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The Mediating Role of Psychological Distress in the Relationship Between Emotional Adjustment, Experiential Avoidance, and Functional Disability in Patients with Chronic Pain

Sara Hashemi[1] (PhD), Reyhaneh Gholizadeh[2] (MSc), Mahdieh Radaei[2] (MSc)

1. Department of Clinical Psychology, Science and Research Branch, Islamic Azad University, Tehran, Iran
2. 2.Faculty of Medical Sciences and Technologies, Science and Research Branch, Islamic Azad University, Tehran, Iran

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Corresponding Author:
Sara Hashemi,
Department of Clinical Psychology,
Science and Research Branch,
Islamic Azad University,
Tehran,
Iran
E-mail: hashemi2026@iau.ac.ir

Abstract

Introduction: Chronic pain is a disabling and complex condition associated with physical, psychological, and social consequences, including psychological distress, difficulties in emotional adjustment, and impaired daily functioning. This study aimed to examine whether psychological distress mediates the relationship between emotional adjustment, experiential avoidance, and functional disability in patients with chronic pain.

Method: This study included 130 patients with chronic pain who were recruited using purposive sampling. Participants were assessed using validated instruments, including the Self-Handicapping Questionnaire (SHS). Data were analyzed using correlation and path analysis conducted with SPSS version 28 and AMOS version 24.

Results: The findings demonstrate a negative direct relationship between emotional adjustment and disability ($p < 0.01$), and further, between emotional adjustment and functional disability, mediated by psychological distress ($p < 0.01$), while there is a positive direct association between experiential avoidance and functional disability ($p < 0.05$). The path from experiential avoidance to psychological distress did not reach statistical significance ($p > 0.05$). A satisfactory level of model fit indicators was achieved.

Conclusion: The above-outlined findings stress the prominent role of psychological distress in explaining functional disability in patients with chronic pain and suggest the potential value of emotion regulation interventions in reducing patients' disability and improving their quality of life.

Keywords: Emotional Adjustment, Experiential Avoidance, Functional Disability, Psychological Distress, Patients with Chronic Pain

Introduction

Since pain is among the most common reasons for seeking medical care it represents a major contributor to healthcare utilization worldwide [1]. Chronic Pain (CP) is a significant global public health problem, with significant economic, social, physical, and mental impacts on both individuals and society as a whole. It is estimated that between 20 and 30% of the world's population is affected by it [2-5]. Considering the significance of this issue in contemporary society, CP is seen not just as a physical symptom, but its psychological and social aspects are also responded to more specifically. Therefore, the new ICD-11 classification considers it as an independent disease [6].

Pain is an experience that has both sensory and psychological aspects and is defined as an unpleasant experience. The unpleasant experience is usually associated with actual or

potential injury and is described in linguistic terms by the person feeling it [7]. Apart from certain disease conditions, people sometimes experience CP throughout their lives without a specific physical cause. According to the World Pain Association (WPA), CP is defined as pain that persists for more than three months despite medical treatment [8]. This is due to the fact that the duration of this pain is longer than expected and makes the person's life difficult and difficult. These conditions have a significant impact on and influence the quality of life of the individual [9]. Results have shown that there is a relationship between pain and the quality of life of patients, and the experience of CP can be accompanied by suffering and extensive physical, emotional, social, and occupational functioning limitations [10, 11].

CP is a significant source of global disability, impacting around 20% of the global population [12]. In addition, within developed countries, around 20% of adults suffer from CP, which could be of different kinds [13]. Functional disability is defined as a reduction in or lack of capacity to perform essential self-care tasks that are normally required for independent living in the community. In either case, it can be a long-term limitation in activities of daily living that is caused by health problems [14, 15]

Such a condition imposes significant burdens to the individual and presents social and economic implications to the health sector and occupational activities [16]. In particular, even though the amount of direct health costs in the treatment of CP disorders is high, the amount of the indirect costs, including benefits for the disabled and absenteeism from work, is higher [16]. Furthermore, emotional distress, functional disability, and sleep disturbances co-vary greatly within the context of pain experience in people suffering from CP [8, 17].

