Resilience, anxiety, and depression in patients with chronic pain of various etiologies: interdisciplinary analysis

Resiliência, ansiedade e depressão em pacientes com dor crônica de várias etiologias: análise interdisciplinar

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ABSTRACT

BACKGROUND AND OBJECTIVES: Chronic pain represents a significant global public health challenge, affecting millions of individuals worldwide. Characterized by their persistence and prolonged duration, these kinds of pain not only result in functional incapacity, but are also the main reason for patients to seek medical care. The complexity of these conditions is not only limited to the physical aspects, but can also affect a person's emotional state and mood, favoring the presence of anxiety and/or depression, which not only exacerbate chronic pain but also complicate the treatment process. Resilience and the capacity to deal with adversity are crucial in this context. The objective of this study was to seek out and examine the relationship between resilience, anxiety and depression in patients with chronic pain, aiming at more effective and targeted therapeutic approaches.
METHODS: Exploratory study in which patients with chronic pain starting treatment at a tertiary hospital were assessed based on sociodemographic and pain-related variables. This work also used the Hospital Anxiety and Depression Scale (HAD) and the Connor-Davidson Resilience Scale.
RESULTS: The study explored the relationship between resilience, anxiety, depression and chronic pain. The sample, composed mostly of women, showed that the majority of patients (78.3%) had mood disorder symptoms. Resilience presented a negative correlation with anxiety, depression and pain intensity, suggesting that it helps to protect against these health problems.
CONCLUSION: Resilience should be considered an important factor in the effective treatment of people with chronic pain.
Keywords: Anxiety, Chronic pain, Depression, Mood, Resilience.

RESUMO

JUSTIFICATIVA E OBJETIVOS: As dores crônicas representam um desafio global significativo para a saúde pública, afetando milhões de indivíduos em todo o mundo. Caracterizadas por sua persistência e duração prolongada, essas dores não apenas resultam em incapacidade funcional, mas também se revelam como o principal motivo de busca por assistência médica. A complexidade desses quadros não se limita apenas aos aspectos físicos, podendo afetar também o estado emocional e o humor de uma pessoa, favorecendo a presença de quadros de ansiedade e/ou depressão, que não só exacerbam as dores crônicas como também complicam o processo de tratamento. A resiliência e a capacidade de lidar com adversidade são cruciais nesse contexto. O objetivo deste estudo foi buscar e examinar a relação entre resiliência, ansiedade e depressão em pacientes com dores crônicas, visando abordagens terapêuticas mais eficazes e direcionadas.
MÉTODOS: Trata-se de um estudo exploratório no qual pacientes com dores crônicas que iniciaram tratamento em um hospital terciário foram avaliados com base em variáveis sociodemográficas, variáveis relacionadas à dor, e por meio da Escala Hospitalar de Ansiedade e Depressão (HAD) e da Escala de Resiliência Connor-Davidson.
RESULTADOS: O estudo explorou a relação entre resiliência, ansiedade, depressão e dores crônicas. A amostra, composta majoritariamente por mulheres, mostrou que a maioria dos pacientes (78,3%) apresentava sintomas de transtornos de humor. A resiliência apresentou correlação negativa com ansiedade, depressão e intensidade da dor, sugerindo que auxilie com associação de proteção a esses problemas de saúde.
CONCLUSÃO: A resiliência deve ser considerada como um fator importante para a efetividade do tratamento de pessoas com dores crônicas.
Descritores: Ansiedade, Depressão, Dor crônica, Humor, Resiliência.

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HIGHLIGHTS
• The study confirms international findings on the incidence of resilience, anxiety and depression.
• Results reinforce the importance of psychological assessment in patients with chronic pain
• Results reinforce the subjective nature of the pain experience.

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INTRODUCTION

Chronic pain (CP) represents a significant challenge for global public health, affecting millions of people worldwide due to its persistence and prolonged duration. This phenomenon can not only result in functional incapacity, compromising quality of life (QoL) of patients, but also standing out as the main reason for seeking medical care. Worldwide, out of every ten people who seek care for pain, one receives a diagnosis of chronic pain. In Brazil, it is estimated that between 40% and 76% of the adult population suffers from CP, denoting the magnitude of the impact. Identifying the factors that trigger or aggravate CP is imperative, given its prevalence, the reduction in QoL and the considerable social and economic costs associated with it[1-3]. For those who live with CP, the impacts extend to various aspects of their lives and cause adverse consequences. In addition to the physical manifestations, evidence links CP to emotional consequences, such as anxiety and depression, which not only exacerbate the condition, but can also hinder the progress and effectiveness of treatment[1-4].

