Associating Depression with Low Back Pain in the Population of Crete

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Abstract Low back pain is one of the most common reasons for seeking medical help in primary health care, as one of the most common conditions that cause chronic pain. There are several studies associating low back pain with depression, because of the general passive attitude of depressed people and the general psychological factors of depressed people which are involved in chronic low back pain and low back pain. Although studies have shown an association between low back pain and depression, little is known about the role of socio-demographic factors that may also play a role in this association. In particular, in Crete, with its particular socio-economic and environmental (climatic) characteristics, there is no relevant research on the relationship between back pain and depression. The aim of this study is to identify the association between low back pain and depression in patients of a large Greek region, the Region of Crete, in order to contribute to the entire Greek literature, but also to the overall effort to find solutions for patients back pain, who also have problems with depression. In order to achieve the purpose of this study, a quantitative survey was conducted. According to the results of the present study, it is concluded that the pain is more intense and affects more these patients suffering from low back pain, in contrast to the patients of the control group. In addition, severe and chronic low back pain affects both the depression and anxiety of these patients, who have more sleep problems than the control group, where there is no correlation.

Keywords: *low back pain, depression, anxiety, sleep problems, chronic pain*

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1. Introduction

Low back pain is one of the most common reasons for seeking medical help at the primary health care level. During a year, around 7% of the adult population in the UK seek medical help for low back pain [1]. Similarly, low back pain in Hong Kong is a common health problem [2], while in the US, 149 million working days per year have been reported as "lost" due to low back pain [1]. Similarly, in Greece according to the research data [3], 10% of the population has visited the Emergency Department or Orthopedic clinics and Physiotherapy departments of hospitals, at least once in a while, because of symptoms of low back pain. During the period 1986-87, it was estimated that the cost of laboratory examinations and tests in outpatients was greater than 5,000 dr. per case of low back pain without taking into account the operating costs of clinics [3]. This amount has typically increased over time. However, there are research data showing that about 12% of Greek population has been diagnosed with some form of low back pain [3].

Depression is the most common mental illness associated with chronic pain. Other mental illnesses associated with chronic pain include generalized anxiety disorder, post-traumatic stress disorder, and substance use [4]. There are many ways in which pain and depression can be associated with one or more factors in a single patient. First, the psychological and physical discomfort of persistent pain that interacts with individual and social vulnerability can accelerate the onset of a depressive episode [5]. Second, depression can be a precursor, and sometimes a contributor, to pain. Pain tolerance is reduced to major depression and dealing with physical discomfort can be a prominent symptom, especially in the elderly. It is worth noting that more than half of patients with depression, when seeking primary care, have pain as their main symptom [6,7].

According to several studies [8,9,10,11], depression is more common in patients with chronic pain. There is growing evidence that pain problems increase the risk of

depression [12]. More specifically, there are studies that highlight depression as a consequence of chronic pain problems, as well as studies that highlight depression as a cause and an important risk factor for the development of chronic pain, such as low back pain [13,14].

According to Ohayon et al. [15], the majority of the patients suffering from major depression had at least one chronic problem of severe pain, four times higher, compared to those who did not have severe depression. A similar result was found in the study of Arnow et al. [16], who reported that in 41% of patients suffering from depression had a severe problem of chronic pain. According to Demyttenaere et al. [17] 56% of patients diagnosed with depression experienced severe pain, while 70% of them were unable to explain the natural causes of this pain. In addition, according to Gerrits et al. [18], depression is associated with the occurrence of multiple pains in the patient's body and increases the intensity of pain.

