ORIGINAL: Investigating the Depression Status in Patients with Upper Limb Pain

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ABSTRACT

Introduction: Depression is considered the most common psychological problem in societies. Depression, anxiety disorders, and substance abuse are more common in patients with pain compared to the general population. In this study, the state of depression in patients with upper limb pain with radiculopathy or without paraclinical signs of radiculopathy has been investigated.

Material and Methods: We conducted the depression status in patients with upper limb pain with and without radiculopathy in a descriptive cross-sectional study in Sari in 2017. Beck Depression Inventory (BDI-II), Short Form (36) Health Survey (SF-36), short-form McGill pain questionnaire was used to evaluate the status of major depressive disorder, health status and quality of life, and severity of pain in them, respectively. The data was analyzed by SPSS 22.

Results: From 120 patients with the mean age 44.97±9.77 years, 19% had mild depression, 18% moderate depression, and 11% severe depression. The mean score of SF36 was 29.94±6.86. The mean scores of the McGill pain scale were 13.31±6.02. The mean depression score had a significant difference between the two groups studied (P=0.04). The McGill pain score had also a significant difference between the two study groups (P=0.012). The mean score of SF36 had no significant difference in both groups (P=0.41).

Conclusion: The depression score and the prevalence of moderate and severe depression were also higher in patients with chronic upper limb pain with cervical radiculopathy than in patients without cervical radiculopathy.

Introduction

Depression is considered the most common psychological problem in societies. Despite the prevalence of depression worldwide, about 50% of patients do not receive treatment in this regard. The lack of diagnosis and treatment of depression leads to resistance to treatment, relapse, and delayed recovery in the concurrent disease. Depressed patients in medical departments use medical resources three times more than

non-depressed people and repeat medical expenses. They refer to emergency centers to check their health seven times more than others, at the same time, they have more physical complaints and pain (1, 2).

Pain is the most common complaint in patients and 7 million people are disabled every year in the United States, and more than 8 million patients are referred to medical services. Depression, anxiety disorders, and substance abuse are more common in patients with pain compared to the general population (3). The prevalence of chronic physical diseases and disabilities resulting from them is such that the World Health Organization (WHO) has predicted that chronic diseases will account for two-thirds of all illnesses and the main cause of death and general disability in 2020 since the medical attitude in these types of diseases only focuses on the treatment method and controlling of symptoms. Since these diseases have great effects on the individual and society, they should be given special attention and should not be limited solely to the medical template in taking care of these patients (4).

These findings suggest that patients with pain respond to pain in a variety of ways, and pain is always associated with adjustment disorders, while some patients have adjusted relatively well to their pain. Another group exhibits various problems in physical and psychological functions (5). Radiculopathy is one of the diseases that causes shooting pain in the limb. Radiculopathy is referred to a condition in which the nerve root that is exiting from the spinal cord is pressured for some reason, and this pressure causes symptoms such as pain and numbness in a part of the limb (6). Upper limb radiculopathy is a common condition that has a prevalence of 63.5 to 107.3 per 100,000 people in males and females, respectively (7, 8). This disease is referred to as the disorder of spinal cord nerve or cervical spinal nerve roots that occurs following pressure and inflammation at the exit location of spinal roots due to degenerative changes (spondylosis) or intervertebral disc herniation. Most patients often complain of neck and upper limb pains with paresthesia or motor dysfunction. They may also have changes in the reflexes of upper limb, in which the location of symptoms differs according to the distribution of the involved nerve root (9).

The quality of life is also a range of objective needs of every human being that is achieved to personal perception of a sense of well-being. The desirable quality of life does not mean the absence of disease, but it means feeling good in many psychological, social, and functional areas. WHO defines the quality of life as an individual's perception of their position in life in the context of the culture and value systems in which they live and to their goals, expectations, standards, and concerns. Measurement of quality of life has various applications in research work and serves as a useful tool in measuring two categories of functional and recovery or systematic mental degradation (10). According to the contents stated, in this study, the state of depression in patients with upper limb pain with radiculopathy or without paraclinical signs of radiculopathy has been investigated, so based on the results obtained, prevent the cost of treatment and manpower in the wrong direction.

