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The role of catastrophizing, depression and anxiety in chronic pain: a cross-sectional pilot study

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Abstract. ***Background.*** *The accumulated evidence underscores the possible pivotal role of psychological and/or psychiatric factors in shaping the landscape of chronic pain. Understanding and addressing these mental dimensions are paramount in advancing holistic approaches to chronic pain management and enhancing patient well-being.* ***Materials and methods.*** *This is a pilot cross-sectional observational study to investigate the role of psychological and/or psychiatric factors such as depression, anxiety and catastrophizing in the structure of chronic pain. Demographic variables, pain-related data like pain disorder duration, pain intensity, diagnosis that provokes pain, number of body parts that provoke pain were collected. Comorbidities, traumatic brain injury history, traumatic events in childhood and post-traumatic stress disorder in present, physical activity, sleep disorder have also been assessed. The Visual Analog Scale, Pain Catastrophizing Scale, Hospital Anxiety and Depression Scale were used as part of psychodiagnostic assessment.* ***Results.*** *Our findings revealed a significant association between mood disturbances/disorders such as depression, anxiety and pain catastrophizing, and their influence on the course of pain disorders. Additionally, physical inactivity was associated with higher levels of pain catastrophizing, highlighting the importance of addressing lifestyle factors in chronic pain management.* ***Conclusions.*** *Mood disturbances, combined with catastrophizing, may significantly impact pain disorders. These findings underscore the importance of incorporating psychological and/or psychiatric assessments and interventions into chronic pain management strategies to optimize patient outcomes and enhance overall well-being. A holistic approach that considers the interplay between mental, physiological, and lifestyle factors is essential for effective chronic pain management.*

Keywords: *catastrophizing; depression; anxiety; chronic pain*

Introduction

Chronic pain represents a pervasive global health concern affecting over 30 % of the population [1]. Its prevalence underscores its significance as a leading medical challenge, imposing substantial burdens on both healthcare systems and societal well-being [2]. The consequences of chronic pain extend beyond physical discomfort to include a wide range of negative personal and social consequences such as functional impairment, mental effects, disability, and increased risks of suicide and death [3, 4].

In the diagnostic landscape, the recent revision of the International Classification of Diseases (ICD-11) distinguishes between chronic primary and chronic secondary pain [5]. Chronic primary pain, characterized by its persistence for over three months, presents a distinct clinical entity despite the absence of a clear etiology or pathophysiological understanding. Conversely, chronic secondary pain stems from underlying primary diseases. This updated taxonomy underscores the complexity and heterogeneity inherent in chronic pain conditions.

Contemporary medical perspectives acknowledge pain as a multifaceted phenomenon, necessitating a holistic approach encapsulated in the biopsychosocial model. By adopting this framework, clinicians can comprehensively assess the interplay of biological, psychological, and social factors in pain pathogenesis, thereby optimizing therapeutic interventions and mitigating negative sequelae [6].

Recognized as a multifaceted phenomenon, contemporary medicine views pain through the lens of the biopsychosocial model, acknowledging the interplay of biological,

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psychological and/or psychiatric, and social factors in its manifestation and progression. Within this framework, psychological elements emerge as increasingly prominent contributors to the experience and trajectory of pain disorders, as well as the overall well-being of individuals grappling with chronic pain [7, 8].

However, despite mounting evidence underscoring the significance of psychological and/or psychiatric factors, including depression, anxiety, and catastrophic thoughts, their full import often eludes both patients and healthcare practitioners [7]. Our understanding of their intricate role in shaping pain perception, treatment outcomes, and long-term prognosis remains incomplete, necessitating further exploration.

In our study, we directed our attention to several psychological and/or psychiatric factors, notably depression, anxiety, and catastrophizing, hypothesizing their pivotal influence on pain experiences and associated outcomes. Notably, patients grappling with concurrent depression and catastrophizing tendencies may exhibit heightened susceptibility to negative pain-related phenomena, potentially exacerbating their distress and compromising treatment efficacy [9, 10].

