CORRELATIONS BETWEEN PAIN INTENSITY, SEVERITY OF DEPRESSION, STATE AND TRAIT ANXIETY IN PATIENTS WITH CHRONIC PAIN AND DEPRESSION

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ABSTRACT

INTRODUCTION: Patients with chronic pain and depression are a specific group in which mental (depression and anxiety) and physical (pain) symptoms manifest together.

AIM: The aim of the present study is to investigate the correlations between the severity of depression, the anxiety (trait and state), and the intensity of pain in patients with chronic pain and depression.

MATERIALS AND METHODS: The study included 61 patients with chronic pain and depression. It was conducted in two stages with a three-month period between them. All participants received antidepressant treatment. The severity of depression was assessed with HAM-D-17, the level of state and trait anxiety—with Spielberger's STAI, and pain intensity—with VAS. A correlation analysis between the main indicators was carried out in both stages of the study.

RESULTS: The mean age of the sample was 55.61±10.91. Women comprised 91.8% of the sample and men—8.2%. A reduction of the mean values of the indicators in the second stage was reported, with the most pronounced being in the severity of depression from 16.15±5.87 to 13.36±6.96. The number of patients with high trait (80.33%) and high state anxiety (64%—first stage, 62.5%—second stage) was predominant. The correlation analysis at both stages of the study proved significant correlations between all indicators ($p<0.01$).

CONCLUSION: The patients with chronic pain and depression are a specific group that requires a complex clinical assessment of the associated indicators depression, anxiety, and pain intensity for their effective management.

Keywords: *chronic pain, state anxiety, depression, trait anxiety, pain intensity, correlation analysis*

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INTRODUCTION

Chronic pain is among the leading causes of disability worldwide (1) and it has a profoundly negative impact on all areas of an individual's life and society (2).

The phenomenon of pain is a consequence of a complex integration of sensory-discriminatory, affective-motivational and cognitive-evaluating processes (3). They are influenced by heterogeneous factors: biological, psychological, personal, cultur-

al, ethnic, and sociodemographic (2). The psychosocial factors have a more significant influence on pain persistence compared to the physiological processes (4). They are modifiable and can be managed towards improving the patients' prognosis and quality of life (5).

Depression and anxiety encompass the affective aspects of pain (6). Depression is a major psychological factor, which is involved in the process of persistence of chronic pain (7). The combination of chronic pain with a depressive episode is a common mental comorbidity that predicts future disability and poor quality of life (8). The severe depressive symptoms predict a worsening of pain and vice versa (9). Anxiety is more common in patients with chronic pain and depression than in those without depression (10). Even the mild symptoms of anxiety affect the course of the depressive episode and determine its more severe course (6). The combination of symptoms of anxiety and depression exacerbates the condition of patients with chronic pain more than when presenting independently (11). Thus, the patients with chronic pain need a complex assessment of their condition. Besides the physical characteristics of pain, the psychological factors such as symptoms of depression and anxiety should also be estimated. This determines the essential role of psychiatrists and psychologists in the multidisciplinary pain management programs (12).

Finding correlations between pain and the affective factors influencing the condition of patients with chronic pain and depression would contribute to their better clinical assessment and choice of tools to monitor them dynamically.

AIM

The aim of the study was to search for correlations between severity of depression, state and trait anxiety and pain intensity in patients with chronic pain and depression. Finding correlations between the studied indicators would be indicative of the fact that the proposed scales would be applicable for dynamic monitoring of affective and pain symptoms in patients with chronic pain and depression.

MATERIALS AND METHODS

A randomized study of 61 patients with chronic non-malignant pain of different origins and depression, hospitalized at St. Marina University Hospital, Varna, was carried out in a period of one year (from August 2019 to July 2020). The design of the study has been approved by the Ethics of Scientific Research Committee at Medical University of Varna. The study was phased in two stages. The second stage was carried out three months after the first.