In light of this new perspective, there has been a growing recognition of the importance of psychological and social factors within the persistence and exacerbation of disabling pain, and thus, the biopsychosocial model has been fully embraced for this field of practice [18]. In this regard, studies have shown that psychological factors are among the causes of CP and its consequences [19]. In the framework and purpose of the research, three key variables play a central role: First, experiential avoidance, which is a persistent and maladaptive tendency to not confront, inhibit, or suppress unpleasant internal experiences [20, 21].

The tendency to escape or avoid personal psychological experiences is one of the most prominent transdiagnostic psychological processes with a recognized role in a wide range of psychological disorders and defined practical contexts, which causes control or minimize the impact of distressing experiences and creates short-term relief, which as a result of this action negatively reinforces behavior. Although, this avoidance can be challenging when it hinders one from carrying out everyday activities [22].

Experiential avoidance can occur at two stages in patients living with CP. First, it may occur during the pain experience, when individuals attempt to escape or reduce unpleasant pain sensations. Second, it may result from fear and worry about future pain experiences, leading to avoidance behaviors [23]. According to the Fear-Avoidance Model of musculoskeletal pain, fear of pain can be maintained and reinforced over time, while avoidance behaviors contribute to the persistence of functional disability by initiating a vicious cycle [24]. Research has shown that even in the absence of high pain intensity, experiential avoidance can strongly predict impaired daily functioning [25, 26].

Second, emotional adjustment refers to the display of the signs of emotional health and the ability of an individual to regulate and manage their emotions, which enables an individual to effectively and appropriately regulate their emotional responses in various social situations [27, 28] and plays an important protective role against distress and negative consequences caused by pain. Pain acts as a warning signal for imminent or actual tissue damage and is essential for survival. However, due to the continuous and inescapable nature of CP, this condition can lead to maladaptive emotional states and is often associated with psychiatric disorders. Changes in neural circuits in patients exacerbate mood problems such as depression and anxiety [29] . In this regard, studies have shown that psychological factors are among the causes of CP and its consequences [19].

Conceptually, emotional adjustment includes the components of experiencing negative emotions, having irrational thoughts and beliefs, and being unable to control impulses in stressful situations (30-32).

Because pain or difficult situations have impaired or weakened adaptation to various emotions, especially negative emotions, the individual experiences higher psychological distress, followed by inability to function in their daily lives [33, 34]. Therefore, patients with higher levels of emotion regulation experience less disabling pain and have better sleep quality and social functioning [35, 36].

Third, psychological distress, which is a multidimensional construct consisting of anxiety, depression, and stress, is a common outcome of CP. Longitudinal and cross-sectional studies have confirmed that distress, even after controlling pain intensity, has a significant contribution to explaining functional disability [37, 38]. Psychological distress can cause individuals to experience mental stress, which in turn affects their function. Reducing psychological distress as a concern has always been of interest to researchers and psychologists, and practical efforts have been made in this regard [39]. Psychological variables associated with distress, such as insomnia and fatigue, have been identified as important predictors of disability in CP patients [9]. In addition, clinical evidence suggests that a higher level of depression and anxiety in CP patients is associated with lower treatment effectiveness for pharmacological and rehabilitation treatments [40, 41]. Research has also shown that high levels of undiagnosed distress in pain clinics are associated with higher levels of functional disability and reduced quality of life. Despite this evidence, many previous studies have examined these variables separately or have focused solely on the direct relationships between

them [42] .

In a previous study [43], the role of health-promoting lifestyle, emotional adjustment, and psychological distress in predicting disability was examined, and experiential avoidance was included as a mediator in the model. Although the results of the mentioned study revealed the importance of lifestyle and avoidance processes, a more fundamental question remained unanswered: Can psychological distress, beyond being an outcome, act as a key mediator between emotional adjustment and experiential avoidance and functional disability in patients with CP?

Addressing this question is important because psychological distress may not only reflect the consequences of chronic pain but may also represent an underlying mechanism through which psychological processes contribute to functional disability. Therefore, further investigation is needed to clarify its mediating role within the biopsychosocial framework of CP. Accordingly, the main innovation of the present study is the examination of psychological distress as a mediating construct. Unlike many previous studies that considered it merely as an outcome or a side effect, this study shows that psychological distress is a critical link that connects emotional and avoidance pathways to functional disability.

