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The Role of Maladaptive Schemas in Pain Perception and Pain Acceptance in Patients with End-Stage Cancer

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ABSTRACT

The present study aimed to examine pain perception and pain acceptance in patients with end-stage cancer based on maladaptive schemas. In terms of purpose, the study was applied research, and in terms of methodology it employed a correlational design. The statistical population of the present study consisted of all patients with end-stage cancer at Imam Khomeini Hospital in Tehran, totaling 300 individuals. Using a random sampling method, 150 patients were selected as the study sample, and the questionnaires were distributed among them. The instruments used included the Young Schema Questionnaire (YSQ-SF; Young, 1988) and the McGill Pain Questionnaire (MPQ; Melzack, 1975). The data were analyzed in two sections—descriptive and inferential—using SPSS version 23. The results of the statistical analyses indicated that there was a significant relationship between all maladaptive schema variables and pain perception and acceptance. The correlation coefficient between rejection and pain perception and acceptance was 0.674, which was statistically significant ($p < .05$). Furthermore, a significant relationship was found between other components and pain perception and acceptance. The raw and standardized coefficients in the regression analysis indicated that the standardized coefficient was 0.727 and the unstandardized coefficient was 0.17. Therefore, maladaptive schemas can significantly predict pain perception and acceptance in patients with end-stage cancer.

Keywords: pain perception, pain acceptance, maladaptive schemas, end-stage cancer.

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Introduction

Cancer is one of the most serious and life-threatening illnesses worldwide and is often accompanied by numerous physical and psychological challenges. Among these challenges, pain is one of the most prevalent and distressing symptoms experienced by patients with cancer, particularly in advanced or end-stage conditions. Pain in cancer patients is not merely a physiological phenomenon but rather a complex multidimensional experience that involves biological, psychological, social, and cognitive factors. The perception and interpretation of pain can significantly influence patients' quality of life, emotional functioning, and adaptation to illness (1-6). Therefore, understanding the psychological processes that shape pain perception and pain acceptance has become an important focus of contemporary psychological and medical research. Effective pain management requires attention not only to medical interventions but also to psychological variables that influence how individuals experience and cope with pain (3, 4).

Pain perception refers to the subjective interpretation and evaluation of painful stimuli, which can vary considerably between individuals even when the physical condition is similar. Psychological factors such as emotional regulation, cognitive appraisal, and personal beliefs play an important role in determining how pain is experienced and interpreted. Pain acceptance, on the other hand, refers to an individual's willingness to experience pain without excessive attempts to control or avoid it, while continuing to engage in meaningful life activities. Research has shown that higher levels of pain acceptance are associated with better psychological adjustment, lower emotional distress, and improved quality of life among patients with chronic illnesses and cancer (2, 6). Consequently, investigating the psychological mechanisms that influence both pain perception and pain acceptance has become increasingly important for improving patient outcomes.

Recent research in health psychology has highlighted the role of cognitive and emotional schemas in shaping individuals' experiences of pain. Schemas are deep-seated cognitive structures that develop early in life and influence how individuals perceive themselves, others, and the world around them. Early maladaptive schemas are dysfunctional patterns of beliefs and emotions that originate in childhood as a result of unmet emotional needs and adverse experiences. These schemas can remain stable across the lifespan and influence emotional responses, cognitive processing, and behavioral patterns in adulthood. Individuals with strong maladaptive schemas may interpret stressful events, including illness and pain, in more negative and catastrophic ways, which can intensify psychological distress and pain perception (7, 8).

Schema theory suggests that early maladaptive schemas may significantly affect the way individuals interpret and cope with health-related stressors. When individuals experience severe illness or chronic pain, these schemas may become activated and influence cognitive appraisals, emotional responses, and coping strategies. For example, schemas related to abandonment, vulnerability, or defectiveness may lead individuals to perceive pain as overwhelming and uncontrollable, thereby increasing psychological suffering. Studies have shown that maladaptive schemas are associated with higher levels of pain intensity, greater emotional distress, and maladaptive coping strategies in individuals suffering from chronic pain conditions (9, 10).

Several empirical studies have also demonstrated the relationship between emotional schemas and psychological outcomes in patients experiencing chronic pain. Emotional schemas influence how individuals interpret, regulate, and respond to emotional experiences, including pain-related distress. In patients with chronic low back pain, emotional schemas have been found to play an important role in shaping psychological outcomes such as anxiety, mood disturbances, and overall quality of life. These schemas may interact with other cognitive variables such as perfectionism, experiential avoidance, and self-compassion to influence pain-related experiences and psychological well-being (11, 12).

