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Original Article

Assessing Temperament and Character Traits in Patients with Varying Degrees of Chronic Pain: A Comparative Analysis

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Abstract

Chronic pain is a multifaceted condition influenced by biological, psychological, and sociocultural factors, with personality traits playing a key role in shaping individual experiences. This study investigates the differences in temperament and character traits among individuals with varying degrees of chronic pain severity. Conducted as a descriptive and causal-comparative study, the research focused on patients with chronic pain attending pain clinics and physiotherapy centers in Tehran between 2022 and 2023. A purposive sample of 130 individuals experiencing low and 130 individuals experiencing high pain levels participated in the study. The participants completed questionnaires assessing chronic pain severity using the Graded Chronic Pain Scale and personality traits using the Temperament and Character Inventory. Data analysis was conducted using multivariate analysis of variance with SPSS 24. The results revealed significant temperament and character components between the two groups ($p < 0.01$). Patients experiencing higher levels of chronic pain exhibited elevated levels of harm avoidance (F=761.740) and novelty seeking (F=399.756), alongside decreased levels of reward dependence (F=564.723), persistence (F=243.040), self-directedness (F=291.953), cooperativeness (F=452.232), and self-transcendence (F=285.586). The results of this study revealed that individuals with higher levels of chronic pain exhibit elevated harm avoidance and novelty seeking, along with lower reward dependence, persistence, self-directedness, cooperativeness, and self-transcendence. These differences highlight the significant influence of personality traits on chronic pain experiences. The findings can inform the development of personalized pain management strategies to improve the quality of life for these patients.

Keywords

Chronic pain
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Introduction

Chronic pain is a multifaceted and prevalent health condition that affects individuals across diverse demographics and clinical presentations (Pinto et al., 2023). Its impact extends beyond physical discomfort to encompass emotional distress, functional impairment, and diminished quality of life (Gustin et al., 2016). Within the spectrum of chronic pain, patients present with varying degrees of severity, duration, and etiology, reflecting the heterogeneous nature of this complex phenomenon (Ren et al., 2024). Understanding the nuances of chronic pain across different patient populations is essential for tailoring interventions and optimizing patient care (Burri et al., 2017). Patients with varying degrees of chronic pain may exhibit distinct clinical characteristics, treatment responses, and psychosocial factors influencing their pain experience and outcomes (Bagheri Sheykhangafshe et al., 2023). Sá et al. (2019) conducted a systematic review and meta-analysis of the prevalence of chronic pain in developing countries. They found that after correction for publication bias, the overall pooled prevalence of chronic pain was 18%. Murray et al. (2022) reported an overall pooled random-effect prevalence rate of 11.6% for chronic pain in young adults, indicating that approximately 1 in 9 young adults worldwide experience chronic pain. In Iran, Ghafouri et al. (2022) reported a 25.2% prevalence of low back pain in a study involving 163,770 participants.
Chronic pain, a complex and pervasive health condition,

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profoundly impacts individuals' physical, emotional, and social well-being (Ahmadi & Mirmohamadi, 2024; Günday et al., 2023). While the physiological mechanisms of chronic pain have been extensively studied, there is growing recognition of the role that psychological factors play in shaping the pain experience (Tönük et al., 2021). One such psychological framework that has garnered attention in the context of chronic pain is temperament and character (Gökmen et al., 2015). Temperament and Character, proposed by Cloninger as part of his psychobiological model of personality, represent distinct dimensions of personality that influence how individuals perceive, interpret, and respond to various stressors, including pain (Cloninger et al., 1994). Temperament encompasses biologically based tendencies toward emotional reactivity and regulation, while Character reflects self-concepts and adaptive strategies for coping with life's challenges (Badil Güloğlu & Tunç., 2022).

Understanding the interplay between chronic pain and temperament and character is essential for elucidating the individual differences in pain perception, coping mechanisms, and treatment outcomes (Demirci et al., 2017). Certain temperamental traits, such as harm avoidance and novelty seeking, have been associated with heightened pain sensitivity and maladaptive coping strategies in individuals with chronic pain (Lexne et al., 2018). Conversely, character traits, such as self-directedness and cooperativeness, may facilitate resilience and adaptive coping strategies in the face of pain-related challenges (Ren et al., 2024). Furthermore, the relationship between chronic pain and temperament and character is dynamic, with chronic pain potentially influencing and being influenced by personality traits over time (Lopez-Ruiz et al., 2023). For instance, the experience of persistent pain may shape individuals' character development, leading to changes in self-concepts, values, and coping strategies (Knefel et al., 2023; Vespa et al., 2024).

