, et al. Headache-related cognitive distortions questionnaire. Headache Medicine 2022;12:309–16. Doi:10.48208/HeadacheMed.2021.51.
15. Seng EK, Seng CD. Understanding migraine and psychiatric comorbidity. Curr Opin Neurol 2016;29:309–13. Doi:10.1097/WCO.0000000000000309.
16. McCracken H, Thaxter L, Smitherman T. Psychiatric comorbidities of migraine 2024:505–16. Doi:10.1016/B978-0-12-823357-3.00013-6.
17. Hamelsky SW, Lipton RB. Psychiatric Comorbidity of Migraine. Headache: The Journal of Head and Face Pain 2006;46:1327–33. Doi:10.1111/j.1526-4610.2006.00576.x.
18. Friedman LE, Gelaye B, Bain PA, Williams MA. A Systematic Review and Meta-Analysis of Migraine and Suicidal Ideation. Clin J Pain 2017;33:659–65. Doi:10.1097/AJP.0000000000000440.
19. Ng QX, Venkatanarayanan N, Kumar L. A Systematic Review and Meta-Analysis of the Efficacy of Cognitive Behavioral Therapy for the Management of Pediatric

Migraine. Headache: The Journal of Head and Face Pain 2017;57:349–62. Doi:10.1111/head.13016.

20. Pei J-H, Wang X-L, Yu Y, Zhang Y-B, Gou L, Nan R-L, et al. Prevalence of suicidal ideation and suicide attempt in patients with migraine: A systematic review and meta-analysis. J Affect Disord 2020;277:253–9. Doi:10.1016/j.jad.2020.08.019.

21. Wenzel A, Brown G, Beck A. Terapia cognitivo-comportamental para pacientes suicidas. Porto Alegre: Artmed; 2010.

22. D'Anci KE, Uhl S, Giradi G, Martin C. Treatments for the Prevention and Management of Suicide. Ann Intern Med 2019;171:334–42. Doi:10.7326/M19-0869.

23. The International Classification of Headache Disorders, 3rd edition (beta version). Cephalalgia 2013;33:629–808. Doi:10.1177/0333102413485658.

24. Kroenke K, Spitzer RL, Williams JBW. The PHQ-9. J Gen Intern Med 2001;16:606–13. Doi:10.1046/j.1525-1497.2001.016009606.x.

25. de Lima Osório F, Vilela Mendes A, Crippa JA, Loureiro SR. Study of the Discriminative Validity of the PHQ-9 and PHQ-2 in a Sample of Brazilian Women in the Context of Primary Health Care. Perspect Psychiatr Care 2009;45:216–27. Doi:10.1111/j.1744-6163.2009.00224.x.

26. Spitzer RL, Kroenke K, Williams JBW, Löwe B. A Brief Measure for Assessing Generalized Anxiety Disorder. Arch Intern Med 2006;166:1092. Doi:10.1001/archinte.166.10.1092.

27. Löwe B, Decker O, Müller S, Brähler E, Schellberg D, Herzog W, et al. Validation and Standardization of the Generalized Anxiety Disorder Screener (GAD-7) in the General Population. Med Care 2008;46:266–74. Doi:10.1097/MLR.0b013e318160d093.

28. Kröner-Herwig B. Psychological treatments for pediatric headache. Expert Rev Neurother 2011;11:403–10. Doi:10.1586/ern.11.10.

29. Tripp DA, Nickel JC, Krsmanovic A, Pontari M, Moldwin R, Mayer R, et al. Depression and catastrophizing predict suicidal ideation in tertiary care patients with interstitial cystitis/bladder pain syndrome. Canadian Urological Association Journal 2016;10:383. Doi:10.5489/cuaj.3892.

30. Kowal J, Wilson KG, Henderson PR, McWilliams LA. Change in Suicidal Ideation After Interdisciplinary Treatment of Chronic Pain. Clin J Pain 2014;30:463–71. Doi:10.1097/AJP.0000000000000003.

Rebeca Veras de Andrade Vieira
https://orcid.org/0000-0003-2907-8699
Juliane Prieto Peres Mercante
https://orcid.org/0000-0003-2383-289X
Talita Souza Perboni
https://orcid.org/0009-0006-0731-2586
Walkyria Busato Will
https://orcid.org/0009-0005-0146-9112
Vanise Grassi
https://orcid.org/0000-0002-9859-9167
Liselotte Menke Barea
https://orcid.org/0000-0002-9531-9115
Renata Gomes Londero
https://orcid.org/0000-0002-9780-4739
Juliana Burges Sbicigo
https://orcid.org/0000-0001-9600-3318
Luciane Benvegnú Piccoloto
https://orcid.org/0000-0002-5031-1005