In recent years, psychological interventions targeting schemas have been developed to help individuals cope more effectively with pain and emotional distress. Schema therapy, which integrates cognitive-behavioral, experiential, and interpersonal techniques, has shown promising results in improving psychological functioning among individuals with chronic health conditions. Studies have demonstrated that schema-focused interventions can significantly improve pain acceptance, enhance pain self-efficacy, and reduce pain intensity in patients with medical conditions such as spinal surgery and chronic pain disorders

(13, 14). These findings suggest that maladaptive schemas may represent an important psychological mechanism underlying pain-related experiences.

Moreover, schema-based approaches have been integrated with other therapeutic methods such as mindfulness and cognitive-behavioral therapy to improve psychological outcomes in patients with medical conditions. Mindfulness-based schema therapy, for instance, has been shown to reduce mental pain and experiential avoidance among patients with cardiovascular diseases by helping individuals develop greater awareness and acceptance of internal experiences (15). Similarly, psychological interventions focusing on emotional schemas have been found to reduce depression and pain among patients with cancer, highlighting the importance of addressing cognitive-emotional patterns in the treatment of chronic illness (16).

Pain in cancer patients is particularly complex because it often involves both physical suffering and psychological distress. Cancer-related pain can arise from the disease itself, medical treatments, or secondary complications, and it frequently leads to significant emotional and cognitive burdens. Research indicates that psychological factors such as anxiety, catastrophic thinking, and maladaptive cognitive patterns can amplify pain perception and reduce patients' ability to cope effectively with their illness. Consequently, psychological interventions have become an important component of comprehensive cancer care (1, 5).

Furthermore, contemporary research emphasizes the importance of integrating psychological and behavioral approaches in pain management for cancer patients. Interventions such as behavioral activation, mindfulness practices, and digital health tools have been shown to improve patients' coping abilities and reduce the impact of pain on daily functioning. These approaches highlight the role of psychological flexibility, emotional awareness, and cognitive restructuring in shaping patients' experiences of pain (4, 6). At the same time, studies have shown that spiritual well-being and hope may play important roles in helping cancer patients adapt to pain and illness, suggesting that psychological resilience can moderate the impact of pain on quality of life (2).

Despite growing evidence regarding the role of psychological factors in pain experiences, there is still limited research examining the relationship between early maladaptive schemas and pain perception and acceptance among patients with end-stage cancer. Most previous studies have focused on chronic pain conditions such as musculoskeletal disorders or non-terminal illnesses, while fewer studies have explored schema-related cognitive processes in patients facing life-threatening diseases. Given that end-stage cancer patients often experience intense physical pain alongside profound emotional challenges, understanding the psychological mechanisms that influence their pain experiences is particularly important.

Moreover, existing research suggests that maladaptive schemas may influence not only the intensity of pain but also the way individuals interpret and cope with painful experiences. For instance, schemas related to vulnerability, abandonment, and emotional deprivation may contribute to heightened sensitivity to pain and reduced ability to accept and tolerate painful sensations. Similarly, difficulties in cognitive emotion regulation may mediate the relationship between maladaptive schemas and pain-related experiences, highlighting the complex interplay between cognitive, emotional, and behavioral processes (17).

Given the multidimensional nature of pain and the important role of psychological variables in shaping pain experiences, investigating the relationship between maladaptive schemas and pain perception and acceptance can provide valuable insights for clinical practice. Understanding these relationships may help

clinicians design more effective psychological interventions aimed at improving pain management and enhancing the quality of life of patients with cancer. Furthermore, identifying cognitive vulnerabilities associated with maladaptive schemas may contribute to early psychological assessment and targeted therapeutic strategies for individuals experiencing severe illness.

Therefore, considering the significant psychological burden associated with cancer-related pain and the potential role of maladaptive schemas in shaping pain experiences, the present study aims to examine the relationship between early maladaptive schemas and pain perception and pain acceptance among patients with end-stage cancer.

Methods and Materials

Study Design and Participants

The present study was applied in terms of purpose and correlational in terms of research design. In the correlational component of the study, maladaptive schemas were considered the predictor variable, while pain perception and pain acceptance were considered the criterion variables.

