# Catastrophic thinking and functional disability in Primary Health Care chronic pain patients

*Pensamentos catastróficos e incapacidade funcional em portadores de dor crônica na Atenção Primária à Saúde*

José Jefferson da Silva Cavalcanti Lins[1], João Paulo Lopes dos Passos[1], Antônio Plauto Oliveira Lima[2], Polyana Felipe Ferreira da Costa[1], Américo Danuzio Pereira de Oliveira[1], Rita di Cássia de Oliveira Angelo[3]

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## ABSTRACT

**BACKGROUND AND OBJECTIVES**: Catastrophic thoughts are an important evaluative factor because they interfere with pain management and degree of disability since they affect responses to pain. The study aimed to investigate the relationship between catastrophic thoughts and the dimensions of functional disability in patients with chronic musculoskeletal pain in primary health care.

**METHODS**: A cross-sectional descriptive study that included 50 patients of both genders, aged 18 to 59 years, with chronic musculoskeletal pain, with intensity from 3 to 7 by the visual analog scale. To evaluate pain catastrophization, the Brazil validated Pain Catastrophizing Scale (B-PCS) was used and the interference of pain on function was assessed by the Pain Disability Index (PDI).

**RESULTS**: The majority of patients were female (94%), mean age 42±10.3 years, median pain 7 [6-7], basic schooling level (62%), unemployed (66%), and sedentary (76%). Catastrophizing (56%). The regions with the highest prevalence of pain were thoracolumbar (38%), anterior knees (32%), lumbosacral and face (30%). There was a direct and significant correlation between the PCS and PDI scores (ρ=0.56; p<0.01), as well as between the PDI scores and the subdomains: rumination (ρ=0.34; p <0.01), magnification (ρ=0.57; p <0.01) and helplessness (ρ=0.53; p <0.01).

**CONCLUSION**: People with chronic pain demonstrate a tendency towards the most unpleasant aspects of pain, resulting in less participation in daily activities, with impacts on functional capacity.

**Keywords**: Catastrophization, Chronic pain, Musculoskeletal pain, Primary health care.

## RESUMO

**JUSTIFICATIVA E OBJETIVOS**: Os pensamentos catastróficos são fatores avaliativos importantes porque interferem no gerenciamento da dor e no grau de incapacidade, uma vez que mediam as respostas à dor. O estudo objetivou investigar a relação entre pensamentos catastróficos e as dimensões de incapacidade funcional em portadores de dores crônicas de origem musculoesquelética no âmbito da atenção básica a saúde.

**MÉTODOS**: Estudo descritivo transversal que incluiu 50 pacientes de ambos os sexos, com idade entre 18 e 59 anos, portadores de dor crônica musculoesquelética, com intensidade de 3 a 7 pela escala analógica visual. Para avaliação da catastrofização da dor foi utilizada a Escala de Pensamentos Catastróficos sobre a Dor (B-PCS) e a interferência da dor na funcionalidade foi avaliada pelo Índice de Incapacidade Relacionada à Dor (PDI).

**RESULTADOS**: A maioria dos pacientes foi do sexo feminino (94%), com média etária de 42±10,3 anos, mediana da dor 7 [6-7], nível fundamental de escolaridade (62%), sem emprego (66%) e sedentários (76%). Catastrofização (56%). A maior prevalência de dor foi identificada nas regiões toracolombar (38%), anterior dos joelhos (32%), lombossacral e face (30%). Houve correlação direta e significativa entre os escores da PCS e do PDI (ρ=0,56; p<0,01) e entre os escores do PDI e os subdomínios ruminação (ρ=0,34; p<0,01), magnificação (ρ=0,57; p<0,01) e desesperança (ρ=0,53; p<0,01).

**CONCLUSÃO**: Os portadores de dor crônica apresentaram orientação mental em direção aos aspectos mais desagradáveis da dor, acarretando menor participação nas atividades cotidianas, com repercussão sobre a capacidade funcional.

