

Beliefs and concerns about pain were associated with craniofacial pain experienced within 24 hours: cross-sectional study

Crenças e preocupações sobre a dor têm associação à dor craniofacial experimentada nas últimas 24 horas: estudo transversal

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ABSTRACT

BACKGROUND AND OBJECTIVES: Although craniofacial pain has been associated with negative psychological aspects, how the patient's perception of their own illness could influence craniofacial pain is not elucidated yet. Therefore, this study aims to identify the main factors and beliefs about the illness that could influence pain intensity and pain duration in people who experienced craniofacial pain in the last 24 hours.

METHODS: This cross-sectional study comprised undergraduate students, aged between 18 and 40 years old, who experienced self-reported craniofacial pain in the last 24 hours. Participants answered questions regarding body functions, activities and participation, and personal factors based on the International Classification of Functioning (ICF); In addition, questions from the Brief Illness Perceptual Questionnaire (Brief IPQ) were applied. The analysis was carried out with a single and multiple regression model.

RESULTS: The sample comprised 87 volunteers. Pain intensity and duration experienced in the last 24 hours were associated by concerns about the presence of an illness and the need for treatment. Pain intensity was specifically associated with the

importance of treatment and the extent to which the patient is concerned about their pain ($R^2=0.108$). Pain duration was associated with how much the individual is worried about their illness ($R^2=0.1459$).

CONCLUSION: Both pain intensity and duration experienced in the last 24 hours are associated with concerns regarding the presence of an illness and beliefs related to such illness treatment, which reinforces the influence of psychosocial aspects on pain perception.

Keywords: Facial pain, Pain perception, Psychosocial functioning, Students.

RESUMO

JUSTIFICATIVA E OBJETIVOS: Embora a dor craniofacial seja associada a aspectos psicológicos negativos, ainda não está totalmente elucidado como a percepção do paciente sobre sua própria doença pode influenciá-la. Portanto, este estudo teve como objetivo identificar os principais fatores e as crenças sobre a doença que podem influenciar a intensidade e a duração da dor em pessoas que sentiram dor craniofacial nas últimas 24 horas.

MÉTODOS: Estudo transversal composto por universitários, com idade entre 18 e 40 anos, que relataram dor craniofacial nas últimas 24 horas. Os voluntários responderam a perguntas sobre funções corporais, atividades e participação e fatores pessoais com base na classificação da Classificação Internacional de Funcionalidades (CIF). Além disso, foram aplicadas questões do Questionário de Percepção de Doenças Versão Breve (Brief IPQ). A análise foi realizada com um modelo de regressão simples e múltiplo.

RESULTADOS: A amostra foi composta por 87 voluntários. A intensidade e a duração da dor sentida nas últimas 24 horas foram influenciadas pela preocupação com a presença de doença e com a necessidade de tratamento. A intensidade da dor foi associada à importância do tratamento e à preocupação do paciente com sua dor ($R^2=0,108$). A duração da dor associou-se à preocupação do indivíduo com sua doença ($R^2=0,1459$).

CONCLUSÃO: Tanto a intensidade quanto a duração da dor vivenciadas nas últimas 24 horas são influenciadas pela preocupação com a presença de doença e crenças relacionadas ao seu tratamento, o que reforça a influência dos aspectos psicossociais na percepção da dor.

Descritores: Dor facial, Estudantes, Funcionamento psicossocial, Percepção da dor.

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HIGHLIGHTS

- Duration of pain can be associated with individual's beliefs about the illness.
- Beliefs and concerns about the illness could influence craniofacial pain intensity.
- Education therapy could be an important key to management of acute craniofacial pain.

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INTRODUCTION

Craniofacial pain conditions, including those related to temporomandibular disorders, toothaches, headaches, and trigeminal neuropathic pain¹⁻³ are the most common persistent pain conditions related to oral and craniofacial structures³. They affect approximately 25% of the worldwide population at least once in life, being more prevalent in an adult female population⁴.

