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Forecasting Psychological Distress in Chronic Pain: The Influence of Post-Traumatic Stress Disorder and Pain Catastrophizing

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Abstract

Introduction: Chronic Pain (CP) is a multifaceted condition that encompasses more than just physical discomfort, intertwining with a variety of psychological factors. This study aims to explore the influence of post-Traumatic Stress Disorder (PTSD) and Pain Catastrophizing (PC) on the prediction of Psychological Distress (PD) among patients grappling with CP.

Method: This research is a descriptive and correlational study. The population of the study included patients with CP who had referred to pain and physiotherapy centers in the Tehran province in 2022-2023. A sample of 395 individuals was selected by the convenience sampling method and then data was collected using psychological distress (DASS-21), post-traumatic stress disorder (PCL-5), and Pain Catastrophizing Scale (PCS). Data were analyzed by SPSS-24 software using Pearson correlation and multiple regression.

Results: The results showed that the correlation between PD of CP with re-experiencing (r=0.66, P<0.001), avoidance (r=0.55, P<0.001), negative alterations (r=0.73, P<0.001), hyper-arousal (r=0.70, P<0.001), emotional numbness (r=0.74, P<0.001), rumination (r=0.70, P<0.001), magnification (r=0.64, P<0.001), and helplessness (r=0.74, P<0.001) was positive and significant. In addition, the results of multiple regression analysis revealed that PTSD and PC predict 73% of PD.

Conclusion: The current study contributes to the empirical understanding of the relationship between CP and PD and provides valuable insights for clinicians and researchers alike.

Keywords: Chronic Pain, Psychological Distress, Post-Traumatic Stress Disorder, Pain Catastrophizing

Introduction

Chronic Pain (CP), a formidable adversary to well-being, transcends the physical boundaries of the body, weaving its intricate tendrils into the fabric of psychological health [1]. The amalgamation of persistent discomfort and psychological distress creates a challenging terrain, where emotions such as anxiety, depression, and frustration become silent companions in the daily lives of those grappling with pain [2]. The biopsychosocial model offers a framework for understanding the multifaceted nature of chronic pain, emphasizing the interaction between biological, psychological, and social factors in shaping individuals' pain experiences [3]. As we navigate through the shadows of distress, we uncover the intricate interplay between the physical sensations of pain and the emotional responses they evoke [4]. The results of Shaygan et al. (5) research showed a 23% prevalence of CP in Iranian youth, which was influenced by heredity and mental health. The findings of Aguiar et al. [6] revealed a prevalence of 23 to 76% of CP in the Brazilian population. Yong et al. [7] also indicated a 20% prevalence of CP among American adults.

The experience of CP is frequently intertwined with various forms of psychological distress, including depression, anxiety, stress, and impaired cognitive functioning [8]. Individuals grappling with CP commonly report feelings of helplessness, frustration, and hopelessness, which can exacerbate their suffering and impair their overall quality of life [9]. Psychological distress encompasses a range of emotional and mental health symptoms, including anxiety, depression, and overall emotional discomfort, which can significantly influence the experience and management of CP [10]. The implications of psychological distress in chronic pain extend beyond the individual, affecting interpersonal relationships, daily functioning, and overall quality of life [11]. Recognizing the intricate connections between psychological and physical well-being is paramount for designing holistic and patient-centered approaches to CP management [12].

Individuals with a history of trauma, such as childhood abuse, combat exposure, or accidents, are at heightened risk for developing both chronic pain and Post-Traumatic Stress Disorder (PTSD) [13]. Traumatic experiences can sensitize the nervous system, increase susceptibility to pain, and contribute to the development of maladaptive coping strategies and psychological symptoms, perpetuating the cycle of distress [14]. The intersection of CP and PTSD introduces a layer of complexity that demands a nuanced understanding of the reciprocal influences between physical and psychological well-being [15]. In examining the interplay between these two conditions, it becomes evident that the manifestation of psychological distress extends beyond the additive effects of chronic pain and PTSD, creating a synergistic impact that poses unique challenges for individuals and healthcare providers alike [16]. The physiological underpinnings of both CP and PTSD share commonalities, involving alterations in neurobiological pathways and heightened stress responses [17]. This shared biological terrain may contribute to the amplification of pain perception and the exacerbation of PTSD symptoms, further intertwining the experiences of these two conditions [18]. The hyperarousal associated with PTSD, for example, can heighten pain sensitivity, potentially intensifying the overall pain experience for individuals with CP [19]. Furthermore, the cognitive and emotional aspects of PTSD, such as intrusive memories and avoidance behaviors, can significantly impact an individual's ability to cope with CP [20]. The avoidance of pain-related stimuli or activities may lead to a restricted and isolated lifestyle, further compounding the challenges of managing CP. This cyclical relationship underscores the importance of considering both conditions concurrently in the assessment and treatment of individuals experiencing this complex comorbidity [21]. The results of the study by Ford-Gilboe et al. [22] indicated that patients with CP who had experienced a violent and traumatic incident in the past suffer from more symptoms and pain intensity. Also, lack of social support, reduced quality of life, and rumination were among the underlying factors of CP. The findings of Gasperi et al.'s study [23] showed that PTSD had a significant correlation with CP. In addition, heredity, occupation, education, and marriage played a significant role in the type of CP.