**Descritores**: Atenção primária a saúde**,** Catastrofização, Dor crônica, Dor musculoesquelética.

José Jefferson da Silva Cavalcanti Lins – https://orcid.org/0000-0003-2804-5879;
João Paulo Lopes dos Passos – https://orcid.org/0000-0001-6900-610X;
Antônio Plauto Oliveira Lima – https://orcid.org/0000-0001-6601-6628;
Polyana Felipe Ferreira da Costa – https://orcid.org/0000-0002-6054-8401;
Américo Danuzio Pereira de Oliveira – https://orcid.org/0000-0002-7050-0129;
Rita di Cássia de Oliveira Angelo – https://orcid.org/0000-0002-1694-1927.

1. University of Pernambuco, Serra Talhada Campus, Department of Medicine, Serra Talhada, PE, Brazil.
2. Bahia State University, Graduate Program in Human Ecology and Socio-Environmental Management, Juazeiro, BA, Brazil.
3. University of Pernambuco, Garanhuns Multicampi, Graduate Program in Health and Socio-Environmental Development, Garanhuns, PE, Brazil.

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**Correspondence to**:
Avenida Custódio Conrado de Lorena e Sá, 1200 – AABB
56.912-550 Serra Talhada, PE, Brasil.
E-mail: rita.angelo@upe.br ritangel@gmail.com

## INTRODUCTION

The concept of pain was recently revised by the International Association for the Study of Pain (IASP) and is defined as "an unpleasant sensory and emotional experience associated with, or resembling that associated with, actual or potential tissue damage". The construct of pain perception occurs through subjective processes and is, therefore, an individual and multidimensional experience[1].

Chronic pain (CP) is defined as a discomfort that persists continuously or episodically for more than 3 months[1], often related to musculoskeletal origins[2]. The worldwide prevalence of CP in adults is 40%[3]. In Brazil, the data is not precise, with rates varying between 30 and 70%, which probably reflects regional data[4]. Chronic musculoskeletal pain (CMP) is considered a disabling condition that interferes with daily life and occupational activities, increases social costs[5] and is one of the main complaints in primary health care services[6,7].

It's important to understand the universal meaning of the term disability. According to the International Classification of Functioning, Disability and Health (ICF), "disability" is a comprehensive term that encompasses impairments, activity limitations and participation restrictions[8]. Considering the influence of psychosocial aspects in the genesis and persistence of pain, it's possible to understand the relationship between catastrophic thinking, activity limitations and participation restrictions[9].

Catastrophizing pain is the amplified negative interpretation of a real or expected painful experience, characterized by excessively thinking about painful sensations, with a feeling of impotence in dealing with pain and the inability to get rid of thoughts that arise before, during or after experiencing pain[9].

Catastrophizing encompasses three dimensions: magnification, the amplification of the perception of pain intensity and expectation of negative results; rumination, the repetitive occurrence of negative thoughts, worry and inability to suppress or divert attention from pain-related thoughts; and, finally, hopelessness or helplessness, the feeling of incompetence to control pain[9-11].

Although CMP is one of the main causes that lead the population to seek care in Brazil's Basic Health Units (UBS - *Unidades Básicas de Saúde*), the scope of primary health care doesn't encompass treatment directed to the biopsychosocial model of pain. Although it's possible to institute an efficient and safe multidisciplinary approach in primary care, in many UBS patients are referred to specialists or receive only pharmacological treatment[7]; or yet, in most cases, the result of the therapeutic intervention frustrates patients and the health staff[2].

Additionally, the study of the association between catastrophizing thoughts, pain intensity and functional disability has often been directed to very specific pains such as knee osteoarthritis, knee arthroplasty and shoulder CP, thus the conclusions of these analyses are restricted to these special health conditions[12].

Such context demonstrates the importance of studies on musculoskeletal pain at the primary level of health care[7], because the resulting knowledge can provide a better understanding of the mechanisms of CMP and support theoretical bases for the planning of strategies to face pain, based on the biopsychosocial model.

The present article addresses the negative aspects of the interaction between patients with CMP and the environmental and personal contextual factors, which result in limitations of daily activities[8].

This study aimed to investigate the association between catastrophic thinking and the dimensions of functional disability in patients with CMP in primary health care.

