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Prediction of Pain Intensity Based on Pain Metaphorical Perception and Quality of Life in Musculoskeletal Patients

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ABSTRACT

Aims: The purpose of this study was to find the relationship between pain metaphorical perception and quality of life with pain intensity in musculoskeletal patients.

Method and Materials: This was a descriptive correlational study. The statistical population of this study included all musculoskeletal patients in Tehran. In this study, 250 candidates were selected via the at-reach method in 2024. They completed three questionnaires, Chronic Pain Intensity (1992), Pain Metaphorical Perception (2023), and Quality of Life (1996). For data analysis, SPSS-26 was used.

Findings: The results showed that the correlation coefficient of pain intensity with pain metaphorical perception was significant (r=0.46) (P<0.01). The relationship between quality of life and pain intensity were negative and meaningful (r = -0.29) (P<0.05). Moreover, 9.6% of the pain intensity variance was explained by the pain metaphorical perception and 4.5% was explained by the quality of life.

Conclusion: It is suggested to investigate specific conceptual metaphors of musculoskeletal pain in future studies. It is also recommended that specialists in this field, physicians, health psychologists, etc. pay attention to the role of metaphors in improving the quality of life of patients with severe pain.

Keywords: : Pain Intensity, Pain Metaphorical Perception, Quality of Life, Musculoskeletal Patients

Introduction

Musculoskeletal pain is a persistent, vague pain that can occur almost anywhere in the body, but the most common areas are the back, shoulders, neck, and head [1]. In the past, these pains were often misdiagnosed as inflammation and wear between tissues, arthritis, or visceral disease [2]. In the experience of pain, two factors of tissue damage should be considered as a sensory dimension and unpleasantness as an emotional dimension [3]. The use of these two words in the definition of pain indicates the fact that emotional and cognitive factors play a significant role in explaining this experience. Pain is a mental and psychological experience and because it has unpleasant sensory and emotional components, it can change the interpretation of pain metaphorically [4]. The essence of conceptual metaphors is based on the cognitive linguistics approach and based on the theory of Lak off [5]. According to this theory, conceptual metaphors consist of a source domain and a target domain. The source domain is the semantic base that determines and specifies the status of the target domain. While the field of the target domain is more abstract and to understand it, the field of the source domain is needed, which is based on the individual experiential world [6]. To understand the relationship between the source and target domains, requirements or mappings are necessary so that by using them the two semantic domains can be correctly recognized and understood [7]. Many concepts and fields of meaning that have a strong abstract aspect need metaphors to understand and communicate with others. Since pain is abstract and has no external example, it has originality and a metaphorical nature. A study

indicated the deeper the pain, that is when it is very internal and results from perception or does not have physical symptoms, the more metaphors are needed to express it [8]. Metaphors are involved in the diagnosis and treatment of severe pain such as pain caused by cancer and its treatment, and cancer patients express their lived experience of pain, the treatment process, and their illness with metaphors [9]. The source domains of pain are based on physical characteristics, which define the target domains, and we, as beings with thoughts and knowledge, are bound to take help from our physical characteristics to bring our inner pains into the arena of words. Therefore, the basis of pain metaphor perceptions is embodiment or physical characteristics [10].

Quality of life can represent a kind of mental perception of pain and its intensity [11]. Quality of life is a perception of the situation in which people live and the cultural context and value system they are in, which is based on their goals, expectations, standards, and interests [12]. Therefore, quality of life is a multidimensional and multifactorial concept. Quality of life is defined as a special state of well-being, which is a combination of the following two dimensions: the first dimension is the ability to perform daily activities, which itself refers to physical, mental, and social well-being. The second dimension includes patient satisfaction in functional dimensions, control of pain and disease, and treatment of disease-related symptoms such as types of pain [13]. It has been observed in various studies that there is a relationship between quality of life and pain especially in musculoskeletal patients. For example, a study indicated the association between disability severity, pain, and quality of life in female students with chronic low back pain [14]. Another study confirmed the relationship between pain intensity and quality of life in elderly with low back pain [15]. Low health-related quality of life among patients with chronic musculoskeletal pain is related to pain intensity [16].