Studies indicate that between 20 and 50% of patients with CP have depression as a comorbidity and point out that the possibility of experiencing depression increases in patients with severe pain. Likewise, individuals with a history of depression are at greater risk of developing CP. Anxiety, fear of pain and avoidance behaviors are associated with a greater likelihood of developing CP and a less favorable recovery prognosis. Therefore, the relationship between CP and mood disorders can be considered bidirectional, emphasizing the importance of controlling these symptoms simultaneously in order to optimize pain management[5].

Within this context, resilience emerges as a crucial concept in the context of CP and related mental health conditions. Defined as the ability to face adversity, maintain emotional balance and recover from stressful experiences, resilience has a significant influence on mental health and adaptation to chronic conditions. Its impact on mental health and adaptation to chronic conditions has been widely studied and discussed in scientific literature[6].

Studies highlight the protective role of resilience, indicating that higher levels of resilience and happiness are associated with better mental health, even in the midst of challenges such as the presence of CP. Furthermore, resilience is recognized as an important factor that influences the ability to manage pain, favoring the maintenance of a healthy lifestyle, helping to reduce the severity of CP and its psychological and social effects, such as depression and social isolation[7-9]. Assessing levels of resilience and the coping strategies adopted in different adverse situations is essential for developing supportive and preventive psychosocial intervention[10].

The present study explored the Interaction between resilience, anxiety, depression and CP in patients with different etiologies, analyzing how these factors influence the patients' experience and the potential impact on the effectiveness of treatment and intervention strategies. Understanding these dynamics is fundamental to improving the management of these patients with more effective and targeted therapeutic approaches, thus contributing to the scientific and clinical literature and promoting an integrated and holistic care approach for individuals living with CP.

METHODS

This is an exploratory study, characterized by the work with a small sample, allowing the researcher to get closer to the universe of the study's object. This type of research provides information, guides the formulation of hypotheses and allows for the choice of the most appropriate techniques for investigation, as well as insight into the issues that require greater attention during the investigation[11]. The scarcity of studies in Brazil on the benefits of resilience as a protective factor for mental health and as a mitigator of pain intensity contrasts with the widespread recognition of these aspects in international literature, indicating a fertile field for research and academic contribution in Brazil.

The study sample was selected by convenience, i.e. the non-probabilistic, non-random sampling technique was used to create samples according to the availability of people to take part in the study at a given time interval. This method is commonly used in exploratory research or preliminary studies where the objective is not to make inferences, but rather to gain an initial understanding of a phenomenon. It involved the participation of 46 patients with CP of various etiologies, with a predominance of patients diagnosed with Myofascial Pain Syndrome. Data collection took place through face-to-face meetings, in which the structured questionnaires were applied. These meetings were held during the patients' first consultation of the Pain Group of a tertiary hospital in the city of São Paulo. These meetings were conducted by researchers trained in applying questionnaires. The study took place between May 8 and November 13, 2023.

The inclusion criteria were: adults over the age of 18 who could be contacted by telephone and answer questions or arrange further meetings, if necessary. Individuals with substantial cognitive impairment, previously diagnosed severe psychiatric disorders or who declined participation were excluded. Individuals who agreed to take part in this study formalized their participation by signing the Free and Informed Consent Term (FICT), in accordance with the code of ethics and the guidelines of the General Personal Data Protection Act (LGPD - *Lei Geral de Proteção de Dados Pessoais).*

The evaluation of the participants covered the following variables: sociodemographic (age, marital status, gender, schooling and religion), pain-related (length of time living with pain and pain intensity) and psychological aspects. The sociodemographic variables were asked directly to the insured individuals and recorded on forms developed by the team. Patients were asked directly how long they had lived with pain, while pain intensity was measured using the Numerical Pain Scale (NPS)[12,13]. To assess psychological aspects, the Hospital Anxiety and Depression Scale (HAD)[14,15] and the Connor-Davidson Resilience Scale (CD-RISC)[16,17] were used.