Moreover, studies have illuminated the intricate links between depression, social isolation, and the exacerbation of chronic pain [11]. While pain catastrophizing appears to mediate this relationship, its impact on depression may be further compounded by factors such as poor sleep quality [12]. Importantly, the severity of chronic pain appears to correlate with the intensity of catastrophic thinking, with distinct associations observed between different facets of psychological distress [13–15].

Furthermore, the intricate interplay between depression, anxiety, and pain catastrophizing underscores the need for a nuanced understanding of their contributions to chronic pain experiences [16]. Notably, these psychological factors exhibit varying degrees of predictive power, with anxiety emerging as a potent predictor of catastrophic pain and depression [17].

In summary, the accumulating evidence underscores the possible pivotal role of psychological and/or psychiatric factors in shaping the landscape of chronic pain. From depression and anxiety to catastrophic ideation, these variables wield significant influence over pain experiences and treatment outcomes. Understanding and addressing these psychological dimensions are paramount in advancing holistic approaches to chronic pain management and enhancing patient well-being. Thus, our study seeks to contribute to this burgeoning field by elucidating the intricate interplay of psychological and/or psychiatric factors in chronic pain experiences.

The purpose of the study was to investigate the role of psychological and/or psychiatric factors such as catastrophizing (catastrophic thoughts) and negative emotions (anxiety and depression) in the structure of chronic pain in the Ukrainian population.

Materials and methods

Study population. This was a pilot cross-sectional observational study. Due to its exploratory design, a non-representative subset of patients was diagnosed to assess trends and prospects for further research on this topic. The first 40 consecutive patients with chronic pain who were accepted to participate in the study were included.

The study included outpatients over the age of 18 years with chronic primary and secondary pain with a duration of pain disorder of more than 3 months, confirmed by ICD-11 (current version in Ukraine at the time of the study). Patients were recruited at the Department of Medical Psychology, Psychosomatic Medicine and Psychotherapy of the Bogomolets National Medical University from December 2023 to March 2024.

The Department of Medical Psychology, Psychosomatic Medicine, and Psychotherapy is a leading department at the Bogomolets National Medical University, which implements and applies a multidisciplinary psychosomatic approach to the treatment of patients with chronic pain. The authors are mostly psychiatrists who work in multidisciplinary teams with general practitioners. In turn, general practitioners refer patients with chronic pain of various etiologies for treatment within the biopsychosocial model. The provision of psychological and psychiatric care at the Department of Medical Psychology, Psychosomatic Medicine, and Psychotherapy is part of a comprehensive treatment plan, alongside other treatment methods.

Inclusion criteria: 1. Age from 18 to 70 years. 2. The presence of a chronic pain that lasts more than three months. 3. Written informed consent to participate in the study.

Exclusion criteria: 1. Severe uncontrolled chronic non-communicable diseases. 2. Presence of severe cognitive impairment (< 20 points on the Mini-Mental State Examination). 3. Established, suspected, or planned pregnancy at the time of the screening assessment. 4. Lactation. 5. Surgery planned at the time of the screening assessment. 6. Severe or total disability.

Informed consent was received from all the patients. All the study methods were in line with the Declaration of Helsinki. All data were recorded anonymously.

Data collection. Participants' gender, age, education level, marital, financial, working status, living area (city or countryside) were collected as a part of the demographic data. Such pain-related data as pain disorder duration, pain intensity, diagnosis that provokes pain, number of body parts that provoke pain were collected.

Comorbidities, traumatic brain injury (TBI) history, traumatic events in childhood and post-traumatic stress disorder (PTSD) in present, physical activity, sleep disturbances have also been assessed. During the initial interview, we asked patients about history of TBI, traumatic events in childhood, and the presence of current PTSD symptoms.

Diagnosis of PTSD, childhood trauma history and sleep disturbances were assessed by a psychiatrist using ICD-11, and history of TBI was assessed by a neurologist. Additionally, we verified data with medical records. The patients did not have specific sleep disorders but had insomnia, which was managed by providing recommendations on sleep hygiene or by prescribing medications such as pregabalin, trazodone, or quetiapine.