Aker et al. (2017) conducted a study to explore the association between personality traits and chronic pain by comparing clinical features and personality traits between CPD patients and healthy controls. The study included 60 chronic pain outpatients and 60 healthy controls. The findings revealed that chronic pain patients displayed elevated impulsiveness and harm avoidance scores, particularly in subscales associated with anticipatory worry, fear of uncertainty, shyness with strangers, and fatigability and asthenia, in comparison to the healthy control group. Aho et al. (2022) aimed to explore the distinct roles of psychobiological temperament and cognitive-evaluative character dimensions in managing chronic pain, particularly chronic post-surgical neuropathic pain (CPSNP), among women treated for breast cancer. Their findings revealed that 83% of patients experienced chronic pain, with 56% meeting the criteria for CPSNP. CPSNP patients demonstrated elevated levels of Harm Avoidance temperament, which correlated with reduced cold pain tolerance and heightened pain intensity during the Cold Pressor Test. Specific subscales within harm avoidance, such as Fear of Uncertainty and fatigue, contributed significantly to the intensity of pain experienced. Additionally, CPSNP patients reported higher levels of self-transcendence and lower levels of self-directedness and Cooperativeness compared to non-CPSNP patients regarding character dimensions. Conrad et al. (2007) explored the connections between pain and personality. They examined 207 chronic pain patients and compared them to 105 pain-free control subjects. The chronic pain group exhibited higher scores on depression and state anxiety scales, with 41% meeting the criteria for at least one personality disorder. Using covariance analysis to account for depression and state anxiety, the chronic pain group demonstrated elevated scores on the harm avoidance temperament dimension and lower scores on the self-directedness and cooperativeness character dimensions.

Despite considerable advancements in pain management, chronic pain continues to be a pervasive global health challenge, affecting millions and imposing substantial personal and societal burdens. While numerous studies have investigated biological and physiological aspects of chronic pain, less is known about the psychological and personality-based factors that shape individual pain experiences. A gap persists in understanding how specific temperament and character traits interact with chronic pain severity to influence coping mechanisms, emotional responses, and treatment outcomes. By exploring these traits across varying levels of pain severity, this study seeks to uncover critical psychological mechanisms underlying chronic pain. Such insights are crucial for addressing existing gaps in the literature and can inform the development of personalized, multidimensional treatment approaches that cater to the unique psychological profiles of individuals. Our primary objective is to assess temperament and character traits in patients experiencing varying degrees of chronic pain through a comprehensive comparative analysis. By bridging this gap, the research aims to enhance our understanding of the complex interplay between personality traits and chronic pain, paving the way for more effective and tailored interventions to improve patient outcomes and quality of life.

Method

Participants

This was a descriptive-comparative study. The population of this study consisted of patients with chronic pain referred to pain clinics and physiotherapy centers in Tehran in the years 2022-2023 (N=260). G*Power software version 3.1.9.2 was used to calculate the sample size (Sheykhangafshe et al., 2022). A sample size of 110 individuals was calculated for each group, considering a 10% dropout rate, resulting in 130 individuals per group. The inclusion criteria for the study included experiencing chronic pain in the past two years, not receiving psychological interventions and personal satisfaction. Exacerbation of pain, incomplete

questionnaire completion, and random question answering were considered exclusion criteria.

Instrument

Graded Chronic Pain Scale (GCPS):

Developed by Von Korff et al. (1992), this scale is a widely used instrument for assessing chronic pain severity and its impact on daily functioning. This scale comprises seven items designed to evaluate pain intensity, stability or duration of pain, and the resulting degree of disability. Responses are recorded using an 11-point numerical rating scale ranging from 0 (no pain) to 10 (most severe pain). Scores are derived from three subscales: pain intensity, disability score, and grades of disability. The pain intensity subscale reflects the average level of pain experienced, while the disability score measures how much pain interferes with daily activities, and the grades of disability categorize the overall impact into levels from low to high severity. Higher scores indicate greater pain intensity and disability. The maximum score for pain intensity and disability is 10, with the total score representing the overall impact of chronic pain (Von Korff et al., 1992). Previous research in Iran reported a Cronbach's alpha of 0.86, demonstrating high internal consistency (Sheykhangafshe et al., 2024). The GCPS has demonstrated strong psychometric properties, with the current study reporting a Cronbach's alpha of 0.89, indicating high internal consistency.

