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Original Article

Psychological Factors Influencing Pain Intensity Perception: A Qualitative Study on Canadian Patient Insights

Yaliu Yang[1]*, Mehdi Rostami[2], Nadereh Saadati[2], Sefa Bulut[3], Baidi Bukhori[4], Jiantang Yang[5], Maura McDonnell[6], Nebahat Bulut[7] and Zohreh Zadhasn[8]

1. Marriage and Family Therapy Department, Iona College, New Rochelle, NY, United States Department of Psychology and Counselling, KMAN Research Institute, Richmond Hill, Ontario, Canada
2. Department of Psychology and Counselling, KMAN Research Institute, Richmond Hill, Ontario, Canada
3. Department of Counselling Psychology & Head of the Counselling Center, Ibn Haldun University, Istanbul, Turkey
4. Faculty of Psychology and Health, Universitas Islam Negeri Walisongo Semarang, Indonesia
5. Coventry University, London–University House, UK
6. Department of Psychology, University of Minnesota, Minneapolis, MN, USA
7. Department of Anaesthesiology, School of Medicine, Beykent University, Turkey
8. Department of Psychology and Counselling, KMAN Research Institute, Richmond Hill, Ontario, Canada

Abstract

Background: Chronic pain is a pervasive condition that significantly impacts the quality of life and involves complex interactions between physical sensations and psychological factors. This study aimed to explore the psychological factors influencing pain intensity perception, offering insights into how emotional responses, cognitive perceptions, social influences, and physical experiences shaping the experience of pain.

Methods: This qualitative study involved semi-structured interviews with 28 participants aged 18-65 from Richmond Hill, Ontario, who experience chronic pain within September to December 2023. The interviews aimed to achieve theoretical saturation and were analyzed using NVivo software to identify themes and sub-themes within the data.

Results: Four main themes were identified: emotional responses, cognitive perceptions, social influences, and physical experience. Each theme comprised several categories with distinct concepts such as anxiety, depression, coping mechanisms, pain significance, personal control, family dynamics, healthcare interactions, sensory details, and activity levels. These themes collectively depicted a comprehensive view of the multifaceted psychological impact on pain perception.

Conclusion: The study underscores the importance of addressing the psychological aspects of pain perception in chronic pain management. By integrating emotional, cognitive, and social factors, healthcare providers can enhance therapeutic approaches and improve quality of life for individuals suffering from chronic pain.

Keywords: Chronic pain, Pain management, Pain perception, Quality of life

*** Corresponding author**
Yaliu Yang, PhD
Marriage and Family Therapy Department, Iona College, New Rochelle, NY, United States Department of Psychology and Counselling, KMAN Research Institute, Richmond Hill, Ontario, Canada
Tel: +1 437 429 3507
Email: yaliuyang@kmanresce.ca

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Introduction

The perception of pain, a profoundly subjective experience, is influenced not only by biological, but also psychological and social factors (1-3). This understanding forms the cornerstone of modern pain management strategies, where the focus extends beyond the physical symptoms to address the mental and emotional dimensions of suffering. As the prevalence of chronic pain continues to rise globally, the imperative to unravel the complex web of factors that contribute to pain perception has never been more critical (4-7).

While previous studies such as Givi *et al* have highlighted the role of psychological factors like rumination and resilience in managing chronic pain, the majority of research tends to focus on specific conditions or factors without integrating these elements into a broader understanding of pain perception (8). Similarly, Ebrahimi *et al* explored emotional self-regulation in coronary heart disease patients but did not address how these strategies might be applied to general pain experiences (3). The current study addresses this gap by providing a comprehensive analysis of how these psychological mechanisms work across various pain conditions, offering a more generalized understanding of pain perception and management.