## METHODS

A cross-sectional consecutive descriptive study, composed of users registered in a UBS in the town of Serra Talhada, Pernambuco. Data was collected in a single individual interview, conducted in a private environment. Inclusion criteria were individuals of both genders; aged between 18 and 59 years; with complaints of CMP lasting more than 3 months, with pain intensity between 3 and 7 according to the visual analogue scale (VAS)[13]; preserved cognitive functions and good understanding of the Portuguese language; who filled out the questionnaires completely. Patients with a diagnosis of any disabling health condition during the study or with incomplete data were excluded.

The instrument used to identify health and sociodemographic conditions was the individual registration form of the Brazilian Unified Health System (SUS - *Sistema Único de Saúde*). The Brazilian validated version for the Brief Pain Inventory (BPI)[14] was applied for multidimensional pain assessment and pain location, with a zero to 10 scale to grade pain intensity and its interference in daily activities. The most intense pain was considered as the pain evaluated by the patients at the moment they filled out the questionnaire and the less intense pain as the mean pain of the last 24 hrs.

The Pain Disability Index (PDI)[15] was used to evaluate the dimensions of disability and functional interference of pain, an instrument consisting of seven items that evaluate the functional limitation related to pain in family and household responsibilities, leisure activities, social activities, work, sexual behavior, personal care and vital activities. Each item has a numerical classification of 11 points (zero to 10); zero means no disability and 10 means that all activities the patient would normally be involved in have been totally interrupted or prevented by pain. The higher the final score, the greater the patient's functional impairment due to pain.

The Pain Catastrophizing Scale version translated and validated for the Brazilian population (B-PCS)[16] was used to identify the amplification of pain perception and the occurrence of distorted beliefs associated with pain. The participants pondered on 13 statements that described thoughts and feelings related to painful experiences and indicated the degree of these using a scale ranging from zero, minimal, to 4, very intense. The sum of all items resulted in a total score between zero and 52, besides three subscale scores for rumination, magnification, and helplessness.

The study was approved by the Research Ethics Committee (CEP - *Comitê de Ética em Pesquisa*) of the University of Pernambuco under opinion number 3.041.726. All research participants signed the Free and Informed Consent Term (FICT).

**Statistical analysis**

The SPSS software version 16.0 (SPSS Inc., Chicago, IL, USA, Release 16.0.2, 2008) was used for descriptive and inference analysis. The absolute and percentage frequencies were calculated in the descriptive statistics for categorical variables. The analyses were two-tailed, p values were calculated, 95% confidence intervals (95% CI) when calculated were exact, and the significance level adopted was 5%. In order to verify possible associations between the presence of catastrophizing and pain-related functional impairment, the Pearson's Chi-square test was applied. The scores were tested for normality using the Shapiro-Wilk test. The Levene test was used to analyze the data homoscedasticity. In the absence of these assumptions, the Mann-Whitney U test was applied in the intergroup comparative analysis to compare the mean ranks of the total PDI score and its domains.

Spearman's correlation test was used to verify possible correlations between catastrophizing and its domains, pain intensity, and functional disability related to pain. For the dichotomous dependent variable of catastrophizing, evaluated by the B-PCS, the cut-off point was the score PCS≥24[17], indicative of the presence of pain perception amplification and distorted beliefs related to pain, which generated the catastrophizing and non-catastrophizing categories. The magnitude of the correlations was established according to Miot's criteria[18].

## RESULTS

The sample consisted of 50 patients with CMP, of both genders, with a mean age of 42±10 years and a median perceived pain of 7 [6-7], 94% were female, 62% had basic schooling, 66% were unemployed, 76% were sedentary, and 72% had no access to mental health care.

The presence of catastrophic thinking was identified in more than half of the sample (56%). The regions with the highest prevalence of pain complaints were face (30%), neck (22%), thoracolumbar (38%), lumbosacral (30%), and anterior knees (32%), but there were complaints of pain in multiple regions.

Intergroup comparison, separated by the presence of catastrophizing thoughts, showed a significant association between the catastrophizing category and pain-related functional impairment in leisure (p=0.042), social (p=0.003), coping (p=0.009), and personal care (p=0.042) activities. The presence of catastrophic thoughts was not associated with impairment of activities related to family responsibilities, work, and sexual activities (Table 1).

The intergroup comparative analysis of the mean ranks of the total PDI score and the scores of its domains showed significantly higher values in the catastrophizing category for pain-related disability (p=0.008), as well as for the variables of functional impairment in social activities (p=0.013), sexual activity (p=0.022), coping activities (p=0.006) and personal care (p=0.019).