Methods

The present study is a descriptive cross-sectional study. This study was conducted to investigate the depression status in patients aged 18-60-year-old with upper limb pain referring to Touba Clinic in Sari city in the second half of 2017. At first, patients referred to the outpatient clinic of Touba were examined by a renowned orthopedic specialist and referred to the neurological clinic for electromyography to confirm the diagnosis. Patients were divided into two groups of patients with upper limb pain with radiculopathy and patients with upper limb pain without paraclinical symptoms associated with radiculopathy. Then, by obtaining written consent, they were included in the study and referred to the psychiatric clinic to perform the diagnostic tests. In the

psychiatric clinic, Beck Depression Inventory (BDI-II) was used to evaluate the status of major depressive disorder in them, and then, with the interviewer's guidance, patients completed The Short Form (36) Health Survey (SF-36) and the short-form McGill pain questionnaire. Information related to the disease, demographic data, and the results of the patient's electromyography report was recorded. Assuming that the difference of at least 10 scores from the BDI score between the two groups of the patient is clinically significant, and also considering the maximum loss of 20% of the data during the study, the minimum sample size in each group was considered as 60 with a total of 120 people. The inclusion criteria considered as all patients aged 18-60 with upper limb pain, and the exclusion criteria considered as the inability to read and write, patients with severe musculoskeletal disorders, history of fracture in the upper limb in the last 6 months, and history of trauma leading to contusion in the upper limb in the last 6 months, such as motor crashes.

Questionnaire
Beck's Depression Inventory (BDI)
The second version BDI-II is one of the most popular and commonly used self-reporting tools for screening depression in people over 13 years of age. This inventory is available in two forms of 21-item and 13-item, and it also can measure the type and severity of depression. This questionnaire also has cognitive, motivational, emotional, physiological dimensions, as well as other factors (11, 12).

The Short Form (36) Health Survey (SF-36)
It is used to evaluate the health status and quality of life and includes 36 questions about 8 activity domains. The validity and reliability of this questionnaire have been confirmed in Iran. Underlying questions and concepts of the structure of the scales and SF-36 questionnaire summary measurements are classified in three levels as follows: **1-** questions, **2-** eight scales, each of which

consists of 2 to 10 questions: physical function, physical limitations, physical pain, general health, vitality, social function, mental problems and mental health, 3- two summary measurements that are obtained from the integration of the scales as follow: Physical Health (Physical Function + Physical Limitation + Physical Pain + General Health) and Mental health (Social + Mental Problems + Mental Health + Vitality). Apart from one question that individually examines the change in the health status of a person over one year, the remaining questions are used to calculate the score of eight scales of SF-36's. Each question is only used in calculating the score of a single scale. For some questions, the scores are re-encoded, so that all scales get one-way scores. The scores for each scale vary from 0 to 100, with zero reporting the worst and 100 reporting the best status on the scale. This questionnaire has been validated in Iran (13).

The short-form McGill pain questionnaire
This questionnaire consisted of 11 items related to the sensory components of pain (throbbing, shooting, stabbing, sharp, cramping, gnawing, hot-burning, aching, heavy, tender, and splitting pains), and 4 affective components of the pain including tiring-exhausting, sickening, fearful and punishing-cruel of the pain, as well as a visual rating scale for pain (0 to 10 points) and the choice of one of the six scales of the severity of pain (painless to torturous). In the numerical verbal scale, the lack of pain is expressed as a score of zero and the most severe pain as a score of 10 (28, 29). This questionnaire has been validated in Iran (14).