The study population consisted of all patients with cancer at Imam Khomeini Hospital in Tehran who were in the final stage of treatment. To select the sample, 150 patients with cancer were randomly selected and the questionnaires were distributed among them. The inclusion criteria were having a confirmed diagnosis of cancer according to a medical specialist, having the ability to read and write, and willingness to participate in the study. The exclusion criteria were lack of cooperation until the end of the research process and participation in other psychological programs during the study.

Data Collection

McGill Pain Questionnaire (MPQ). The McGill Pain Questionnaire (MPQ) was developed by Melzack and Torgerson in 1971 to provide a comprehensive scale for assessing pain using lexical analysis of words commonly used to describe pain (Melzack, 1983). This questionnaire measures pain perception across four dimensions: sensory pain, affective pain, evaluative pain, and miscellaneous pain. The questionnaire contains 20 items. The sensory pain perception dimension includes Items 1 through 10, the affective pain perception dimension includes Items 11 through 15, the evaluative pain perception dimension is measured by Item 16, and the miscellaneous pain dimension includes Items 16 through 20. Participants select the word in each item that best corresponds to their perception of their current pain experience, and based on the sequence of the words, the intensity of pain is scored from top to bottom. In the study conducted by Durkin (2009), the validity of this questionnaire was confirmed. Reliability was also calculated using Cronbach's alpha, and the alpha coefficients for all dimensions ranged from .83 to .87. Moradi-Far (2013) also examined the validity of this questionnaire. Using the split-half reliability method, the reliability coefficient was reported as .67, indicating moderate but acceptable reliability. The Cronbach's alpha coefficient for the questionnaire was reported as .83.

Pain Acceptance Questionnaire (McCracken & Vowles, 2004). The Pain Acceptance Questionnaire was developed by McCracken and Vowles (2004). This scale measures pain acceptance through two components: willingness to accept pain and activity engagement, and it contains a total of 20 items. Nine items are related to the willingness to accept pain component (Items 4, 7, 11, 13, 14, 16, 17, 18, and 20), while eleven items

correspond to the activity engagement component (Items 1, 2, 3, 5, 6, 8, 9, 10, 12, 15, and 19). Responses are scored using a seven-point Likert scale. The scale has demonstrated good internal consistency, with Cronbach's alpha coefficients of .82 for the willingness to accept pain component and .87 for the activity engagement component. Factor analysis results reported by McCracken, MacLeod, and Eccleston (2008) confirmed the presence of these two factors and supported the construct validity of the scale. In studies conducted in Iran, the Cronbach's alpha coefficient for this scale has been reported as .87. In the present study, reliability calculated using Cronbach's alpha was .79.

Data Analysis

Data analysis was conducted using both descriptive and inferential statistical methods. In the descriptive section, the mean, standard deviation, and relevant descriptive indicators were calculated. In the inferential section, after verifying the necessary statistical assumptions, regression analysis was conducted to examine the relationships between variables. All analyses were performed using SPSS version 24.

Findings and Results

The mean, standard deviation, minimum, and maximum values for the domains of maladaptive schemas (disconnection/rejection, impaired autonomy, impaired limits, other-directedness, and overvigilance), as well as total pain perception and pain acceptance scores, are presented in Table 1.

Table 1. Descriptive Statistics for Research Variables

Variable	M	SD	Min	Max
Disconnection/Rejection Domain	66.30	9.80	47	91
Impaired Autonomy Domain	45.76	11.82	31	73
Impaired Limits Domain	37.50	12.17	23	70
Other-Directedness Domain	36.26	14.83	21	70
Overvigilance Domain	44.96	12.16	27	73
Total Pain Perception Score	60.60	11.24	35	87
Total Pain Acceptance Score	74.60	9.59	24	112

As shown in Table 1, the descriptive statistics for the maladaptive schema domains as well as the total scores for pain perception and pain acceptance are presented.

Main Hypothesis: There is a relationship between early maladaptive schemas and pain perception and pain acceptance in patients with end-stage cancer.

Table 2. Pearson Correlation Coefficients Between Early Maladaptive Schema Domains and Pain Perception and Pain Acceptance

Variable	Disconnection / Rejection	Impaired Autonomy	Impaired Limits	Other-Directedness	Overvigilance
Pain Perception	.684**	.621**	.402**	.453**	.610**
Pain Acceptance	.592**	.630**	.498**	.512**	.532**

Note. **p < .05.