**Table 1.** Comparative analysis of the frequency distribution of the functional impairment domains assessed by the Pain Disability Index between the groups of patients dichotomized for the presence of catastrophizing thoughts

| Domains of functional impairment related to pain n (%) | Catastrophizing (n=28) n (%) | Non-catastrophizing (n=22) n (%) | p-value* |
|---|---|---|---|
| Family responsibilities | | | |
| Yes | 15 (53.6) | 8 (36.4) | 0.226 |
| No | 13 (46.4) | 14 (63.6) | |
| Leisure activities | | | |
| Yes | 17 (60.7) | 7 (31.8) | 0.042 |
| No | 11 (39.3) | 15 (68.2) | |
| Social activities | | | |
| Yes | 18 (64.3) | 5 (22.7) | 0.003 |
| No | 10 (35.7) | 17 (77.3) | |
| Professional activities | | | |
| Yes | 14 (50.0) | 8 (36.4) | 0.335 |
| No | 14 (50.0) | 14 (63.6) | |
| Sexual activity | | | |
| Yes | 14 (50.0) | 6 (27.3) | 0.103 |
| No | 14 (50.0) | 16 (72.7) | |
| Personal care | | | |
| Yes | 17 (60.7) | 7 (31.8) | 0.042 |
| No | 11 (39.3) | 15 (68.2) | |
| Coping activities | | | |
| Yes | 18 (64.3) | 6 (27.3) | 0.009 |
| No | 10 (35.7) | 16 (72.7) | |

*Pearson's Chi-square test.

In the intergroup comparison for functional impairment in leisure activities, a trend toward statistical significance was observed, with numerical superiority of the mean ranks in the catastrophizing category (Table 2).

The correlation analysis of the ranks didn't show significant relation (p=0.097) between the presence of catastrophizing thoughts, evaluated by the B-PCS, and the perception of pain intensity, evaluated by the VAS (Figure 1a).

There was a moderate positive and significant correlation (ρ=0.56; p<0.001) between catastrophizing thoughts and pain-related functional impairment, assessed by the PDI (Figure 1b). Similarly, significant correlations (ρ<0.001) of moderate degree were found between functional impairment and the domains of magnification (ρ=0.57; figure 1c) and helplessness (ρ=0.53; figure 1e), and of weak degree for rumination (ρ=0.34; figure 1d). Such findings demonstrate that these variables present simultaneous growth of values, that is, the degree of catastrophizing and its domains present a directly proportional relationship to pain-related functional impairment.

**Table 2.** Comparative analysis of the Pain Disability Index total score means ranks and its domains between the groups of patients dichotomized for the presence of catastrophizing thoughts

| Variables | Catastrophizing (n=28) | Non-catastrophizing (n=22) | U | p-value* |
|---|---|---|---|---|
| Functional impairment associated with pain | 30.34 | 19.34 | 443.5 | 0.008 |
| Family responsibilities | 27.00 | 23.59 | 350.0 | 0.404 |
| Leisure activities | 28.98 | 21.07 | 405.0 | 0.053 |
| Social activities | 29.93 | 19.86 | 432.0 | 0.013 |
| Professional activities | 28.66 | 21.48 | 396.5 | 0.080 |
| Sexual activity | 29.57 | 20.32 | 422.0 | 0.022 |
| Personal care | 29.68 | 20.18 | 425.0 | 0.019 |
| Coping activities | 30.45 | 19.20 | 446.5 | 0.006 |

*Mann-Whitney's U test.