Temperament and Character Inventory (TCI):

Created by Cloninger et al. (1994), it is a comprehensive tool designed to assess dimensions of temperament and character through 125 items with binary response options (true/false). The TCI is divided into two major components: temperament, consisting of four subscales (harm avoidance, novelty seeking, reward dependence, and persistence), and character, consisting of three subscales (self-directedness, cooperativeness, and self-transcendence). Higher scores in each subscale reflect stronger tendencies in the respective trait. Validation of the Persian version of the TCI was conducted by Kaviani and Poor Naseh (2005) on a sample of 1,212 individuals, demonstrating internal correlations between subscales ranging from 0.55 to 0.84 and validity coefficients from 0.72 to 0.90. The absence of significant correlations between temperament and character subscales supports their independence. In the present study, Cronbach's alpha coefficients were as follows: total score (0.76), novelty seeking (0.80), harm avoidance (0.92), reward dependence (0.90), persistence (0.58), self-directedness (0.77), cooperativeness (0.92), and self-transcendence (0.86). These results indicate acceptable to excellent internal consistency, reinforcing the reliability of the instrument in assessing psychological traits related to chronic pain.

Procedure

After obtaining the ethics code from the Ethics Committee of Tarbiat Modares University (IR.MODARES.REC.1401.197), a list of relevant centers was prepared, and initial coordination was made with the authorities. Then, 600 patients with chronic pain were purposefully selected, and the research objectives were explained to them. After obtaining permission from the treating physician, they were requested to accurately complete the research questionnaires and answer questions to the best of their ability. Each individual completed the research questionnaires, taking approximately 15 to 20 minutes. Finally, 130 participants with scores above 45 on Pain were selected as the high levels of Pain group. 130 patients who obtained lower scores on the Pain questionnaire were considered as the low levels of the Pain group. The data obtained from questionnaire completion were analyzed using SPSS 24, and multivariate analysis of variance (MANOVA) was used to test the research hypotheses. The significance level in this study was set at 0.05.

Results

260 patients with chronic pain were analyzed, 130 of whom had high levels of pain (average age=31.05, SD=4.35) and 130 of whom had low levels of pain (average age=30.82, SD=5.41). The age range of patients with chronic pain was 18 to 45 years. Table 1 shows the demographic information of the two groups.

Table 1. Demographic information of participants

Variable		High levels of Pain		Low levels of Pain	
		N	Percent	N	Percent
Gender	Female	73	56.1	61	46.9
	Male	57	43.9	69	53.1
Marital status	Single	63	48.4	59	45.4
	Married	67	51.6	71	54.6
Age (Year)	18 to 26	42	32.3	38	29.2
	27 to 36	57	43.9	59	45.4
	37 to 45	31	23.8	33	25.4
Education	Diploma	16	12.3	18	13.8
	Associate degree	31	23.8	30	23.1
	Bachelor	46	35.4	47	36.2
	Masters	28	21.6	24	18.4
	Ph.D.	9	6.9	11	8.5

According to Table 1, more women suffer from severe chronic pain compared to men, while individuals who are single or hold bachelor's degrees tend to experience heightened levels of pain. Table 2 shows the mean and standard deviation of the two groups. Also, to check the normality of the data, the Kolmogorov-Smirnov test was used, and the obtained results indicate that this assumption was established (p > 0.005).

Table 2. Analyzing the distribution of research variables through descriptive statistics and assessing normality

	High levels of Pain		Low level of Pain			
Variables	**M**	**SD**	**M**	**SD**	**K-S Z**	**P**
Graded Chronic Pain	48.65	7.64	39.42	7.59	0.105	0.064
Harm avoidance	31.16	4.98	14.98	4.45	0.165	0.058
Novelty seeking	27.60	4.61	17.77	3.18	0.109	0.092
Reward dependence	18.70	5.57	32.36	3.45	0.143	0.063
Persistence	21.80	4.20	28.92	3.06	0.130	0.087
Self-directedness	21.32	4.87	29.86	2.97	0.124	0.072
Cooperativeness	18.79	6.57	32.70	3.51	0.115	0.055
Self-transcendence	19.04	5.44	30.11	5.12	0.141	0.074

To assess differences in temperament and character between patients with varying degrees of chronic pain, 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 M Box test demonstrated the equality of the covariance matrix between the two groups (Box's M=130.26, F=4.51, p > 0.005), validating this assumption. Moreover, Bartlett's test confirmed the significance of the relationship between temperament and character (χ^2=1339.83, df=27, P<0.001), justifying parametric tests. One-way analysis of variance was used to determine in which of the variables the groups differed from each other. Table 3 reports a one-way analysis of variance.