Instruments: a form developed by the researchers was used to collect personal and socioeconomic data (name, telephone number, date of application, age, marital status, gender, schooling and religion). To evaluate the sensory dimension of pain, the NPS[12,13] was used, which asks patients to assign a value to their pain on a scale of zero to 10, where 0 represents 'no pain' and 10 'unbearable pain'. This metric provides healthcare professionals with a quantitative comprehension of the intensity of physical discomfort and suffering reported by the patient.

The HAD is a tool for assessing anxious and depressive symptoms in patients in an inpatient or outpatient setting. This scale has been widely used in the field of pain, facilitating the identification of psychological comorbidities in patients suffering from CP. It can be self-administered and consists of 14 items, which explore thoughts, feelings and behaviors linked to these emotional states. Patients are asked to indicate the option that best corresponds to their state in the previous week. Each question is evaluated on a scale of zero (absence of the symptom) to three (high presence of the symptom), allowing a score of up to 21 points for each of the subscales - anxiety and depression. Scores above eight on the anxiety subscale and above nine on the depression subscale suggest the need for a more in-depth psychiatric assessment for possible diagnostic confirmation[15].

The CD-RISC is a psychometric tool developed to assess an individual's level of resilience. This scale is made up of 25 items that explore various dimensions related to resilience, such as adaptability, stress tolerance, perseverance and self-confidence, grouped into five factors (personal competence, trust in one's own instincts and tolerance of adversities, positive acceptance of change, control and spirituality). Participants were asked to rate their degree of agreement with each item on a scale ranging from zero ("does not apply to me") to four ("applies a lot to me"), considering the last month. The score ranges from zero to 100 points, and as there are no cut-off values, higher scores indicate greater resilience[17].

The FICT was filled and signed by the participants immediately after the team provided them with information about the research (study objectives and procedures adopted for data collection), in agreement with their participation in this study, and only after they were aware and in agreement with the terms of the research were the interviews and data collection carried out.

The Research Ethics Committee of the Pontifical Catholic University of São Paulo - PUC-SP approved the study (number: 80953917.1.0000.5482), following the principles of the Declaration of Helsinki for human research.

Statistical analysis

The variables collected were analyzed and correlated using SPSS (version 20). Descriptive statistics were used to describe the data set (absolute and relative frequencies, percentage, mean and standard deviation for data with a normal distribution, or median and interquartile range for those without a normal distribution). Tests were applied for inferential analysis of the data with a significance level of 0.05. The following statistical tests were used: Pearson's correlation and Linear Regression.

RESULTS

The sample consisted of 46 participants, 89% women and 10.9% men, with an average age of 48.78±15.65 years, ranging from 18 to 75 years. The average pain intensity was 7.54±2.26, ranging from zero to 10, and the average period of living with pain was 106.98±146.40 months, ranging from 6 to 780 months. As for religion, 28.3% identified themselves as Catholics and 32.6% as Evangelicals. Regarding marital status, 37% were single, 30.4% married, 19.6% separated and 8.7% widowed. As for schooling, 65.2% had levels of education ranging from high school to university.

Analysis of the mood of these patients revealed that 32.6% had anxious traits, 2.2% had depressive traits, 43.5% had anxious and depressive traits, and 21.7% had no traits of mood disorders. The average anxiety score was 10.46±4.05, ranging from 2 to 19. The average depression score was 8.07±4.48, ranging from 0 to 20, and the average resilience score was 67.04±14.66, ranging from 21 to 91. These data are shown in tables 1 and 2.

The statistical analyses were carried out using SPSS, and the data set was complete, so no imputation strategy was necessary. In all analyses, statistical significance was set at a conservative level of $p<0.05$. Initial analyses were carried out to broadly characterize the relationships between the variables by means of descriptive statistics and Pearson correlations.