As mentioned, few researches both abroad and inside have not been conducted with this comprehensiveness that can cover these variables and this issue was one of the reasons for conducting this research. Furthermore, the metaphorical perception of pain is a new interdisciplinary variable, because it has a cognitive-verbal nature, it can be assumed that cognitive causes in addition to psychological causes are effective on the intensity of pain, and for this reason, using metaphors can change the cognitive system concerning the perception and intensity of pain.

The main question of this study is if it is possible to predict the pain intensity of musculoskeletal patients based on the pain metaphorical perception and the quality of life.

Method and Materials

This was a descriptive correlational study. The statistical population of this study included all musculoskeletal patients in Tehran. According to the target population and based on the formula n=z2(1-p)/ d2, (d2 is equal to 0.06) [17], 250 patients were selected via the at-reach method in 2024. The entry criteria were to be between the ages of 30 and 50 years and have a history of musculoskeletal pain for a minimum of 6 months. The exclusion criterion was the refusal to continue completing the questionnaires. With a call on Instagram, while announcing the goals of the research, the researchers asked the musculoskeletal patients to contact the main researcher through Instagram, WhatsApp, and email. Then the link to online press questionnaires was provided to them. The main researcher of this study supervised all these processes, and steps. Confirming the informed consent was obtained from each participant and the purpose of the study was explained at the beginning of the form. To maintain ethical principles, they were assured that the information would remain confidential. For data analysis, SPSS-26 was used.

The data were collected using three instruments:

Chronic Pain Intensity Questionnaire: This questionnaire was created by Von Korff, et al. (1992) to measure the intensity of chronic pain. This questionnaire has three subscales, which are the intensity of pain, stability or

duration of pain, and the degree of disability due to pain. The respondent rates each of the seven question statements of the test on an eleven-point scale of 0-10. Pain means in each subscale is (question 1 + question 2 + question 3) x 10. This score is obtained between 0-100. The convergent validity of this questionnaire with the McGill pain scale was reported as 0.89 and its reliability according to Cronbach's alpha is 0.90 [18]. The Iranian version of the chronic pain intensity questionnaire indicated Cronbach's alpha is 0.84. In this study, the content and formal validities of this questionnaire were confirmed [19]. The Cronbach alpha recorded in this study was 0.73, which indicates the desirability of the validity coefficient of this questionnaire.

Pain Metaphorical Perception Questionnaire: The pain metaphorical perception questionnaire was created by Raiisi (2023). This questionnaire has 25 items. This questionnaire has 4 subscales: object, force, human, and causality. This questionnaire is graded on a Likert scale from "strongly disagree (1) to strongly agree (5)". Which gives an overall score from a minimum of 25 to a maximum of 125. The reliability of this questionnaire was obtained through internal consistency by Cronbach's alpha for total was 0.75 and (object=0.73, force=0.76, human=0.72 and causality=0.77). The content validity index of this questionnaire confirmed by experts (20). The Cronbach alpha recorded in this study was 0.83, which indicates the desirability of the validity coefficient of this scale.

Quality of Life Questionnaire: The World Health Organization quality of life questionnaire was created in 1996. This questionnaire has 26 items that measure a person's overall quality of life. This questionnaire has 4 subscales and a total score. These subscales are physical health, mental health, social relationships, health of the surrounding environment, and total score. The range of scores is between 26 and 130. In the World Health Organization version, reliability with Cronbach's alpha; physical health, 0.80, psychological health, 0.76, social relations, 0.66 and environment 0.80 have been obtained [21]. In Iran, intra-cluster correlation values and Cronbach's alpha were above 0.7 in all areas, but in social relations, Cronbach's alpha value was 0.55, which could be due to the small number of questions in this area or its sensitive questions. The face validity of this scale was acceptable [22]. The Cronbach alpha recorded in this study was 0.88, which indicates the desirability of the validity coefficient of this questionnaire.

Findings

In this study, 250 participants who had cosmetic rhinoplasty or were candidates participated in the research. The gender of patients included, 145 (58 percent) were women and 105 (42 percent) were men. The mean and standard deviation of the age were 45.34±6.81. The averages and standard deviations of the variables with their subscales are presented in Table 1.

