Prediction of Psychological Capital Based on Mental Health, and Pain Metaphorical Perception in Musculoskeletal Patients

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A B S T R A C T

Aims: The purpose of this study was to examine the relationship between mental health and pain metaphorical perception with psychological capital in musculoskeletal patients. Method and Materials:.

Method and Materials: This research was a descriptive correlational study. The statistical population included all musculoskeletal patients in Tehran in the first quarter of 2025. Therefore, 250 eligible participants were selected via at-reach and candidate methods. The participants completed the questionnaires (Pain Metaphorical Perception, Psychological Capital Questionnaire, and the Iranian Version of the 12-Item General Health Questionnaire) using SPSS-25.

Findings: The results indicated a significant correlation between psychological capital and pain metaphorical perception (r=0.42) (P≤0.01). Furthermore, there was a significantly negative relationship between mental health and psychological capital (r=-0.52) (P≤0.01). Moreover, 8.9% of the variance in psychological capital was explained by pain metaphorical perception, and 6.3% by mental health.

Conclusion: It seems psychological factors are related to pain perception and its metaphorical explanation. Researchers are advised to pay attention to linguistic-cognitive factors, in addition to psychological factors, in future studies of patients with musculoskeletal conditions.

Introduction

Musculoskeletal pain is a persistent, vague pain that can occur anywhere in the body, but it is most commonly felt in the back, shoulders, neck, and head [1]. These kinds of pain can vary across groups. In addition, this type of pain is associated with individuals' demographic characteristics [2]. They reduce patients' Quality of Life (QoL) [3]. Pain in general is associated with anxiety, pain catastrophizing, and reduced cognitive flexibility during pain perception [4]. Therefore, pain can affect mental health or mental well-being. For example, unknown and unexplained pain can produce health anxiety [5]. Studies indicated that chronic pain can lead to depression [6-7]. In general, bone pain leads to insomnia and depression [8]. Abdominal pain, headaches, musculoskeletal pain, and menstrual pain can lead to phobias, fears, anxiety, and depression [9]. A study of women with musculoskeletal conditions found that they often suffer from sleep disorders [10]. A survey of Indian nurses with musculoskeletal disorders found that they suffered from severe social and personal consequences of pain, leading to reduced social connections, reduced job satisfaction, and physical and emotional distress [11].

Pain is a psychological experience and a state characterized by unpleasant sensory and emotional qualities. Due to its sensory and emotional nature, pain has an abstract character; the more internal the pain is, the more abstract it becomes [12]. According to Lakoff's theory [13], everything abstract is understood and expressed metaphorically. Based on this theory, conceptual metaphors are the container for our thinking, and without them, the possibility of thinking

disappears.This cognitive-verbal phenomenon has two components: the source domain and the target domain. The source domain is based on our experimental components, that is, embodiment, and the target domain is abstract or a field of meaning, and the semantic domain [14]. The relationships between the source domain and target domain are called cognitive mappings. These cognitive mappings are a kind of travel and commuting between the source and target domains. Metaphors have universal characteristics in every semantic domain. However, linguistic-cultural characteristics can affect them [15]. A study of cancer patients has shown that they often describe their condition as being confined to a place [16]. A study indicated that the basis of the pain metaphor is based on bodily characteristics [17]. In Iranian patients, nine pain source domains, such as object, causation, path, and direction, human, place, taste, container, force, and circle, are popular [18]. Another study showed that conceptual metaphors of pain can facilitate the therapeutic relationship [12].

One of the factors that facilitates coping with pain is having psychological capital [19]. People with psychological capital are less vulnerable to stressful events and experience higher levels of happiness, satisfaction, and mental health [20]. Psychological capital is one indicator of positive psychology and comprises resilience, optimism, hope, and self-efficacy. It is also defined by characteristics such as a person's belief in their ability to succeed, persistence in pursuing goals, the development of positive self-images, and the tolerance of difficulties [21]. The components of psychological capital, in an interactive and evaluative process, give meaning to an individual's life, sustain the individual's efforts to change stressful situations, and prepare him or her to enter the scene of action [22]. Therefore, high psychological capital enables a person to cope better in stressful situations and be less affected by daily stressors [23]. A study indicated the relationships between mental pain and psychological capital in people with grief experienced due to the Coronavirus [24]. Another study showed that there is a relationship between pain perception and psychological capital in people with COVID-19 [25].

