



# Predicting Pain Anxiety Symptoms based on Pain Perception with the mediating role of Mental Pain in Musculoskeletal Patients

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## ABSTRACT

**Aims:** The purpose of this study is to investigate the prediction of pain anxiety symptoms based on pain perception with the mediating role of mental pain in patients suffering from musculoskeletal disorders.

**Method and Materials:** This research is a cross-sectional study in which descriptive-correlational method was applied. The study population was all musculoskeletal patients in Tehran, Iran in 2021. In present study, 300 musculoskeletal patients were selected via candidate sampling method. They completed the Orbach & Mikulincer Mental Pain Scale (2018), Melzack McGill Pain Questionnaire (1975) and Paknejad et al. Pain Anxiety Symptoms (2014). Pearson correlation & bootstrap test were used to analyze data through SPSS-22.

**Findings:** There was significant negative relationship between pain perception and mental pain and conversely and significant direct positive relationship between pain perception and pain anxiety symptoms ( $P < 0.01$ ). Moreover, it was shown the mediating role of mental pain in the relationship between pain perception and pain anxiety symptoms in patients with musculoskeletal pain.

**Conclusion:** To conclude, based on the results, it could be argued that pain is affected by mental components and if the psychological reasons are relieved, the pain will be perceived less severe.

**Keywords:** Pain Perception, Mental Pain, Pain Anxiety Symptoms, Musculoskeletal Patients.

## Introduction

According to International Association for the Study of Pain (IASP), pain is a state that interrupt with daily life and it is described as tissue damage potentially or not<sup>[1]</sup>. Pain is expressed in different ways<sup>[2]</sup> and comes in many forms and in any case affects the quality of life of people<sup>[3]</sup>. On the other hand, pain can be associated with various personal components<sup>[4]</sup>, including psychological components as depression, self-efficacy and so on<sup>[5]</sup>. Researches have shown that pain intensity and chronic pain are influenced by psychological and cognitive factors<sup>[6]</sup>. As cited before, pain is reaction of body into illness and injuries. When the causes of pain are disappeared but pain is remained it is called chronic

pain<sup>[7]</sup> and it cause pain anxiety symptoms.

Therefore, many of the factors that perpetuate pain can be psychological<sup>[8]</sup>. In psychology, some pain even chronic pain is rooted from our mental states. In another word, mental pain or emotional pain targets our self and its meaning and in the end, distorts our experiences of pain. It accompanies with undesirable feelings<sup>[9]</sup>. Mental pain can be caused by deep depression, which is often caused by depression and can lead to suicide or suicidal ideation<sup>[10]</sup>. According to psychoanalytical approach, mental pain has a secondary benefit for the person to escape from his real self or change it into pain<sup>[11]</sup>. In clinical conditions, researchers have shown; there are reciprocal

relationships between chronic pain and emotions and its constructs [12]. In cognitive neuroscience; emotional or psychological pain can alter pain circuits in our brain and translated it as chronic pain in long time. In another word, neuronal and chemical factors are involved in this phenomenon [13].

Pain perception can be facilitated by mental pain and pain anxiety symptoms [14]. Chronic pain refers to psychological and environmental factors like anxiety that they can exacerbate conditions for pain. Our different perception of pain is related to genetic, cultural, psychological, environmental factors. Attention, understanding, control and expectations can affect pain perceptions [15]. Pain perception is affected by memory, emotional learning and affective component [16]. In a study, results show unconscious emotional stimuli of pain can decrease pain perception [17]. In another study, researchers found that there is relationship between pain and anxiety stimuli [18].

Psychological treatments as Cognitive Behavioral Therapy, improve psychological factors that they are related to chronic pain like; anxiety, depression, psychological problems, risk factors, and low well-being [19]. Physical chronic pain is affected by emotional regulation mechanisms in patients and they are related to their quality of life and life style [20]. In cognitive viewpoint, individuals with chronic pain can minimize their pain by attention distortion. In fact, they have strong cognitive mechanisms that they distract themselves from the pain and these mechanisms decrease pain perception in chronic patients [21]. A model of pain perception in people with chronic pain syndrome has shown; there are psychosocial variables as pain catastrophic and perceived social support have important roles in in perception of pain and in patients [22].