These painful craniofacial conditions exhibit multifactorial etiologies that are still unknown or poorly understood^{1-3,5}. However, it is well-known that such conditions display an important correlation with other symptoms associated with head and neck structures (i.e. headaches, neck pain, neck disability, among others)⁵. This intimate relationship with other anatomical areas, such as facial skin, meninges, oral mucosa, teeth, bone, temporomandibular joint, muscles, ligaments, and fascia, among others, could also impact body functions².

In this sense, the craniofacial region is extensively represented in the somatosensory area of the central nervous system, which facilitates the centralization of pain perception². Thus, changes in the somatosensory cortex of patients with craniofacial pain conditions may be interpreted as a consequence of pain, leading to several associated somatic symptoms^{2,5}, such as impairments in appearance, communication and expressing emotions, besides jaw limitations, changes in eating and drinking habits, besides alterations in psychological, sensory, and speech functions^{2,6-9}. Besides, the majority of individuals who present symptoms of craniofacial pain also experience psychosocial symptoms (i.e., anxiety, depression, among others), which could influence pain-related beliefs (i.e. catastrophizing, fear-avoidance beliefs, among others)^{2,6-9} and negatively impact their activities and participation in life activities^{2,6-10}.

The presence of psychosocial problems is related to the chronicity of craniofacial pain^{2,5}, and the degree of chronic pain is influenced by the beliefs, making the management of these conditions a challenge^{2,5,10}. Along with somatic symptoms, craniofacial pain conditions are frequently related to impaired perception of quality of life, stress, depression, and anxiety complaints, which are considered perpetuating factors for craniofacial chronic pain states⁶⁻¹⁴, especially in the orofacial area¹³. Another relevant aspect is that such psychosocial impacts of craniofacial pain seem to predominate among women aged between 18 to 44 years old and may represent a risk factor for the maximization of painful behavior¹⁴. Considering the high prevalence of painful craniofacial conditions and its negative repercussions, there is a need for early identifying factors that could influence on craniofacial pain behavior and characteristics. Such elucidation could help practitioners to better understand craniofacial pain, as well as to improve therapeutic approaches, based on a comprehensive biopsychosocial approach model^{2,6}, as recommended by the International Classification of Functioning, Disability, and Health (ICF)¹⁵.

Considering these recommendations, pain and its impact on different aspects of life have been deeply investigated^{4,7,8,14,16}, using measurement tools such as the 36-item Short Form Survey^{7,8}, and the Oral Health Impact Profile^{14,16}. The studies usually in-

vestigate how pain has impacted an individual's functioning and other aspects during the past 24 hours or the past week, which is considered an important patient-reported outcome¹⁷⁻¹⁹. Moreover, other studies highlighted that patients' perception of their own illness relevantly affects psychological functions, pain perception, and physical functioning^{20,21}.

However, literature still lacks evidence on how patients' perception of their own illness could influence craniofacial pain in the last 24 hours. Thus, to provide new perspectives on the factors that influence craniofacial pain conditions, of the present study was to identify the main factors and beliefs about the illness that could be associated with pain intensity and pain duration in people who experienced craniofacial pain in the last 24 hours.

METHODS

This is a cross-sectional study that followed STROBE recommendations²² and it was developed in the *Laboratório de Aprendizagem e Controle Motor* (Learning and Motor Control Laboratory - LACOM) of the Physiotherapy Department at Federal University of Pernambuco (UFPE), between July 2019 and June 2021. It was approved by the Ethics Committee for Research with Human Beings of the UFPE Health Sciences Center (approval number: 190415058), and all volunteers involved signed the Free and Informed Consent Term (FICT).

The invitation to participate in the research was disseminated through advertisements on social media. A convenience sample was obtained including volunteers that met the following criteria: students enrolled in undergraduate courses at UFPE Health Sciences Center, Recife Campus, aged between 18 and 40 years, regardless of gender, who presented with self-reported complaints of pain in the craniofacial region in the previous 24 hours. Exclusion criteria were the presence of infectious or degenerative disease of the central nervous system, cerebral aneurysm, intracranial hypertension, myopathies, myelopathies, fibromyalgia, symptomatic cervical disc herniation, rheumatoid arthritis, history of brain or spinal tumors, previous history of facial or cervical trauma, presence of surgical procedure in the cervical spine and/or craniofacial segment, or presence of cognitive impairment.

