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Catastrophizing in patients with trigeminal neuralgia is associated with pain intensity, anxiety, and neuropathic characteristics

Catastrofização em pacientes com neuralgia do trigêmeo está associada com a intensidade da dor, ansiedade e características neuropáticas

Guilherme Machado Alvares de Lima[1], Vinicius Gonçalves Gomes Pereira[1], Nilo Souza Sampaio[2], Fernanda Pereira Hildebrandt[3], Nivaldo Ribeiro Villela[1], Maud Parise[1]

[1] Rio de Janeiro State University, Department of Surgical Specialties, Neurosurgery/Pain Clinic, Rio de Janeiro, RJ, Brazil.
[2] Rio de Janeiro State University, Department of Mathematics, Physics and Computing, Resende, RJ, Brazil.
[3] Rio de Janeiro State University, Medical Specialties Department, Rio de Janeiro, RJ, Brazil.

Correspondence to:
Maud Parise
maud_parise@uerj.br

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ABSTRACT

BACKGROUND AND OBJECTIVES: Trigeminal neuralgia (TN) is an intense, paroxysmal facial pain, triggered by innocuous stimuli. Although it is relatively rare, the impact on patients' lives is profound. Pain catastrophizing in TN was investigated in a few studies. This study aimed to collect detailed clinical characteristics of patients with TN and examine the relationship between pain catastrophizing (PC), pain intensity, anxiety, depression, and sleep quality.

METHODS: Patients with a diagnosis of TN (according to the International Classification of Orofacial Pain criteria) were evaluated through the following scales: Pain Catastrophizing Scale (PCS), Hospital Anxiety and Depression Scale (HADS), Pittsburgh sleep quality index (PSQI), painDETECT and visual analog scale.

RESULTS: The study included 38 patients (26 women), with mean age of 64.4 ± 8 years. 28.9% had scores for anxiety (HAD_A ≥ 9), 34.2% had scores for depression (HAD_D ≥9), 86.8% had poor sleep quality (PSQI≥6) and 73.7% had scores for catastrophizing (PCS>20). Average pain intensity was correlated with depression (p=0,01), anxiety (p=0,04), and catastrophizing (p=0,03), especially helplessness (p<0,05). PC was also associated with anxiety (p=0,001) and neuropathic features (p=0,03). Moreover, magnification and helplessness were correlated with anxiety and depression. Rumination was correlated with poor sleep quality (p<0,05) and neuropathic features (p<0,05).

CONCLUSION: This study found high levels of catastrophizing and poor sleep quality in most patients with TN. Pain catastrophizing was related to pain intensity, anxiety, and neuropathic features while poor sleep quality was associated with rumination.

KEYWORDS: Catastrophizing, Depression, Sleep initiation and maintenance disorders, Trigeminal neuralgia, Anxiety disorders.

RESUMO

JUSTIFICATIVA E OBJETIVOS: A neuralgia do trigêmeo (NT) é uma dor facial intensa e paroxística, desencadeada por estímulos inócuos. Embora seja relativamente rara, o impacto na vida dos pacientes é profundo. A catastrofização da dor (CD) na NT foi investigada em poucos estudos. Este estudo teve como objetivo coletar características clínicas detalhadas de pacientes com NT e examinar a relação entre catastrofização, intensidade da dor, ansiedade, depressão e qualidade do sono.

MÉTODOS: Pacientes com diagnóstico de NT (de acordo com os critérios da Classificação Internacional de Dor Orofacial) foram avaliados por meio das seguintes escalas: Escala de Catastrofização da Dor (PCS), Escala Hospitalar de Ansiedade e Depressão (HADS), Índice de qualidade do sono de Pittsburgh (PSQI), painDETECT e Escala Analógica Visual (EAV).

RESULTADOS: Foram incluídos no estudo 38 pacientes (26 mulheres), com idade média de 64,4 ± 8 anos. 28,9% tiveram escores para ansiedade (HAD_A ≥9), 34,2% tiveram escores para depressão (HAD_D ≥9), 86,8% tiveram má qualidade do sono (PSQI ≥6) e 73,7% tiveram escores para catastrofização (PCS >20). A intensidade média da dor foi correlacionada com depressão (p=0,01), ansiedade (p=0,04) e catastrofização (p=0,03), especialmente desamparo (p<0,05). A CD também foi associada com ansiedade (p=0,001) e características neuropáticas (p=0,03). Além disso, amplificação e desamparo foram correlacionados com ansiedade e depressão. A ruminação foi correlacionada com má qualidade do sono (p<0,05).