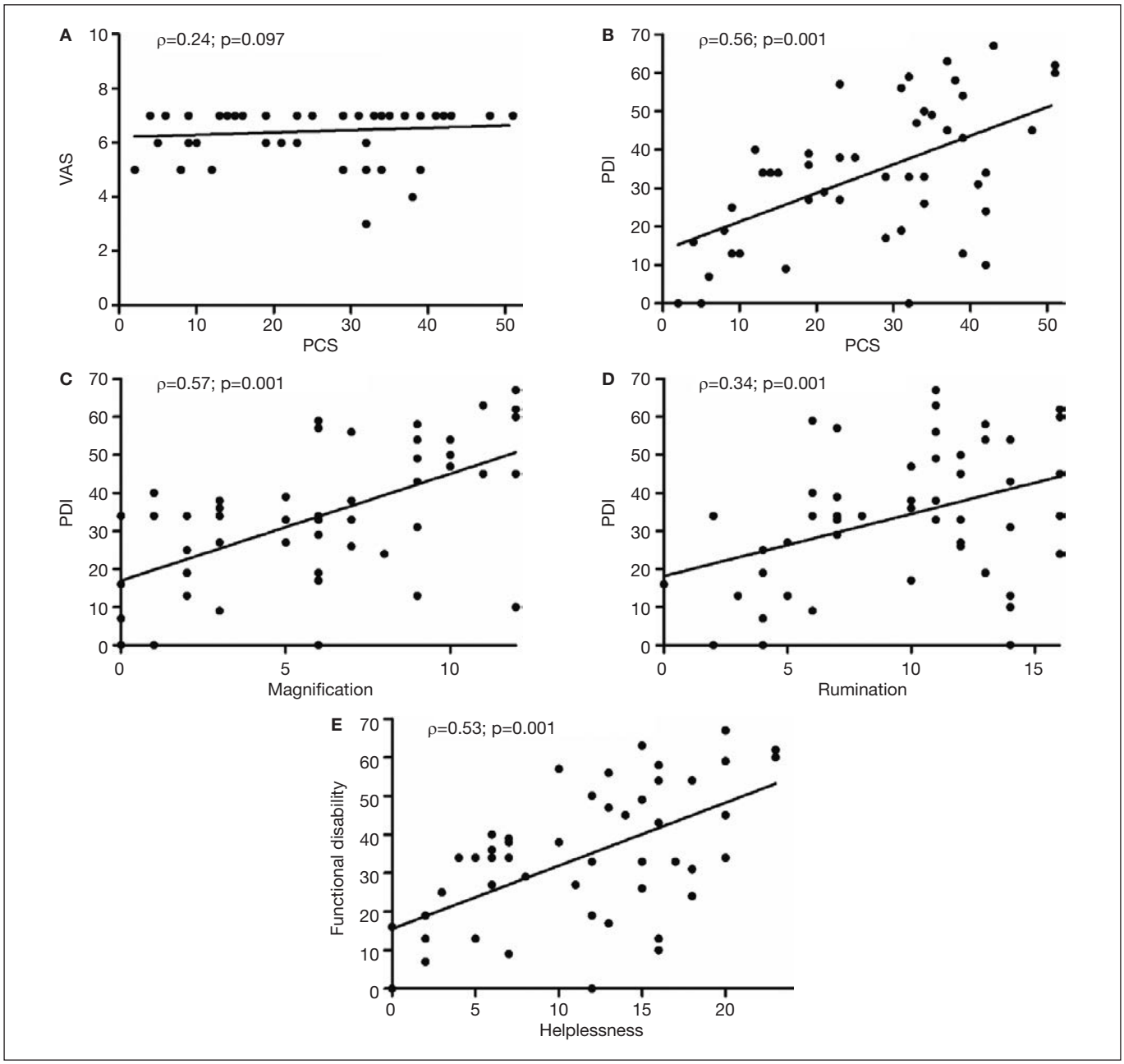


**Figure 1**. Diagrams of dispersion and correlation coefficients (ρ: Spearman) between catastrophizing, magnification, rumination, and helplessness domains (B-PCS); pain intensity (VAS) and pain-related functional disability (PDI)

## DISCUSSION

Despite the inference that CMP is a serious public health problem[1,2,4,7] and the reasonable number of publications on the topic, there is no intervention routine for managing the psychosocial aspects of CP in primary health care[7].

The results are consistent with the literature[3,4,11,19-21] and show an association between catastrophic thinking and reduced participation in several daily activities in women in the fourth decade of life, with CMP, living in a low-income urban community and with low schooling levels. Furthermore, women with persistent pain are more likely to develop maladaptive coping strategies, which predisposes chronification of pain, favors the restriction of activities and can result in the reduction of functional capacity[22,23].

