Examining Alexithymia and Post-Traumatic Stress Disorder across Different Levels of Chronic Pain in Patients

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A B S T R A C T

Aims: The primary objective of this study is to examine the relationship between alexithymia and Post-Traumatic Stress Disorder (PTSD) among patients experiencing varying degrees of Chronic Pain (CP).

Method and Materials: This study utilized a descriptive causal-comparative approach. The participants were drawn from patients referred to pain and physiotherapy clinics in Tehran from 2022 to 2023. Out of 300 CP patients, 150 patients with high CP levels and an equal number with low CP levels were purposively chosen. The participants completed the Graded Chronic Pain Scale (GCPS), Perth Alexithymia Questionnaire (PAQ), and Post-traumatic Stress Disorder Checklist (PCL). Data analysis was performed using SPSS-24 software, employing multivariate analysis of variance.

Findings: The findings revealed a significant difference in the levels of alexithymia and PTSD between the two groups (P<0.001). Patients with high levels of CP demonstrated increased negative-difficulty identifying feelings (F=241.87), positive-difficulty identifying feelings (F=389.01), negative-difficulty describing feelings (F=190.61), positive-difficulty describing feelings (F=347.81), general-externally orientated thinking (F=376.28), re-experiencing (F=246.75), avoidance (F=100.74), negative alterations (F=378.01), hyper-arousal (F=388.46), and emotional numbness (F=388.47) compared to their counterparts (P<0.001).

Conclusion: These findings underscore the intricate relationship between CP, alexithymia, and PTSD. Therefore, the need for comprehensive assessment and management strategies addressing the interplay of these factors in patient care is highlighted.

Introduction

Chronic pain (CP) is defined as pain that persists beyond the normal time expected for healing, typically lasting for more than three to six months [1]. It encompasses a wide range of conditions, from persistent back pain to neuropathic disorders, and is characterized by its enduring nature lasting beyond the expected healing time [2]. While CP can manifest in various forms and intensities, it is increasingly recognized that not all experiences of CP are alike [3]. Indeed, the severity and impact of CP can vary widely among individuals, leading to the classification of different levels of CP [4]. In the previous study [5] it was reported that pain prevalence at the population level in Europe varies widely, ranging from approximately 30% to 60%, depending on the status of the country and the year of assessment. According to Yong et al. [6], in the USA, 50.2 million adults, equivalent to 20.5% of the population, reported experiencing pain on most days or every day. Additionally, Zaki & Hairi [7] found that the prevalence of CP among Asian adults ranges from 7.1% in Malaysia to as high as 61% in Cambodia and Northern Iraq.

Navigating the complex interplay between alexithymia, characterized by difficulties in recognizing and expressing emotions, and CP, which encompasses a spectrum of debilitating conditions, poses a significant challenge for healthcare providers [8]. As individuals with CP traverse varying levels of pain severity, the influence of alexithymia on their pain experience and management becomes increasingly

Pertinent [9]. The convergence of alexithymia and CP represents a compelling intersection in the field of healthcare, captivating researchers and clinicians alike [10]. Alexithymia, characterized by challenges in recognizing and expressing emotions, intertwines with the pervasive nature of CP, posing unique hurdles in understanding, managing, and treating this complex phenomenon [11].

Aaron et al. [12] conducted a systematic review and meta-analysis to explore the relationship between alexithymia and CP, along with its connection to pain intensity, physical interference, depression, and anxiety. The study incorporated data from 77 studies involving 8,019 individuals with CP, revealing significantly higher alexithymia scores in CP populations compared to both nonclinical and clinical nonpain controls. Moreover, alexithymia demonstrated positive associations with pain intensity, physical interference, depression, and anxiety among CP sufferers. In a separate study, Tesio et al. [13] investigated the influence of alexithymia on the Health-Related Quality of Life (HRQoL) of fibromyalgia (FM) patients, while considering the impact of depression, anxiety, and pain. Analyzing data from 205 female FM patients, the study found that 26% of participants exhibited alexithymia, with notable levels of depression (61%) and anxiety (60%). Hierarchical multiple regression analyses indicated that pain intensity and depressive symptoms significantly accounted for the variance in the physical component of HRQoL, while depressive symptoms, anxiety, alexithymia, and pain intensity explained variations in the mental component. Mediation analyses confirmed both direct and indirect effects of alexithymia on HRQoL, mediated by depressive symptoms. Overall, the study underscored the significant influence of alexithymia, particularly difficulty identifying feelings, on the HRQoL of FM patients.