Low back pain is a chronic pain disorder which causes pain in the waist area as well as from the pelvis and buttocks [19]. Low Back pain is an extremely common problem that most people experience at some point in their lives. Many environmental and temperamental factors influence the onset and course of low back pain. According to the literature review, there are many studies which strongly associate low back pain with depression, either as a cause or as a result of each other [20,21], while in other studies [14], depressive symptoms are a strong and independent predictor of the onset of a back pain episode. According to Mercado et al. [22], the association of depression with low back pain may be a consequence of the general passive attitude of depressed individuals, in the sense that passivity and inactivity are key features of depression and the negative cognitive patterns of depressed individuals predispose them to unpleasant events, including any pain they experience. In addition, according to Pincus et al. [23], more general psychological factors such as discomfort and depressed mood are involved in the transition to chronic low back pain and are interpreted as the cause of these pains, while on the contrary according to Diepenmaat et al. [24]. Symptoms of depression are strongly associated with low back pain, which is more common and severe in women.

Currie & Wang [25] studied the possibility of major depression due to the presence of chronic low back pain. In their study, Currie & Wang [25] also used socioeconomic factors and the number of chronic health problems, as predictors of depression. Their findings showed a stronger association between the incidence of depression in people with low back pain compared to the general healthy population, while no socioeconomic or other variables were found to affect depression, such as age, gender and marital status, both in patients with low back pain and in healthy patients.

2. Purpose & Method of Research

According to various studies, there is an association between low back pain and depression but little is known about the role of socio-demographic factors that may also play a role in this association. The aim of this study was to identify the association between back pain and depression in patients of a large Greek region, the Region of Crete, in order to contribute to the entire Greek literature, but also to the overall effort to find solutions for patients with low back pain, who also face problems with depression. In the present study, an additional objective is to investigate the relationship between back pain, anxiety and depression, as well as coexisting problems such as sleep disorders [26,27,28,29].

To achieve the purpose of the study, a quantitative research method was used using a structured questionnaire, which included nine (9) categories of questions and specifically:

• 1st category: Demographics of patients (eg gender, age, height, weight, marital status and family relationships, educational level and occupation, income, place of residence and cohabitation conditions, main caregivers)

• 2nd category: Patient's daily habits (Exercise, smoking, alcohol consumption, diet)

• 3rd category: Medical history of the patient (back problems, history of problems, frequency of pain and problems it creates, co-existing diseases such as COPD, Heart failure, diabetes, hypertension, arthritis, taking antidepressants, coexisting orthopedics, other pains, other pains chest pain, surgeries, past or existing health problems and treatment)

• 4th category: Sleep problems. The Penn State Sleep Questionnaire was used to assess sleep problems, which will help to investigate whether sleep is affected by the mental health of participants who are associated with depression and pain due to low back pain.

• 5th category: Quebec Back Pain Disability Scale was used to assess low back pain and how it affects the patient's daily life.

• 6th category: Visual Analogue Scale was used for measuring the intensity of pain that the patient feels in his daily life. This scale is a tool used to show the intensity of specific sensations and emotions in pain, where it has been used extensively in many clinical trials examining the effectiveness of health interventions, comparing different alternative therapies or investigating the burden. of the health of specific population groups (Yfantopoulos, 2001).

• Category 7: Self-assessment of depression was done with the Zung Self-Rating Scale and is a scale of 20 questions, self-assessment on the psychological and physical symptoms of people with depression. The scale is rated 4-point Likert from 1 = never, 2 = sometimes, 3 = often and 4 = always.

• 8th category: Questions to assess the impact of pain on mobility, self-care, routine activities and patient psychology

• Category 9: Stress Self-Assessment for which State - Trait Anxiety Inventory was used