We also asked about current physical activity limitations due to pain during the initial interview.

Psychological assessment. The following scales were used:

— the Visual Analog Scale (VAS) served as the primary instrument for the subjective evaluation of pain intensity among study participants. The VAS is a well-established tool widely utilized in clinical and research settings for its simplicity and effectiveness in quantifying pain perception. Participants were presented with a horizontal line, anchored by verbal descriptors at each end representing the extremes of pain intensity such as "no pain" and "worst pain imaginable". They were instructed to mark on the line the point from 0 to 10 that best corresponded to their current level of pain intensity [18]. The use of the VAS allowed for the quantification of pain intensity in a continuous manner, capturing nuances and variations in pain perception that may not be fully captured by categorical rating scales. In the analysis phase, the VAS scores were treated as continuous variables, allowing for statistical comparisons and correlations with other study variables such as psychological factors and demographic characteristics [19];

— the Pain Catastrophizing Scale (PCS) was used to study catastrophizing thoughts in patients with chronic pain [20]. The PCS is a 13-item self-report questionnaire to assess the presence of catastrophizing thoughts in patients with pain, which assesses 3 indicators: rumination, magnification, and helplessness. Patients independently answer questions that are evaluated on a 5-point Likert scale ranging from 0 to 5, where 0 is no catastrophizing and 5 is the maximum level of catastrophizing. There are 4 statements (0–16 points) for rumination, 3 statements (0–12 points) for magnification, and 6 statements (0–24 points) for helplessness. A total score is the sum of the scores for the individual items, and ranges from 0 to 52;

— the Hospital Anxiety and Depression Scale (HADS) was used to screen for depression and anxiety. It contains 14 statements, which are divided into 2 subscales: subscale A — "Anxiety" (odd items 1, 3, 5, 7, 9, 11, 13) and subscale D — "Depression" (even items 2, 4, 6, 8, 10, 12, 14). Each statement corresponds to 4 answer options that reflect the gradation of the symptom severity from 0 points (absence) to 3 (maximum severity). When interpreting the data, the total score for each subscale (A and D) is considered. Three areas of clinical values are distinguished: 0–7 points — normal; 8–10 points — subclinical anxiety/depression; 11 points and above — clinically expressed anxiety/depression [21].

Statistical analysis. The Shapiro-Wilk test was used to assess the distribution of numeric variables. Descriptive statistics are presented as mean and standard deviation (SD) for data with normal distribution, median with 1st and 3rd quartiles — for data with non-normal distribution. An independent samples t-test was used to assess the differences between the groups in numeric variables (Mann-Whitney U-test in case of a non-normal distribution in at least one of the groups). A chi-squared test was used to assess the differences in categorical variables. The p-value less than

Table 1. Demographic descriptive statistics, n (%)

Parameters	Full sample (n = 40)	Females (n = 26)	Males (n = 14)	t/χ^2	p
Age (years), mean ± SD	38.15 ± 12.48	37.08 ± 14.02	40.14 ± 9.09	0.737	0.466
Education					
Higher education	32 (80)	20 (76.92)	12 (85.71)	0.061	0.804
General secondary education	8 (20)	6 (23.08)	2 (14.29)		
Marital status					
Married	25 (62.5)	18 (69.23)	7 (50)	7.485	0.024
Divorced	8 (20)	6 (23.08)	6 (42.86)		
Single	7 (17.5)	2 (7.69)	1 (7.14)		
Financial status					
Satisfied	22 (55)	12 (46.15)	10 (71.43)	3.11	0.211
Not satisfied	16 (40)	13 (50)	3 (21.43)		
Very not satisfied	2 (5)	1 (3.85)	1 (7.14)		
Living area					
City	29 (72.5)	18 (69.23)	11 (78.57)	0.068	0.795
Countryside	11 (27.5)	8 (30.77)	3 (21.43)		
Employment status					
Employed	25 (62.5)	19 (73.08)	6 (42.86)	19.96	< 0.001
Military serviceman	8 (20)	0 (0)	8 (57.14)		
Unemployed	7 (17.5)	7 (26.92)	0 (0)		

Notes: t — t-test statistic; χ^2 — chi-square test statistic.