Table 1. Demographic data

Gender	Female	89.1%
	Male	10.9%
Mood	Anxiety	32.6%
	Depression	2.2%
	Mixed	43.5%
	Normal	21.7%
Schooling	Elementary school complete	2.2%
	Elementary school incomplete	4.3%
	Elementary II complete	8.7%
	Elementary II incomplete	2.2%
	High school complete	41.3%
	High school incomplete	4.3%
	Higher education complete	15.2%
	Higher education incomplete	8.7%
Marital Status	Married	30.4%
	Separated	19.6%
	Single	37.0%
	Widowed	8.7%
Religion	Catholic	28.3%
	Christian	2.2%
	Spiritist	8.7%
	Evangelical	32.6%
	Messianic	2.2%
	Other	2.2%
	No religion	6.5%

Table 2. Descriptive statistics for numerical variables

	Mean	SD	Minimum	Maximum
Age	48.78	15.65	18	75
VAS	7.54	2.27		10
Time of pain	106.98	146.4	6	780
Anxiety	10.46	4.05	2	19
Depression	8.07	4.48	0	20
Resilience	67.04	14.66	21	91

SD = standard deviation; VAS = Visual Analog Scale

In the present study, as presented in table 3, it was observed that resilience has a weak negative correlation (b) with anxiety and pain intensity, but has a moderate negative correlation (d) with depression, suggesting that lower levels of resilience may be associated with higher anxiety, depression and pain intensity scores. Furthermore, resilience showed a weak positive correlation (a) with the patients' age and duration of pain, suggesting that older patients who have lived with CP for longer tend to have greater resilience.

Anxiety, in addition to the weak negative correlation (b) with resilience, showed the same correlation with age and time in pain, suggesting that as anxiety increases, resilience, patient age and time living with pain decrease. However, anxiety showed a moderate positive correlation (c) with depression and a weak positive correlation (a) with pain intensity, suggesting that increased anxiety is associated with increased depression and pain intensity in patients.

Regarding depression, a behavior similar to that of anxiety was observed, except for the fact that increased symptoms of de- pression are associated with lower pain intensity (weak negative correlation - b), but with greater patient age (weak positive correlation - a), which indicates that older patients may experience slightly higher levels of depression symptoms, however the suffering generated by depression may be greater than that caused by pain.

A weak positive correlation (a) was also noted between the duration of pain and the patient's age, as well as a weak negative correlation between the duration of pain and its intensity. These findings are fundamental to understanding the complex nature of mood disorders and CP.

Taking into account the statistically significant data of a moderate correlation between anxiety and depression (where the higher the anxiety score, the higher the depression score) and between depression and resilience (where the higher the resilience score, the lower the depression score), in order to gain a deeper comprehension of this correlation, a Multiple Linear Regression was carried out between these variables to investigate protective and preventive factors. It should be noted that the other variables did not meet all the prerequisites for this type of test.

Regression analyses were carried out to assess the amount of variance explained by depression in the two dependent variables: resilience and anxiety. This analysis resulted in a statistically significant model [$F(1,44)=14.726$, $p<0.001$; $R2=0.284$], in which resilience ($\beta=-0.533$; $t=-4.176$; $p<0.0001$) could be identified as a predictor of depression, i.e. it showed that the resilience score is a significant predictor of the level of depression, indicating that the higher the resilience, the lower the likelihood of depression, as shown in table 4.

Table 3. Pearson Correlation Test

Age	Intensity of pain	Time of pain	Anxiety	Depression	Resilience
1	0.062[a]	0.320[a]	-0.032[b]	0.090[a]	0.054[a]
0.062[a]	1	-0.010[b]	0.271[a]	-0.027[b]	-0.066[b]
0.320[a]	-0.010[b]	1	-0.309[b]	-0.245[b]	0.018[a]
-0.032[a]	0.271[a]	-0.309[b]	1	0.518[c]	-0.304[b]
0.090[a]	-0.027[b]	-0.245[b]	0.518[c]	1	-0.533[d]
0.054[a]	-0.066[b]	0.018[a]	-0.304[b]	-0.533[d]	1

[a] = Weak positive correlation; [b] = Weak negative correlation; [c] = Moderate positive correlation; [d] = Moderate negative correlation