The population of the present research included the patients who came during the research to the Orthopedic Clinic of PAGNI Heraklion Crete, as well as to the Clinic of the Neurosurgery Clinic of the hospital, due to musculoskeletal problems. In particular, the population included people who reported pain lasting more than 3 months and being either continuous or intermittent, over the age of 18 and under 75 (with the exception of the extreme age), those who spoke good Greek and lived permanently in the Region of Crete and did not report a

musculoskeletal injury in the last quarter. The sample consisted of 104 patients of this population (men and women), which with the use of intentional sampling and the main criterion for the diagnosis of chronic low back pain. All participants in the survey were informed in writing of their participation in the survey and the purpose of its conduct and gave their written consent. The data were collected from the questionnaires and were coded and analyzed using the statistical package SPSS v.22. Appropriate parametric and non-parametric tests were performed in order to draw the conclusions of the study. In addition, the study included 106 patients of similar age and gender from other outpatient clinics of the hospital, as a control group who do not have chronic back pain. Indicatively, the control group includes patients of the clinics of the Pathology, Surgery and Ophthalmology Clinic of PAGNI. The general population (control group) came from simple random sampling, in order to ensure equal chances of patients' participation in the study. The results of the control group were compared to the results of the research sample.

3. Results - Presentation of Surveys

A. Sample Patients & Control Team Demographics

The sample consisted of 69 women (65.1%) and 37 men, while the control group consisted of 53 men (51%) and 51 women (49%). The mean age of the sample was 55.63 years, while the mean age of the control group was 58.75 years. The height of the sample was 1.66m while the control group was 1.65m. Regarding the average weight of the sample was 78.25 kg and the control group 75.9 kg. The largest percentage of the sample, 75.5% were married, while the corresponding percentage of the control group amounts to 65%. Regarding the educational level of the participants in the research, 36.8% of the sample had completed Gymnasium / Lyceum, while the corresponding percentage in the control group was 31.7%. The largest percentage of the control group had completed studies at AEI / TEI, 43.3%, while 19.2% have completed primary school. The 24.4% of the sample were retired, while the corresponding percentage of the sample amounts to 39.6%. In terms of their living conditions, 47.2% of the sample live with their spouse in their home, while the corresponding percentage of the control group is 49%.

B. Daily Habits of Sample Patients & Control Group

The 24.5% of the sample (n = 26) exercised, of which 36.4% exercised 2-3 times a week, while 31.8% exercise daily. Regarding smoking, 34% of the sample smoke (n = 36), while the average amount of cigarettes per day were ~ 15 cigarettes. Respectively, 28.8% of the control group (n = 30) exercised, while of those who exercised 27.6% exercise daily, 13.8% once a week, while 41.4% exercised 2-3 times the week. The 1.1% (n = 39) of the sample consumed alcohol, while of them, the largest percentage of (~33%) consumed alcohol several times a month (1-5 times). Respectively, 31.7% of the control group (n = 33) currently consumed alcohol. 22.5% (n = 23) of the sample always followed a specific diet plan. Of the patients in the sample who followed a specific diet plan, 44.4% did so for medical reasons, while 37% for personal reasons. Of the patients in the control group who followrd

a specific diet plan (33.7%) while of them, 51.4% followed a specific diet plan for medical reasons, 31.4% for personal reasons, 14.3% for medical reasons and personal reasons and 2.9% for weight loss., το 14,3% για ιατρικούς και προσωπικούς λόγους και το 2,9% για μείωση βάρους.

C. Medical history

Regarding the onset of the problem, in the sample there was an average onset period of 14.8 years, while in the control group the mean onset period was 17.76 years. Regarding the coexisting problems in the waist, 32.3% of the sample had no other problems in the waist, except for back pain, while 94.7% of the control group had no problems in the waist. The frequency of pain in the waist of the sample was about 29.6% daily, as well as a corresponding percentage sometimes. For 12.7%, pain created problems in the middle of the sample when tired. Regarding the control group, 86.7% (n = 52) rarely experienced back problems, 10% (n = 6) only when tired and 3.3% (n = 2) daily only in the morning. Regarding co-existing diseases (COPD, Heart failure, diabetes, high blood pressure, arthritis and depression) 67.7% of the sample and 32.3% of the control group had co-existing problems.