0.05 was considered statistically significant. Pearson's correlation test was used to assess the relationship between the numeric variables.

Data was stored in Microsoft Excel 365, and Python programming language was used for data analysis and visualization.

Results

The study included a total of 40 patients with chronic pain with a mean age of 38.15 ± 12.48 years: there were 26 females with a mean age of 37.08 ± 14.02 years and 14 males with a mean age of 40.14 ± 9.09 years. A statistically significant differences between females and males were in marital status (males were more commonly divorced), and employment status (males were more commonly military servicemen). No statistically significant differences were found in age, education, financial status, or living area (Table 1).

Most of the patients had an abnormal anxiety level, borderline depression level and quite a high PCS total score. Additionally, most of the patients had a sleep disorder, low physical activity. An interesting finding was quite high prevalence of childhood trauma history and PTSD.

A statistically significant differences were found between males and females in physical activity (males were more active than females in their daily routine) and depression level (measured by HADS). There were no statistically significant differences between females and males in anxiety level, PCS total score and subscores (rumination, magnification, helplessness), and prevalence of diagnosed sleep disorder, PTSD, or childhood trauma history (Table 2).

On average, patients marked their pain's intensity as moderate, and pain disorder lasting more than 7 years. Most of the patients noted that the current pain episode duration is more than 3 months. Although no statistically significant differences were found between females and males on the prevalence of chronic pain diagnosis (mostly due to the small sample sizes), for women most common diagnosis was migraine, while for men migraine and spinal hernias had the same prevalence. No statistically significant differences between males and females were found in the pain intensity and duration, as well as in the number of body parts that provoke pain (Table 3).

Table 2. Mental health characteristics by gender

Parameters	Full sample (n = 40)	Females (n = 26)	Males (n = 14)	t/χ^2	p
HADS-A	11.50 ± 3.28	11.69 ± 3.39	11.14 ± 3.16	–0.500	0.619
Normal	5 (12.5)	3 (11.54)	2 (14.29)		
Borderline	9 (22.5)	6 (23.08)	3 (21.43)	0.068	0.967
Abnormal	26 (65)	17 (65.38)	9 (64.29)		
HADS-D	9.52 ± 4.69	11.00 ± 4.59	6.79 ± 3.62	–2.97	0.005
Normal	15 (37.5)	7 (26.92)	8 (57.14)		
Borderline	11 (27.5)	8 (30.77)	3 (21.43)	3.638	0.162
Abnormal	14 (35)	11 (42.31)	3 (21.43)		
PCS					
Total score	20.35 ± 10.02	21.31 ± 10.34	18.57 ± 9.50	–0.821	0.417
Rumination	7.52 ± 4.04	8.12 ± 3.95	6.43 ± 4.11	–1.269	0.211
Magnification	5.70 ± 2.59	5.54 ± 2.69	6.00 ± 2.48	0.532	0.597
Helplessness	7.12 ± 4.48	7.69 ± 4.84	6.14 ± 3.68	–1.018	0.315
Sleep disorder					
No	6 (15)	4 (15.38)	2 (14.29)	~ 0	~ 1
Yes	34 (85)	22 (84.62)	12 (85.71)		
Constant physical activity					
No	33 (82.5)	26 (100)	7 (50)	12.485	< 0.001
Yes	7 (17.5)	0 (0)	7 (50)		
Childhood psychological trauma history					
No	27 (67.5)	15 (57.69)	12 (85.71)	2.105	0.147
Yes	13 (32.5)	11 (42.31)	2 (14.29)		
PTSD diagnosis					
No	34 (85)	20 (76.92)	14 (100)	2.206	0.137
Yes	6 (15)	6 (23.08)	0 (0)		

Note: data are given as mean ± SD and n (%).

A statistically significant difference between females and males was found in the prevalence of comorbid diseases and TBI history. Females more frequently than males had at least 1 comorbid disease, most often a chronic pharyngitis, diabetes, and aortic valve insufficiency. Males more commonly had post-traumatic neuropathy, hernia as a comorbid disease, and prostatitis. Also, males most often had a TBI history present (Table 4).