CONCLUSÃO: Este estudo encontrou altos níveis de catastrofização e má qualidade do sono na maioria dos pacientes com NT. A PC foi relacionada à intensidade da dor, ansiedade e características neuropáticas, enquanto a má qualidade do sono foi associada à ruminação.

DESCRITORES: Catastrofização, Depressão, Distúrbios do início e da manutenção do sono, Neuralgia do trigêmeo, Transtornos de ansiedade.

HIGHLIGHTS

- Pain catastrophizing and poor sleep quality were common in patients with trigeminal neuralgia
- Pain catastrophizing was related to pain intensity, anxiety, and neuropathic features
- Poor sleep quality was associated with rumination
- Pain catastrophizing could be an important element to be addressed in the search for better control of this type of pain

INTRODUCTION

Trigeminal Neuralgia (TN) is a debilitating neuropathic pain condition that affects basic human needs such as eating, drinking, talking, or touching the face. It is characterized by recurrent unilateral brief electric shock-like pains, abrupt in onset and termination, limited to the distribution of one or more divisions of the trigeminal nerve, and triggered by innocuous stimuli. It may develop without apparent cause or be a result of another disorder. Additionally, there may or may not be a concomitant association with continuous pain of moderate intensity within the affected division(s)[1].

Although clinically well described, the pathophysiology of TN still needs to be fully understood[2]. Based on the existing evidence, the symptoms may arise from neurovascular compression (classical TN) or underlying disease (secondary TN) or may occur without an apparent cause (idiopathic).

TN is a rare condition showing a prevalence rate of 0.3%[3] and an incidence varying from 4,3-28,9 patients for every 100,000 inhabitants[4,5]. It affects women (60%) more than men (40%). The average age of onset was reported to be 53–57 years[6,7]. The rarity of cases contributes to delayed diagnosis and inadequate treatment, often aggressive and irreversible, before obtaining a correct diagnosis[8].

Antiepileptics, carbamazepine, and oxcarbazepine are the first-choice drugs for the long-term treatment of TN. Both drugs are effective, but side effects often hamper treatment. Invasive surgical procedures may follow pharmacologic therapy in cases of intractable pain; these procedures are associated with variable success rates and side-effect risks[9].

The consequences of living with TN are severe: patients often live in fear of pain, with daily functioning disrupted and quality of life impaired. Several articles investigate the impact of pain on the lives of the affected individuals. Some of them showed increased anxiety, depression, and poor sleep quality, highlighting the condition's effect on mental health[7,10–15]. Indeed, TN was reported to reduce the quality of life and to cause social and occupational impairment, and disability[16,17]. These factors highlight the need to investigate cognitive processes that may influence pain perception and coping.

Pain catastrophizing (PC) is the propensity to magnify the pain, actively ruminate on it, and feel helpless about the pain experience[18]. It has shown strong associations with pain intensity, disability, and emotional distress in patients with chronic pain, temporomandibular disorders, and heterogeneous chronic orofacial pain[19–23]. Despite the defining characteristics of trigeminal neuralgia (TN)—notably its intensity, abrupt and often unpredictable onset, and its tendency to be triggered by minimal stimuli—there has been limited research on catastrophizing in this patient population. Nevertheless, high levels of catastrophizing have been reported in over 70% of affected individuals[7,24,25].

The present study's objective was to collect detailed clinical characteristics of patients with TN and examine the relationship between PC, pain intensity, anxiety, depression, and sleep quality.

METHODS

In this cross-sectional study, the authors prospectively screened consecutive consenting patients with TN attending at the Pain Clinic at Pedro Ernesto University Hospital from January 2020 to December 2022. Inclusion criteria were a diagnosis of TN according to the ICOP (International Classification of Orofacial Pain) criteria[1]. Exclusion criteria were secondary TN, cognitive disturbances, and another orofacial pain condition diagnosis. Patients who had undergone previous surgery for TN were not excluded if their pain was the same as pre-operatively.

The total number of patients enrolled was 38. The study was approved by institutional ethics committee (Protocol Number 3.416.028).