The assessment of the mental state of the patients studied complied with the criteria of ICD-10 for depressive episode. Between the two stages of the study, all patients underwent antidepressant treatment. Using quantitative methods, the severity of depression, the degree of state and trait anxiety and the intensity of pain were assessed. All indicators, with the exception of trait anxiety, were assessed during both stages of the study. The latter was only investigated during the first stage of the study as it was considered a constant trait. The following scales were selected to assess the condition: 1) Hamilton Depression Rating Scale (HAM-D-17) for assessment of the severity of depression; 2) Spielberger's State and Trait Anxiety Inventory (STAI)—scale (S) for state anxiety (STAI—form Y1) and scale (T) for trait anxiety assessment (STAI—form Y2); and 3) Visual Analog Scale (VAS) for assessment of the intensity of pain.

To fulfil the tasks of the study a Pearson correlation analysis between the main indicator groups was carried out.

RESULTS

The study included 61 patients with chronic pain and depression at a minimum age of 24 years and a maximum of up to 76 years were studied. The mean age of the participants was 55.67 at a standard deviation of 10.91. The distribution by sex in the studied group was uneven. The proportion of women surveyed was predominant—91.8% (n=56) compared to that of men—8.2% (n=5).

The distribution of the sample by regularity of medical treatment of pain showed that 63.93% of the patients received medication only during pain and 36.07% received maintenance treatment.

The results of the distribution of the sample by conduction of an antidepressant treatment show that 73.78% (n=45) of them were on maintenance treatment, 18.03% (n=11) discontinued treatment for any given reason, and 8.19% (n=5) had never taken antidepressants. All patients received maintenance treat-

ment with antidepressants between the two stages of the study.

The distributions by frequency by the main scales used were close to normal.

The dynamics in the mean values of the indicators in the two stages of the study are shown in Table 1. A decrease in the mean values of all indicators in the second stage of the study was reported, i.e. the severity of depression, the degree of state anxiety and the intensity of pain decreased. Trait anxiety was only studied at the first stage of the study. The reduction in the mean value of the indicator severity of depression from 16.15±5.87 to 13.36±6.96 was the most pronounced one, as a result of antidepressant treatment between the two stages of the study (Table 1).

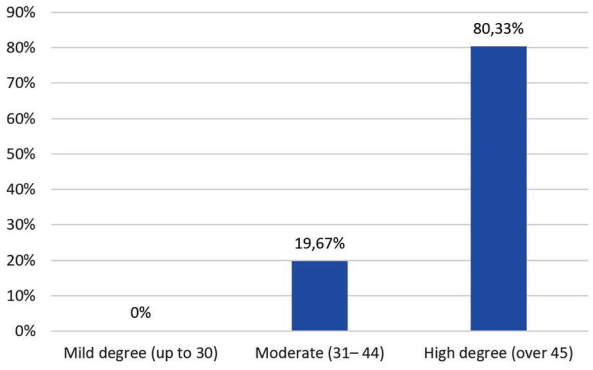

Fig. 2. Sampling distributions according to the trait anxiety degree

were with moderate trait anxiety—19.67% (Fig. 2). At the first stage of the study, 64% of the patients had high, 27.8% had moderate, and 8.2% had a mild degree of state anxiety.

Table 1. Dynamics of the mean values of the indicators in both stages of the study

Indicator	Depression Severity		Pain Intensity		State Anxiety		Trait Anxiety
Stage	Stage I	Stage II	Stage I	Stage II	Stage I	Stage II	Stage I
Mean	16.1475	13.3607	5.7705	5.2623	50.1475	49.2295	49.2295
Standard deviation	5.86753	6.95948	2.73492	2.58135	13.89944	16.03475	11.39356

An assessment of the severity of depression on the HAM-D-17 scale showed that at the first stage of the study, 54.2% of the patients had mild, 37.8% had moderate, and 8% had severe depression. At the second stage of the study, a decrease in the severity of depression in the sample was recorded: 62.4% had mild depression, 31.1% had moderate, and 6.5% had severe depression (Fig. 1).