Post-Traumatic Stress Disorder (PTSD) and CP are two complex and debilitating conditions that frequently coexist, posing significant challenges in both diagnosis and treatment[14]. Post-Traumatic Stress Disorder is a psychiatric disorder that can develop in individuals who have experienced or witnessed a traumatic event, leading to symptoms such as intrusive memories, hyperarousal, and avoidance behaviors [15].

Chronic pain, on the other hand, is characterized by persistent discomfort lasting beyond the expected healing time, often stemming from injuries, medical conditions, or other underlying factors [16]. The intersection of PTSD and CP presents a complex clinical scenario, as both conditions can exacerbate and perpetuate each other[17]. Individuals with PTSD may experience heightened sensitivity to pain and may be more prone to developing CP conditions[18]. Conversely, CP can exacerbate PTSD symptoms, leading to increased distress and impairment in functioning [19].

Gasperi et al.[20] conducted a study to explore the interplay of genetic and environmental factors in the co-occurrence of PTSD and various CP conditions. They analyzed data from 4,680 male twins and employed biometric modeling to estimate genetic and environmental influences on PTSD and CP. The results highlighted significant heritability estimates for both PTSD and CP, with a strong genetic correlation indicating shared genetic influences between the two conditions. Sager et al. [21] investigated the prevalence of PTSD and CP among veterans diagnosed with cancer, also examining the relationship between pain and PTSD over three time periods. Their study involved face-to-face interviews with predominantly male veterans with oral-digestive cancers at 6-, 12-, and 18 months post-diagnosis. Findings revealed a notable proportion of participants experiencing CP and symptoms of combat-related and cancer-related PTSD. Changes in PTSD symptom clusters were observed over time, with hyperarousal and emotional numbing increasing at 18 months. Furthermore, logistic regression analysis demonstrated significantly higher odds of CP among individuals exhibiting symptoms of both combat and cancer-related PTSD at six months.

The primary objective of this study is to examine the relationship between alexithymia and PTSD among patients experiencing varying degrees of CP. This investigation is motivated by the recognition that effectively managing the complex interplay between CP, alexithymia, and PTSD requires a comprehensive understanding of their connections and manifestations across different levels of pain severity. By exploring these relationships, we aim to provide insights that can inform tailored interventions and support strategies, thereby enhancing patient outcomes

and overall quality of life for individuals navigating these challenging conditions.

Method and Materials

This study adopted a descriptive-comparative approach to examine the relationship between alexithymia and PTSD across various levels of CP in patients. The study population comprised individuals with CP referred to pain clinics and physiotherapy centers in Tehran between 2022 and 2023. Sample size determination was facilitated using G*Power software version 3.1.9.2[22]. A sample size of 120 individuals per group was initially calculated, which with adjustments made for a 10% anticipated dropout rate, resulting in 150 individuals per group. Inclusion criteria encompassed individuals experiencing CP within the past two years, the absence of psychological interventions, and personal satisfaction. Exclusion criteria included exacerbation of pain, incomplete questionnaire responses, and random answering patterns. Following approval from the Ethics Committee of Tarbiat Modares University (IR.MODARES.REC.1401.197), a roster of pertinent centers was compiled, and initial coordination was established. Subsequently, 300 CP patients were purposefully selected, briefed about the research objectives, and requested to diligently complete the questionnaires under the supervision of their treating physician. Upon questionnaire completion, patients were categorized into two groups based on pain intensity: severe pain (n=150) and low pain (n=150).