Based on the conceptual framework presented in Figure 1, it was hypothesized that emotional adjustment would be negatively associated with psychological distress and functional impairment, whereas experiential avoidance would be positively associated with both psychological distress and functional impairment. It was further hypothesized that psychological distress would be positively associated with functional impairment and that emotional adjustment would be negatively associated with experiential avoidance. This approach enriches the biopsychosocial model, filling the gap in the current state of the existing literature on the topic and having significant clinical implications for the design of intervention strategies aimed at regulating emotions and overcoming avoidance processes. Thus, the present study not only provides a novel explanation for the disability caused by CP, but also outlines a new path for improving the quality of life of patients and increasing the effectiveness of multidisciplinary interventions (Figure 1 shows the conceptual model of the study).

Method

This study is applied in its purpose and utilizes a correlational design with survey data collection. The statistical population consisted of all male and female patients with CP treated at the Iranian Rheumatism Center and Farhikhtegan Hospital in Tehran during the first half of 1401. Participants were recruited in these clinical settings using a purposive sampling method to ensure clinical homogeneity. The required sample size was determined based on the guidelines proposed by Fidell and Tabachnick (2007) for multivariate analysis. Given the complexity of the path analysis model with 10 predictor variables, we applied the formula N≥50+8mN \geq 50 + 8mN≥50+8m to establish a sufficient participant-to-variable ratio, ensuring the stability of the model estimates. Accordingly, 130 participants were recruited [44].

Eligibility was determined through a structured screening process conducted by the researcher. The inclusion criteria were:(1) age between 45 and 65 years;(2) at least a bachelor's degree, which was required to ensure the participants had the necessary literacy level to complete the study questionnaires independently; and (3) a confirmed diagnosis of CP for at least three years. Exclusion criteria were applied to minimize the impact of confounding variables, specifically regarding psychiatric history. During the initial screening interview, potential participants were systematically questioned about their history of psychiatric disorders and current use of psychiatric medications; those reporting such history were excluded from the study. Additionally, participants were excluded if they had experienced significant negative life events in the last six months or were unable to provide informed consent. Following written informed consent, participants completed the questionnaires in a quiet, controlled environment.

The tools used in this study were as follows:

Self-Handicapping Questionnaire (SHS): The SHS scale was designed by Jones and Rodewalt (1982) and consists of 25 items, which are divided into three subscales: negative mood, effort, and excuse-making. Scoring is on a six-point scale. The total score can be interpreted as the overall level of self-handicapping, with higher scores indicating high levels of self-handicapping and low scores representing low levels of self-handicapping. The internal consistency reliability coefficients for this measure has been reported in studies with Cronbach's alpha ranging from 0.38 to 0.918 [45].

Psychological Distress Questionnaire: This is a 10-item instrument developed by [46]. It is designed to measure about the psychological state for the last month. It is based on a five-point likert scale, and the total score is calculated by summing the scores of all questions. It has been tested for its reliability, and the findings indicated a Cronbach's alpha measure of 0.95 and 0.83 in Iran [47].

Emotional Adjustment Questionnaire: The scale has 28 items, using a six-point Likert scale ranging from completely agree to completely disagree. Questions 21, 25, and 28 are reversely scored. The scale has a reliability measure ranging from 0.89 to 0.91 [32, 48].

Acceptance and Action Questionnaire (II-AAQ): This questionnaire consists of 10 questions, each scored from 1 to 7, making the total score between 10 and 70. Factor analysis confirmed its construct validity. The reliability, measured by Cronbach's alpha, was 0.84, and a three-month test-retest reliability was 0.81. Also, Cronbach's alpha of 0.89 and test-retest reliability of 0.71 have been reported for this scale [49].

The study was conducted in accordance with the Declaration of Helsinki. Ethical approval was obtained from the Islamic Azad University, Science and Research Branch. Before data collection, all participants were provided with comprehensive information regarding the

purpose of the study. Written informed consent was obtained from all participants, and they were explicitly informed of their right to withdraw from the study at any time without any negative consequences. To ensure confidentiality and anonymity, all collected data were coded (de-identified) and stored on a password-protected computer accessible only to the research team. Physical documents, if any, were kept in a secure, locked cabinet. Data will be retained for five years and then securely destroyed.