When examining the relationship between various psychological and/or psychiatric factors and pain management, we conducted Pearson correlation tests with VAS scores serving as a proxy for pain intensity, and several potential influencing variables.

The Pearson correlation coefficient revealed a weak negative association with VAS scores ($r = –0.112$, $p = 0.491$), indicating that age is not significantly correlated with pain intensity. The correlation between pain disorder duration and VAS scores was negligible and non-significant ($r = 0.001$, $p = 0.993$), suggesting that the time since diagnosis was made does not influence pain perception. There was a moderate positive correlation between HADS-A and VAS scores, though it did not reach statistical significance ($r = 0.275$, $p = 0.086$), indicating that overall anxiety levels may have a slight influence on pain intensity. Similarly, HADS-D scores exhibited a moderate positive correlation with VAS, but the relationship was not statistically significant ($r = 0.299$, $p = 0.060$), suggesting that depression levels may have a modest impact on pain perception.

PCS total scores demonstrated a moderate positive correlation with VAS scores ($r = 0.464$, $p = 0.003$), indicating that higher levels of pain catastrophizing are associated with increased pain intensity. Likewise, PCS rumination scores displayed a robust positive correlation with VAS ($r = 0.457$, $p = 0.003$), indicating that individuals who engage in rumination about pain experience had higher pain intensity. PCS magnification scores exhibited a moderate positive correlation with VAS ($r = 0.317$, $p = 0.046$), suggesting that magnification of pain sensations contributes to heightened pain perception. PCS helplessness scores showed a strong positive correlation with VAS ($r = 0.443$, $p = 0.004$), indicating that feelings of helplessness in coping with pain are associated with increased pain intensity.

Overall, these results underscore the significance of psychological and/or psychiatric factors, particularly pain catastrophizing components, in influencing pain perception and management.

Additionally, to assess the complexity of relationships between emotions and pain-related cognitions, a correlation analysis of age, HADS and PCS scores were done.

There was a moderate negative significant correlation between age and PCS total score ($r = –0.413$, $p = 0.008$), rumination ($r = –0345$, $p = 0.029$), magnification ($r = –0.485$, $p = 0.002$), and helplessness score ($r = –0.332$, $r = 0.036$). A moderate positive significant correlation was found between HADS-A score and PCS total score ($r = 0.5$, $p = 0.001$), rumination ($r = 0.4$, $p = 0.011$), magnification ($r = 0.455$, $p = 0.003$), helplessness score ($r = 0.495$, $p = 0.001$). There was a weak-to-moderate significant relationship between HADS-D score and PCS total score ($r = 0.321$, $r = 0.044$), and helplessness score ($r = 0.326$, $p = 0.039$).

No significant relationship was found between HADS-D and PCS rumination ($r = 0.248$, $p = 0.123$), and magnification scores ($r = 0.289$, $p = 0.070$).

Additionally, differences in pain intensity and catastrophizing were assessed with Mann-Whitney tests between the groups with different physical activity, history

Table 3. Pain disorder characteristics by gender

Parameters	Full sample (n = 40)	Females (n = 26)	Males (n = 14)	t/χ^2	p
VAS (points), mean ± SD	5.88 ± 1.64	6.08 ± 1.72	5.50 ± 1.45	–1.066	0.293
Pain disorder duration (years), mean ± SD	7.60 ± 5.58	7.38 ± 6.18	8.00 ± 4.42	0.429	0.744
Current pain duration, n (%)					
More than 3 months	40 (100)	26 (100)	14 (100)		
Number of body parts that provoke pain, n (%)					
One	20 (50)	14 (53.85)	6 (42.86)	0.759	0.684
Two	11 (27.5)	6 (23.08)	3 (21.43)		
More than two	9 (22.5)	6 (23.08)	5 (35.71)		
Chronic pain diagnosis, n (%)					
Migraine	18 (45)	14 (53.85)	4 (28.57)	7.277	0.296
Hernia	6 (15)	2 (7.69)	4 (28.57)		
Osteoarthrosis	5 (12.5)	2 (7.69)	3 (21.43)		
Unknown	5 (12.5)	4 (15.38)	1 (7.14)		
Spinal osteochondrosis	4 (10)	2 (7.69)	2 (14.29)		
Rheumatoid arthritis	1 (2.5)	1 (3.85)	0 (0)		
Pancreatitis	1 (2.5)	1 (3.85)	0 (0)		