After screening for eligibility, the volunteers were contacted in order to check whether they presented with craniofacial pain in the last 24 hours and, if so, the evaluation questionnaire was applied. Eligible volunteers who did not experience pain in the craniofacial region in the last 24 hours at the time of the interview were instructed to contact the researchers when they experienced pain in the last 24 hours, so that they would be able to answer the assessment questionnaire.

The assessment questionnaire was designed by the research team and contained ICF-related questions regarding body functions, activities and participation, besides personal factors. The question "How much do you think you are responsible for your health?" was also asked, with answer options ranging from zero to 10. In addition, the seven objective questions of the Brief Illness Perception Questionnaire (Brief IPQ) were included. This is a valid instrument that was adapted for the Brazilian population,

which displays answers ranging from zero to 10, aiming at analyzing patient's perception of their own illness²³. The higher the total score, the greater the perception of the illness as a threat. All variables included in the assessment questionnaire are described in tables 1, 2, 3 and 4.

Statistical analysis

Analyses were carried out through SPSS software, version 20.0, and STATA software v.14. The Shapiro-Wilk normality test evidenced that all variables were normally distributed. Data were presented as mean and standard deviation with a 95% confidence interval (CI 95%) or number and percentage (%).

Table 1. General characteristics of the sample.

Variables (n=87)	Mean (SD) / n (%)
Age (years)	23.22 (4.20)
Do you have a job? (Yes)	18/87 (20.6%)
Intensity of pain experienced in the last 24 hours	
Mild	4/87 (4.59%)
Mild to moderate	24/87 (27.58%)
Moderate	32/87 (36.78%)
Moderate to severe	24/87 (27.58%)
Severe	3/87 (3.44%)
Duration of pain experienced in the last 24 hours	7.42 (7.63)
Frequency of physical activity practice (number of days/week)	1.77 (2.23)
Duration of physical activity (minutes)	33.16 (45.54)
Activities and body functions	Had problems with activities or functions due to craniofacial pain in the last 24 hours
Recreation and leisure	17/87 (19.5%)
Walking	9/87 (10.3%)
Reading	50/87 (57.5%)
Grooming	8/87 (9.2%)
Focusing attention on something	68/87 (78.2%)
Sleeping functions	23/87 (26.4%)
Housekeeping	25/87 (28.7%)

Data are presented as mean and standard deviation (SD) or number (n) and percentage (%).

To determine the factors that significantly was associated with pain intensity and duration among eligible volunteers, a two-step analysis was performed:

In the first step, a simple linear regression was conducted to analyze the relationship between dependent variables (pain intensity and pain duration) with each of the independent variables (information about body functions, activities and participation, personal factors, the seven objective questions of the Brief IPQ, and the question “how much do you think you are responsible for your health?”) as displayed in tables 1 to 4. The significant variables in the univariate analysis with $p \leq 0.20$ were added to the multivariate model in a hierarchical way, based on the R^2 value, and then analyzed through a multiple linear regression test²⁴.

In the initial multivariate analysis, all variables with significant R^2 ($p \leq 0.20$) were included. However, the choice of the best multivariate model that explained the variation in pain intensity and duration was determined according to the variables that were significant at $p < 0.05$.

RESULTS

Ninety-two volunteers were screened for eligibility, of which 5 were excluded due to: previous craniofacial surgeries (n=2), non-enrollment in undergraduate courses at the UFPE Health Sciences Center (n=1) and, finally, some individuals did not experience pain in the last 24 hours throughout the study period (n=2). In the end, 87 volunteers were included in the study, where most of them were women (n = 72, 82.75% of overall sample), and mean age was 23.22 (4.20) years old. The general characteristics of the sample are described in table 1.

The time point at which the subjects presented pain symptoms was not collected in this study, as this data did not seem important to the analysis in the beginning of the study. However, as this is an important pain measurement, additional information about this limitation was presented in the discussion session.