First of all, the data were examined for normality and the presence of any outliers. Further, Pearson's correlation coefficient and path analysis were used to verify the research hypotheses. SPSS 28 and AMOS 24 software were used to analyze the data. The level of significance was fixed at 0.05. The research proposal was approved by the Islamic Azad University Ethics Committee (Code of Ethics: IR.IAU.SRB.REC.1401.088). In this research, informed consent forms were signed by all participants. The collected data were confidential. To reduce the effect of biases, the questionnaires were randomized. Moreover, to deal with common biases that occur when data is collected from one source only, the single-factor Harman test was performed. The test outcome indicated an inconsequential result as no factor explained more than 38% of the variance. Additionally, since Structural Equation Modeling (SEM) was employed, the potential for Common Method Bias (CMB) was further addressed by assessing the discriminant validity of the latent constructs and ensuring that the error terms were not significantly correlated, which provides more robust statistical evidence against method bias beyond the scope of the Harman test.

Results

The results obtained from Cronbach's Alpha method, used to examine the reliability of the measurement tools, revealed values of 0.85 for the Emotion Adjustment Scale, 0.89 for experiential avoidance, 0.91 for psychological distress, and 0.88 for functional disability. Each of these values was higher than the standard requirement of 0.70. Before the final analysis, data were screened, and univariate outliers were identified and corrected with box plots and multivariate outliers with Mahalanobis intervals. In this study, the relationship between variables was tested with Pearson's correlation test and the research model was tested with the Path Analysis technique. The maximum alpha error level for testing hypotheses was determined to be 0.05 ($p \geq 0.05$). Data analysis was performed using SPSS 28 and AMOS 24 statistical software.

By gender, the majority of respondents were female, with 101 (77.7%) and 29 (22.3%) males. In terms of their marital status, the majority, 118 (90.8%) were married, while 10 (7.7%) were divorced, and 2 (1.5%) were single. Regarding their education levels, 37 (28.5%) had completed cycle education, 51 (39.2%) held diplomas, 9 (6.9%) had post-diplomas, 22 (16.9%) had bachelor's degrees, and 11 (8.5%) held master's degrees and doctorates. Respondents' ages ranged from 45 to 65 years, with an average of 54.16 with a standard deviation of 6.84 years. Descriptive statistics of the variables are presented in Table 1, as well as variables' correlations by the Pearson correlation test.

According to the results of Table 1, the normality of the univariate was examined with the skewness and kurtosis indices, and since the skewness and kurtosis values of all variables were obtained in the range of +1 to -1, it indicated the normality of the distribution of the variables. The results of the correlation test showed that there was a significant relationship between emotional adjustment, experiential avoidance, and psychological distress with the dependent variable of functional disability ($p<0.001$). The direction of the relationship between emotional adjustment and functional disability was negative, and the direction of the relationship between experiential avoidance and psychological distress with functional disability was positive. A significant relationship was observed between emotional adjustment and experiential avoidance with the mediator variable of psychological distress with functional disability ($p<0.001$), which was negative for the relationship between emotional adjustment and positive for the relationship between experiential avoidance.

Also, a significant relationship was observed between emotional adjustment and experiential avoidance with the mediator variable of psychological distress; the direction of the relationship between emotional adjustment was negative and experiential avoidance was positive. The examination of the multiple noncollinearity assumption showed that the variance inflation factor values were less than five in all cases, indicating that the multiple noncollinearity assumption was valid. The conceptual model of the research was tested using the path analysis technique and Amos software. Figure 1 shows the empirical model in the standard coefficients mode and the significance level is marked with an asterisk.