Table 4. Comorbid diseases and TBI history by gender, n (%)

Parameters	Full sample (n = 40)	Females (n = 26)	Males (n = 14)	t/χ^2	p
Comorbid diseases					
None	12 (30)	6 (23.08)	6 (42.86)	24.616	0.010
Post-traumatic neuropathy	2 (5)	0 (0)	2 (14.29)		
Lumbar hernia	2 (5)	0 (0)	2 (14.29)		
Prostatitis	2 (5)	0 (0)	2 (14.29)		
Polyarthritis	1 (2.5)	0 (0)	1 (7.14)		
Hypertension	2 (5)	1 (3.85)	1 (7.14)		
Chronic pharyngitis	2 (5)	6 (23.08)	0 (0)		
Diabetes	4 (10)	4 (15.38)	0 (0)		
Aortic valve insufficiency	4 (10)	4 (15.38)	0 (0)		
Hypothyroidism	2 (5)	2 (7.69)	0 (0)		
Gastritis	2 (5)	2 (7.69)	0 (0)		
Endometriosis	1 (2.5)	1 (3.85)	0 (0)		
TBI history					
No	34 (85)	25 (96.14)	9 (64.29)	4.964	0.026
Yes	6 (15)	1 (3.85)	5 (35.71)		

Table 5. Differences in VAS and PCS scores based on physical activity, childhood trauma history, diagnosed PTSD and TBI (medians with 25th and 75th percentiles)

Parameters	VAS	PCS			
		Total score	Rumination	Magnification	Helplessness
Constant physical activity					
No	7 (5–7)	23 (15–29)	10 (6–10)	6 (5–8)	9 (6–10)
Yes	5 (4–7)	8 (8–20)	3 (3–7)	4 (4–6)	1 (1–7)
Mann-Whitney's W	142.5	173	185.5	152.5	179.5
Mann-Whitney's p	0.326	0.042	0.012	0.182	0.022
Childhood psychological trauma history					
No	7 (5–7)	23 (19–26)	10 (6–10)	6 (4–6)	9 (7–10)
Yes	6 (4–7)	15 (15–29)	8 (4–11)	6 (6–9)	6 (1–9)
Mann-Whitney's W	207.5	203	181.5	135	230.5
Mann-Whitney's p	0.344	0.433	0.872	0.235	0.111
PTSD diagnosis					
No	6 (6–7)	20 (15–26)	8 (3.75–10)	6 (5–7.5)	7.5 (2–10)
Yes	7 (7–7.75)	26 (23–29)	10.5 (10–11)	6 (3–9)	9 (9–9.75)
Mann-Whitney's W	61.5	73.5	54	95.5	77
Mann-Whitney's p	0.115	0.287	0.068	0.815	0.347
TBI history					
No	7 (5–7)	20.5 (15–26)	8 (6–10)	6 (4.25–7.5)	8 (2–10)
Yes	5.5 (5–6.76)	26 (12.5–30.5)	9 (4.25–13)	7 (4.5–8.75)	9 (3–9.75)
Mann-Whitney's W	123	84	85	80	104
Mann-Whitney's p	0.419	0.505	0.526	0.403	0.954

of childhood trauma, PTSD and TBI. Patients who were less physically active have shown statistically significantly higher PCS total scores, mostly due to high scores in rumination and helplessness subscales. No statistically significant differences were found between people with different childhood trauma history (although there was a trend in those with a history of trauma to have lower catastrophizing scores), PTSD presence/absence (here, as well, patients with PTSD tended to have higher catastrophizing scores). However, there were no statistically significant differences between patients with and without TBI; those with a history of head trauma tended to have a lower VAS score, yet higher PCS scores (Table 5).