Table 2 presents the Pearson correlation coefficients and significance levels between maladaptive schemas and their domains and the variables of pain perception and pain acceptance. As observed, significant relationships exist between all maladaptive schema variables and both pain perception and pain acceptance. For example, the correlation coefficient between the rejection schema domain and pain perception was .674, which is statistically significant ($p < .05$). Significant relationships were also observed between the other

schema domains and both pain perception and pain acceptance. To examine the multivariate relationship between variables, multiple regression analysis was conducted.

Table 3. Model Summary for Multiple Regression Predicting Pain Perception and Pain Acceptance

R	R^2	Standard Error of Estimate	p
.742	.528	7.86	.001

As shown in Table 3, the multiple correlation coefficient between early maladaptive schemas and pain perception and pain acceptance was R = .742. The coefficient of determination (R^2 = .528) indicates that approximately 52% of the variance in pain perception and pain acceptance can be explained by individual differences in maladaptive schema domains. This relationship is statistically significant (p = .001). Therefore, the main hypothesis of the study is supported at the .05 significance level.

Table 4. ANOVA Results for Multiple Regression Predicting Pain Perception and Pain Acceptance

Source	SS	df	MS	F	p
Regression	1935.272	1	1935.272	31.32	.001
Residual	1729.928	28	61.78	—	—
Total	3665.200	29	—	—	—

As shown in Table 4, the results of the analysis of variance confirm the overall significance and validity of the regression model used to predict pain perception and pain acceptance based on the research variables (F = 31.32, p < .05).

Table 5. Unstandardized and Standardized Regression Coefficients

Predictor	B	SE	β	t	p
Constant	19.256	7.525	—	2.55	.016
Maladaptive Schemas	0.179	0.032	.727	5.59	.0001

Table 5 shows the unstandardized and standardized regression coefficients. The standardized regression coefficient was β = .727 and the unstandardized coefficient was B = 0.17.

Discussion and Conclusion

The present study aimed to examine the role of early maladaptive schemas in pain perception and pain acceptance among patients with end-stage cancer. The findings demonstrated that all domains of early maladaptive schemas were significantly associated with both pain perception and pain acceptance. Specifically, higher levels of maladaptive schemas were related to greater pain perception and poorer psychological adjustment in coping with pain. Moreover, the results of multiple regression analysis indicated that maladaptive schemas explained a substantial proportion of the variance in pain-related outcomes, confirming their strong predictive role. These findings highlight the importance of deep-rooted cognitive–emotional structures in shaping how patients with end-stage cancer experience and respond to pain, supporting the view that pain is not solely a physiological phenomenon but is also profoundly influenced by psychological factors.

The results of this study are consistent with schema theory, which posits that early maladaptive schemas become particularly salient under conditions of intense stress, such as life-threatening illness. Patients with

end-stage cancer are exposed to persistent pain, uncertainty, and existential threat, all of which can activate schemas related to abandonment, vulnerability to harm, emotional deprivation, and defectiveness. Activation of these schemas may lead patients to interpret pain as overwhelming, uncontrollable, and catastrophic, thereby intensifying subjective pain experiences. This interpretation aligns with previous research demonstrating that maladaptive schemas are associated with increased pain intensity, emotional distress, and reduced quality of life in individuals with chronic pain conditions (7, 8).

The significant relationship observed between maladaptive schemas and pain perception can be explained through cognitive processing mechanisms. Individuals with strong maladaptive schemas are more likely to engage in negative cognitive biases, including selective attention to bodily sensations, catastrophizing, and persistent rumination about pain. These processes can lower pain tolerance and amplify the subjective experience of pain. The present findings are in line with those reported by Goharrizi Zandi and colleagues, who found that early maladaptive schemas significantly predicted pain severity and psychological distress in patients with chronic pain (9). Similarly, Khanzadeh and colleagues emphasized the role of maladaptive schemas and emotion regulation difficulties in shaping pain experiences and psychological adjustment (10). Together, these studies support the notion that cognitive–emotional vulnerabilities play a crucial role in the perception of pain.

