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Evaluation of the relationship between disability and pain severity with anxiety and depression in chronic low back pain patient: Research and review

Narges Beyraghi¹, Maryam Hosseinzadeh¹, Masood Hashemi², Yashar Nasiri Moghaddam²

¹Department of Psychiatry, Behavioral Research Center, Shahid Beheshti Medical University, Tehran, Iran, ²Department of Anesthesiology, Shahid Beheshti University of Medical Sciences, Tehran, Iran

Correspondence

Dr. Maryam Hosseinzade, Department of Psychiatry, Shahid Beheshti University of Medical Sciences, Tehran, Iran. Tel/Fax: +9809155010367. E-mail: maryampsycho95@gmail.com

Received: 26 July 2016;

Accepted: 01 September 2016

doi: 10.15713/ins.ijcdmr.106

How to cite this article:

Narges Beyraghi, Maryam Hosseinzadeh, Masood Hashemi, Yashar Nasiri Moghaddam, "Evaluation of the relationship between disability and pain severity with anxiety and depression in chronic low back pain patient: Research and review," *Int J Contemp Dent Med Rev*, vol.2016, Article ID: 010816, 2016. doi: 10.15713/ins.ijcdmr.106

Abstract

Background: Chronic disabling physical and mental symptoms contribute to substantial health-care costs and reduced human productivity. Low back pain (LBP) and depression are leading causes of years lived with disability in every country. Almost half of chronic LBP individuals have comorbid depression and anxiety conditions with a higher risk in female gender. This is a very common comorbidity, and the psychological comorbidities have a negative impact on chronicity of LBP symptoms. Psychological distress and depressed mood have been reported to be correlated with chronicity and persisting disability of chronic LBP. The aim of this study is to investigate the correlation of pain and disability and associated factors in a subgroup of depressed and anxious individual with chronic LBP (CLBP). **Materials and Methods:** A total of 74 CLBP participants in a university pain clinic with depression or anxiety diagnosis were enrolled. Hospital anxiety depression scale (HADS) for depression and anxiety, visual analog scale for pain severity, and Oswestry disability index were recorded for disability evaluation. Correlation and regression analysis was used to evaluate the effect of different factors on disability and depression. **Results:** Around 49 women and 25 men participated in this study. Duration of CLBP was 12.97 ± 9.27 , and scores of depression and anxiety were 14.24 ± 3.41 and 12.95 ± 2.74 , respectively. Disability and pain severity was 32.62 ± 9.9 and 5.67 ± 1.34 , respectively. There was a significant relationship between disability and other scores. Pain and depression had a significant correlation with disability, and the effect of depression ($\beta = 0.357$) on disability was more than pain ($\beta = 0.331$). **Conclusion:** Due to our results, there is a significant relationship between psychiatric (depression and anxiety) and clinical factors (disability and pain) in patients with CLBP. The score of disability was higher than pain intensity and depression was the most important predictor factor of disability which must be recognized and treated in CLBP patients. Our results support that depression can predict disability and to some extend pain severity in CLBP patients.

Keywords: Chronic low back pain, depression, disability, pain

Introduction

Chronic disabling physical and mental symptoms contribute to substantial health-care costs and reduced human productivity. Low back pain (LBP) and depression are leading causes of years lived with disability in every country.^[1] Due to a recent systematic review, chronic LBP prevalence in low- or middle-income countries is 18% (14-24) of their general adult population.^[1]

Almost half of chronic LBP individuals have comorbid depression and anxiety conditions with a higher risk in

female gender.^[2,3] This is a very common comorbidity, and the psychological comorbidities have a negative impact on chronicity of LBP symptoms.^[4] It is also interesting that chronic LBP has also a negative impact on depression outcomes.^[5]

Contrary to general believe, severity of pain is not related to radiological findings in chronic LBP patients.^[6,7] Although there is substantial evidence that depression, in general, can cause more pain complaint and greater impairment,^[8] other studies posit that severity of pain has no correlation with mood and anxiety disorders.^[3]

Level of disability as was aforementioned for pain intensity is not correlated to magnetic resonance imaging findings.^[7]

Psychological distress and depressed mood have been reported to be correlated with chronicity and persisting disability of chronic LBP.^[4] Depression has been reported to be more powerful factor associated with disability comparing to somatic symptoms of chronic LBP patients.^[9]

Other studies argue psychological factors to be a generic risk factor for disability in pain problems and declare that psychological factors may not play a large role in disability consequences.^[10]

The aim of this study is to investigate the correlation of pain and disability and associated demographic factors in a subgroup of depressed and anxious individual with chronic low back pain (CLBP) and no history of previous pain interventions or treatment for the psychological problem.

Materials and Methods

This study participants were enrolled from the outpatient pain clinic of Akhtar University General Hospital in Tehran. The study is approved by the Shahid Beheshti Medical University Ethical Committee (Ethical Code: IR.SBMU.SM.REC.1394, 183). Chronic LBP patients' age between 18 and 65 years old was assessed by an academic pain specialist and referred to the research team for further evaluations.