These findings highlight the complex interplay between physical activity, psychological and/or psychiatric factors, and pain perception. Physical inactivity was consistently linked to higher levels of pain catastrophizing, which could inform interventions aimed at reducing pain-related distress.

Discussion

Chronic pain is a multifaceted condition influenced by a myriad of factors, including demographic, psychological and/or psychiatric, and physiological variables [22]. The present study aimed to elucidate some of these complexities by examining the relationship between various demographic characteristics, psychological factors, and pain perception among patients with chronic pain.

Psychological and/or psychiatric factors such as anxiety, depression, and pain catastrophizing play crucial roles in shaping individuals' experiences of pain. Our study found high levels of anxiety and depression among patients with chronic pain, consistent with previous research reporting the high prevalence of psychiatric comorbidities in this population [23]. Moreover, pain catastrophizing, characterized by rumination, magnification, and helplessness, emerged as a significant predictor of pain intensity. Patients who engaged in higher levels of catastrophizing reported greater pain intensity, emphasizing the detrimental impact of maladaptive coping strategies on pain perception. A meta-analysis, conducted by Rogers et al., revealed that pain catastrophizing and fear of pain are positively and moderately associated with psychological and/or psychiatric outcomes like anxiety and depression [24].

The correlation analysis revealed complex relationships between various psychological and/or psychiatric factors and pain perception. While age and pain disorder duration did not significantly correlate with pain intensity, anxiety, depression, and pain catastrophizing demonstrated moderate to strong positive correlations with pain intensity. This suggests that mental distress, particularly feelings of helplessness and rumination, may exacerbate pain perception, highlighting the need for targeted interventions to address these factors in chronic pain management.

Our findings revealed several demographic differences between male and female patients, particularly in marital and employment status. Male patients were more likely to be divorced and to be military servicemen, reflecting potential differences in stressors and lifestyle factors that could influence pain perception. However, no significant differences were observed in pain intensity or duration between males and females, suggesting that these demographic variables may not directly impact pain perception. Such findings somehow oppose the studies that argue about the gender difference in pain perception [25]. Yet, we observed a trend (although, statistically not significant) for females to have higher PCS scores, indicating higher pain catastrophizing in women. This underscores the importance of considering psychological and/or psychiatric and physiological factors in addition to demographic characteristics when assessing chronic pain.

Our study also examined the influence of physical activity and trauma history on pain perception. Physical inactivity emerged as a significant predictor of pain catastrophizing, with less active patients exhibiting higher levels of catastrophizing thoughts. This underscores the importance of promoting physical activity as part of multidisciplinary pain management strategies to alleviate distress associated with chronic pain. Additionally, while no significant differences were found in pain perception based on childhood trauma history or PTSD diagnosis, patients with TBI tended to have lower pain intensity but higher pain catastrophizing scores. Some studies reveal that chronic pain affects approximately 60 % of those living with TBI, therefore this suggests that individuals with a history of TBI may experience unique challenges in coping with pain [26]. Further investigation into tailored interventions for this population is needed. Childhood psychological trauma history and pain are still an object of debates and require further investigation [27].

Depression, anxiety, and catastrophizing can be markers of negative prognosis for patients suffering from chronic pain. The combination of these factors can interfere with progress in the treatment of inflammatory processes (persistently high titers of reactive proteins), postoperative recovery (longer postoperative rehabilitation period), and general impairment and disability. Psychological factors are potentially modifiable, so with effective timely interventions, we can influence the patient's perception of chronic pain, change functionality, enhance daily activities, and generally improve the quality of life.

Further study of negative factors such as depression, anxiety, and catastrophizing will help find new mechanisms of effective personalized pain relief for patients with chronic pain.

Limitations

The exploratory nature of this pilot cross-sectional observational study inherently involves several limitations. First, the use of a non-representative subset of the first 40 consecutive patients with chronic pain who agreed to participate could introduce selection bias. This sampling method limits the generalizability of the findings as it may not accurately reflect the broader population of individuals with chronic pain. Moreover, because the study was conducted in a single location, the Department of Medical Psychology, Psychosomatic Medicine and Psychotherapy of the Bogomolets National Medical University, the results may not be applicable to different settings or regions, potentially affecting the external validity of the study.