As mentioned, pain and its severity affect mental health. On the other hand, having psychological capital can improve coping with pain and reduce the level of depression and anxiety caused by pain. These are intertwined psychological variables in pain perception that cannot be easily separated. They are also related at the level of words and beliefs, and because they have a psychological aspect, they have acquired a metaphorical flavor. Therefore, the metaphorical nature of pain in this study highlights the role of language and cognition in this area, which has been less addressed in previous studies. The central hypothesis of this study is: Is it possible to predict the psychological capital based on mental health, and pain metaphorical perception? In other words, the purpose of this study was to examine the relationship between mental health and pain metaphorical perception with psychological capital in musculoskeletal patients.

Method and Materials
This research was a descriptive correlational study. The study population comprised all musculoskeletal patients in Tehran during the first quarter of 2025. According to the purpose and methodology, the formula $n = z^2 (1-p)/d^2$ ($d^2 = 0.06$) was used to determine the sample size ($n = 26$). Then, 250 patients were selected via the at-reach method in 2024. The entry criteria were as follows: aged 30-50 years and having a history of musculoskeletal pain for at least 6 months. The exclusion criterion was the refusal to continue completing the questionnaires.

The questionnaires for this study were designed in Pors- Online. Researchers visited pain clinics in Tehran and, after making the necessary arrangements, asked the clinic managers to send the questionnaire links to patients' mobile phones with musculoskeletal conditions.

The data were collected using three instruments:

Psychological Capital Questionnaire This questionnaire was designed by Luthans et al. [27]. It has four subscales: hope, efficacy,

resilience, and optimism. Each item is answered on a 6-point Likert scale (Strongly disagree = 1 to strongly agree = 6). Therefore, the score range is 24-144. In one study, internal consistency (α = 0.73-0.86) was favorable. Also, the reliability (rtt = 0.85-.92) and specific construct validity of this questionnaire were examined [28]. In Iran, a psychometric study indicated that the internal consistency of the extracted factors, as measured by Cronbach's alpha, ranged from 0.85 to 0.89, and test-retest validity was confirmed after a 4-week interval [29]. The Cronbach's alpha reported in this study was 0.83, which is desirable. Pain Metaphorical Perception Questionnaire: The pain metaphorical perception questionnaire, designed by Raiisi [30], with 25 items and four subscales: object, force, human, and causality. The scoring is based on a Likert scale from "strongly disagree [1] to strongly agree [5]". Accordingly, the minimum score is 25, and the maximum score is 125. The internal consistency calculated by Cronbach's alpha for total items was 0.75 (object=0.73, force=0.76, human=0.72, and causality=0.77). The content validity index of this questionnaire was confirmed by experts [20]. The Cronbach's alpha reported in this study was 0.90, which is desirable.

General Health Questionnaire: This questionnaire was designed by Rahmati Najarkolaei et al [31]. This is the Iranian version of the 12-item General Health Questionnaire. Structure factor analysis indicated two subscales: psychological distress and social dysfunction. Scoring is yes/no. The Cronbach's alpha coefficient was 0.85. Using the split-half method, the alpha for the social dysfunction was found to be 0.77; it was 0.76 for the psychological distress. The two subscales of this study accounted for 48% of the observed variance. The Cronbach's alpha reported in this study was 0.92, which is desirable.

Findings

In this study, 250 patients with musculoskeletal conditions participated. The gender of patients was 161 (64.4 percent) women and 89 (35.6 percent) men. The mean and standard deviation of the ages were 62.18±7.75. The means and standard deviations are presented in Table 1.