Table 3. Results of the multivariate analysis of variance test related to the difference between the two groups in temperament and character

Effects	Value	F	Hypothesis df	Error df	Sig.	Partial Eta Squared
Pillai's Trace	0.78	129.200	7	252	<0.001	0.78
Wilks' Lambda	0.218	129.200	7	252	<0.001	0.78
Hoteling’s Trace	3.589	129.200	7	252	<0.001	0.78
Roy's Largest Root	3.589	129.200	7	252	<0.001	0.78

According to the results obtained in Table 3, the F statistic of the multivariate analysis of variance examining the differences between groups in temperament and character is significant at the 0.001 level (Wilks' Lambda =0.218, F=129.200, 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 4.

Table 4. Results of a one-way analysis of variance test related to the difference between the two groups in temperament and character

Variable	Type III Sum of Squares	df	Mean Square	F	Sig.	Partial Eta Squared	Observed Power
Harm avoidance	17010.035	1	17010.035	761.740	<0.001	0.74	1.000
Novelty seeking	6281.862	1	6281.862	399.756	<0.001	0.61	1.000
Reward dependence	12145.112	1	12145.112	564.723	<0.001	0.68	1.000
Persistence	3290.865	1	3290.865	243.040	<0.001	0.48	1.000
Self-directedness	4755.938	1	4755.938	291.953	<0.001	0.53	1.000
Cooperativeness	12572.554	1	12572.554	452.232	<0.001	0.63	1.000
Self-transcendence	7964.312	1	7964.312	285.586	<0.001	0.52	1.000

According to Table 4, the F statistics for harm avoidance (F=761.740), novelty seeking (F=399.756), reward dependence (F=564.723), persistence (F=243.040), self-directedness (F=291.953), cooperativeness (F=452.232), and self-transcendence (F=285.586) are all significant at the 0.001 level. These results suggest a noteworthy disparity between the two groups regarding these variables (p < 0.001). Patients experiencing higher levels of chronic pain, in contrast to the comparison group, exhibited elevated levels of harm avoidance and novelty seeking, and decreased levels of reward dependence, persistence, self-directedness, cooperativeness, and self-transcendence.

Discussion

This study aims to explore variances in temperament and character traits among individuals experiencing different levels of chronic pain severity. The results indicate notable distinctions in temperament factors (such as harm avoidance, novelty seeking, reward dependence, and persistence) and character traits (including self-directedness, cooperativeness, and self-transcendence) between the studied groups. Individuals with higher chronic pain levels displayed heightened levels of harm avoidance and novelty seeking compared to the control group. These findings align with previous research by Aker et al. (2017), Aho et al. (2022), and Conrad et al. (2007).

The observed increase in harm avoidance suggests a strong aversion to potential sources of discomfort or exacerbation of pain among individuals with higher

chronic pain levels (Vespa et al., 2024). This heightened sensitivity to perceived threats may lead to adaptive behaviors aimed at minimizing pain experiences, yet excessive harm avoidance may result in avoidance of beneficial activities or social interactions, negatively impacting the quality of life (Badil Güloğlu & Tunç., 2022). Likewise, the elevated novelty-seeking behavior in individuals with chronic pain indicates a proactive approach to coping with their condition. Seeking out new or stimulating experiences may serve as a distraction from persistent pain or as a means of counteracting the monotony associated with chronic pain conditions (Lexne et al., 2018). However, excessive novelty seeking may lead to impulsive behaviors or risk-taking, potentially exacerbating pain or causing other negative consequences (Aker et al., 2017).

These findings underscore the multifaceted nature of chronic pain experiences and emphasize the importance of a holistic approach to pain management. Recognizing and addressing individual differences in temperament traits can inform tailored interventions that encompass both physical and psychological dimensions of pain. Integrating behavioral therapies, mindfulness practices, and social support networks into treatment plans may foster adaptive coping strategies and resilience in individuals living with chronic pain (Aho et al., 2022). In their study, Demirci et al. (2017) investigated how temperament and character traits influence perceived social support and quality of life in patients with epilepsy (PWE). The research involved 52 PWE and 54 healthy controls, and it included the collection of demographic and clinical data. The assessment of temperament and character traits was conducted using temperament and character, while perceived social support was measured with the Multidimensional Scale of Perceived Social Support. Quality of life was evaluated using the 36-item Short-Form Health Survey (SF-36). PWE participants reported significantly lower scores on both the mental and physical subscales of the SF-36 compared to controls. Through multiple linear regression analysis, the researchers identified Reward Dependence and Cooperativeness as independent predictors of perceived social support. Additionally, the Persistence score emerged as an independent predictor for the physical subscale of SF-36, even after adjusting for confounding variables.