Measures

Participants reported demographic information (e.g., age, gender) and clinical characteristics (e.g., pain area, side, drugs, previous surgery) and completed the following questionnaires recommended by Initiative on Methods, Measurement, and Pain Assessment in Clinical Trials (IMMPACT)[26], adapted and validated to the Brazilian Portuguese:

- The pain catastrophizing scale (PCS) is a three-dimensional scale that assesses distinct subconstructs of pain-related catastrophic thinking comprising rumination (R), magnification (M) and helplessness (H). It is a13-item questionnaire, each item was rated on a 4-point Likert scale (0-4) and all items added up to a total score of 52. Scores over 20 indicate significant negative thoughts[7,27].
- PainDETECT (PD-Q): the questionnaire encompasses four domains. The first domain includes three questions that assess the intensity of pain. The second domain entails four graphs asking about the pain course pattern. The third domain comprises a body chart on which to draw the main areas of pain and the presence of radiating pain. The fourth domain has seven questions addressing seven sensory descriptor items of pain. Six different answers are possible for each question, with scores from zero (never) to five (very strongly). A final score between 1 to 38 can be achieved by summing up the scores given in each domain. For scores ≤ 12, a neuropathic component is unlikely, whereas a neuropathic component is probable in the ≥ 19 scores. Between 12 and 19, neuropathic pain can be present, but it is uncertain[28,29].
- Pittsburgh sleep quality index (PSQI): is a 19-item questionnaire based on the patient's sleep quality in the last month. Scores of 0 to 5 points for sleep quality are considered healthy, while scores of 6 points or more indicate sleep impairment[30,31].
- Hospital Anxiety and Depression scale (HADS): is composed of 14 questions assessing levels of anxiety (HADS-A) and depression (HADS-D). The global score in each subscale ranges from 0 to 21. Scores greater than 8 in each subscale indicate the presence of anxiety or depression[32,33].
- Visual Analog Scale/score (VAS): was employed to measure pain intensity using a 10-cm horizontal line. Patients were instructed to indicate their pain on the line, based on the

severity of the pain, at the time of consultation and average pain in the last 30 days. Scores of 1 to 3 points indicated mild pain, 4 to 7 indicated moderate pain, and 8 to 10 indicated severe pain.

Statistical analysis

Data analysis was performed using Stata Statistical Software Version 17 /2021 (Stata Corporation. College Station, TX). Means, standard deviations, and medians (interquartile ranges) were provided for continuous variables, and frequency distributions for categorical variables. Chi-squared tests were used for categorical outcomes and numerical data were compared using the Mann-Whitney test. Spearman's correlation was used to examine the relationship between PC scores (total and subgroups M,R,H) and average pain intensity, PainDETECT scores, anxiety (HADS_a), depression (HADS_d), and sleep quality (PSQI). p-values <0.05 were considered statistically significant.

RESULTS

This study included 38 patients, 26 females (68,4%) and 12 males (31,6%), with a mean age of 64,4 ± 8 years. TN affected the ophthalmic branch (V1) in only one patient, the maxillary branch (V2) in 2 patients, the mandibular branch (V3) in 9 patients, maxillary and mandibular (V2+V3) in 20 patients, ophthalmic and maxillary (V1+V2) in 3 patients, whereas all three branches (V1 + V2 + V3) were affected in 3 patients. The right side was affected in 22 (57%) patients. Thirty-one patients (78%) had classical trigeminal neuralgia, purely paroxysmal (type1) irrespective of neurovascular compression findings, and 7(18,4%) had classical trigeminal neuralgia with concomitant continuous pain (type 2). Nineteen patients (50%) had average pain considered mild (VAS 0-3) and the other 19 (50%) had moderate or severe (VAS≥4), in the last 30 days. Nineteen patients had undergone previous surgery for TN (microvascular decompression, radiofrequency thermocoagulation or percutaneous balloon compression), they were significantly older than non-operated ones (p=0.03), no other difference was found in this subgroup.

Thirty-three patients (86.8%) had poor sleep quality (PSQI≥6). Twenty-four patients (68.5%) had nocturnal awakenings due to NT, with 6 (17.14%) waking up less than once a week, 8 (22.8%) waking up 1 or 2 times a week, and ten patients (28%) woke up three or more times.

Eleven patients (28.9%) had scores for anxiety (HADS_a≥9) and 13 (34.2%) for depression (HADS_d≥9) and 28(73.7%) had scores for catastrophizing (PCS >20) (Table 1).

Magnification and helplessness were correlated with anxiety and depression, and rumination was correlated with poor sleep quality and neuropathic characteristics of pain using Spearman's correlation test (Table 2). Moreover, catastrophizing was significantly correlated with average pain intensity (p=0.03), especially helplessness (p<0.05), anxiety (p=0.001), and neuropathic characteristics of pain (p=0.03) (Figure 1).