The intricate relationship between personality traits and pain perception has also been documented, with research by Sayed Alitabar and Goli illustrating how neuroticism may exacerbate pain catastrophizing through diminished self-efficacy (9). This relationship posits that personality may not only affect the experience of pain but also the efficacy of pain management strategies employed by individuals. Additionally, studies by Hooshmandi *et al* and Goli delve into the impacts of interoceptive awareness and personality underpinnings on pain catastrophizing and chronic pain, suggesting a complex interplay between self-awareness, personality traits, and pain perception (10,11).

Furthermore, the social context of pain cannot be overlooked, as it plays a crucial role in shaping pain experiences. Rostami *et al* provided a phenomenological insight into living with fibromyalgia, emphasizing how daily coping mechanisms and fatigue are intertwined with social interactions and personal resilience. This social dimension is critical as it encapsulates the stigma and the often invisible nature of chronic pain, which can lead to misinterpretation and misunderstanding by peers and healthcare providers (12).

Pain's biopsychosocial model is further supported by research linking psychological stress with physical symptoms. For instance, Melvariza, Wardhani, and Widhiyanto identified psychological stress as a significant risk factor for low back pain, suggesting that the management of psychological factors could mitigate the severity of physical symptoms (13). This is echoed in studies exploring the effectiveness of integrative therapies and non-pharmacological interventions, such as those by Jhawer and Boelman and Theingi *et al*, which highlight the benefits of addressing psychological and emotional aspects to reduce reliance on analgesics (14,15).

Given the increasing recognition of the psychological dimensions of pain, there is a pressing need to understand how these factors uniquely shape pain intensity perception. Although existing literature has highlighted various psychological aspects of pain management, there remains a gap in understanding how these factors interact on an individual level. Moreover, the social context of pain in Canada is influenced by varying cultural attitudes toward healthcare, pain expression, and treatment preferences. For example, certain communities may rely on alternative healing methods, while others may prefer conventional medical treatments. Additionally, the accessibility of healthcare services, particularly in urban versus rural settings, can affect how individuals manage pain. This study aims to fill this gap by exploring the subjective experiences of individuals with chronic pain, providing new insights into the complex interplay of emotional, cognitive, and social factors. By addressing this, the research underscores the necessity of developing holistic, psychologically informed approaches to chronic pain management.

Materials and Methods

Study design and participants

This qualitative study was conducted within September to December 2023 to explore the psychological factors influencing pain intensity perception among patients. The authors adhered strictly to ethical guidelines, obtaining approval under the ethics code

KEC.2023.10B3 from the KMAN Research Institute. The study adhered to strict confidentiality protocols, ensuring that all the participants' personal information remained private and secure throughout the research process. The participants were informed that their responses would be kept confidential and used solely for research purposes.

This study employed a phenomenological approach, which allowed for an in-depth exploration of the lived experiences of individuals with chronic pain. The participants were selected through purposive sampling, aiming to recruit individuals who could provide rich, relevant insights into the psychological factors influencing pain perception. The inclusion criteria were: 1) Adults aged 18-65 year, 2) Diagnosed with chronic pain lasting more than 6 months, 3) Able to provide informed consent and communicate in English, and 4) Residents of Richmond Hill, Ontario. The participants were approached *via* email and telephone after referrals from healthcare providers. Out of 35 individuals contacted, 28 agreed to participate, while seven declined, citing personal reasons. The interviews were conducted in the participants' homes, ensuring a comfortable environment for sharing their experiences. All the participants provided informed consent prior to participation in the study.

Theoretical saturation was achieved in this study, meaning that no new themes or relevant data emerged from successive interviews. This saturation occurred after conducting interviews with 28 participants, ensuring robust and comprehensive data coverage relevant to our research question.

Data collection tools

Semi-structured interview: Semi-structured interview guides, developed by the research team, were pilot-tested with three participants to refine the questions and prompts.

The interviews were conducted by a trained female psychologist with a PhD in clinical psychology, specializing in chronic pain management. No repeat interviews were necessary, and the participants were not provided with transcripts for feedback. The interview guide included open-ended questions designed to elicit detailed information on the participants' perceptions of pain and the psychological factors they believe influence these perceptions. The interviews were conducted in a quiet, private setting to ensure participant comfort and confidentiality. Each session lasted approximately 60 minutes and was audio-recorded with the participant's permission.