The intricate nature of CP demands a comprehensive understanding that goes beyond mere physiological aspects [24]. One psychological phenomenon closely associated with the experience of CP is Pain Catastrophizing (PC). Actually, PC refers to a cognitive and emotional response wherein individuals magnify the threat of pain, feel helpless in their ability to cope with it, and ruminate excessively about its potential consequences (25). This maladaptive coping style can exacerbate pain perception, increase distress, and hinder effective pain management strategies, thereby perpetuating the cycle of suffering [26]. As individuals grapple with the challenges of persistent pain, the cognitive distortions inherent in PC contribute to a distorted appraisal of the threat posed by pain [27]. The tendency to magnify the severity of pain, anticipate negative outcomes, and feel a sense of helplessness in the face of pain creates a fertile ground for the development and perpetuation of psychological distress [28]. The impact of PC extends beyond the individual's cognitive landscape, influencing behavioral responses and coping strategies [29]. Maladaptive behaviors such as avoidance of activities, social withdrawal, and an increased reliance on passive coping mechanisms can further entrench the cycle of pain and distress [30]. This underscores the need for a nuanced understanding of how psychological factors, specifically PC, become integral components in the perpetuation of CP and its broader repercussions [31]. Slawek et al. [32] showed that patients who had low mental health and suffered from PC suffered from insomnia, headache, anger, and widespread body pain. The research findings of Montag et al. [33] indicated that low self-efficacy, depression, and catastrophizing of pain decrease the quality of life of patients with CP.

The synergy between PTSD and PC creates a dynamic framework for forecasting psychological distress in CP. Individuals with a history of trauma may be more susceptible to catastrophizing tendencies, and the combination of these factors can result in a heightened vulnerability to psychological distress. Understanding this forecasting dynamic is crucial for tailoring interventions that address both the underlying trauma and maladaptive cognitive responses, offering a more comprehensive approach to CP management. The present study investigates the role of PTSD and PC in predicting psychological distress disorder in patients with CP.

Method

The current research was descriptive of the correlation type. The statistical population of the study included patients with CP who had referred to pain and physiotherapy centers in Tehran province in 2022-2023. Among these, the number of 350 people was estimated using Cochran's sample size formula, and in this study, 395 people were selected using the convenience sampling method to ensure the sample size [34]. The inclusion criteria for the research included personal satisfaction,

suffering from CP in the last two years, not suffering from another chronic disease, and the age range of 18 to 45 years. Also, the exclusion criteria for the research included not belonging to the research community, having a chance to answer the questions, and leaving the questionnaires half-finished. The method of conducting the research was that at first the necessary measures were taken to receive the code of ethics from Tarbiat Modares University (IR.MODARES.REC.1401.197). To collect data, necessary arrangements were made with the managers of the centers and after their agreement, the study questionnaires were given to the patients. Finally, after the number of samples reached the appropriate level, data collection was stopped. It should be mentioned that for the patients, the purpose and importance of the research, the principle of confidentiality and confidentiality of personal information, and the analysis were stated in general.

The tools used in this study were as follows:

The Depression, Anxiety, and Stress Scale (DASS-21): This scale is the short form of the Psychological Distress Scale which consists of 21 items and three subscales of depression, anxiety, and stress [35]. Lovibond and Lovibond [35] mentioned Cronbach's alpha coefficients of 0.93, 0.88, 0.82, and 0.90 for the entire scale, in addition to the subscales of depression, anxiety, and stress, respectively. In Iran, Cronbach's alpha coefficient of this scale for anxiety, depression, and stress components was reported as 0.82, 0.78, and 0.84 respectively [36]. In the present examination, Cronbach's alpha coefficient of depression, anxiety, and stress had been 0.87, 0.81, and 0.89, respectively.