DISCUSSION

This study tested the association between PC and pain-related outcomes: pain intensity, depression, anxiety, and sleep quality while accounting for relevant demographic and clinical variables in patients with TN. PC was associated with pain intensity, anxiety, and neuropathic characteristics while poor sleep quality was associated with rumination. These findings emphasize the importance of addressing PC among individuals with TN pain and its potential to aid in reducing pain intensity and pain-related disability among this population.

PC is a tendency to magnify the pain, actively ruminate about it, and feel powerless about the pain experience. This study observed that 73.7% of patients with TN had negative thoughts about their

Table 1. Characteristics of patients.

Age, (range)	66.2 (39-84)
Gender, n (%)	
Female	54 (69.2%)
Male	24 (30.8%)
Pain characteristic, n (%)	
Typical	31 (81.6%)
Atypical	7 (18.4%)
Trigeminal Branches, n (%)	
V1	1 (2.6%)
V1+V2	3 (7.9%)
V1+V2+V3	3 (7.9%)
V2	2 (5.3%)
V2+V3	20 (52.6%)
V3	9 (23.7%)
Average Pain Intensity, median [P25-P75]	3.5 [0-6]
HADS-A, median [P25-P75]	6.5 [3-10]
HADS-D, median [P25-P75]	7 [3-10]
Pain Catastrophizing Scale, median [P25-P75]	32.5 [18- 42]
Pain Catastrophizing Subscale, median [P25-P75]	
Magnification	7 [4-9]
Rumination	12 [9-12]
Helplessness	13 [7-19]
Pittsburgh Sleep Quality Index, median [P25-P75]	8 [7-12]
PainDETECT	20 [17-23]
Drugs	
Carbamazepine, n(%)	33 (86.1%)
Phenytoin, n(%)	1 (2.6%)
Tricyclic, n(%)	8 (21.0%)
Clonazepam, n(%)	8 (21.0%)
Duloxetine, n(%)	1 (2.6%)
Baclofen, n(%)	4 (10.5%)
Gabapentinoid, n(%)	5 (13.2%)
No drugs	4 (10.5%)

Type 1: classical trigeminal neuralgia, purely paroxysmal; Type 2: classical trigeminal neuralgia with concomitant continuous pain; PCS: Pain Catastrophizing Scale; PSQI: Pittsburgh Sleeps Quality Index; PD-Q: PainDETECT Questionnaire; HADS: Hospital Anxiety and Depression Scale.

Table 2. Correlation of age, pain intensity, anxiety, depression, magnification, rumination, helplessness, sleep quality and PainDETECT.

	Age	Pain Intensity	HADS_A	HADS_D	PCS_M	PCS_R	PCS_H	PSQI
Pain Intensity	-0.4852**							
HADS_A	0.1361	0.3672*						
HADS_D	-0.1354	0.4415**	0.5871***					
PCS_M	-0.2167	0.3094	0.5605***	0.3571*				
PCS_R	-0.1327	0.2560	0.3022	0.0450	0.5765***			
PCS_H	-0.1705	0.3678*	0.4970**	0.3519*	0.7292***	0.5419***		
PSQI	0.0392	0.2311	0.2843	0.2394	0.2858	0.3335*	0.2791	
PainDETECT	-0.3740	0.3287*	0.1461	0.1713	0.1636	0.3776*	0.2998	0.2827

*p<0.05; **p<0.01, *** p<0.001; HADS_A: Score of Anxiety of the Hospital Anxiety and Depression Scale; HADS_D: Score of Depression of the Hospital Anxiety and Depression Scale; PCS_M: Pain Catastrophizing Subscale_Magnification; PCS_R: Pain Catastrophizing Subscale_ Rumination; PCS_H: Pain Catastrophizing Subscale_ Helplessness; PSQI: Pittsburgh Sleep Quality Index.