Data analysis

Two independent researchers coded the data using NVivo software. A consensus meeting was held after the initial round of coding to ensure reliability and consistency in the identified themes. This approach bolstered the study's validity, ensuring that the themes reflected the participants' experiences accurately. Initial codes were generated by identifying recurring words and phrases across the transcripts. These initial codes were then grouped into potential themes, which were reviewed and refined in an iterative process until clear and distinct themes regarding the psychological factors influencing pain perception were identified.

The data analysis process was rigorously checked for validity and reliability through constant comparison, ensuring that the themes were grounded in the data collected. This approach provided a detailed and nuanced understanding of the psychological aspects of pain perception among the study participants.

Results

The participants varied in terms of educational background, with 12 holding post-secondary degrees and 16 possessing high school diplomas or lower. Pain intensity was measured using a Visual Analog Scale (VAS), and the average reported pain score was 7 out of 10. The participants experienced pain in various body regions, but 75% reported lower back pain. All the participants had varying degrees of functional impairment due to pain, which influenced their perception of pain severity. The age distribution was broad, with participants ranging from 24 to 65 years old. The group consisted of 16 females and 12 males, reflecting a balance in gender representation. The participants varied in their employment status, including 10 who were employed full-time, 8 part-time, and 10 who were not currently employed due to their pain conditions.

Emotional responses

Anxiety: emerged as a crucial emotional response, with participants frequently expressing worries about

Table 1. The results of thematic analysis

Main themes	Subthemes	Concepts (open codes)
Emotional responses	Anxiety	Worry about future, Fear of pain increase, Restlessness, Concentration difficulties
	Depression	Loss of interest, Feeling hopeless, Low mood, Withdrawal from activities
	Coping mechanisms	Use of distraction, Seeking social support, Cognitive reframing, Relaxation techniques
	Anger	Irritability, Frustration with limitations, Resentment towards treatment, Short temper
	Acceptance	Acknowledging pain, Adaptation strategies, Letting go of control
Cognitive perceptions	Pain significance	Pain as a warning, Pain as an obstacle, Interpretations of pain severity
	Personal control	Sense of autonomy, Decision-making in treatment, Self-efficacy
	Beliefs about pain	Chronicity expectations, Attribution of pain to causes, Belief in recovery
	Pain understanding	Knowledge of pain processes, Comprehension of treatment, Information seeking
Social influences	Family dynamics	Family support, Impact on family roles, Expectations from family
	Healthcare interactions	Trust in providers, Communication quality, Satisfaction with care
	Social stigma	Perception of disbelief, Isolation feelings, Impact of societal norms
Physical experience	Sensory details	Pain intensity, Pain location, Variability of pain, Duration of pain episodes
	Activity level	Physical limitations, Adaptation of activities, Impact of activity on pain
	Sleep patterns	Sleep quality, Sleep disturbances due to pain, Effect of pain on sleep routine
	Fatigue	Chronic tiredness, Impact of pain on energy levels, Coping with fatigue

1. Emotional Responses

the future and fear of pain worsening. One participant noted, “I constantly worry about how much worse the pain could get it’s always on my mind, making it hard to focus on anything else” (Age: 44 year, Female). This theme also included concepts such as restlessness and difficulties with concentration.

Depression: was characterized by a loss of interest in activities, feelings of hopelessness, and low mood. A poignant reflection from a participant: “It feels like the pain has taken over my life. I don’t enjoy things I used to love anymore” (Age: 51 year, Male).

Coping mechanisms: varied widely, with strategies including distraction (“I try to keep busy just to not think about the pain” Age: 38, Female), seeking social support (“Talking to my friends helps me not feel so alone with it” Age: 49 year, Male), cognitive reframing, and relaxation techniques.