Table 1) Descriptive Indicators of the Main Variables

Main Variable	Subscales	Number	Mean	Standard Deviation
Pain intensity	Intensity	250	67.73	16.91
	Duration	250	61.19	16.83
	Disability	250	62.29	17.62
	Pain intensity	250	81.09	20.15
Pain metaphorical perception	Object	250	37.28	6.75
	Force	250	35.64	7.28
	Human	250	36.56	8.14
	Causality	250	34.09	6.21
	Pain metaphorical perception	250	40.37	9.05
Quality of life	Physical health	250	15.42	9.46
	Mental health	250	14.26	9.07
	Social relationship	250	6.42	9.04
	Environmental Health	250	14.22	10.14
	Quality of life	250	9.82	9.65

Pearson's correlation coefficient was used to examine the relationship between the pain metaphorical perception and quality of life with pain intensity. The results showed that the correlation coefficient of pain intensity with pain metaphorical perception is significant (r=0.46) (P=0.01). In other words, as pain intensity increases in patients, their pain metaphorical perception changes. The relationship between quality of life and pain intensity is negative and meaningful (r=-0.29) (P=0.05). All variables and their subscales are significant at levels 0.01, and 0.05 (Table 2).

Table 2) Correlation Matrix Subscales of pain intensity, pain metaphorical perception, and quality of life

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13	14
1. Intensity	1													
2. Duration	0.65**	1												
3. Disability	0.52**	0.88**	1											
4. Pain intensity	0.68**	0.76**	0.66**	1										
5. Object	0.33**	0.43**	0.54**	0.53**	1									
6. Force	0.54**	0.55**	0.49**	0.48**	0.68**	1								
7. Human	0.44**	0.43**	0.45**	0.43**	0.61**	0.63**	1							
8. Causality	0.47**	0.41**	0.45**	0.66**	0.73**	0.79**	0.76**	1						
9. Pain metaphorical perception	0.49**	0.41**	0.48**	0.46**	0.79**	0.77**	0.75**	0.74**	1					
10. Physical health	-0.27*	-0.28*	-0.24*	-0.26*	0.48**	0.41**	0.43**	0.42**	0.45**	1				
11. Mental health	0.21*-	-0.25*	-0.27*	-0.24*	0.45**	0.43**	0.49**	0.48**	0.44**	0.75**	1			
12. Social relationship	-0.23*	-0.27*	-0.28*	0.22*-	0.41**	0.40**	0.46**	0.41**	0.47**	0.60**	0.65**	1		
13. Environmental Health	-0.20*	-0.25*	-0.27*	-0.26*	0.42**	0.45**	0.44**	0.33**	0.46**	0.62**	0.61**	0.65**	1	
14. Quality of life	-0.28*	-0.23*	-0.24*	-0.29*	0.44**	0.38**	0.40**	0.35**	0.43**	0.68*	0.67*	0.67**	0.66**	1

(**) Significance at level 0.01 and (*) significance at level 0.05.

In other words, 4.5% of the pain intensity variance is explained by the quality of life. That is, 4.5% of the observed variance in pain intensity is explained by this variable. The observed R value (0.84) also represents the linear regression model established for this study. In addition, the F calculated for this variable (9.76) is significant at the level of 0.95. Therefore, it can be concluded that there is a significant association between the quality of life and its subscales with pain intensity (Table 3).

Table 3) Linear regression analysis predicting pain intensity based on pain metaphorical perception, and quality of life

Variables	Non- standardized	Dependent variable: Pain intensity	T	Sig
Fixed number of pain metaphorical perception	3.36	-	8.73	0.001
Object	0.13	0.02	0.43	0.000
Force	0.16	0.04	0.36	0.001
Human	0.18	0.03	0.39	0.006
Causality	0.16	0.06	0.41	0.003
Fixed number of quality of life	4.02	-	6.27	0.001
Physical	0.73	-0.12	1.25	0.075
Mental	0.68	-0.16	0.89	0.050
Social	0.65	-0.11	-056	0.043
Environmental	0.62	-0.13	-0.52	0.016