In addition to pain perception, maladaptive schemas were also significantly related to pain acceptance. Pain acceptance reflects an individual's willingness to experience pain without excessive attempts to control or avoid it, while maintaining engagement in meaningful life activities. Patients with pronounced maladaptive schemas—particularly those related to vulnerability, control, and emotional deprivation—may perceive pain as an intolerable threat and respond with experiential avoidance. Although avoidance may provide short-term relief, it often leads to reduced functioning, increased disability, and greater psychological suffering over time. This explanation is consistent with previous findings indicating that experiential avoidance and psychological inflexibility are associated with lower pain acceptance and poorer outcomes in individuals with chronic and medical pain conditions (12, 15).

The findings of the present study are further supported by intervention-based research demonstrating the effectiveness of schema-focused treatments in improving pain-related outcomes. Arabkhradmand reported that schema therapy significantly enhanced pain acceptance and pain self-efficacy among patients following spinal surgery (13). Similarly, Yousefzadeh and colleagues found that schema-based interventions reduced pain intensity and improved psychological adjustment in patients with chronic pain (14). These results reinforce the current findings by suggesting that maladaptive schemas are not only associated with pain experiences but also represent modifiable targets for psychological intervention.

The present results are also consistent with studies conducted among patients with cancer. Hosseini and colleagues demonstrated that interventions targeting emotional schemas led to reductions in both depression and pain among cancer patients (16). Moreover, recent research has emphasized the importance of psychological factors in cancer pain management, highlighting the value of integrated psychosocial and medical approaches in improving patients' quality of life (1, 5). The findings of the present study extend this literature by specifically identifying early maladaptive schemas as key cognitive–emotional variables associated with pain perception and acceptance in patients with end-stage cancer.

From a broader theoretical perspective, the results support contemporary models that emphasize psychological flexibility, acceptance, and meaning-making in the experience of pain. Maladaptive schemas may undermine these adaptive processes by promoting rigid, negative interpretations of pain and illness, thereby limiting patients' capacity to accept pain and engage in valued activities. This interpretation is consistent with recent work highlighting the role of psychological flexibility and integrative psychosocial interventions in pain management (4, 6). Overall, the findings underscore the necessity of addressing both physical and psychological dimensions of pain in end-stage cancer care.

Despite its contributions, the present study has several limitations that should be considered when interpreting the findings. First, the correlational design precludes causal inferences regarding the relationships between maladaptive schemas, pain perception, and pain acceptance. Second, all data were collected using self-report measures, which may be influenced by response biases, patients' physical condition, or momentary emotional states. Third, the sample was limited to patients with end-stage cancer from a single medical center, which may restrict the generalizability of the findings to other populations, stages of cancer, or cultural contexts. Finally, potential confounding variables such as disease severity, type of cancer treatment, medication use, and levels of social support were not fully controlled.

Future studies are encouraged to employ longitudinal or experimental designs to clarify the causal pathways linking early maladaptive schemas with pain perception and pain acceptance. Investigating potential mediating and moderating variables, such as emotion regulation, experiential avoidance, psychological flexibility, meaning in life, and social support, may provide a more comprehensive understanding of the mechanisms underlying pain experiences in cancer patients. Comparative studies across different stages of cancer and between cancer-related pain and other chronic pain conditions could further elucidate the specificity of schema-related effects. In addition, the use of qualitative or mixed-methods approaches may enrich understanding of patients' lived experiences of pain and the role of maladaptive schemas in shaping these experiences.

Based on the findings of the present study, it is recommended that assessment of early maladaptive schemas be incorporated into the psychological evaluation of patients with cancer, particularly those in advanced stages of the disease. Identifying active schemas may enable clinicians to design more targeted and effective psychological interventions aimed at improving pain acceptance and reducing psychological distress. Integrating schema-focused interventions, acceptance-based approaches, and mindfulness techniques alongside medical treatments may contribute to more comprehensive and patient-centered pain management. Furthermore, training healthcare professionals to recognize the influence of cognitive–emotional factors on pain experiences may enhance interdisciplinary collaboration and improve the overall quality of care for patients with end-stage cancer.

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Authors' Contributions

All authors equally contributed to this study.

Declaration of Interest

The authors of this article declared no conflict of interest.

Ethical Considerations

The study protocol adhered to the principles outlined in the Helsinki Declaration, which provides guidelines for ethical research involving human participants.

Transparency of Data

In accordance with the principles of transparency and open research, we declare that all data and materials used in this study are available upon request.

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