Anger: and frustration were frequently associated with limitations imposed by pain, with one individual stating, “It’s like I’m constantly on edge because I can’t do what I used to be able to do” (Age: 42 year, Male).

Acceptance: involved acknowledging the reality of pain, with strategies for adaptation and letting go of control, as described by another participant: “I’ve learned to accept that this pain is part of my life now, and I just have to work around it” (Age: 55 year, Female).

Cognitive perceptions

Pain significance: includes interpretations of pain as a warning or an obstacle, impacting participants’ perceptions of their pain’s severity.

Personal control: reflects how individuals perceive their autonomy and influence over their pain management, including decision-making in treatment and their sense of self-efficacy.

Beliefs about pain: encompass chronicity expectations, attributions of pain causes, and beliefs in recovery potential. One participant shared, "I believe if I understand what causes my pain, maybe then I can manage it better" (Age: 39 year, Female).

Pain understanding: covers knowledge about pain processes, comprehension of treatments, and proactive information seeking. "The more I learn about my condition, the better I feel about handling it," mentioned a participant (Age: 48 year, Male).

Social influences

Family dynamics: explore how pain affects family roles and expectations, with support from family playing a critical role. "My family tries to help, but they don't really understand what I go through every day," one participant explained (Age: 40 year, Male).

Healthcare interactions: involve the quality of communication with providers and overall satisfaction with care, crucial for effective pain management. Trust in providers was especially emphasized. One participant shared, "I feel like I can trust my doctor, but sometimes the treatments don't seem to work, and it's frustrating" (Age: 47 year, Female).

Social stigma: related to perceptions of disbelief from others and feelings of isolation. "People look at me and think I'm not really sick because they can't see my pain," a participant lamented (Age: 60 year, Female).

Physical experience

Sensory details: describe the intensity, location, variability, and duration of pain episodes, as directly experienced by the participants.

Activity level: reflects on physical limitations and adaptations necessary due to pain. "I've had to modify how I do everything, from chores to hobbies," said one of the participants (Age: 53 year, Male).

Sleep patterns: chronic pain significantly affects sleep quality, with many participants reporting difficulty falling or staying asleep due to pain. One participant described, "The pain keeps me up at night, and I'm always tired" (Age: 44 year, Female).

Fatigue: was a common issue, with participants experiencing chronic tiredness that impacted daily functioning. One participant shared, "It's like I'm always running on empty, and no matter how much I sleep, I never feel rested" (Age: 51 year, Male).

Discussion

The findings of this study support existing literature that emphasizes the psychological dimensions of pain perception. Emotional responses like anxiety and depression were frequently mentioned, aligning with Givi *et al*'s research on the emotional toll of chronic pain (8). However, this study extends previous work by examining how these emotional factors interact with cognitive perceptions and social influences, offering a more holistic view of pain perception. Practically, these insights could guide the development of interdisciplinary pain management programs that include psychological and social support. Theoretically, the findings suggest the need for further research into the interaction between emotional, cognitive, and social factors in pain perception, providing a richer understanding of how individuals experience and manage chronic pain. Each theme comprised various categories with distinct concepts, offering a comprehensive view of the multifaceted influence of psychological factors on pain perception.

The Emotional Responses theme encompassed several categories: Anxiety, Depression, Coping Mechanisms, Anger, and Acceptance. Anxiety was characterized by concepts such as worry about the future, fear of pain increase, restlessness, and concentration difficulties. Depression was marked by loss of interest, feeling hopeless, low mood, and withdrawal from activities. Coping Mechanisms included using distraction, seeking social support, cognitive reframing, and relaxation techniques. Anger was expressed through irritability, frustration with limitations, resentment towards treatment, and a short temper. Lastly, Acceptance involved acknowledging pain, adaptation strategies, and letting go of control.

Cognitive Perceptions included the categories of Pain Significance, Personal Control, Beliefs about Pain, and Pain Understanding. Pain Significance involved viewing pain as a warning or obstacle and interpreting its severity. Personal Control covered the sense of autonomy, decision-making in treatment, and self-efficacy. Beliefs about Pain encompassed chronicity expectations, attributions of pain causes, and belief in recovery. Pain Understanding detailed knowledge of pain processes, comprehension of treatments, and proactive information seeking.