Table 1. Descriptive Indices, Pearson Correlation Test and Examination of the Hypothesis of Collinearity with the Variance Inflation Factor Index (VIF)

Variables	Emotional adjustment	Experiential avoidance	Psychological distress	Functional disability	Variance inflation (VIF)
Emotional adjustment	1				2.78
Experiential avoidance	-.69	1			1.96
Psychological distress	-.73	.59	1		2.22
Functional disability	-.47	.45	.37	1	
Mean	97.04	37.96	13.95	72.06	
Standard deviation	27.32	11.87	9.13	14.74	
Skewness	-.01	.45	.69	.01	
Kurtosis	-.57	-.39	-.36	-.40	

Figure 1 showed that four out of five paths were confirmed. The effect of experiential avoidance on psychological distress was not confirmed, but other relationships were significant. The model fit indices are given in Table 2.

Table 2 shows that the final model had an acceptable fit based on the findings. In this case, the values of a number of fit indices reached the desired level of fit, including GFI, IFI, value of RMSEA, and χ^2/df with values of 0.93, 0.92, 0.076, and 3.52, respectively, while the remaining two indices, CFI and NFI, fall below conventional thresholds. Therefore, it can be concluded that the data had a relatively acceptable fit with the conceptual model of the study. The coefficient of determination for the dependent variable, functional disability, was 0.34. The predictor variables collectively account for 34% of the variance in (functional disability), with the remaining 66% accounted for by unexplained factors and measurement error. Based on Hair (2011), this value falls between a weak (0.25) and a moderate (0.50) effect size in behavioral research. The results of the direct relationships are presented in Table 3. The findings (Table 3) showed that the effect of all three variables, namely emotional adjustment, experiential avoidance, and psychological distress, on the dependent variable of functional disability was confirmed ($p<0.05$). The findings also showed that the effect of emotional adjustment on the mediator variable of psychological distress was confirmed ($p<0.001$), but the effect of experiential avoidance on psychological distress was not confirmed ($p=0.060$). The mediation role test was analyzed using the bootstrapping method and the standard error obtained from this method in the AMOS 24 software, and the findings are shown in Table 4.

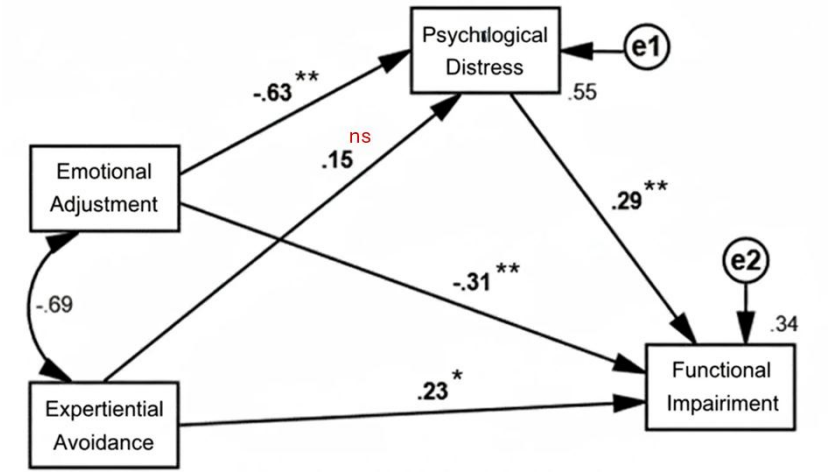


Figure 1. Empirical model in the case of standard path coefficients (ns=non-significant p=*<0.05 and p=**<0.01).

Table 2. Model Fit Indices

Fit Index	R2	PGFI	IFI	NFI	CFI	GFI	RMSEA	Chi square/df
Criterion*	>.33	>.70	>.90	>.90	>.90	>.90	<.08	Range: 1 to 5
Result	.34	.72	.92	.86	.88	.93	.076	3.52

* (Source: Pasasharifi et al., 2012)

Table 3. Results of Examining Direct Effects based on Path Analysis Test Results

Type of Effect	Standardized Coefficient	Unstandardized Coefficient	Standard Error	t-value	P
Emotional Adjustment → Psychological Distress	-0.63	-0.20	0.02	7.67	<.001
Experiential Avoidance → Psychological Distress	0.15	0.11	0.06	1.88	0.060
Emotional Adjustment → Functional Disability	-0.31	-0.16	0.05	3.11	0.002
Experiential Avoidance → Functional Disability	0.23	0.14	0.06	2.39	0.018
Psychological Distress → Functional Disability	0.29	0.17	0.05	3.07	0.003