Statistical analysis
The distribution of the data was investigated by plotting the histogram or performing the Kolmogorov-Smirnov test or Shapiro-Wilk test. Subsequently, the quantitative variables were described with mean and standard deviation or median and interquartile range, and the qualitative variables were described with frequency and percentage. To analyze the data, independent T-test or its non-

parametric equivalent, Mann-Whitney U test, was used. In all cases, the two-tailed P-value of less than 0.05 was considered as the standard for statistical judgment. The IBM SPSS version 22 software was used to describe and analyze the data.

Results

A total of 120 patients with chronic upper limb pain were included in the study based on the inclusion and exclusion criteria. Based on the results of electromyography of the upper limb, the patients were divided into two groups of upper limb pain with radiculopathy (60 patients) and without radiculopathy (60 patients). The mean age of the patients was 44.97±9.77 years (a minimum of 20 and a maximum of 60). 27% of the patients were male and the rest were female. 34% of the patients had a lower level of education than diploma, 37% had a diploma, 10% had an associate degree, 16% had a bachelor's degree, and 3% had higher educations.

In the analytical review, parametric and non-parametric data were analyzed and compared in the two groups of patients with and without radiculopathy, in which sex distribution did not differ significantly between the two groups (P=0.63). The mean age of patients was significantly different in the two groups of study so that the age of patients with radiculopathy was significantly higher (P<0.001).

Based on the BID II questionnaire, the mean depression score in the study population was 14.82±9.64. 52% of patients had minimal depression (BID 1-13), 19% mild depression (BID 14-28), 18% moderate depression and 11% severe depression. The mean score of SF36 was 29.94 ± 6.86 in the patients studied. The mean scores of McGill pain scale was 13.31±6.02 in the patients studied (*Table 1*). The mean depression score had a significant difference between the two groups studied (P=0.04), so that depression score was significantly higher in patients with chronic upper limb pain with radiculopathy than in patients without radiculopathy. The means McGill pain score had also a significant difference between the two study groups (P=0.012), so that it was significantly higher in patients with radiculopathy than in patients without radiculopathy. However, the mean score of SF36 had no significant difference in patients with and without radiculopathy (P=0.41) (*Table 2*) (*Chart 1*).

Depression scores had a significant inverse correlation with the mean scores of SF36, and this correlation was observed in all patients and in both groups of patients with and without cervical radiculopathy, with Pearson

Table 1. Prevalence of depression in two groups

		Without radiculopathy		With radiculopathy		P-value
		Frequency	Percent	Frequency	Percent	
Depression	Minimal	43	69.4	19	30.6	0.005
	Mild	8	34.8	15	65.2	
	Moderate	7	31.8	15	68.2	
	Severe	2	15.4	11	84.6	

Table 2. Average age, depression score, pain and quality of life in two groups

Variable	Mean		P-value
	Without radiculopathy	With radiculopathy	
Age	41.08	48.97	<0.0001
BID	11.55	18.00	0.004
SF36	29.29	30.61	0.41
McGill	11.59	15.08	0.012

coefficient =-0.542 and P<0.001, Pearson coefficient =-0.528 and P=0.01, and Pearson coefficient =-0.569 and P<0.001, respectively. There was no significant