Under Social Influences, the categories were Family Dynamics, Healthcare Interactions, and Social Stigma. Family Dynamics discussed family support, the impact on family roles, and expectations from family members. Healthcare Interactions focused on trust in providers, the quality of communication, and satisfaction with care. Social Stigma dealt with perceptions of disbelief, feelings of isolation, and the impact of societal norms on individuals with pain.

The Physical Experience theme was described through categories such as Sensory Details, Activity Level, Sleep Patterns, and Fatigue. Sensory Details covered pain intensity, location, variability, and duration of pain episodes. Activity Level involved physical limitations, adaptations of activities, and the impact of activity on pain. Sleep Patterns included sleep quality, disturbances due to pain, and effects on sleep routine. Fatigue was characterized by chronic tiredness, impact on energy levels, and coping with fatigue.

Emotional Responses such as anxiety, depression, and coping mechanisms have been significantly highlighted in the findings. The participants often described the emotional toll of chronic pain, which included frequent feelings of anxiety and depression. This aligns with the study by Givi *et al*, who noted that rumination can exacerbate the emotional distress associated with chronic conditions, affecting resilience and vitality in pain management (8). The coping mechanisms identified, such as seeking social support and cognitive reframing, also correlate with findings from Embrahimi *et al*, who emphasized the effectiveness of emotional self-regulation strategies in managing the emotional aspects of pain in patients with coronary heart disease (3).

Cognitive Perceptions regarding personal control, beliefs about pain, and pain significance identified in the current study underscore the role of cognitive factors in shaping pain experiences. This observation is supported by Sayed Alitabar and Goli, who discussed how self-efficacy and neuroticism interplay with pain catastrophizing (9). The participants in this study who exhibited higher levels of personal control and positive beliefs about pain management reported better pain outcomes, suggesting that enhancing self-efficacy could be a crucial element in effective pain management strategies.

Social Influences were profoundly noted, especially in how family dynamics and healthcare interactions affect pain perception. The social stigma associated with pain, as described by the participants, echoes the sentiments found in the study by Rostami *et al*, where participants with fibromyalgia felt misunderstood by their social circles and healthcare providers (12). This misunderstanding can lead to inadequate treatment and social isolation, which negatively impacts pain management and emotional well-being.

Physical Experience of pain, including sensory details and activity levels, was another critical theme. These findings are consistent with the observations of Hooshmandi *et al*, who found that interoceptive awareness significantly influences pain catastrophizing (10). Understanding the physical sensations associated with pain can help in developing targeted interventions that address specific aspects of pain such as intensity, duration, and location.

The need to address both psychological and physical dimensions of pain is further underscored by the research of Boecking *et al* and Boecking *et al*, who demonstrated that treating psychological factors such as depressive symptoms and emotional tension can significantly improve the distress and pain perceptions in patients with chronic conditions like tinnitus (16,17).

The present study extends these findings by providing direct insights from patients, which highlights the importance of incorporating patient-centered care that acknowledges and integrates these various psychological factors into chronic pain management strategies. As suggested by Agarwal, the inclusion of ethnomedicine and patient-centered care approaches can be particularly beneficial in managing chronic pain by taking into account the cultural and individual variability in pain perception and management (18).

This study is not without limitations. The data were derived from a relatively small sample size, confined to participants from Richmond Hill, Ontario, which may not represent the broader population experiencing chronic pain. The qualitative nature of the study, while in-depth, limits the generalizability of the findings. Additionally, the reliance on self-reported data might introduce bias in the participants' accounts of their pain experiences.

Future research should aim to include a more extensive and diverse demographic to enhance the generalizability of the findings. Quantitative studies could also be conducted to measure the prevalence and impact of the psychological factors identified, providing a broader statistical context to the qualitative insights gained. Longitudinal studies could help in understanding how psychological factors influencing pain perception evolve over time, especially in response to interventions.