Post-Traumatic Stress Disorder Checklist (PCL-5): This checklist was created based on the Diagnostic and Statistical Manual of Mental Disorders-5, which is a self-report measure that is used to screen patients with PTSD from normal individuals and other patients [37]. The PTSD checklist includes 20 items and five subscales of re-experiencing, avoidance, negative alterations, hyper-arousal, and emotional numbness. Total scores range from 0 to 80, which is obtained by summing symptom scores based on a Likert scale (0 not at all, 1 very little, 2 very much, 3 very much, and 4 very much). The cut-off point for diagnosis is 50. The reliability coefficients of Cronbach's alpha and the retest of this list in the whole scale and its dimensions were also higher than 0.70 and satisfactory [37]. In the study of Varmaghani, Fathi-Ashtiani, and Poursharifi [38], the Cronbach's alpha coefficient of this scale was reported as 0.92. In the present examination, Cronbach's alpha coefficient of re-experiencing, avoidance, negative alterations, hyper-arousal, and emotional numbness had been 0.89, 0.83, 0.79, 0.89, and 0.89, respectively.

Pain Catastrophizing Scale (PCS): This scale was created by Sullivan et al. (39) in order to evaluate different dimensions of CP and to better understand the mechanism of its effect on pain experience. The questionnaire has 13 items that are graded on a 5-point Likert scale. Factor analysis showed that catastrophizing includes the subscales of rumination, exaggeration, and helplessness [39]. Participants are asked to choose a number from 0 (never) to 4 (always) to describe the frequency of 13 different feelings and thoughts related to the pain experience. Mohammadi et al. [40] have stated that the reliability of subscales was 0.65, magnification 0.53, helplessness 0.81, and Cronbach's alpha coefficient 0.84 for the whole scale. In the present study, Cronbach's alpha coefficient for the total score was 0.89. The sub-scales of rumination, magnification, and helplessness were 0.84, 0.81 and 0.83, respectively.

After completing the questionnaires, the data were entered into SPSS-24 and analyzed by descriptive statistics (mean, standard deviation, and frequency). Simultaneous regression was used to determine the relationship between PTSD and PC with psychological distress. To conduct a regression analysis, the hypotheses associated with it were evaluated. The Durbin-Watson Test is utilized for detecting autocorrelation within regression residuals, whereas the Variance Inflation Factor (VIF) identifies multicollinearity among predictor variables. Kurtosis quantifies the "peakedness" or "tailedness" of a distribution, while skewness gauges its asymmetry. These statistical tools are instrumental in appraising the accuracy of regression models and comprehending the distributional characteristics of the data.

Results

A total of 395 nurses (217 females and 178 males) with a mean age of 34.93 participated in this study. Regarding marital status, 274 patients were married and 121 were single. Table 1 describes the descriptive indicators of PTSD, PC, and psychological distress, including mean and standard deviation. Before analyzing the data, the criteria, and hypotheses of the regression analysis have been checked. The VIF for the predictor variables ranged from 1.34 to 3.91, which was a long distance from 10; therefore, multiple lines were rejected.

In addition, the Durbin-Watson Test was 1.53, a long distance from 0 and 4; accordingly, the residual correlation was also rejected. Furthermore, kurtosis and skewness tests were used to check the normality of the dispersion of variables. Kline [41] suggested that the absolute magnitude of the skewness and kurtosis of the variables should be between ±2. According to Table 1, the absolute value of skewness and kurtosis of all variables is less than one; therefore, this assumption of data normality is also established.

Table 2 presents the results of the assessment of the correlation of psychological distress with PTSD and PC. According to the results of Table 2, re-experiencing ($r=0.668$, $P<0.001$), avoidance ($r=0.556$, $P<0.001$), negative alterations ($r=0.732$, $P<0.001$), hyper-arousal ($r=0.706$, $P<0.001$), emotional numbness ($r=0.745$, $P<0.001$), rumination ($r=0.705$, $P<0.001$), magnification ($r=0.649$, $P<0.001$), and helplessness ($r=0.743$, $P<0.001$) was positive and significant. In other words, with the increase of the mentioned variables, the amount of psychological distress of patients with CP increases ($P<0.01$).