The body regions with more reports of pain complaints have been the subject of studies on the prevalence of catastrophizing thoughts[2] and functional disability[24] in patients with CMP. Despite the methodological heterogeneity of the studies regarding the evaluation of the different mechanisms associated with pain, the reported areas are similar to those observed in the present study, being the main regions the cervical, lumbar and lower limbs[12,19,24]. A prospective cohort study showed that catastrophizing was positively associated with chronic low back pain[19.]

Pain catastrophizing has often been associated with various degrees of functional disability[12,25] and high pain intensity[2], and has been identified as a key target for interventions as it mediates the outcome of physical and cognitive-behavioral treatments in people dealing with CP[12,19,25]. The present research results partially diverge from the literature, since pain catastrophizing was associated only to functional disability. However, among the many biopsychosocial factors that contribute to the experience and impact of pain, negative or maladaptive psychological factors are some of the most important[12].

The psychological suffering resulting from the recurrence of negative thoughts, in addition to the amplification of pain perception, can have repercussions on the prognosis of patients with CMP, reducing their quality of life and increasing pain levels. Catastrophizing individuals usually try to avoid experiences and present excessive worries, as well as significant mood impairment, avoiding situations that cause psychological discomfort[11,26,27].

Similar to the present results, a contemporary study[28] which tested the associations between the subcomponents of catastrophizing and pain-related disability evidenced that helplessness, magnification, and rumination are associated with pain interfering on daily activities, showing that the evaluation of cognitive aspects may play an important role in populations with CP.

The cognitive process of rumination is associated with high levels of disability, indicating that people who tend to focus on the sensation of pain have worse results regarding the effectiveness of pain coping strategies, in addition to a higher level of functional impairment in daily activities[28]. Higher scores in the PCS present significant associations with functional disability related to pain; and magnification and rumination are the main subcomponents of catastrophizing that predict disability[20].

The therapeutic management of these individuals must comprise, besides pharmacological treatment, the treatment of mental health, due to the increase of psychomorbidities[29]. The maintenance of an optimistic and resilient attitude improves the adaptation to CP and reduces hypersensitivity[30]. Studies[20,31,32] show that the adjunct non-pharmacological approach, through educational actions directed to self-management of pain, contribute to the more resilient attitude towards CP and the reduction of drug use. This way, the progress of recovery is facilitated and the levels of catastrophizing and disability decrease.

Since pain is a multidimensional phenomenon, determined and influenced by biopsychosocial aspects[1], therapeutic approach must consider such complexity. Considering the socioeconomic and cultural heterogeneity of the several regions of Brazil[4,21], CP can and must be effectively managed in the primary level of health care, if these aspects are known and considered by the multidisciplinary team in the implementation of protocols and flowcharts of care in SUS[2,7].

Caution is recommended when extrapolating the results of this study, since methodological limitations, such as type of sample, study design and correlation analysis make it impossible to infer causality. Studies that analyze the association between catastrophizing and pain-related disability, as well as their respective domains, are not frequent, especially within the scope of primary health care, and it's understandable that, due to a complex emotional state, patients with CP do not easily undergo long and detailed assessments, which generates sample loss and compromises data collection.

## CONCLUSION

The present study evidenced that a negative mental state, focused exaggeratedly on painful sensations, reduces the participation of patients with CMP in daily activities, generating disability. Furthermore, it's important to consider the influence of psychosocial aspects of pain on functionality in primary health care to establish strategies to precociously fight the mental state of catastrophizing in patients with chronic pain, minimizing the impact on functional capacity and quality of life.

## AUTHORS' CONTRIBUTIONS

**José Jefferson da Silva Cavalcanti Lins**
Data Collection, Research, Writing - Preparation of the original, Writing - Review and Editing
**João Paulo Lopes dos Passos**
Data Collection, Writing - Preparation of the original
**Antônio Plauto Oliveira Lima**
Resource Management, Supervision
**Polyana Felipe Ferreira da Costa**
Data Collection, Project Management, Methodology
**Américo Danuzio Pereira de Oliveira**
Resource Management, Methodology, Writing - Review and Editing, Supervision

**Rita di Cássia de Oliveira Angelo**
Statistical Analysis, Funding Acquisition, Resource Management, Project Management, Methodology, Writing - Review and Editing, Supervision

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