Questionnaires by which the described variables were measured were as follows:

Graded Chronic Pain Scale (GCPS): A tool extensively employed for evaluating the severity of CP and its impact on an individual's daily functioning. The GCPS was developed by Von Korff et al. in 1992 [23]. Since its inception, this scale has been validated and applied in both clinical and research environments. Comprising seven items, the scale assesses pain intensity stability or duration of pain, and the resultant degree of disability using an 11-point numerical rating scale spanning from the absence of pain (zero score) to the most severe pain (10 score). Participant scores on the assessment are derived from three subscales: pain intensity, disability score, and levels or grades of disability [23]. The

current study reported the Cronbach's alpha coefficient for this scale as 0.86.

Perth Alexithymia Questionnaire (PAQ): This scale was developed by Preece et al. in 2018, and consists of a self-report form comprising 24 items and 5 subscales [24]. It aims to evaluate difficulties in identifying emotions, expressing emotions, and external thought elements associated with alexithymia. Respondents rate each item on a 7-point Likert scale ranging from 1 (strongly disagree) to 7 (strongly agree), yielding total scores between 24 and 168. Higher scores indicate greater challenges in identifying individual emotions. The subscales include Negative-Difficulty Identifying Feelings (NDIF), Positive-Difficulty Identifying Feelings (PDIF), Negative-Difficulty Describing Feelings (NDDF), Positive-Difficulty Describing Feelings (PDDF), and General-Externally Orientated Thinking (GEOT) [24]. The validity of the questionnaire was established through concurrent validity analysis, demonstrating that individuals reporting higher levels of alexithymia also exhibited greater difficulties in emotion regulation and higher levels of psychological distress. Concurrently, the questionnaire's internal consistency (reliability) was assessed using Cronbach's alpha, resulting in very good values ranging from 0.89 to 0.91 for all subscales in the study conducted by Preece et al [24]. In this study, favorable Cronbach's alpha coefficients were reported for the variables NDIF (0.84), PDIF (0.86), NDDF (0.89), PDDF (0.82), and GEOT (0.91).

Post-traumatic Stress Disorder Checklist (PCL): The post-traumatic stress disorder checklist was created based on the Diagnostic and Statistical Manual of Mental Disorders-5 (DSM-5), which is a self-report measure that is used to screen patients with PTSD from normal individuals and other patients [25]. The PTSD checklist includes 20 items and 5 subscales of re-experiencing, avoidance, negative alterations, hyper-arousal, and emotional numbness. Total scores range from 0 to 80, obtained by summing symptom scores based on a Likert scale (0=not at all or only one time to 3 = 5 or more times a week/almost always). 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 [25]. In the current

investigation, Cronbach's alpha coefficients for the variables of re-experiencing, avoidance, negative alterations, hyper-arousal, and emotional numbness were reported as 0.84, 0.81, 0.89, 0.89, and 0.76, respectively.

Findings
A total of 300 patients with CP participated in the study, comprising 171 females and 129 males, with a Mean±SD age of 31.67±5.42. Among them, 184 patients were married, while 116 were single. Table 1 provides descriptive statistics for alexithymia and PTSD, including mean and standard deviation. The Kolmogorov-Smirnov test's (K-S) Z statistic for all research variables in both groups is not significant. Consequently, we can infer that the distribution of variables is normal (Table 1).

Table 1) Descriptive statistics and the results of assessing the normality of the distribution of research variables

Variables	High levels of CP		Low level of CP		K-S Z	P-value
	Mean	SD	Mean	SD		
Chronic Pain	42.11	8.64	28.60	7.21	0.063	0.057
Negative-Difficulty Identifying Feelings	18.51	2.74	11.87	3.57	0.115	0.094
Positive-Difficulty Identifying Feelings	18.28	2.83	10.28	2.09	0.096	0.063
Negative-Difficulty Describing Feelings	19.02	2.74	12.32	2.94	0.132	0.084
Positive-Difficulty Describing Feelings	18.66	2.94	10.72	3.07	0.069	0.058
General-Externally Orientated Thinking	36.28	3.22	22.16	2.64	0.054	0.071
re-experiencing	16.77	2.64	11.45	2.55	0.066	0.082
Avoidance	6.42	2.05	4.61	2.17	0.124	0.062
Negative alterations	13.76	3.04	8.43	2.69	0.059	0.076
Hyper-arousal	13.62	2.49	8.58	2.92	0.117	0.069
Emotional numbness	17.32	2.19	10.83	2.35	0.078	0.103