Table 3 presents the results of the study of the role of PTSD and PC in predicting psychological distress in

patients with CP. According to the results of Table 3, the correlation coefficient of predictor variables with psychological distress in patients with CP is 0.85 and these eight variables were able to significantly predict 73% of psychological distress changes (P<0.001). In addition, due to the beta value, the variables of re-experiencing (β=0.14), avoidance (β=0.11), negative alterations (β=0.18), hyper-arousal (β=0.15), emotional numbness (β=0.14), rumination (β=0.12), magnification (β=0.10), and helplessness (β=0.16) had a significant effect on predicting psychological distress in patients with CP (P<0.05).

Table 1. Descriptive Signs and Effects of Analyzing the Normality of Research Variables

Variables	Mean	SD	Skewness	Kurtosis
Psychological distress	42.06	8.63	0.94	1.86
Re-experiencing	13.01	5.09	0.85	0.73
Avoidance	6.79	2.42	0.71	1.22
Negative alterations	11.58	4.66	0.63	1.23
Hyper-arousal	11.14	5.17	0.87	1.83
Emotional numbness	13.97	3.24	0.63	1.05
Rumination	6.74	3.05	1.12	1.86
Magnification	4.99	3.68	0.75	0.49
Helplessness	9.35	4.71	1.52	0.87

Table 2. Results of Correlation between Psychological Distress, PTSD, and PC

	Variables	1	2	3	4	5	6	7	8	9
1	Re-experiencing	1								
2	Avoidance	0.56**	1							
3	Negative alterations	0.61**	0.59**	1						
4	Hyper-arousal	0.64**	0.59**	0.73**	1					
5	Emotional numbness	0.62**	0.52**	0.84**	0.76**	1				
6	Rumination	0.55**	0.49**	0.61**	0.60**	0.59**	1			
7	Magnification	0.54**	0.35**	0.57**	0.47**	0.57**	0.72**	1		
8	Helplessness	0.58**	0.47**	0.63**	0.66**	0.65**	0.75**	0.63**	1	
9	Psychological distress	0.66**	0.55**	0.73**	0.70**	0.74**	0.70**	0.64**	0.74**	1

*P<0.05 **P<0.01

Table 3. Results of Multiple Regression Analysis for PTSD and PC

Variables	B	SE	β	T	P	Tolerance	VIF
Constant	9.24	0.70	-	13.06	0.001	-	-
Re-experiencing	0.36	0.09	0.14	4.51	0.001	0.46	3.30
Avoidance	0.62	0.11	0.11	5.43	0.001	0.63	2.59
Negative alterations	0.46	0.09	0.18	5.05	0.001	0.40	1.34
Hyper-arousal	0.42	0.10	0.15	3.96	0.001	0.78	2.90
Emotional numbness	0.32	0.07	0.14	4.27	0.001	0.86	2.64
Rumination	0.46	0.13	0.12	3.49	0.001	0.28	3.39
Magnification	0.44	0.14	0.10	3.23	0.001	0.49	1.86
Helplessness	0.45	0.08	0.16	5.08	0.001	0.42	3.14

R= 0.85, R^2= 0.73, F=144.98, P<0.001

Discussion

The present study investigated the role of PTSD and PC in predicting psychological distress disorder in patients with CP. The results of the present study showed that PTSD had a positive and significant correlation with the psychological distress of patients with Cp. Patients who suffered from high PTSD experienced more stress, depression, and anxiety during their chronic disease. These results are in line with the findings of Akhtar et al. [20], Sager et al. [21], Ford-Gilboe et al. [22], and Gasperi et al. [23].

One noteworthy aspect of the correlation is the bidirectional nature of the relationship. While CP undoubtedly contributes to psychological distress, the presence of PTSD appears to amplify these distressing symptoms [15]. The study's results suggest that patients with high levels of PTSD are particularly vulnerable to exacerbated stress, depression, and anxiety throughout their chronic disease. This reciprocal influence emphasizes the need for a comprehensive understanding of the mental health dimensions in CP management [18]. The elevated levels of psychological distress among individuals with both CP and PTSD have significant implications for the overall quality of life and treatment outcomes [23]. Healthcare professionals need to recognize and address the co-occurrence of these conditions to formulate more effective and targeted interventions. Integrating mental health assessments into the routine care of CP patients is a crucial step forward [14]. Identifying PTSD early in the treatment process allows tailored interventions that address not only the physical aspects of CP but also the underlying psychological factors contributing to distress. This may involve collaborative efforts between pain specialists and

mental health professionals to provide a comprehensive and multidisciplinary approach to patient care [17].