Variables that were significantly associated with pain intensity in the univariate analysis were gender ($R^2=0.011$, $\beta=-0.375$, $p=0.161$), as well as the following Brief IPQ questions: “How much control do you feel you have over your illness?” ($R^2=0.013$, $\beta=-0.052$, $p=0.147$); “How much do you think your treatment can help your illness?” ($R^2=0.024$, $\beta=-0.060$, $p=0.080$) and “How concerned are you about your illness?” ($R^2=0.035$, $\beta=0.062$, $p=0.045$), as displayed in tables 2 and 3.

Table 2. Univariate and multivariate analysis of the main factors that influenced pain intensity in people who experienced craniofacial pain in the last 24 hours.

Variable (n=87)	Univariate analysis				Multivariate analysis						
	Coef, (β)	CI 95%	p-value	R ²	Included in the multivariate model	Coef, (β)	CI 95%	p-value	Coef, (β)	CI 95%	p-value
Do you have a job?	0.041	-0.45 to 0.53	0.870	-0.011	No	-	-	-	-	-	-
Frequency of physical activity practice (number of days/week)	-0.008	-0.09 to 0.08	0.861		No	-	-	-	-	-	-

Continue...

Table 2. Univariate and multivariate analysis of the main factors that influenced pain intensity in people who experienced craniofacial pain in the last 24 hours – continued

Univariate analysis					Multivariate analysis						
Variable (n=87)	Coef, (β)	CI 95%	p-value	R ²	Included in the multivariate model	Initial			Final		
						Coef, (β)	CI 95%	p-value	Coef, (β)	CI 95%	p-value
Duration of daily physical activity (minutes)	-0.002	-0.00 to 0.00	0.300	-0.011	No	-	-	-	-	-	-
Physical activity practice (yes/no)	0.007	-0.40 to 0.41	0.973	0.001	No	-	-	-	-	-	-
How much do you think you are responsible for your health?	-0.034	-0.10 to 0.03	0.304	-0.011	No	-	-	-	-	-	-
Brief IPQ Questionnaire				0.000							
How much does your illness affect your life?	0.041	-0.03 to 0.11	0.278	0.002	No	-	-	-	-	-	-
How much control do you feel you have over your illness?	-0.052	-0.12 to 0.01	0.147	0.013	Yes	0.007	-0.07 to 0.08	0.856	-	-	-
How much do you think your treatment can help your illness?	-0.060	-0.12 to 0.00	0.080	0.024	Yes	-0.112	-0.19 to -0.02	0.009	-0.112	-0.19 to -0.02	0.009
How much do you experience symptoms from your illness?	0.044	-0.03 to 0.11	0.242	0.004	No	-	-	-	-	-	-
How concerned are you about your illness?	0.062	0.00 to 0.12	0.045	0.035	Yes	0.105	0.03 to 0.17	0.003	0.105	0.03 to 0.17	0.003
How well do you feel you understand your illness?	-0.006	-0.07 to 0.06	0.843	-0.011	No	-	-	-	-	-	-
How much does your illness affect you emotionally?	0.009	-0.05 to 0.06	0.751	-0.010	No	-	-	-	-	-	-

Coef. = β coefficient; CI = Confidence interval; Brief IPQ = Brief Illness Perception Questionnaire

Table 3. Univariate and multivariate analysis of the main factors that were associated with pain duration in people who experienced craniofacial pain in the last 24 hours.

Univariate analysis					Multivariate analysis						
Variable (n=87)	Coef, (β)	CI 95%	p-value	R ²	Included in the multivariate model	Initial			Final		
						Coef, (β)	CI 95%	p-value	Coef, (β)	CI 95%	p-value
Do you have a job?	-1.493	-5.52 to 2.53	0.463	-0.005	No	-	-	-	-	-	-
Frequency of physical activity practice (number of days/week)	-0.356	-1.08 to 0.37	0.336	-0.000	No	-	-	-	-	-	-
Duration of daily physical activity (minutes)	-0.008	-0.04 to 0.02	0.631	-0.009	No	-	-	-	-	-	-
Physical activity practice (yes/no)	1.306	-1.99 to 4.60	0.434	-0.004	No	-	-	-	-	-	-
How much do you think you are responsible for your health?	0.437	-0.09 to 0.86	0.106	0.0191	Yes	0.205	-0.39 to 0.80	0.495	-	-	-
Brief IPQ Questionnaire											
How much does your illness affect your life?	0.649	0.04 to 1.25	0.036	0.039	Yes	-0.114	-0.92 to 0.69	0.779	-	-	-
How much control do you feel you have over your illness?	-0.345	-0.93 to 0.01	0.246	0.004	No	-	-	-	-	-	-
How much do you think your treatment can help your illness?	0.109	-0.45 to 0.67	0.701	-0.010	No	-	-	-	-	-	-

Continue...