Table 4. Results of the Mediation Test of Psychological Distress in the Relationship between Emotional Adjustment and Experiential Avoidance

Type of Effect	Indirect Effect	Standard Error	Lower bound	Upper bound	t-value	p
Emotional Adjustment → Psychological Distress → Functional Disability	-0.18	0.06	-0.31	-0.05	2.85	0.005
Experiential Avoidance → Psychological Distress → Functional Disability	0.04	0.03	-0.01	0.10	1.40	0.164

The findings (Table 4) showed that the mediating role of psychological distress in the relationship between emotional adjustment and functional disability was confirmed (p=0.005), but not in the relationship between experiential avoidance and functional disability (p=0.164). Overall, the findings showed that emotional adjustment had a direct effect on functional disability and an indirect effect on functional disability through the mediation of psychological distress. Experiential avoidance had a significant direct effect on functional disability but did not have a significant indirect effect on functional disability.

Discussion

The present study examined the relationship between emotional adjustment, experiential avoidance, and psychological distress with functional disability in patients with CP and presented important results in the field of analyzing psychological processes and their impact on individuals' daily functioning. The findings of the study indicate that emotional adjustment has a significant impact on functional disability not only directly but also through the mediation of psychological distress. Adjustment is considered a process by which an individual tries to adapt to internal stresses and external requirements [50]. In line with the Fear-Avoidance Model, our results suggest that improved emotional adjustment acts as a protective mechanism, reducing psychological distress and thereby mitigating functional disability [51]. This is consistent with studies on fibromyalgia, where emotional regulation training was shown to reduce distress and increase mastery over pain [52, 53].

The model shows that difficulties with executive functions may stem from issues relating to emotional self-regulation and self-management, which can worsen disabilities and sustain CP. Psychological distress significantly acted as a mediating variable in the relationship between emotional self-regulation and functional disability, indicating that psychological distress can partially clarify the negative and/or positive role of emotional self-regulation on patient functional performance and the disability status.

In the study by Hashemi and Gholizadeh (2024), it was stated that reducing emotional adjustment is effective in reducing functional disability in patients with CP, and in other words, reducing emotional adjustment leads to increased psychological distress, which in turn leads to an exacerbation of functional disability. Of course, this finding is also consistent with other studies [36, 43, 54].

A study stated that impaired emotion regulation can lead to increased psychological distress and ultimately exacerbate functional disability in patients with CP (36). Since emotional adjustment plays a key role in reducing psychological distress and increasing individual capabilities, these results indicate that the use of psychological interventions based on increasing emotional adjustment can be effective in improving the quality of life of patients with CP. In particular, training that helps patients cope with their emotions more effectively can lead to greater mastery over pain and improve the individual's daily functioning.

A key finding of this study is that while psychological distress serves as a significant mediator between emotional adjustment and functional disability, it did not significantly mediate the relationship between experiential avoidance and functional disability. This suggests that in our sample, experiential avoidance may function as a direct behavioral strategy that hinders daily activities, rather than acting solely through the mechanism of psychological distress. This distinction is crucial; it implies that avoidance behaviors directly restrict a patient's functional repertoire, potentially acting as a primary driver of disability in the Fear-Avoidance framework.

The present study showed that experiential avoidance directly affects functional disability. This highlights the fact that CP patients who employ more avoidance strategies to cope with negative emotions are more functionally disabled in their daily activities over time. This is in accordance with previous studies, experiential avoidance in CP patients significantly affects the level of their functioning (meaning function) [55]. Avoiding painful or emotional experiences, although it may provide a sense of comfort in the short term, can lead to increased worry, anxiety, and tension in the long term and reduce the individual's daily functioning (56)

In a study, experiential avoidance was introduced as a harmful factor that could mediate the relationship between pain, pain anxiety, and pain-related disability as a maladaptive regulatory strategy [57]. In a study of patients with pain, it was found that those who had higher levels of experiential avoidance and stress sensitivity experienced higher levels of distressed mood and disability than another group who did not have these characteristics [58]. Also, longitudinal studies on patients with fibromyalgia indicate that higher levels of experiential avoidance are associated with greater levels of disability and decreased quality of life (23). Research suggests that rheumatism patients experience an impact on their quality of life and disability status due to the psychosocial stressor of experiential avoidance (59). As mentioned, psychosocial stressors contribute to functional disability. Therefore, the need for psychosocial strategies that stress experiential avoidance in CP patients is reinforced. Psychological interventions, including CBT treatments are effective in reducing experiential avoidance, psychological distress, and in improving patient's daily functioning [60, 61].