D. Sleep problems

In terms of sleep scale reliability, Cronbach's alpha was 0.88 for the sample and 0.89 for the control group. Three (3) sub-scales emerge from this scale:
• Excessive Daytime Sleepiness
• Apnea Symptoms
• Insomnia Symptoms

According to the data, 62.7% of the sample and 26.2% of the control group experienced symptoms of excessive daytime sleepiness, 70.3% of the sample and 1.9% of the control group experienced apnea symptoms while 72,1% of the sample and 22.5% of the control group experienced insomnia symptoms.

E. Quebec Back Pain Disability Scale

The correlation of the Quebec Back Pain Disability Scale for the sample was 0.96 while for the control group 0.859. Regarding the score of the pain scale in the sample, the average value was 40.77 (± 24.12), the lowest value zero (0) and the highest ninety-eight (98). Respectively the score of the pain scale in the control group, the average value is much lower at 13.86 (± 14.13), with a lower value of two (2) and a higher eighty-eight (88).

Correlating the sample results in terms of pain, it appears that the level of pain is influenced by the sex of the patient (p-value <0.05). More specifically, women have a higher score on the pain scale (mean = 43.01), in contrast to men where their score on the pain scale averages 36.65 (p-value = 0.02). In addition, the pain scale is affected by age (p-value = 0.000), with patients who are above the mean age of the sample (mean = 55.6 years) having a higher score on the pain scale (Mean = 48.45), compared to younger middle-aged patients (Mean = 32.6). In the control group, pain was not related to gender (p-value = 0.247) and age (p-value = 0.081). The score on the low back pain scale was affected by the coexistence of other diseases in the research sample (p-value = 0.011) with those who had co-morbidities having a higher score on the low back scale (Mean = 60.15) as opposed to those who do not other problems (Mean = 39.94). In addition,

the score on the low back pain scale was affected by the coexistence of other orthopedic diseases / problems (p-value = 0.04) with those with orthopedic problems scoring higher on the pain scale (Mean = 39.78) compared to those did not face other orthopedic problems (Mean = 35.76). Regarding pain in general (eg headache, neck pain, angina, abdominal pain, fibromyalgia, etc.) affected the score on the pain scale (p-value = 0.02) with those who experience even an additional pain beyond the problem in the middle to concentrate high in the lumbar pain scale (Mean = 50.47) compared to those without pain (Mean = 42.9).

In the control group, coexisting problems in the waist / orthopedic problems did not affect the score on the pain scale (p-value = 0.815), while other diseases (eg COPD, depression, etc.) did not affect the pain scale (p-value = 0.45). In addition, in the control group, the coexistence of pain (eg headache, neck pain, angina, abdominal pain, fibromyalgia, etc.) did not affect the score on the pain scale (p-value = 0.516).

G. VAS (Visual Analogue Scale)

The mean value of VAS for the sample was 5.98 (± 2.00), while for the control group 3.29 (± 1.49). Regarding the VAS scale, it seems that it is influenced by gender (p-value = 0.04) with women having a higher score on the VAS scale (Mean = 6.29) compared to the men in the sample (Mean = 5.4). In contrast, in the control group there does not seem to be a correlation between the score of the VAS scale and the sex of the patients (p-value = 0.56). In addition, the age of the sample affected the VAS scale (p-value = 0.03) with those above the middle age having a higher score on this scale (Mean = 6.17) compared to the corresponding score of men (Mean = 5.78). In the control group, the VAS score was not affected by the age of the participants (p-value = 0.07).

H. Zung Self-Rating Scale

Regarding the relevance of the Zung Self-Rating scale, Cronbach's alpha, for the sample it was 0.92, while for control group was 0.857. The average score of the Zung Self-Rating scale was 40.91 (± 8.9) for the sample (min = 24 and max = 64), while the mean score of the scale was 32.94 (± 7.18) for the control group (min = 3 and max = 54). Gender was related to the level of depression of the sample patients (p-value = 0.001) with women having a higher score on the depression scale (Mean = 43.06), compared to men (Mean = 36.97). In contrast, in the control group, the level of depression was not related to the sex of the sample (p-value = 0.06). Depression appears to be positively related to age (r = 0.250, p-value = 0.011). In contrast, in the control group, age does not seem to be related to age (p-value = 0.478).