correlation between BID scores and McGill pain scores in all patients: Pearson's coefficient =-0.175 and P=0.139. In the analysis of subgroup of patients, there was no significant relationship in patients without cervical radiculopathy, Pearson coefficient = -0.012 and P=0.944, while in patients with cervical radiculopathy, a significant inverse correlation was observed between depression scores and McGill pain scores, Pearson coefficient =-0.383 and P=0.045. There was no significant correlation between SF36 and McGill scales in all patients and the evaluation of subgroup of patients (P>0.05).
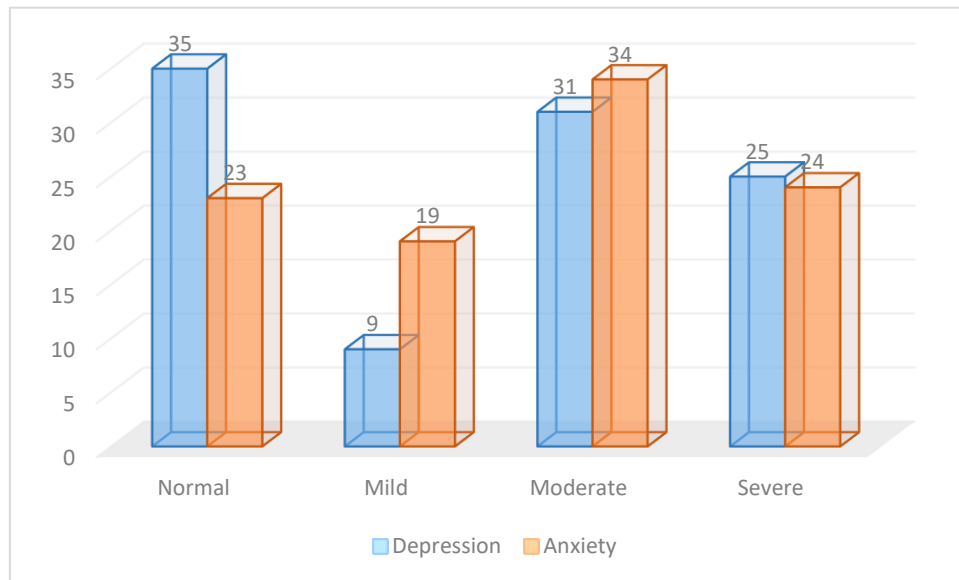

Chart 1. Prevalence of anxiety and depression in chronic low back pain patients

Discussion

In the past years, the correlation between the index of cervical disability and depression has been studied in elderly people, patients with rheumatoid arthritis, multiple sclerosis, COPD, etc. (15-19). However, the level of pain and quality of life and their relationship with severity of depression, especially in patients with upper limb pain, have not been studied. In this study, the level of depression and quality of life and pain in patients with upper limb pain have been studied and these indices have been compared in patients with and without cervical radiculopathy. In the present study, it was shown that the level of depression in patients with chronic pain with cervical radiculopathy was significantly higher than those without cervical radiculopathy. Also, the level of pain according to McGill pain scale was higher in these patients with upper limb pain and cervical radiculopathy, while the quality of life in patients with and without cervical radiculopathy, there was also a significant inverse correlation in the present study between SF36 quality of life and McGill pain index with depression score based on BID.

In epidemiological studies, it has been shown that the prevalence of pain symptoms in the total lifetime is 24% to 37% (20). It has been shown that pain leads to depression and a decrease in mood when it interferes with the individual's activities and daily function. While some can cope with their pain and do their desired activities, others cannot, and as a result they develop depression. However, some also recognize the role of pain in the incidence and severity of depression as independent of its impact on quality of life. Therefore, various studies have been done in recent years to determine the factors influencing depression in patients with chronic pain. Studies have shown that depression and pain may be related conditions (21). On the same hand, the prevalence of depression in patients with chronic pain has been reported more than in

the general population (22). Lintone SJ et al. in a study from 2000 to 2001 showed that depression is also associated with pain severity (23). On the other hand, in the study by Ossipov et al., it was shown that in 70 patients with anxiety and depression disorders, their sensitivity to pain increases (24). In line with the findings of these two studies, it was also shown in the present study that depression was more frequent in patients with radiculopathy who had more pain than patients without radiculopathy, so that there was a significant relationship between pain scores based on the McGill scale in patients with radiculopathy and depression scores based on BID2 scale.