Contrary to the comparison group, individuals with lower levels of chronic pain exhibited elevated levels of reward dependence, persistence, self-directedness, cooperativeness, and self-transcendence. These findings align with prior research conducted on patients with chronic pain (Lexne et al., 2018; Demirci et al., 2017; Vespa et al., 2024).

These results suggest a distinct psychological profile among individuals with lower levels of chronic pain, characterized by traits associated with adaptability, resilience, and interpersonal harmony (Aho et al., 2022). The heightened reward dependence implies greater responsiveness to positive stimuli and reinforcement, potentially contributing to a more optimistic outlook and enhanced motivation to engage in rewarding activities despite experiencing pain (Tönük et al., 2021). Furthermore, increased levels of persistence suggest a determined and tenacious approach to overcoming challenges, including managing pain-related difficulties. This trait may facilitate adherence to treatment regimens and coping strategies, ultimately promoting better pain management outcomes (Gökmen et al., 2015). Moreover, the elevated levels of self-directedness indicate a strong sense of autonomy, goal-directedness, and self-control among individuals with low chronic pain levels. This trait may empower individuals to actively participate in their pain management and make informed decisions about their health and well-being (Knefel et al., 2023).

Additionally, the heightened cooperativeness observed in this group suggests a greater inclination toward empathy, cooperation, and social integration. Stronger social support networks and effective communication skills may contribute to better-coping mechanisms and overall adjustment to chronic pain (Lopez-Ruiz et al., 2023). Finally, the increased self-transcendence implies a broader perspective that extends beyond personal concerns, encompassing a sense of connection with others and the larger world. This trait may foster spiritual or existential growth, providing individuals with a source of meaning and purpose that transcends their pain experiences (Conrad et al., 2007). Lexne et al. (2018) conducted a study to explore personality factors among patients experiencing acute abdominal pain in an emergency ward, aiming to determine whether specific personality traits correlated with different abdominal diagnoses. Their analysis unveiled notable differences in personality traits across the groups. Patients diagnosed with organic dyspepsia exhibited elevated levels of anxiety (harm avoidance) and decreased levels of cooperativeness compared to those with specific abdominal diagnoses and controls. Moreover, they demonstrated a heightened sense of self-transcendence and less mature character when compared to other groups. These distinct personality features observed in individuals with organic dyspepsia at the emergency clinic suggest that evaluating personality factors could offer valuable insights for diagnosing and optimizing treatment for this condition in emergency care settings.

The study drew its participants from pain clinics and physiotherapy centers in Tehran, employing a purposive sampling method. This approach may limit the generalizability of the findings to broader populations of chronic pain sufferers. Additionally, the study's cross-sectional design offers only a snapshot of participants' experiences at a single point in time, which restricts the ability to infer causality or track changes in chronic pain and personality traits over time. Furthermore, the reliance on self-reported measures for chronic pain severity and personality traits could introduce response bias or subjective interpretation, potentially affecting data accuracy and reliability. The study also overlooked potential contextual variables such as socioeconomic status, cultural background, or concurrent medical conditions, which could influence both chronic pain

severity and personality traits.

Future research endeavors could employ longitudinal designs to investigate the dynamic relationship between chronic pain severity and personality traits over time, providing a more nuanced understanding of their interaction and evolution. To improve generalizability, future studies should include more diverse samples encompassing different demographic groups, geographical locations, and types of chronic pain conditions. Integrating objective measures such as neuroimaging techniques or biomarkers alongside self-report measures could offer a more comprehensive assessment of chronic pain severity and personality traits. Furthermore, considering additional factors influencing chronic pain experiences, such as coping strategies, social support, and treatment adherence, can provide a more holistic understanding of the complex nature of chronic pain. Finally, research exploring the effectiveness of interventions targeting specific personality traits in chronic pain management could provide valuable insights into personalized treatment approaches tailored to individuals' unique psychological profiles.

Conclusion

These findings represent a significant contribution to the existing body of literature on the complex relationship between personality traits and chronic pain experiences. By elucidating the associations between temperament, character, and chronic pain severity, our study lays the groundwork for the development of more personalized and effective pain management strategies. With a deeper understanding of how personality factors influence chronic pain, healthcare professionals can tailor treatment approaches to better meet the needs of individual patients. By considering personality traits in the assessment and management of chronic pain, we aim to improve the overall well-being and quality of life of those living with this debilitating condition. Ultimately, our goal is to ensure that individuals with chronic pain receive comprehensive and holistic care that takes into account not only their physical symptoms but also their unique psychological characteristics. By addressing the role of personality in treatment and care, we can work towards more effective interventions and better outcomes for patients experiencing chronic pain.

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The authors have not disclosed any conflicts of interest.

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