Table 1) Descriptive Indicators of the Main Variables

Main Variable	Subscales	Number	Mean	Standard Deviation
Psychological Capital	Hope	250	21.98	6.21
	Efficacy	250	22.23	6.63
	Resilience	250	22.39	7.12
	Optimism	250	21.25	7.09
	Total	250	81.23	7.68
Pain metaphorical perception	Object	250	24.21	4.17
	Force	250	25.20	4.11
	Human	250	23.18	4.34
	Causality	250	21.24	4.28
	Total	250	34.31	6.37
Mental health	Psychological distress	250	4.41	2.16
	Social dysfunction	250	5.05	2.09
	Total	250	9.46	4.66

Pearson's correlation coefficient was used to examine the relationship between mental health and pain metaphorical perception with psychological capital in musculoskeletal patients. The results indicated that the correlation coefficient of mental health with pain metaphorical perception was negative and significant (r=0.46) (P≤0.01). In other words, as mental health states change in musculoskeletal patients, their pain metaphorical perception changes. The relationship between psychological capital

and mental states was negative and significant (r=-0.29) (P≤0.05). There was a positive and significant relationship between the variables of pain metaphorical perception and psychological capital. All variables and their subscales were significant at levels 0.01 and 0.05 (Table 2).

Table 2) Correlation Matrix: Subscales of psychological capital, pain metaphorical perception, and mental health

Variables	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Hope	1												
2. Efficacy	0.85**	1											
3.Resilience	0.82**	0.89**	1										
4. Optimism	0.91**	0.85**	0.84**	1									
5. Total	0.93	0.95	0.96	0.97	1								
6. Object	0.31*	0.35*	0.34*	0.33*	0.30*	1							
7. Force	0.34*	0.35*	0.41**	0.40**	0.43**	0.41**	1						
8. Human	0.34*	0.33*	0.35**	0.33*	0.41**	0.43**	0.41	1					
9. Causality	0.37*	0.31*	0.34**	0.36*	0.33*	0.39**	0.36**	0.34*	1				
10. Total	0.45**	0.43**	0.44**	0.42**	0.46**	0.47**	0.45**	0.44**	0.43**	1			
11. Psychological distress	-0.47*	-0.48**	-0.44**	-0.46**	-0.43**	-0.31**	-0.33**	-0.32**	-0.35**	-0.34**	1		
12. Social dysfunction	-0.43*	-0.47**	-0.44**	-0.45**	-0.44**	-0.28*	-0.26*	-0.21**	-0.27**	-0.25**	-0.35**	1	
13. Total	-0.56*	-0.55**	-0.57**	-0.56**	-0.52**	-0.55**	-0.44**	-0.43**	-0.45**	-0.42**	-0.41**	-0.58**	1

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

Linear regression analysis was used to predict psychological capital from metaphorical perceptions of pain and mental health. The R2 value obtained for the pain metaphorical perception was 0.089. In other words, 8.9% of psychological capital was determined by the metaphorical perception of pain. On top of that, 8.9% of the variance in psychological capital was explained by the metaphorical perception of pain. The observed R value (0.83) also represents the linear regression model established for this study. In addition, the F calculated for this variable (16.04) was significant at the 0.001 level. Therefore, it can be concluded that there was a significant association between the pain metaphorical perception and its subscales with psychological capital. Another result of this study indicates that the R2 value for mental health was 0.063. In other words, 6.3% of the psychological capital was determined by mental health. In this vein, 6.3% of the observed variance in psychological capital was determined by mental health. The observed R value (0.76) also showed the linear regression model established for this study. In addition, the F calculated for mental health (12.23) was significant at the 0.001 level. As a result, it can be found that there was a significant relationship between mental health and its subscales with psychological capital (Table 3).