Table 3. Univariate and multivariate analysis of the main factors that were associated with pain duration in people who experienced craniofacial pain in the last 24 hours – continued

Variable (n=87)	Univariate analysis				Included in the multivariate model	Multivariate analysis					
	Coef, (β)	CI 95%	p-value	R ²		Initial			Final		
						Coef, (β)	CI 95%	p-value	Coef, (β)	CI 95%	p-value
How much do you experience symptoms from your illness?	0.731	0.13 to 1.32	0.017	0.054	Yes	0.219	-0.53 to 0.97	0.565	-	-	-
How concerned are you about your illness?	0.860	0.38 to 1.33	0.001	0.120	Yes	0.920	0.18 to 1.65	0.015	0.860	0.38 to 1.33	0.001
How well do you feel you understand your illness?	0.309	-0.23 to 0.85	0.259	0.003	No	-	-	-	-	-	-
How much does your illness affect you emotionally?	0.414	-0.06 to 0.89	0.089	0.022	Yes	-0.235	-0.85 to 0.37	0.448	-	-	-

Coef.: β coefficient; CI = Confidence interval; Brief IPQ = Brief Illness Perception Questionnaire.

Table 4. Univariate analysis of the association between individual factors on pain intensity and duration in people who experienced craniofacial pain in the last 24 hours.

Variable (n=87)	Univariate analysis					
	Coef, (β)	CI 95%	p-value	R ²	Included in the multivariate model	
Influence of age on pain intensity	0.014	-0.03 to 0.06	0.543	-0.007	No	
Influence of gender on pain intensity	-0.375	-0.90 to 0.15	0.161	0.011	Yes	
Influence of age on pain duration	0.368	-0.01 to 0.75	0.060	0.029	Yes	
Influence of gender on pain duration	1.740	-2.57 to 6.06	0.425	-0.004	No	

Coef.: β coefficient; CI = Confidence interval.

The variables that were significantly associated with pain duration in the univariate analysis were age ($R^2=0.029$, $\beta=0.368$, $p=0.060$; Table 4), the question “How much do you think you are responsible for your health?” ($R^2=0.0191$, $\beta=0.437$, $p=0.106$) and the following Brief IPQ questions: “How much does the illness affect your life?” ($R^2=0.039$, $\beta=0.649$, $p=0.036$); “How much do you experience symptoms from your illness?” ($R^2=0.054$, $\beta=0.731$, $p=0.017$); “How concerned are you about your illness?” ($R^2=0.120$, $\beta=0.860$, $p=0.01$) and “How much does your illness affect you emotionally?” ($R^2=0.022$, $\beta=0.414$, $p=0.089$). These results are described in tables 3 and 4.

In the final multivariate model, two variables displayed a significant association ($p<0.05$) with pain intensity, which were Brief IPQ questions: “How much do you think your treatment can help your illness?” ($R^2=0.108$, $\beta=-0.112$, $p=0.009$) and “How concerned are you about your illness?” ($R^2=0.108$, $\beta=0.105$, $p=0.003$), described in table 2. Regarding pain duration described in table 3, only one variable had a significant association ($p<0.05$), being included in the model: the Brief IPQ question “How concerned are you about your illness?” ($R^2=0.1459$, $\beta=0.920$, $p=0.015$).

DISCUSSION

Beliefs related to the treatment and concerns about illness are the factors that most influence both the intensity and duration of pain felt in the previous 24 hours. Concerns about pain were included in the two models that explain pain intensity and pain

duration in the last 24 hours, therefore, such a variable seems to be the best one to explain pain behavior.