Table 4. Multiple linear regression

			ANOVA				Coefficient			
Model	R	R Square	df		F	Sig.	Beta		t	Sig.
1	.533[a]	0.284	Regression	1	17.441	.000[b]	(Constant)		7.095	.000
			Residual	44			Resilience	-0.533	-4.176	.000
			Total	45						
2	.651[b]	0.423	Regression	2	15.793	.000[c]	(Constant)		3.692	0.001
			Residual	43			Resilience	-0.414	-3.403	0.001
			Total	45			Anxiety	0.392	3.227	0.002

a. Predictors = (Constant), Resilience

b. Predictors = (Constant), Resilience, Anxiety

c. Dependent variable = Resilience

The regression analysis showed that resilience explains approximately 28.4% of the variance in depression, a considerable value which reinforces the importance of resilience as a protective factor. The inclusion of anxiety as an additional variable revealed an R Square of 0.423, indicating that the combination of resilience and anxiety can predict up to 42.3% of the variance in depression levels, which is substantial in understanding the interaction between these factors.

The findings of these statistical analyses are vital to understand the complexity of the relationships between CP, mood and resilience, offering significant insights for designing more targeted and effective therapeutic interventions.

DISCUSSION

The present study's objective was to improve understanding of the relationship between resilience, anxiety, depression and CP by carrying out an exploratory study with 46 participants. The results found are not groundbreaking, but they are scientifically relevant considering that this is one of the few national studies on the subject that explores this relationship, which has already been pointed out as highly relevant in international studies[5-10,19-23]. In addition, they noted the complexity of generalizing information, emphasizing the subjective and unique nature of each patient's experience. These findings corroborate international literature, as they also indicate that resilience is inversely associated with depression and anxiety. This suggests that resilience can act as a protective factor against mental health problems in patients with chronic illnesses in general[7-9,21,22].

This found that factors such as female gender, average schooling, the presence of mixed mood traits and high pain intensity were associated with higher levels of resilience. Although these factors provide indications of the risk of greater disability, modifying these factors, such as increasing a patient's schooling, will not necessarily result in an improvement in resilience levels. In order to increase resilience in individuals with CP and, consequently, increase functionality, actions focused on educating patients about their diagnosis, on patients' proactivity in relation to their treatment and on improving self-care and QoL are required.

Men are less likely to report or experience CP than women, and when corrections are made for the prevalence of pain in the different genders, women are more likely to seek treatment for their pain. The present study, which evaluated patients starting treatment in a pain group at a tertiary hospital in the city of São Paulo, identified a higher number of female patients, which is consistent with the literature that notes a higher incidence of CP among women[5,24].

The minimum age observed in this study was 18 and the maximum was 75, with an average of 48.78. Thus, the average age coincides with that of other national studies[24], demonstrating that the population most affected by CP is the economically active.

In line with studies examining resilience profiles, it was found that age, access to medical care and level of schooling are considerable factors when assessing the presence and levels of resilience in patients with CP. In the present work, 65.2% of the participants presented a medium to high level of schooling and the average age was 48.78 years, highlighting the relevance of these demographic aspects in the context of CP. However, as the variables seeking medical care and employment status were not addressed, it is not possible to discuss these results by comparing them with the three resilience profiles found[25].

With regard to the average intensity of pain, the value of 7.54±2.26 was obtained). This result, considering the standard deviations, corroborates the research carried out in 2014 by a reference study[26]. In that study, the average pain intensity was 5.9±1.9 on a scale of 0 to 10, also carried out in the city of São Paulo. This indicates the severity with which CP affects patients[26].

There is a lot of evidence in the international literature pointing out that cognitive and emotional processes play an important role in the transition from acute to CP, as well as in modulating pain intensity, and these studies also refer to the assessment of resilience as an aspect to be used in cognitive assessments of patients with CP. In this sense, cognitive flexibility, i.e. the ability to adapt behavior in the face of changing external stimuli, so that someone is able to divert attention from the current task in response to a new stimulus or focus on a new cognitive task while experiencing ongoing pain, is seen as a key factor for better pain modulation, showing a connection between lower cognitive flexibility and a predisposition to pain persistence[27].