The quality of perceived pain can affect the severity of the pain. Hence, it is less common

in the research literature to evaluate the psychological and cognitive aspects of pain. Most previous studies have examined the physical aspects of pain. Few studies have examined the psychological factors of pain in details, such as the relationship between depression and pain [5]. Therefore, a study is needed that links the relationship between pain anxiety symptoms and pain perception mediated by mental pain. Because all these variables depend on psychological characteristics. According to these points; the question of this study is; if there is any mediating role for mental pain while relationship between pain perception and pain anxiety symptoms in musculoskeletal patients is assessed?

### Method and Materials

This cross-sectional study was conducted through descriptive–correlational method. The study population included all musculoskeletal patients in Tehran, Iran in 2021. In this study, 300 musculoskeletal patients were selected via candidate sampling method. They completed the questionnaires of study online via Instagram and Whatsapp. Then, data were analyzed by SPSS-22. The instruments of this study included as follows:

**Demographic questionnaire** This scale: included questions regarding age, gender, kind of pain, academic level and so on.

**McGill Pain Questionnaire (short form):** This scale was provided by Melzack [23] and consists of four main dimensions, 20 subgroups and a total of 78 words. In each subgroup the pain intensity increases from top to bottom. Thus, the lowest word has the highest score. The subscales are sensory perception of pain, emotional perception of pain, perception of pain assessment, and various pains. Dworkin et al. reported Cronbach's alpha coefficients for these subscales 0.87, 0.87, 0.83 and 0.86 respectively [24]. In Iran, a study demonstrated

0.85 for whole questionnaire [25].

**Mental Pain Scale:** This scale was designed by Orbach et al. [26] It has 44 items and 9 subscales as labeled emptiness, irreversibility, emotional flooding, helplessness, lack of control, bewildered, alienation, narcissism/worthlessness and confusion. The rating of this questionnaire is in 5-point Likert. In a study, Guimarães, et al. [27] found internal consistency and test-retest reliability and it has concurrent validity with WHO quality of life, Beck depression and Beck anxiety in addicts of Portugal. In Iran, Karami et al. [28] demonstrated 6-factor by exploratory factor analysis that these factors provided 0.40.6 % of mental pain variance. Cronbach’s alpha for the whole mental pain questionnaire was 0.96.

**Pain Anxiety Symptoms Scale:** This scale is developed by Paknejad et al. and it has 40 items. Scoring is in the form of 6-point Likert. In Iranian sample, exploratory factor analysis demonstrated 3 factors as avoidance-escape, fear of pain and physical symptoms. The correlation analysis with TSK scale, PCS, scales of DASS-21, pain self-efficacy beliefs and pain behavior questionnaire showed the convergent and divergent validity [29].

**Findings**

In this study, 300 (187 females and 113 males) musculoskeletal patients were participated. Mean age of participants was 31.27 years old (SD=2.81). The mean and standard deviation of patients’ responses to research variables are given in Table 1.

Correlational results showed that there was relationship between pain perception and mental pain negatively . Conversely the relationship between pain perception and pain anxiety symptoms was positively and directly significant (P0.01<). In another word, when the pain anxiety symptoms of patients with musculoskeletal pain increases, their pain perception increases, but as patients’ mental pain increases, their pain perception and pain anxiety symptoms decreases (Table 1).

The direct effect of pain perception on the mental pain variable was negative significantly (P ≤0.001, Beta = 0.503) and 25% of the variance in mental pain of patients with musculoskeletal pain was explained by their pain perception. Moreover, when pain perception variables (independent variable) and mental pain (mediating variable) were included in the regression equation to predict pain anxiety symptoms in patients with musculoskeletal pain, the effect of pain perception variable on pain anxiety symptoms variable was significantly positive (P ≤ 0.001, Beta =0.435). The effect of mental pain variable on pain anxiety symptoms variable was negative (P=0.015, Beta = -0.154). Finally, both variables (independent and mediating), in total, explain 28% of the variance in pain anxiety symptoms in patients with musculoskeletal pain (Table 2).