The proportion of the patients with high trait anxiety was substantial—80.33%. The rest of them

The distribution of the sample with regard to the level of state anxiety at the first stage showed that 64% of the patients had high, 27.8% had moderate, and 8.2% had a mild degree of state anxiety. At the second stage, a decrease in the proportion of patients with high (62.5%) and mild (6.4%) degrees of state anxiety was recorded. This was at the expense of an

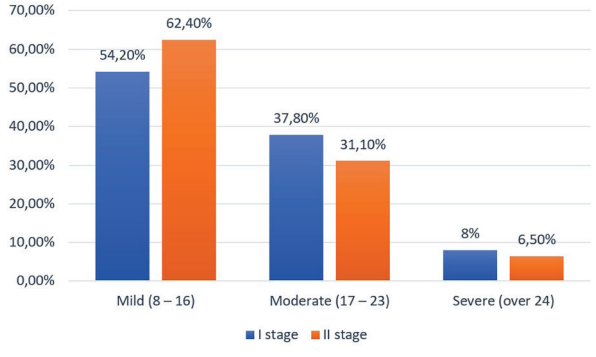

Fig. 1. Distribution of the sample according to the severity of the depression

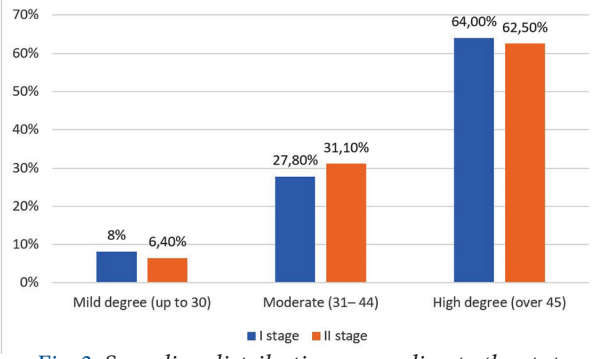

Fig. 3. Sampling distributions according to the state anxiety degree in both stages of the study

increase in the proportion of patients with moderate state anxiety (31.1%) (Fig. 3).

A correlation analysis of the indicators assessed in the two stages of the study was carried out. The results of the correlation analysis for the first stage of the study proved significant correlations between all values ($p<0.01$) (Table 2). By degree of significance, the correlations between the indicator pairs were ranked as follows:

- between severity of depression and pain intensity (highest)
- between state and trait anxiety
- between pain intensity and state anxiety
- between severity of depression and trait anxiety
- between severity of depression and state anxiety.

Table 2. Correlation analysis of the scales in the first stage of the study

Correlations	Pain Intensity	Depression Severity	State Anxiety	Trait Anxiety
Pain Intensity	1	.538**	.491**	.356**
Depression Severity	.538**	1	.405**	.416**
State Anxiety	.491**	.405**	1	.516**
Trait Anxiety	.356**	.416**	.516**	1

Note: Significant correlations are shown:
*** - significant at p<0.01; * - significant at p<0.05.*

There were again significant correlations between all values for the second stage of the study ($p<0.01$) (Table 3). The trait anxiety was not assessed at this stage. The ranking by degree of significance of the correlations between the indicators pairs was as follows:

- between severity of depression and state anxiety (highest)
- between severity of depression and pain intensity
- between pain intensity and state anxiety.

Table 3. Correlation analysis of the scales in the second stage of the study

Correlations	Pain Intensity	Depression Severity	State Anxiety
Pain Intensity	1	.612**	.588**
Depression Severity	.612**	1	.738**
State Anxiety	.588**	.738**	1

Note: Significant correlations are shown:
*** - significant at p<0.01; * - significant at p<0.05.*

DISCUSSION

The distribution by age in the sample with chronic pain and depression was uneven. Most of the patients were between the ages of 45 and 66. The prevalence of chronic pain is greatest among the adult population over the age of 40 (2,13). A research has proven that each year of age in patients with depression increases the risk of experiencing pain by 2% (14). Therefore, age is a risk factor not only for the manifestation of chronic pain, but also for its combination with depression.

The share of women (91.8%) predominated over the share of men (8.2%). Given that depressive disorder and chronic pain, isolated from each other, are more common among women, it could be assumed that women are the sex more vulnerable to their manifestation as a comorbidity (13,15). Women report more severe pain, higher number of pain conditions and depression compared to men (2,16).

More than half of the patients studied were on maintenance treatment with antidepressants—73.78%. The share of the patients who were on treatment with antidepressants in the past due to symptoms of depression was 18.03%. Patients with a new-found depressive episode were registered. The share of those patients who have never consulted a psychiatrist and have never received antidepressant treatment in the past was 8.19%. A study found that 35% of the surveyed patients with chronic pain had clinically manifested and unrecognized symptoms of depression (17). Other researchers found symptoms of depression in 60% of the studied patients with

chronic pain (11) and in 86% of patients with fibromyalgia (18). These data indicate the need of a systematic monitoring of the mental state, active search for symptoms of depression, and assessment of the effectiveness of the antidepressant therapy.