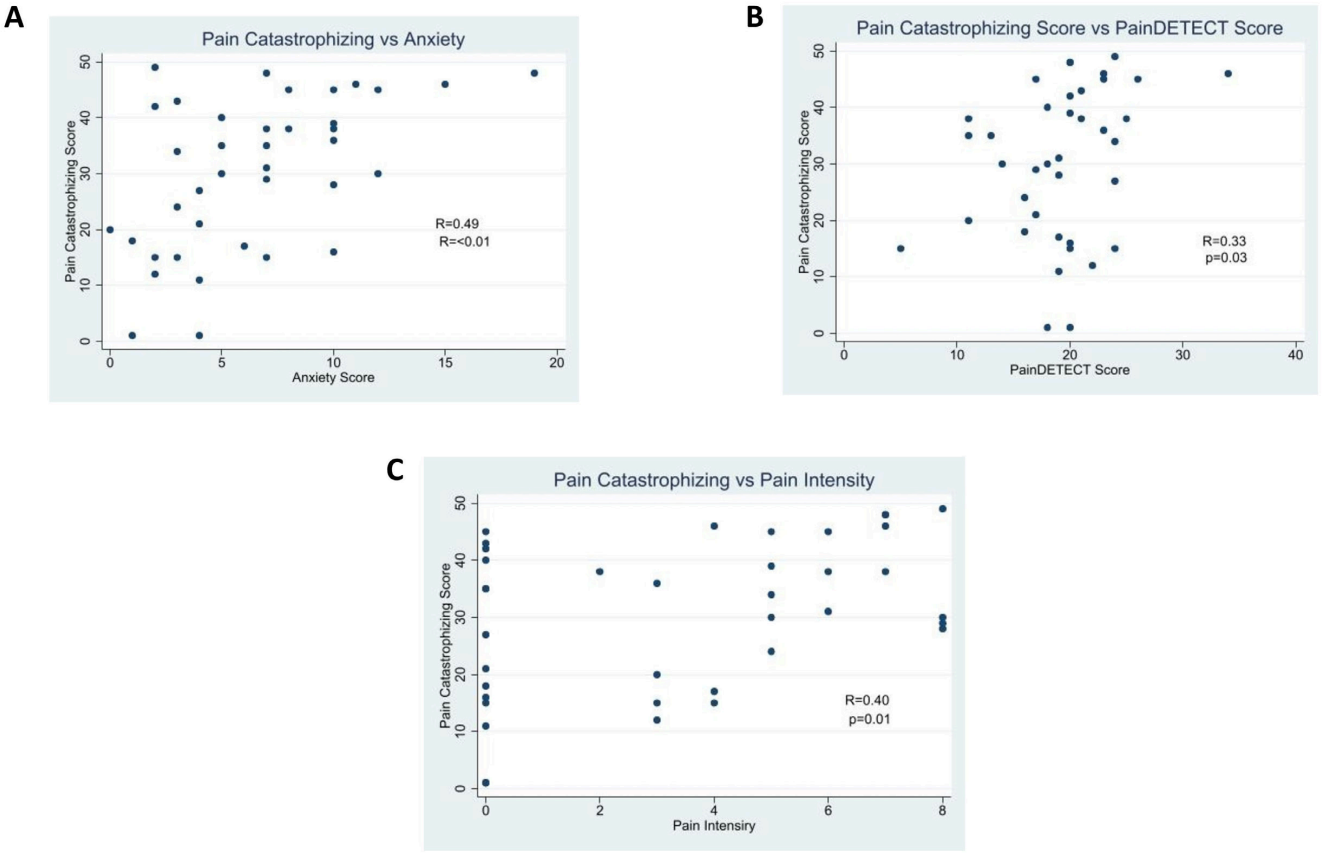

Figure 1. Relationship between pain catastrophizing score (PCS) and anxiety (A), neuropathic characteristics (Pain-Detect scores) (B) and pain intensity (C).

pain. The present study's results are in line with the other three studies that also evaluated catastrophizing in TN. They all found high levels of catastrophizing in over 70% of TN patients[7,24,25]. Fear, the unpredictability of the pain attacks, and lack of confidence in dealing with flare-ups result in high catastrophizing scores in patients with TN[7]. Catastrophizing, fear of pain, and hypervigilance were associated with perceiving oneself as incapable of dealing with suffering, increased perception of pain, anxiety, and depression[34].

PC was associated with diminished endogenous inhibition of pain coupled with central sensitization, which could represent a CNS mechanism by which PC is associated with persistent pain development, maintenance, and aggravation. Preliminary data suggest that pain-related catastrophizing is associated with altered hypothalamic-pituitary responses to pain and amplified activation in neural regions implicated in the processing and regulation of affective components of pain[34].

Fifty percent of patients had average pain moderate to severe in the last 30 days despite using one or more drugs to control it. Pain intensity was related to catastrophizing total scores and with helpless, corroborating a reference author's findings where catastrophizing was related to pain intensity in a series of 303 patients with orofacial pain, of which 51% had TN[35] as well as another author's findings in adults with chronic pain[36].