Longitudinal research and reviews highlight the influence of psychological factors on the development and maintenance of CP, associated suffering and feelings of disability[3,28]. In the present study, the high average scores on the HAD indicate that the majority of patients (78.3%) have traces of mood disorders, which is in line with international and national studies that associate CP with statistically worse psychological functioning, including high levels of anxiety, depression and stress[8,28,29].

Moreover, the research revealed that high levels of resilience are linked to a lower likelihood of experiencing CP, fewer painful regions throughout the body, a better psychological response to nociception, less need for analgesia, better daily and physical function and an overall improvement in well-being, QoL and psychosocial functions, leading to a lower likelihood of comorbid mental health disorders, which confirms the data observed in this study, considering that resilience was found to have a negative correlation with anxiety (weak), depression (moderate) and pain intensity (weak), as well as being a predictor factor in 28.4% of cases of depression[7,8,21,22,30].

A scoping review carried out in 2022 on resilience as a protective factor against disability and pain intensity in adult populations with CP confirms the findings of the present study in the sense that higher levels of resilience were associated with lower rates of depression, although the predictive effect of resilience for depression was found to be insignificant, unlike the present work[7].

Additional neuroscience studies support the negative correlation between resilience and pain intensity, linking resilience

to greater gray matter in the cerebral antinociceptive pathway in individuals with CP. The negative correlation between resilience and pain intensity found in the present study is in line with these findings[23].

Beliefs and attitudes in general may affect a person's likelihood of developing CP and pain-related disability. In the treatment of CP, it is imperative to actively involve the patient, as altering behaviors can reduce the intensity of pain and its impact on QoL[2,5]. More resilient patients tend to have greater psychological flexibility, positive affect and satisfaction of basic psychological needs, factors that are considered important resilience mechanisms for maintaining and recovering from pain and comorbid mood disorders, which again highlights their relevance as essential resilience mechanisms[19]. On the other hand, recent research shows that meta-analytical and systematic reviews have observed moderate overall quality in the assessment and treatment of CP with a focus on resilience, most likely due to the various models of resilience in populations with CP, derived from the fact that resilience is a multifaceted construct, using various definitions, instruments and theoretical constructs[20].

A qualitative reading of the answers provided on the scale identified that the most common responses from participants who showed low resilience reflected difficulty in dealing with changes in their health condition, coping with the stress associated with CP, staying focused and dealing with the challenges that arise from living with CP. In addition, these individuals found it difficult to remain encouraged in the face of difficulties and relapses associated with the management of their pain. These findings provide valuable insights into the psychological impact of CP, suggesting that resilience is not only a buffer against the negative effects of pain, but also a potentially improvable ability to cope with and adapt to life's adversities.

Participants with high levels of resilience showed better day-to-day management despite their persistent pain, highlighting the importance of strengthening this capacity as part of treatment. In that sense, resilience emerges not only as a mental health metric, but also as a therapeutic goal in itself, indicating that programs and interventions that focus on strengthening resilience can be crucial to improving the overall well-being of individuals with CP.

Nevertheless, the inherent limitations of this exploratory study must be considered. Additional and more comprehensive studies are needed to broaden the comprehension of the dynamics between resilience, anxiety, depression and CP. Future research could explore, for example, the relationship between resilience and seeking medical care, as well as the impact of patients' working conditions, which were not directly addressed in this study.

In short, this study has contributed to the body of national research, offering relevant insights into the relationship between CP and mental health. The findings reinforce the need for multidisciplinary approaches to CP treatment that consider psychological aspects and resilience as key elements in the management of the condition and improvement of the patients' QoL.

CONCLUSION

CP has a major influence on patients' lives and its management requires an approach that goes beyond etiology, including psychological and social repercussions. The findings highlight the need for a thorough and comprehensive assessment of the patient, which considers not only the pain itself, but also the patient's history, comorbidities, their social environment, as well as cognitive, emotional and behavioral characteristics. The implementation of multidisciplinary management practices that take into account both pain treatment and psychosocial aspects, particularly resilience, is vital to mitigate the negative impact of CP and promote an improvement in patients' QoL.

AUTHORS' CONTRIBUTIONS

Adrianna Loduca
Statistical Analysis, Data Collection, Conceptualization, Project Management, Research, Methodology, Writing - Preparation of the original, Writing - Review and Editing
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