Pain metaphorical perception; Adjusted R=0.56, R^2=0.096, F= 13.21Quality of life; Adjusted R=0.84, R^2=0.045, F= 9.76

Discussion

The purpose of this study was to predict pain intensity based on pain metaphorical perception and quality of life in musculoskeletal patients. The first finding of this study showed that there is a metaphorical perception and quality of life with pain intensity. Findings revealed that if pain

intensity increases, the pain metaphorical perception changes and vice versa. If pain intensity increases, the quality of life decreases. In confirming the relationship between pain metaphorical perception and quality of life with pain intensity some studies demonstrated pain intensity is intertwined with pain metaphorical perception and quality of life. For example, Raiisi & Riyassi [9] found pain metaphors are related to pain intensity in cancer patients. In another study, Ginnerup-Nielsen, et al. indicted the relationship between pain intensity and quality of life.

People select their pain metaphors not as painful bodies, but in interactions with other bodies and social environments, and according to their mental health (such as accepting the type of treatment and medicine they trust) [23]. Pain metaphors can arise from interactions within the environment, including interactions with other people. There is no necessary and proportional relationship between the severity of tissue damage and the amount of suffering experienced, and cultural forces impose their logic on bodies and narratives of pain metaphorically [24]. On the other hand, the intensity of physical pain affects people psychologically [25], disturbs personal relationships, and reduces the quality of life of patients [26].

The second finding indicated that pain intensity is predicted based on pain metaphorical perception and quality of life in musculoskeletal patients. Results showed that 9.6% of the pain intensity variance is explained by the pain metaphorical perception and 4.5% is explained by the quality of life. In confirming the prediction of pain intensity based on pain metaphorical perception and quality of life, Ginner up-Nielsen, et al. [15] argued that pain intensity is predicted by quality of life and its factors. Bullo & Hearn [27] revealed that the intensity of pain is explained by the metaphor of pain in women with endometriosis.

In the studies that were mentioned, the intensity of pain and its factors are related to quality of life. However, in this study, the cognitive metaphors or conceptual metaphors are related to other psychological variables that are involved in musculoskeletal pain (28). The perception of pain and its intensity can even metaphorically affect the quality of life of patients [29]. They help the patients to express visceral and deep pains and produce the brain network which are common nodes of pain and conceptual metaphor and are told by language to the physicians or therapists [30]. Accordingly, pain metaphors used by the patients can give direction to their quality of life [31]. In some ways, this makes it easier to diagnose, and prescribe medications and treatment methods [32, 33]. This challenging process, in addition to the change in the cognitive system, will cause a change in the behavioral system and will continuously monitor the dimensions of the quality of life cognitively [34, 35].

Conclusions

There is a significant positive correlation between pain intensity and pain metaphorical perception. In other words, as pain intensity increases in patients, their pain metaphorical perception changes. Another finding was a negative correlation between quality of life and pain intensity. In other words, as pain intensity increases in musculoskeletal patients, the quality of life and its factors decrease. Moreover, 9.6% of the pain intensity variance is explained by the pain metaphorical perception and 4.5% is explained by the quality of life. The present study had some limitations. We had a lot of challenges finding samples with musculoskeletal pain who were willing to participate in this study. The most important and prominent limitation was online data collection. Therefore, it is suggested that in future studies, real conditions should be considered. It is suggested to investigate specific conceptual metaphors of musculoskeletal pain in future studies. It is also suggested that specialists in this field, physicians, health psychologists, etc. pay attention to the role of metaphors in improving the quality of life of patients with severe pain.

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Authors' Contribuson

All authors helped in conceptualization, methodology and conducting te resrach. The final manuscript was approved n=bt all atuthors.

Conflict of Interest

The authors declare no conflict of interest.

Ethical Approval

All ethical principles were considered in this study. The participants were informed about the purpose of the research and its stages. They were also assured about the confidentiality of their information. The participants were free to leave the research at any time and not provide personal information other than age. The first author is the designer, methodologist, and writer of this article, and the second and third author assisted in data collection and analysis.

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