In this series, 34.2% of patients with TN had scores for depression and 28.9% for anxiety. Although there was a tendency for a correlation between depression and PC (total score), only the PC dimensions like magnification of pain experience and sense of helpless were correlated to depression as found in recent study[36]. However, anxiety was significantly related to PC total score as well as magnification and helpless. Several studies identified depression in a proportion ranging from 35.7 to 72.6% and anxiety between 18.8 and 50% of patients with TN[7,13-15]. Furthermore, depression was associated with multiple procedures and high rates of surgical complications[37].

Poor sleep quality was observed in 86.8% of the patients studied and 68.5% had nocturnal awakenings due to pain. This corroborates a references author's findings[38], where approximately 60% of patients with TN reported repeatedly waking up with intense and sudden pain, due to involuntary touching of the trigger zone[38]. Other reference authors[12] reported that 73% of TN patients had poor sleep quality, especially when TN involved multiple branches, was intense (VAS 8-10), and was associated with high anxiety scores.

The present study showed a correlation between poor sleep quality and rumination. Another reference study[39] reported that, in patients with chronic pain, ruminations predicts sleep initiation and maintenance problems. They found that general pain-related thoughts predicted sleep latency and thoughts about environmental stimuli predicted wake after sleep at the onset time. In addition, pain severity also predicted wake after sleep onset time.

This study used Pain-DETECT to assess the neuropathic characteristics of patients with TN. On this scale, 63% of patients had neuropathic features, 28.9% had possible neuropathic features, and 7.8% had unlikely neuropathic components. Catastrophizing was positively correlated with Pain-DETECT scores. This was also observed by reference authors[40] in a retrospective study with 285 patients with neuropathic pain, where psychological factors, including catastrophizing, depression, anxiety, and stress, were all influential in producing a higher score on the Pain-DETECT. On the other hand, another reference study[41] analyzing patients with orofacial pain, reported that a primary diagnosis of neuropathic pain was the strongest independent predictor of higher PC. Patients with neuropathic pain could be prone to catastrophizing but could not be especially depressed or anxious.

The diagnosis of TN is clinical, and once established, it is known that no drug or surgical intervention is effective for all patients, probably reflecting the fact that it is a heterogeneous group of disorders that manifests itself through facial pain[42]. Hence, clinical phenotype is a complementary resource to choosing the therapies most directed to the pain maintenance mechanisms. The present study's findings suggest that catastrophizing is an important element to be addressed in the search for better TN control. Studies have pointed that a multidisciplinary pain treatment program, with cognitive-behavioral intervention, could lead to reduction in PC, concurrent with reductions in pain, improving adaptive pain coping skills, disability, sleep and depression. The present authors support the conclusion that the treatment of TN should not be limited to pharmacological or surgical interventions[7].

This study had some limitations: 1- the reduced number of patients in the sample which limits statistical analysis. 2- the study involved a population of patients with TN treated at a specialized clinic. For this reason, the population may not represent the general population of cases with TN, since simpler cases do not reach the pain clinic. 3- Patients were all treated in the public health system, most of them with low socioeconomic and educational status, which implies a greater delay in diagnosis and sometimes having undergone several irreversible dental procedures (such as root canal treatments and extractions) which can somehow influence the perception of helplessness, anxiety, and depression.

CONCLUSION

This study found high levels of catastrophizing in over 70% of patients with TN. PC was related to pain intensity, anxiety, and neuropathic features while poor sleep quality was associated with rumination. These findings suggest the importance of addressing PC among individuals with TN and its potential to help reduce pain intensity and pain-related disability in this population.

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AUTHORS' CONTRIBUTIONS

Guilherme Machado Alvares de Lima: Data Collection, Conceptualization, Research, Methodology, Writing - Preparation of the Original, Visualization
Vinicius Gonçalves Gomes Pereira: Data Collection, Research, Writing - Preparation of the original
Nilo Souza Sampaio: Statistical Analysis, Methodology
Fernanda Pereira Hildebrandt: Writing - Review and Editing, Validation
Nivaldo Ribeiro Villela: Statistical Analysis, Conceptualization, Project Management, Methodology, Writing - Review and Editing, Supervision
Maud Parise: Conceptualization, Project Management, Methodology, Writing - Review and Editing, Supervision, Validation