All subjects studied were evaluated for clinically manifested symptoms of depression according to the criteria for depressive episode of ICD-10. The mean value of severity of depression significantly decreased at the second stage—from 16.15 to 13.36. Therefore, an improvement in the severity of depression has been reported as a result of regular antidepressant maintenance treatment for a period of three months. These dynamics of the results in the group with depression were also observed in the distribution of patients according to the severity of depression. At the first stage of the study, the highest proportion of subjects was of those with mild depression—54.2%. The next largest proportion was of people with moderate depression—37.8%, and the lowest proportion—of those with severe depression (8%). At the second stage of the study, an improvement in the severity of depression was reported. The number of patients with mild depression (62.4%) increased, while the number of those with moderate depression (31.1%), as well as those with severe depression (6.5%) decreased. A study has proven correlations between severity of depression and degree of pain intensity i.e. the more severe the depression, the more intense the pain (19).

The study group was dominated by patients with moderate and high state anxiety. This trend remained at the second stage of the study as well. Therefore, symptoms of anxiety accompanied the depressive episode in the studied sample with chronic pain. Anxious mood, tension and general somatic symptoms are more common in patients with chronic pain and depression than in those without depression (10). The combination of symptoms of anxiety and depression worsened the condition of patients with chronic pain more than when presenting independently (11). Some authors considered state anxiety a prognostic factor for the manifestation of pain and the disability associated with it (20).

The studied sample with chronic pain and depression was characterized by a high mean value of trait anxiety (M=49.22). The predominant part of it (80.33%) had a high degree of trait anxiety. Some authors define trait anxiety as a nonspecific measure for the manifestation of negative affectivity (depressive and anxiety disorders) (21). Similar results were found in a study in which 86% of patients with fibromyalgia had symptoms of depression, and 50% had symptoms of anxiety. Scientists reported a high mean value of trait anxiety—59.38 for the entire group (20). Other authors found that the individuals with high trait anxiety reported significantly higher levels of anxiety and pain intensity compared to those with low trait anxiety. Their findings reveal an additive effect between state-trait anxiety and subjective pain intensity (22). These data underline the need for more evidence about the prognostic role of high trait anxiety in the manifestation of depression in patients with chronic pain.

The correlation analysis proved the presence of significant correlations between all indicators at both stages of the study: severity of depression, degree of state and trait anxiety and intensity of pain. The existence of correlations between the indicators does not demonstrate the existence of causal relationships between them. The correlation only shows that variations in one variable are accompanied by variations in the other variable (23). Similar results are represented by other authors. Positive correlations were found between the intensity of pain, the severity of depression, assessed with the Zung scale, and the state and trait anxiety in studying patients with rheumatoid arthritis (24). Other researchers calculated the correlations between mood, anxiety level, pain, and muscle tension for each patient with high degree of individual variability (25). Based on a bidimensional analysis model, a strong positive correlation between anxiety and depression was proven in a study with pain patients. Both indicators displayed significant positive correlations with pain severity (26).

The results of our analysis showed that the scales used for assessment: HAM-D-17, Spielberger's State and Trait Anxiety Inventory (STAI), and VAS were represented as a set for dynamic monitoring of the condition of patients with chronic pain and depression. The set of scales display susceptibility and correspond to a common pattern when examining patients with chronic pain and associated emotional (affective) symptomatology.

CONCLUSION

The patients with chronic pain and depression are a specific group that requires a complex clinical assessment of objective symptoms of pain and affective symptoms. Depression, anxiety and pain are modifiable factors, which could be managed through various therapeutic approaches. Therefore, the search for symptoms of depression and anxiety and their intervention are crucial in the management of chronic pain.

This study reveals perspectives for future research in two directions. The first is to prove the prognostic role of anxiety as a trait characteristic for the manifestation of depression in patients with chronic pain. The second is to study the influence of the indicator severity of depression on the intensity of pain and the degree of anxiety.

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