In a study by Arnestin et al., it was shown that inability to perform daily activities in patients with chronic pain can be a predictor of depression (25). Zeis et al. reported in a study that although physical illness can be a risk factor for depression in elderly people, however, only the presence of functional disorders without disease may also lead to depression (26). In the present study, it was also shown that quality of life has a significant relationship with depression, so the SF36 score had a significant relationship with depression score. It also seems that the role of pain in the incidence and severity of depression is more than the quality of life. According to the findings of the present study, the quality of life in the two groups of patients with and without radiculopathy was not significantly different, and patients with radiculopathy only had more pain and this seems to be the reason for the higher prevalence of depression in this group. Blozik et al. (27) have shown that patients with chronic pain have higher chances of developing depression, and showed in a regression analysis that the level of depression has also an independent correlation with severity of pain and disability. In a study by Demyttenaere et al. on the level of mental disorders among patients with chronic neck and back pain in developed and developing countries around the world, it has been reported that mental disorders such as mood disorder and anxiety

are more common in people with chronic neck and back pain than those without these problems (28). In another study by Krause et al. conducted in Germany, it was also found that depression and anxiety were significantly associated with increased levels of neck pain. They also pointed out that people with depression and anxiety are probably in a group with high levels of neck pain (29). In the present study, radiculopathy also seems to increase the pain score in patients with chronic upper limb pain, and as a result, it has been associated with an increase in depression scores based on the Beck scale in this group of patients compared to patients without upper radiculopathy.

Lerman et al. (2015), in a study aimed at examining the longitudinal relationship between pain, pain-related disability, and symptoms of depression and anxiety on 428 patients with chronic pain (238 women with a mean age of 54.84 years, mean duration of pain of 85.21 months), they collected and measured the information in two clinical pain questionnaires about their pain (short-form McGill Pain Questionnaire), depression [center of state anxiety] (conditional anxiety) and pain-related disability (Pain Disability Index) in 4-time points, with an average of 5 months. Severe symptoms of depression and anxiety were reported in more than half of the samples. The result of their study showed that in adults with chronic pain treated in specialized clinics, higher levels of depression and anxiety may reduce pain and pain-related inadequacy (10). Another study by Helen Poole et al. (2009) was conducted to determine the prevalence of depression in patients referring to specialized pain services using a Structured Clinical Diagnostic Interview (SCID) and a BDI-II questionnaire. In this study, 36 participants were selected, mostly women with an average age of 47.83 years (Standard deviation = 12.85 years) who were abhorrent with their pain. SCID identified 26 people as depressed (72%). The BDI-II scores indicated 31 cases of depression (86%), which also considered the least mild depression (30). Samadzadeh et al. (2017) conducted a cross-sectional study to

investigate the relationship between depression and perception of pain intensity in patients admitted to the general surgery department. The results showed that there is a significant relationship between depression and perception of pain intensity. This means that patients with a history of depression experience more pain during admission and post-surgery (31). In a study by Umay et al. (2015) on investigating the characteristics of rheumatoid arthritis (RA), functional capacity, depression and anxiety, as well as the quality of life (QoL) in patients with RA with the diagnosis of chronic leg pain and back pain. There were no significant differences in the scores of depression and anxiety between the three groups (32). In a study by Mathew et al. (2017), 30 people participated in the study, and were examined for Neck Disability Index (NDI) and Beck Depression Inventory (BDI). This study was conducted only on those diagnosed with cervical radiculopathy. There was a strong positive correlation between neck disability and depression in cervical radiculopathy patients (33).

Considering that radiculopathy can further restrict the activity of patients with chronic pain, it seems that, given the increased restrictions on daily activities, the incidence and severity of depression in these individuals is higher. The quality of life also reduces. In line with this, in the present study, the prevalence of moderate to severe depression and the pain score in the patients suffering from upper limb pain with radiculopathy were significantly higher than patients without radiculopathy.

Conclusion

In the present study, it was shown that chronic upper limb pain accompanied with radiculopathy has significantly increased the pain score, so that the mean score of McGill scale in patients with cervical radiculopathy was higher than patients without cervical radiculopathy. The depression score and the prevalence of moderate and severe depression were also higher in patients with chronic upper limb pain with cervical radiculopathy than in patients without cervical radiculopathy.

Conflicts of interest

None of the contributing authors have any conflict of interest that may have biased this work.

Authors' Contribution

All authors have intellectually contributed to the study design and process.

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