The International Association for the Study of Pain (IASP) defines pain as a subjective experience, which is influenced by biological, psychological, and social factors. Thus, pain and nociception are different phenomena, and the painful sensation cannot be explained only by sensory pathways activity, as individual experiences related to pain should also be considered. Based on this, a person’s report about a painful experience should be accepted and respected²⁵. Although pain generally plays an adaptive role, it may also trigger adverse effects on function, social and psychological well-being. Besides, verbal description is just one among several behaviors to express pain, and the inability to communicate does not invalidate the possibility of a human being or an animal feeling pain²⁵.

In the present study, the pain characteristics felt in the last 24 hours were associated with concern about the illness and beliefs related to its treatment, thus demonstrating the influence of psychosocial aspects on pain perception. This finding corroborates other studies in which anxiety and depression were associated with orofacial pain in women, evidencing that the perception of the disease may affect multidimensional aspects of life, including emotional factors and quality of life²⁶⁻³⁰.

Furthermore, the present results support the findings of other authors²⁷, who carried out a survey involving patients with chronic pain, evidencing that pain and perception of the illness were the main predictors for the presence of anxiety and depression in such a population. In addition, pessimistic beliefs about

treatment success, the severity of the symptoms, the emotional impact, comprehensibility and concerns about the disease, the intensity and inability of pain, as well as variables regarding oral, cognitive, and social interactions may also lead to depression and anxiety symptoms. However, an important contribution brought by the present research is the specific identification of thinking factors related to treatment and the concern regarding the illness as directly associated with pain intensity. Based on this, clinicians should provide more assertive approaches in pain treatment, aiming to address such factors, as psychosocial conditions are very broad and the lack of specification regarding such factors may generate non-specific treatment goals²⁷.

Similar findings were also found in patients with temporomandibular disorders, who demonstrated that their perception of quality of life was influenced by physical and mental health aspects²⁸. Moreover, beliefs about pain play an important role in the experience of and response to pain, and it includes beliefs about one's ability to control pain and catastrophizing²⁹. Thus, it is important to recognize that unhelpful pain-related beliefs are relevant predictors of treatment outcomes in craniofacial pain conditions and they can impact patients' lives^{30,31}.

In this way, beliefs about the pain consequences should be included in the assessment of craniofacial conditions to provide information for appropriate clinical management. Patients' evaluation of their own illness beliefs may provide basic information about these important predictors, and changes in dysfunctional pain-related beliefs can be powerful targets for the treatment of chronic pain^{30,31}.

A systematic review found that treatment adherence of chronic pain patients is influenced by pain-related beliefs¹⁰. To overcome misbeliefs in patients with craniofacial conditions, pain education should be encouraged as an effective choice, and may contribute to breaking the cycle of misinformation and the spread of pain-related beliefs⁹. Previous reports in the literature indicate that changes in the patient's perception of the illness with a focus on treatment goals, as well as developing control beliefs may improve mental health, quality of life, and illness management³².

The main limitation of this study is its sample size. However, as it is an exploratory study, the sample size was not calculated, therefore, it is not possible to affirm that the present results are powerful enough to be extrapolated to the overall population with craniofacial pain. Another relevant point is that the present study only performed questions related to the presence of craniofacial pain in the last 24 hours. The time that pain affects each volunteer and the frequency of pain were not investigated, which may be an important missing piece of information about the sample characteristic, and it could possible be an important influencing factor in the pain models.

Despite these limitations, the pain biopsychosocial approach is a significant strength of the present study and represents an important patient-reported outcome. This study highlights that psychological, especially pain-related beliefs, should be investigated in craniofacial painful conditions, even before starting clinical treatment. The increased understanding regarding physiological and multidimensional aspects related to pain may con-

tribute to improvements in the currently available craniofacial pain literature.

CONCLUSION

The present study identified that the pain intensity and pain duration experienced in the last 24 hours are associated with beliefs related to the treatment and concerns about the disease. Thus, health professionals should be aware of the importance of identifying the presence of multidimensional aspects related to pain, thus conducting clinical treatments that should also include a psychosocial approach in people with craniofacial pain. The relevance of approaches that incorporate health education should also be considered, guiding the patient toward the self-management of their dysfunction and effective strategies for controlling and living with pain.

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