To assess differences in alexithymia and PTSD across various levels of CP in patients, a Multivariate Analysis of Variance (MANOVA) was conducted. Levene's test indicated homogeneity of variance across groups (P>0.005), ensuring equal variance of research variables. The Box's M test demonstrated the equality of the covariance matrix between the two groups (Box's M=68.42, F=1.96, P>0.005), validating this assumption. Moreover, Bartlett's test confirmed the significance of the relationship between alexithymia and PTSD (χ^2=1941.40, df=54, P<0.001), justifying the use of parametric tests (Table 2)

Table 2) Results of the MANOVA Analysis on the Associations between Alexithymia and PTSD across Research Groups

Effects	Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Pillai's Trace	0.743	83.359	10	289	<0.001	0.74
Wilks' Lambda	0.257	83.359	10	289	<0.001	0.74
Hoteling's Trace	2.884	83.359	10	289	<0.001	0.74
Roy's Largest Root	2.884	83.359	10	289	<0.001	0.74

According to the results obtained in Table 2, the F statistic of the multivariate analysis of variance examining the differences between groups in alexithymia and PTSD is significant at the level of 0.001 (Wilks' Lambda =0.257, F=289, P<0.001). To determine which groups, differ from each other in each of the variables, a one-way analysis of variance was utilized. The one-way analysis of variance is reported in Table 3.

Table 3) The results of the one-way analysis of variance (ANOVA) assessing group disparities in alexithymia and PTSD

Variable	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared	Observed Power
Negative-Difficulty Identifying Feelings	3306.72	1	3306.72	241.87	<0.001	0.448	1.000
Positive-Difficulty Identifying Feelings	4792.01	1	4792.01	389.01	<0.001	0.566	1.000
Negative-Difficulty Describing Feelings	3366.75	1	3366.75	190.61	<0.001	0.390	1.000
Positive-Difficulty Describing Feelings	4728.27	1	4728.27	347.81	<0.001	0.539	1.000
General-Externally Orientated Thinking	14938.96	1	14938.96	376.28	<0.001	0.558	1.000
re-experiencing	2122.68	1	2122.68	246.75	<0.001	0.453	1.000
Avoidance	244.80	1	244.80	100.74	<0.001	0.253	1.000
Negative alterations	2117.36	1	2117.36	378.01	<0.001	0.559	1.000
Hyper-arousal	1905.12	1	1905.12	388.46	<0.001	0.566	1.000
Emotional numbness	3162.25	1	3162.25	388.47	<0.001	0.567	1.000

Based on Table 3, the results suggest a notable contrast between the two groups concerning alexithymia and PTSD (P<0.001)

Discussion

The primary objective of this study is to examine the relationship between alexithymia and PTSD among patients experiencing varying degrees of CP. Our results unveil a significant correlation between CP and heightened levels of alexithymia across various dimensions, namely NDIF, PDIF, NDDF, PDDF, and GEOT, particularly evident among patients with elevated CP levels. This suggests that as CP severity increases, so does the likelihood of experiencing difficulties in identifying and expressing emotions, as well as an externally oriented thinking style. These findings resonate with prior research conducted by Aaron et al. [12] and Tesio et al. [13], providing further support for the association between CP and alexithymia.

The correlation between CP and heightened levels of alexithymia unveiled in our study elucidates the intricate interplay between physical discomfort and emotional processing. Our findings underscore the significance of considering psychological factors in understanding and managing CP [8]. Alexithymia, characterized by difficulties in identifying and expressing emotions, as well as externally oriented thinking, emerges as a salient aspect in individuals with high levels of CP [10]. This suggests that emotional processing challenges may exacerbate the experience of pain and impede effective coping mechanisms [12]. Recognizing the presence of alexithymia in CP patients opens avenues for tailored interventions aimed at enhancing emotional awareness and regulation. Integrating psychological support alongside conventional pain management approaches could lead to more holistic and effective treatment outcomes [9]. By incorporating strategies to enhance emotional awareness and regulation, healthcare providers can empower individuals with CP to better cope

with their condition and improve their overall quality of life [6]. Ultimately, our findings underscore the need for a comprehensive understanding of CP that encompasses both physical and psychological aspects [8]. Our findings align with previous research indicating a link between CP and alexithymia. By further elucidating this relationship, our study contributes to a deeper understanding of the multifaceted nature of CP and its impact on psychological well-being. Clinicians and healthcare providers should be mindful of the potential presence of alexithymia in individuals with CP, integrating approaches that address emotional difficulties alongside conventional pain management strategies [11,13].