Regarding the influence of sleep problems on the degree of depression, it seems that those who have symptoms of excessive daytime sleepiness had a higher score on the scale of depression (Mean = 43.66) compared to those who did not have similar symptoms (Mean = 36.78) (p-value = 0.00). Similarly, apnea symptoms were related to the degree of depression, with those with apnea symptoms having a lower score on the depression scale (Mean = 39.69) compared to those without apnea symptoms (Mean = 45.03) (p-value = 0.008). Regarding insomnia symptoms, they were related to a higher score on the depression scale (Mean = 43.08) compared to the

score on the depression scale of those who did not experience corresponding symptoms (Mean = 34.89) (p-value <0.001).

In the control group, the symptoms of excessive daytime sleepiness were related to depression, as the presence of such symptoms waere associated with a higher score on the scale of depression (Mean = 36,18) compared to those who did not show such symptoms (Mean = 31,10) (p-value = 0.001), apnea symptoms were not related to depression (p-value = 0.99), nor were insomnia symptoms (p-value = 0.182). Depression seems to be related to the level of pain (Quebek) in the sample (r = 0.16, p-value = 0.01), while no corresponding correlation was found in the control group (p-value = 0.218).

Coexisting orthopedic problems did not affect the score on the Zung scale (p-value = 0.113) in the sample, while the presence of some pain (eg headache, neck pain, angina, abdominal pain, fibromyalgia etc) in the sample, affected the score of depression (p-value = 0.004), with those who had some pain scoring higher on the Zung scale (Mean = 41.14) compared to those who did not experience any pain (Mean = 34.79). According to the results of the control group, their Zung score is not affected by coexisting orthopedic problems (p-value = 0.266), is not affected by other problems / diseases (COPD, depression, etc.) (p-value = 0.143) or existence of other pains (p-value = 0.241).

I. Stress self-assessment

Cronbach's alpha of the self-esteem scale for stress was 0.84 for the sample and 0.885 for the control group. The mean score on the stress scale was 46.58 (± 11.48) for the sample and 45.25 (± 9.32) for the control group.

Pain seems to be positively related to the stress scale in the sample (r = 0.124, p-value = 0.02). Similarly, in the control group, the score on the pain scale was positively related to the stress rating scale (r = 0.256, p-value = 0.009). The stress scale was related to the symptoms of excessive daytime sleepiness for the sample (p-value = 0.02), with those who had these symptoms having a higher mean score on the stress scale (Mean = 48.74) compared to those who had no such symptoms (Mean = 42.96). Apnea symptoms were related to the anxiety scale with those who experienced such symptoms having a lower score on the anxiety scale (Mean = 45.49) compared to those who did not experience such symptoms (Mean = 5055) (p-value = 0.05) . Regarding insomnia symptoms, they affected the scale of anxiety, with those who experienced such symptoms having higher anxiety (Mean = 46.8) compared to those who did not have such symptoms (Mean = 45.91) (p-value = 0.007). Regarding the control group, the stress self-assessment scale was not related to the symptoms of excessive daytime sleepiness (p-value = 0.231), but neither to the apnea symptoms (p-value = 0.518). In contrast, those who showed insomnia symptoms had a higher score on the anxiety scale (Mean = 46.62) compared to those who did not show such symptoms (Mean = 40.86) (p-value = 0.009).

The onset of the problem on low back was positively related to the score on the SAS scale (r = 0.24, p-value = 0.019) as well as to the score on the Zung scale (r = 0.55, p-value = 0.000) which means that the Increasing the time of onset of the problem increases the score on the stress scale, while it also increases depression. In contrast, in the

control group, the onset time of the problem was not positively related to the pain scale (p-value = 0.938) and to the depression scale (p-value = 0.684).