As a cross-sectional study, the data represents a single moment in time. This design restricts the ability to infer causality between psychological factors, pain intensity, and other variables.

While the VAS and the HADS are well-established tools, they rely on subjective self-reporting, which can introduce reporting bias. Participants' self-reported measures might be influenced by current mood, memory recall, and desire to conform to perceived expectations. Additionally, the VAS measures pain intensity at a specific moment, which might not accurately reflect overall or average pain experiences, especially in conditions where pain fluctuates significantly over time.

The exclusion of patients with severe uncontrolled chronic diseases, cognitive impairments, and certain physiological conditions (such as pregnancy and lactation), although providing more homogeneity in a sample characteristics, may omit a segment of the chronic pain population that could experience distinct psychological impacts.

Overall, while the study provides valuable insights into the relationship between psychological factors and chronic pain, these limitations suggest that findings should be interpreted with caution. Future research should aim to address these limitations by employing longitudinal designs, larger and more diverse samples, and more comprehensive data analysis techniques to validate and expand upon the findings reported in this study.

Conclusions

In conclusion, our study sheds light on the intricate interplay between demographic, psychological and/or psychiatric, and physiological factors in shaping individuals' experiences of chronic pain. Psychological distress, particularly pain catastrophizing, emerged as significant predictor of pain intensity, highlighting the importance of addressing these factors in chronic pain management. Anxiety and depression may affect pain intensity not directly, but via exacerbation of pain catastrophizing. Moreover, physical activity and trauma history may also influence pain perception, underscoring the need for multidisciplinary approaches to pain management that consider the holistic well-being of patients. Future research should focus on elucidating the underlying mechanisms driving these relationships and developing targeted interventions to improve pain outcomes in individuals with chronic pain.

Informed consent. Informed consent was obtained from all the patients who participated in the study.

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Роль катастрофізації, депресії та тривоги в структурі хронічного болю: пілотне крос-секційне дослідження

Резюме. ***Актуальність.*** Накопичені докази підкреслюють можливу ключову роль психологічних та/або психіатричних факторів у формуванні структури хронічного болю. Розуміння й врахування цих психічних аспектів є важливим для вдосконалення цілісних підходів до лікування хронічного болю та покращення благополуччя пацієнтів. ***Матеріали та методи.*** Це пілотне крос-секційне обсерваційне дослідження з вивчення ролі психологічних та/або психіатричних факторів, як-от депресія, тривога й катастрофізація, у структурі хронічного болю. Було зібрано демографічні й клінічні показники: тривалість больового розладу, інтенсивність болю, діагноз, що провокує біль, кількість локалізацій болю. Також аналізували супутні захворювання, історію черепно-мозкових травм, травматичні події в дитинстві, наявність посттравматичного стресового розладу, фізичну активність і порушення сну. Як частина психодіагностичної оцінки використовували візуальну аналогову шкалу, шкалу катастрофізації болю, госпітальну шкалу тривоги та депресії. ***Результати.*** Виявлено значний зв'язок між розладами настрою, як-от депресія, тривога, і катастрофізацією болю, а також їхній вплив на перебіг больового розладу. Крім того, фізична неактивність була пов'язана з вищим рівнем катастрофізації болю, що підкреслює важливість врахування факторів способу життя в управлінні хронічним болем. ***Висновки.*** Розлади настрою в поєднанні з катастрофізацією можуть значно впливати на больові розлади. Ці результати підкреслюють важливість інтеграції психологічної та/або психіатричної оцінки й втручань у стратегії лікування хронічного болю для оптимізації результатів терапії та покращення загального благополуччя пацієнтів. Цілісний підхід, який враховує взаємодію психічних, фізіологічних аспектів і факторів способу життя, є ключовим в ефективному управлінні хронічним болем.

Ключові слова: катастрофізація; депресія; тривога; хронічний біль