The insights from this study have significant implications for clinical practice. Healthcare professionals should consider incorporating assessments of psychological well-being and social context into routine evaluations of patients with chronic pain. Training in communication skills for better patient engagement and the integration of interdisciplinary approaches involving psychologists, physiotherapists, and social workers could enhance the effectiveness of pain management strategies. Additionally, promoting patient education about the psychological aspects of pain could empower patients, fostering a more proactive approach to managing their condition. Furthermore, social influences such as family dynamics and healthcare interactions highlight the need for a more comprehensive, interdisciplinary approach to pain management. Incorporating family counselling and improving patient-provider communication can enhance treatment outcomes by addressing the broader social context in which pain is experienced. Training healthcare providers to better understand the psychological and social dimensions of pain may reduce instances of social stigma and improve patient satisfaction with care, as the participants expressed frustration with being misunderstood by their healthcare providers. Additionally, physical experiences, particularly the variability in pain intensity and its impact on daily functioning, suggest that individualized pain management plans are crucial. Pain is not a one-size-fits-all condition, and treatment protocols should be tailored to the specific physical and psychological needs of each patient. This could involve a combination of pharmacological treatment, physical therapy, and psychological support, coordinated by an interdisciplinary team of specialists. In terms of cognitive perceptions, this research highlights the importance of self-efficacy and beliefs about pain in shaping pain experiences. Theoretical frameworks on self-regulation and pain catastrophizing may benefit from incorporating these findings, as they emphasize the role of individual cognitive control in managing pain. Future theoretical developments should explore the integration of self-efficacy theory with pain management strategies to better understand how enhancing personal control can improve pain outcomes. Moreover, this study adds to the discourse on social pain theory, suggesting that the social context, including family dynamics and healthcare interactions, plays a critical role in pain perception. Theories that emphasize the influence of social interactions on health outcomes could be extended to account for the psychological toll of chronic pain within familial and healthcare settings. By integrating these social dimensions into existing models, researchers and clinicians may develop more comprehensive theories that explain the variability in pain experiences across different social and cultural contexts. In conclusion, this study not only provides practical recommendations for healthcare providers but also extends existing theoretical frameworks by emphasizing the need for a holistic, biopsychosocial approach to pain management.

Conclusion

This study explored the psychological factors influencing pain intensity perception, revealing four primary themes: Emotional Responses, Cognitive Perceptions, Social Influences, and Physical Experience. The participants described various emotional responses, including anxiety, depression, and diverse coping mechanisms that significantly affect their pain perception. Cognitive factors, such as beliefs about pain and personal control, highlighted the importance of mindset and self-efficacy in managing pain. Social influences, including family dynamics and healthcare interactions, emerged as critical in shaping individuals' experiences and perceptions of pain. Lastly, physical experiences, detailed through sensory descriptions and activity limitations, provided insight into the direct impact of pain on daily functioning.

The findings from this study underscore the multifaceted nature of pain, emphasizing that pain perception is not only a physical experience but also deeply intertwined with psychological and social dimensions. By acknowledging and addressing these dimensions, healthcare providers can better support individuals in managing their pain. This study contributes to a broader understanding of how diverse factors influence pain perception, reinforcing the necessity for a holistic approach in chronic pain management.

Declarations

In order to correct and improve the academic writing of the paper, the language model ChatGPT was used.

Ethics considerations

This research was conducted in accordance with the ethical guidelines and approval provided by the KMAN Research Institute, under the ethics code KEC.2023.10B3. Prior to the commencement of the study, all the participants were informed about the research objectives, the confidentiality of their responses, and their right to withdraw from the study at any point. Written informed consent was obtained from all the participants. Measures were taken to ensure the anonymity of the participants, and personal identifiers were removed or altered in the transcription process.

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Conflict of Interest

There was no conflict of interest in this manuscript.

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