Akhtar et al. [20] showed that 28% of patients with CP suffer from PTSD, which aggravates the disease in them. The findings of Sager et al. [21] indicated that age, gender, type of pain, and PTSD were among the aggravating factors of CP, which require early identification and treatment measures. While this study contributes valuable insights, there remains a need for further research to deepen our understanding of the complex interplay between CP and PTSD. Future investigations might explore the effectiveness of specific interventions targeted at reducing PTSD symptoms in CP populations. Longitudinal studies could provide insights into the temporal aspects of this relationship, allowing a more nuanced understanding of how these conditions influence each other over time. Additionally, exploring potential moderating factors, such as the type and duration of trauma, could refine our understanding of the variability in the relationship between PTSD and psychological distress in CP patients. This knowledge could inform the development of personalized treatment approaches tailored to the unique characteristics of individual patients.

On the other hand, the findings of this research revealed that PC had a positive and significant correlation with the psychological distress of patients with CP. Patients who suffered from high PC experienced more stress, depression, and anxiety during their chronic disease. These results are in line with studies by Anagnostopoulos et al. [30], Kim and Lee [31], Slawek et al. [32], and Montag et al. [33].

The outcomes of this research shed light on the intricate relationship between PC and psychological distress in individuals grappling with CP. The observed positive and significant correlation underscores the impact of cognitive and emotional processes on the experience of CP. In addition, PC, characterized by an exaggerated negative orientation towards actual or anticipated pain, emerges as a crucial factor contributing to heightened levels of stress, depression, and anxiety among patients with CP [26]. One key aspect of this correlation is its potential bidirectional influence. While CP undoubtedly triggers PC, the heightened levels of distress experienced by patients with high PC may, in turn, exacerbate their perception and experience of pain (28). This cyclical relationship emphasizes the need for a multidimensional understanding of CP, incorporating both the physical and psychological aspects of the condition [33].

Anagnostopoulos et al. [30] showed that patients with PC had low emotional intelligence and suffered high pain intensity. The results of a review study by Kim and Lee [31] indicated the role of PC in aggravating the symptoms and physical problems of patients with CP. The identification of PC as a significant contributor to psychological distress holds implications for the development of targeted interventions. Healthcare providers should consider incorporating assessments for PC into routine clinical evaluations to identify individuals at risk. By recognizing and addressing PC early in the treatment process, clinicians may be able to implement tailored interventions aimed at breaking the cycle of negative cognitive and emotional responses to pain. Moreover, understanding the specific components of PC that contribute most strongly to psychological distress could inform the development of targeted therapeutic approaches.

The study employed convenience sampling, potentially introducing selection bias and limiting the generalizability of findings to the broader CP population. Data reliance on self-report measures for psychological distress, PTSD, and PC may be susceptible to response biases and might not fully capture the constructs' complexity. The study's focus on patients in Tehran province's pain and physiotherapy centers may restrict sample diversity and the findings' applicability to other populations or settings. Future research should consider longitudinal designs to explore temporal relationships between CP, PTSD, PC, and psychological distress. Employing random sampling methods and diversifying recruitment locations could enhance sample representativeness. Incorporating objective measures alongside self-reports could offer a more comprehensive understanding. Investigating intervention effectiveness targeting PTSD symptoms and PC in reducing psychological distress among CP patients could guide treatment approaches. Furthermore, exploring mediating and moderating factors such as coping strategies, social support, and pain severity could deepen understanding of the chronic pain-psychological distress relationship.

Conclusion

Moving forward, healthcare providers should consider incorporating routine assessments for PTSD symptoms and PC in the evaluation and management of CP patients. Early identification of PTSD and pain catastrophizing allows more targeted and personalized interventions, potentially improving treatment outcomes and enhancing the overall well-being of individuals facing the dual challenges of CP and psychological distress. To the best of our knowledge, the complex dynamics between PTSD, PC, and CP continues to evolve, future research endeavors may explore specific mechanisms that underlie this correlation and assess the efficacy of integrated treatment models. By advancing our knowledge in this field, healthcare professionals can better tailor interventions to address the unique needs of patients with CP, PC, and PTSD, ultimately improving their overall quality of life.

Conflict of Interest

There is no conflict of interest between authors.

Ethical Approval

This article has been extracted from the doctoral thesis in psychology approved by Tarbiat Modares University, by the first author in 2022. The current study was approved by the Ethics Committee of Tarbiat Modares University (Code: IR.MODARES.REC.1401.197).

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