Our results underscore a noteworthy correlation between CP severity and the manifestation of PTSD symptoms, with heightened CP levels being associated with increased PTSD symptomatology. This suggests a potential bidirectional relationship between CP and PTSD, wherein the presence of CP may exacerbate PTSD symptoms, and vice versa. These findings align closely with prior research conducted by Gasperi et al. [20] and Sager et al. [21], further substantiating the observed association between CP and PTSD.

PTSD and CP often coexist and interact in complex ways. Understanding the relationship between these conditions is crucial for providing comprehensive care and improving outcomes for individuals affected by both PTSD and CP. Our study reveals a significant correlation between CP and heightened levels of PTSD, shedding light on the complex intersection of physical and psychological distress in affected individuals [15]. The presence of PTSD symptoms, including re-experiencing, avoidance, negative alterations in cognition and mood, hyper-arousal, and emotional numbness, among patients with elevated CP levels underscores the multifaceted nature of their experiences [19]. The co-occurrence of CP and PTSD suggests potential shared underlying mechanisms, such as

heightened arousal, maladaptive coping strategies, and alterations in neural processing. These overlapping symptoms may exacerbate the burden of both conditions and contribute to poorer treatment outcomes and decreased quality of life for affected individuals[20]. Addressing PTSD symptoms alongside CP management is crucial for providing comprehensive care to patients experiencing both conditions[14]. Interventions aimed at addressing trauma-related symptoms and enhancing coping mechanisms may offer promising avenues for improving overall well-being and functional outcomes in this population[18]. By integrating trauma-informed care into pain management approaches, healthcare providers can offer more comprehensive support to individuals living with both CP and PTSD. Moving forward, it is essential to continue investigating the complex interplay between CP and PTSD and to develop tailored interventions that address the unique needs of individuals experiencing both conditions. By adopting a holistic approach to care that considers both physical and psychological dimensions, we can strive to improve outcomes and enhance the well-being of patients living with CP and PTSD [17].

One limitation of this study is the reliance on self-report questionnaires to assess alexithymia, PTSD, and CP levels, which may introduce response bias and subjective interpretations. Additionally, the study's sample was drawn from specific pain and physiotherapy clinics in Tehran, potentially limiting the generalizability of the findings to broader populations with CP. Future research could employ longitudinal designs to explore the temporal relationships between alexithymia, PTSD, and CP, providing insights into the causal pathways and potential mechanisms underlying these associations. Additionally, incorporating objective measures such as physiological assessments or clinical interviews alongside self-report questionnaires could enhance the validity and reliability of the findings. Furthermore, investigating the effectiveness of tailored interventions targeting alexithymia and PTSD symptoms in patients with CP may offer valuable insights into improving treatment outcomes and patient well-being.

Conclusions

In addition to highlighting the intricate relationship between CP, alexithymia, and PTSD, this study sheds light on the multifaceted nature of psychological and emotional factors in patients dealing with CP conditions. The findings suggest that individuals with higher levels of CP are more susceptible to experiencing heightened alexithymia and PTSD symptoms, indicating the need for tailored interventions that address both the physical and psychological aspects of pain management. Moving forward, healthcare professionals must incorporate holistic approaches to patient care, integrating psychological assessments and interventions alongside traditional pain management strategies. Furthermore, future research endeavors could delve deeper into exploring the underlying mechanisms driving the observed relationships between CP, alexithymia, and PTSD, ultimately paving the way for more effective treatment approaches and improved patient outcomes in clinical setting.

Authors' Contribution
FBS conceptualized the project; HF designed methodology and conduct the study; MD and AFA wrote the original draft; FBS and HF reviewed and edited the manuscript. All authors approved the study and manuscript.

Conflict of Interest
There are no conflicts of interest among the authors.

Ethical Permission
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