4. Discussion - Conclusions

The purpose of this study was to identify the association between low back pain and depression in patients of a large Greek region, the Region of Crete, in order to contribute to the entire Greek literature, but also to the overall effort to find solutions for patients with low back pain, who also face problems with depression. In particular, the intensity of pain and the presence of depression and anxiety were investigated in a sample of patients with low back pain (69 women and 37 men, with a mean age of 55.63 years), as well as in a control group of patients with other problems without low back pain. (53 men and 51 women, with a mean age of 58.75 years). The study also investigated whether the above problems (pain, depression, anxiety) affect the sleep habits of the patients in the sample and the control group.

The overall conclusion of the present study is that there is a statistically significant association between low back pain and depression in patients with chronic disease, and these conditions significantly affect patients' stress levels and sleep. In particular, the pain experienced by the patients in the sample is more intense (Mean = 40.77, ± 24.12), compared to the patients in the control group (Mean = 13.86, ± 14.13). This finding is consistent with other studies [30,31] which show that low back pain is accompanied by more intense pain compared to other lumbar diseases or other musculoskeletal problems. Women are more sensitive to pain than men, which is confirmed by previous research [32,33,34], which confirm this finding and in fact, they note that it is more intense in the postmenopausal period [32].

In addition, the pain is more intense to patients in the older sample (> 55.6 years). This finding is supported by previous studies, which have shown that growing up with low back pain patients experience a higher level of pain compared to the onset of the problem when they were younger [33,35,36]. Both comorbidities in general and concomitant orthopedic problems affect the pain intensity of patients with low back pain, while in combination they reduce functionality, complicate the daily life of patients [30,35,37] and negatively affect their quality of life [38].

Depression according to the results of the present study is particularly intense in the patients of the sample, compared to the patients in the control group. More specifically, the mean score of the ZUNG scale is 40.91 (± 8.9) for the patients in the sample, while the mean score of the scale is 32.94 for the patients in the control group. This finding, which is confirmed by previous research [39,40,41] may be due to the fact that low back pain is a chronic problem, which is strongly associated with depression like most problems and significantly limits patients' functionality and daily activities [42]. In general, it can be noted that psychological distress such as anxiety and depression are more common in patients with low back pain compared to patients without this problem [39]. As in the scale of pain, so in the scale of depression, women are the ones who show higher depression

(Mean = 43.06), compared to men (Mean = 36.97), something that is confirmed by previous research [43] and may be due to reduced functionality in cases of disease or pain, such as in patients with low back pain. More specifically, in these cases, women have a higher degree of depression as their roles are limited and they cannot cope with their daily activities in the same way they did before the onset of the problem [39].

Regarding sleep problems, the majority of patients in the sample had problems with their sleep (62.7% excessive daytime sleepiness, 70.3% apnea, 72.1% insomnia), which is not detected in patients of control group (26.2% excessive daytime sleepiness, 1.9% apnea and 22.5% insomnia). According to the present study, depression is associated with patients' sleep problems in all three subscales (excessive daytime sleepiness, apnea, insomnia). According to Alsaadi et al. [26] and Kelly et al. [27], sleep disorders are affected by pain intensity and are common in patients with low back pain, while according to Murase et al. [44], sleep disorders are common in patients with musculoskeletal problems in general which affect the patient's sleep quality

Depression was positively related to the level of pain (Quebek) in the sample (r = 0.16, p-value = 0.01), while no corresponding correlation was found in the control group (p-value = 0.218). According to Pinheiro et al. [45], depression can have an adverse effect on low back pain and worsening of low back pain, as the patient's psychological state may aggravate the pain (somatization) which is confirmed by other studies [39,46,47].

According to the results of the present study, it is concluded that the pain is more intense and affects more patients suffering from back pain, in contrast to the control group. In addition, severe and chronic low back pain significantly affects both the depression and anxiety of these patients, who have more sleep problems than the control group, where there is no correlation.

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