Table 3) Linear regression analysis predicting psychological capital based on pain metaphorical perception and mental health

Variables	Non- standardized	Dependent variable: Psychological capital	T	Sig
Fixed number of pain metaphorical perception	6.14	-	9.22	0.001
Object	0.17	0.08	0.43	0.001
Force	0.19	0.07	0.36	0.001
Human	0.21	0.09	0.39	0.002
Causality	0.15	0.11	0.41	0.004
Fixed number of mental health	5.13	-	8.25	0.001
Psychological distress	0.59	-0.18	0.96	0.014
Social dysfunction	0.62	-0.19	-0.66	0.016

Pain metaphorical perception; Adjusted R=0.83, R2=0.089, F= 16.04
Mental health; Adjusted R=0.76, R2=0.063, F= 12.23.

Discussion

The purpose of this study was to predict psychological capital from pain metaphorical perception and mental health in patients with musculoskeletal conditions. The first finding of this study showed that there was a metaphorical perception of pain and mental health, with psychological capital. Findings revealed that as psychological capital features increase, the metaphorical perception of pain improves, and vice versa. If psychological capital features increase, mental health decreases. In confirming the relationship between pain metaphorical perception and mental health with psychological capital, some studies demonstrated that psychological capital features are intertwined with mental health and pain perception. Bolourani et al. [19], Meseguer de Pedro et al. [23], Daliri et al. [24], and Jafari [25] reported relationships among pain, mental health, and psychological capital in people with different pain and illness conditions. What distinguishes this study from existing research is that it focuses more on the cognitive and verbal aspects of pain. A metaphorical view of pain transforms the explanation of pain into a different form.

Patients choose conceptual metaphors for their pain not only based on the rule of embodiment or painful bodies, but also consider their pain from the perspective of socio-cultural environments and concerning the level of mental health and psychological capital. Because one cannot talk about internal pain, such as musculoskeletal pain, metaphors did not help [32]. On the other hand, psychological capital itself is a powerful metaphor that expresses psychological assets that can help us deal with pain. Therefore, they can also play an essential role in the metaphorical expression of pain. In times of psychological challenges, or in other words, when psychological problems arise, psychological capital acts like a shield that protects us from risky situations [33].

The second finding indicated that psychological capital was predicted based on pain metaphorical perception and mental health in musculoskeletal patients. Results showed that 8.9% of the variance in psychological capital was explained by the

pain metaphorical perception, and 6.3% by mental health. Bolourani et al. [19], Meseguer de Pedro et al. [23], Daliri et al. [24], and Jafari [25] indicated that psychological capital can be predicted from pain perception and mental health in different studies.

It seems that in musculoskeletal pain, verbal-cognitive and psychological factors are intertwined. Psychological capital can be explained by cognitive-verbal factors such as conceptual metaphors [34]. Because the metaphorical nature of pain challenges psychological capital. Throughout chronic pain, psychological capital and its components can be replenished and depleted like an energy source. From this perspective, psychological capital is highly dependent on our cognitive and mental systems. Psychological capital acts as a psychological reserve that, on the one hand, draws on psycho-cognitive resources and, on the other hand, provides one's psychological energy in response to perceived pain.

This study, like any other study, has limitations. One of the significant limitations of this study was the lack of cooperation from participants. Most people were unable to fill out the questionnaires due to overwhelming pain. It was not possible to examine moderating variables in this study. Therefore, for future studies, researchers are advised to pay attention to moderating factors and variables, and to include them in their research to obtain more accurate information in the field of musculoskeletal pain

Conclusion

According to the findings of this study, psychological factors seem related to pain perception and its metaphorical explanation. Researchers are advised to pay attention to linguistic-cognitive factors, in addition to psychological factors, in future studies of musculoskeletal patients.

Authors' Contribution

AMN was the designer, methodologist, and writer of the manuscript draft. AL and RH

participated in data collection and analysis. All authors read the manuscript and confirmed it.

Conflicts of Interest

The authors declare no conflict of interest.

Ethical Permission

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 to provide no personal information beyond their age.

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