According to the results, while the direct relationship between emotional adjustment and experiential avoidance with functional disability was confirmed, psychological distress could not act as an effective mediating variable and explain this relationship. This means that, despite the prominent role of psychological distress in other research, in this particular study it had an effective role in mediating the relationship between emotional adjustment and functional disability, but it could not significantly moderate the process of the effect of experiential avoidance on functional disability.

Conclusion

In conclusion, this study demonstrates that emotional adjustment and experiential avoidance are directly associated with functional disability, with psychosocial distress playing a pivotal mediating role in this relationship. Specifically, improved emotional adjustment serves to reduce psychosocial distress, which in turn mitigates the impact of CP on functional disability. These findings underscore the necessity of integrating emotional adjustment and psychosocial distress management into therapeutic interventions and pain management programs. Such integrative strategies are essential for enhancing the overall functioning and quality of life for patients living with CP.

As a result, psychological interventions aimed at improving emotional adjustment and decreasing experiential avoidance can help improve patients' quality of life and daily functioning. Specifically, clinical protocols should prioritize Acceptance and Commitment Therapy (ACT), which is particularly effective in targeting experiential avoidance by promoting psychological flexibility rather than struggle. Simultaneously, Cognitive-Behavioral Therapy (CBT) techniques, such as cognitive restructuring and mindfulness-based emotion regulation, should be employed to enhance emotional adjustment and reduce psychosocial distress. By integrating these evidence-based interventions into multi-disciplinary pain management programs, clinicians can move beyond simple symptom management and instead provide patients with actionable coping strategies that directly address the psychological mechanisms underlying functional disability. Future studies can explore the impact of time in these relationships, particularly how changes in emotional adjustment and experiential avoidance over time influence functional disability. Additionally, focus on ACT and CBT with CP patients and the study of psychological distress and individual functioning may provide more practical and applied studies in this area.

Given that the data of the present study were collected within a certain time limit, it is naturally not possible to identify causal and temporal relationships between variables, and as a result, it cannot be stated with certainty that changes in independent variables (such as emotional adjustment and experiential avoidance) cause changes in the dependent variable (functional disability). In this regard, it is suggested that longitudinal studies or controlled experiments be conducted in order to find out the cause-and-effect relationships.

Furthermore, a potential limitation lies in the measurement instrument; since the data relied on self-report measures, there is a risk of common method bias and social desirability bias, where participants might provide responses that align with perceived expectations rather than their actual experiences. Future research should incorporate multi-informant or objective measures to mitigate these measurement issues.

On the other hand, the sampling in the present study was carried out purposefully and in specific centers. This approach introduces sample bias, as the participants may not fully represent the broader spectrum of the population due to the specific characteristics of the selected sites and the non-random nature of the selection process, which limits the generalizability of the findings to other geographical or cultural contexts. As a result, it is suggested that research be conducted using random sampling and expanding the sample to medical centers and different social and cultural groups in order to help generalize the results.

In addition, the most important limitation of this study is that intervening variables such as socioeconomic status, treatment history, education level, and social support have not been fully controlled. These variables can indirectly affect functional disability and other psychological variables. Therefore, it is suggested that in future research, these intervening variables be identified and controlled to obtain more accurate results.

Conflict of Interest

The authors declare no conflicts of interest.

Ethical Approval

This study was approved by the Ethics Committee of Islamic Azad University, Science and Research Branch (Code of Ethics: IR.IAU.SRB.REC.1401.088). The study was conducted in accordance with the Declaration of Helsinki.

Declaration of Generative AI and AI-Assisted Technologies

During the preparation of this work no AI tools were used.

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