The bootstrap test was done to determine the mediating role of mental pain in the relationship between pain perception

**Table 1)** Statistical indicators and correlation matrix between variables

Variable	Mean	Standard deviation	Pain perception	Mental pain	Pain anxiety symptoms
Pain perception	52	1.85	1		
Mental pain	157	3.06	-0.05**	1	
Pain anxiety symptoms	171	2.25	0.51**	-0.38**	1

(\*\*) Significance at the level of 0.01

**Table 2)** Regression model for predicting pain anxiety symptoms

Independent	Dependent	Beta	B	Se	T	P	R	R <sup>2</sup>
Pain perceptio n	Mental pain	-0.50	1.03-	0.11	-9.15	0.001**	0.50	0.25
Pain perception	Pain anxiety symptoms	0.43	0.29	0.04	6.96	0.001**	0.53	0.28
Mental pain		-0.15	-0.05	0.02	-2.46	0.015*		

(\*\*) Significance at the level of 0.01

(\*) Significance at the level of 0.05

**Table 3)** Bootstrap test results to determine the mediating role of mental pain

Independent variable	Mediating variable	Dependent variable	Resampling	Error estimation	Bootstrap limits		if	Significance of P. Value
					Lower limit	Upper limit		
Pain perception	Mental pain	Pain anxiety symptoms	1000	0.03	0.01	0.15	0.08	0.04*

(\*) Significance at the level of 0.05

and pain anxiety symptoms in patients with musculoskeletal pain. According to Cohen <sup>[30]</sup>, the effect size is interpreted as: 0.02(weak), 0.15(medium) and 0.35(strong), respectively. In this study, indirect effect size of pain perception on pain anxiety symptoms in patients with musculoskeletal pain with a standard coefficient of 0.08 at the level of 0.04 was positively significant. As the result, mental pain had a small effect size and it had a mediating role between pain perception and pain anxiety symptoms in patients with musculoskeletal pain. In other words, mental pain causes patients with pain anxiety symptoms to perceive less pain (Table 3).

**Discussion**

The purpose of this study was predicting pain anxiety symptoms based on pain perception with the mediating role of mental pain in musculoskeletal patients. Results showed mental pain has a mediating role between pain perception and pain

anxiety symptoms. This finding is consistent with studies in the research literature. For example, in study of Cimpean and David <sup>[18]</sup> emphasized on the role of pain catastrophizing and state anxiety on pain tolerance and pain-related anxiety. In another view, when cognitive behavioral therapy is conducted on patients, chronic pain, pain anxiety, depression and psychological problems improve <sup>[19]</sup>. In another study, results demonstrated emotional regulation mechanisms in patients with chronic pain are related to their quality of life and life style <sup>[20]</sup>. The intensity of perception of a pain is the intensity of suffering and the concept of pain for the patient. Psychological and cognitive factors such as the ability to understand, pain conceptualization or meaning and personal interpretation are effective in how to respond to pain. It seems pain anxiety is a type of pain perception that is not dependent on external stimuli. On the other hand, recognizing and even measuring



pain anxiety can be effective in treating chronic pain. Because pain is expressed in metaphorical statements [2], it is often difficult to measure mental and perceived. Often, perceived pain manifests itself in the form of anxiety symptoms pain [31]. All three variables of this study are more cognitive and subjective. Therefore, their perceptual and mental aspects are intertwined and they cannot be separated exactly in terms of pain. According to cognitive approach; attentional and conceptual processes direct and manipulate pain and emotional states facilitate our cognitive capacities [32].

Although, this study contributed to our knowledge regarding the role of psychological factors in pain perception, it is not without limitations. Due to the online data collecting, it was difficult for patients to cooperate and probabilistic sampling was not possible due to Corona virus outbreak.

### Conclusion

Mental pain has a small effect size and it has a mediating role between pain perception and pain anxiety symptoms in patients with musculoskeletal pain. Accordingly, researchers are recommended to pay attention to the mental factors of pain in their future studies.

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**Authors' contribution:** RF was corresponding author who helped for drafting introduction and discussion and supervise to design methodology/ and statistical analysis 70%.

RKZ wrote introduction and conduct the research (%20). RR contributed in participants sampling (%10).

**Conflicts of Interests:** None.

**Ethical Permission:** In this study, all ethical principles were respected. The purpose of

the study was explained for all participants. Written signed consent form was obtained from all participants

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