CLBP was defined as a non-cancer LBP of minimum duration of 3 months. To be enrolled in our study, patients should have the following criteria: (1) CLBP for more than 3 months. (2) No history of previous pharmacological or non-pharmacological psychiatric treatment. (3) No history of pain treatment rather than simple analgesics. (4) Hospital anxiety depression scale (HADS) scores of 8 or higher in either of anxiety or depression sub scales.

Demographic data, type of occupation, and chronicity of pain were recorded for all participants.

Occupation is categorized as physical and non-physical.

Farsi validated version of HADS^[11] was used to assess the severity of depression (HADS-D) and anxiety (HADS-A) separately. Grading of these disorders based on acquired scores are: Normal, 0-7; mild, 8-10; moderate, 11-14; severe, 15-21.

Severity of pain was reported by all participants by visual analog scale (VAS). Pain severity based on acquired scores are: 0, no pain; 1-3, mild pain; 4-6, moderate pain; 7-10 severe pain.

For all participants, Iranian version of Oswestry disability index questionnaire is used to assess LBP disability.^[12] Grading based on acquired percentage are: 0-20%, mild; 20-40%, moderate; 40-60%, severe; 60-80%, disable; more than 80%, bedridden.

Results are reported as mean and standard deviation (SD). Data were analyzed by Spearman rank order and Pearson correlation test using the Statistical Package for the Social Sciences version 16 (SPSS-16).

Results

This study population included 49 women and 25 men (total = 74) CLBP patient, with mean age of 38.64 (SD = ±11.82). Chronic LBP mean duration was 12.97 (SD = 9.27) months. 26 patients were married, 46 were single, and 2 of them had divorced. Only 6 patients had physical jobs. The majority of participants showed moderate depression and anxiety scores. None of our participants have disability score more than 60% (disable or bedridden). HADS, Oswestry, and VAS score results of these 74 participants are presented in Table 1.

The correlation of demographic characteristics and questionnaires results including HADS-D, HADS-A, Oswestry, and VAS were evaluated by Pearson and Spearman analysis. Our results showed a significant relationship between female sex and anxiety ($P = 0.025$). None of the other demographic variables showed a significant result.

To examine the relationship between HADS, Oswestry, and VAS scores, Pearson correlation coefficient was used. According to our results, there was a significant relationship between disability with all other scores. We also observed a significant relationship between both depression and anxiety with pain severity [Table 2].

Linear regression analysis was used to evaluate the effect of depression, anxiety, and pain on disability. The results of the analysis showed that pain and depression had a significant correlation with disability and the effect of depression ($\beta = 0.357$) on disability was more than pain ($\beta = 0.331$). The results are shown in Table 3.

The effect of depression and anxiety, disability, and pain was evaluated by multiple regression analysis. The results of this regression model that are demonstrated in Table 4 showed that the impact of depression was mostly on anxiety ($\beta = 0.675$), whereas its weakest effect was on pain severity ($\beta = 0.215$).

Table 1: HADS, Oswestry, and VAS scores in 74 study participants

Measures	Variable	Mean±SD	Normal number (%)	Mild number (%)	Moderate number (%)	Severe number (%)
HADS-D	Depression	14.24±3.41	3 (4.1)	8 (10.8)	27 (36.5)	36 (48.6)
HADS-A	Anxiety	12.95±2.74	2 (2.7)	11 (14.9)	35 (47.3)	26 (35.1)
Oswestry	Disability	32.62±9.9	0	8 (10.8)	48 (64.9)	18 (24.3)
VAS	Pain	5.67±1.34	0	4 (5.4)	50 (67.6)	20 (27)

Rating is based on the following criteria. HADS: Normal (0-7), mild (8-10), moderate (11-14), severe (15-21). Oswestry: 0-20% mild, 20-40% moderate, 40-60% severe. VAS: 0 no pain, 1-3 mild pain, 4-6 moderate pain, 7-10 severe pain. HADS: Hospital anxiety depression scale, VAS: Visual analog scale, SD: Standard deviation, HADS-D: HADS was used to assess the severity of depression, HADS-A: HADS was used to assess the severity of anxiety

Discussion

Psychological factors (depression and anxiety) are implicated in prediction of disability in CLBP individuals. Disability is a complex consequence of direct or indirect factors.^[4,13] Different studies evaluated the relationship between LBP and depression. Due to their results, CLBP is prevalent among depressed patients.^[14] Furthermore, depression is more prevalent among patients with CLBP.^[15] Some studies showed the negative effect of psychiatric factors including anxiety and depression on CLBP.^[16-18] This relation is probable from biological point of view because pain, depression, and anxiety are affected by serotonin, γ -aminobutyric acid, glutamate, and other neuropeptides.^[19] Sympathetic system and hypophysis hypothalamus axis and benzodiazepine receptors in frontal cortex are the mechanisms which can explain such a relationship.^[20]

Our results showed the significant relationship between psychiatric (depression and anxiety) and clinical factors (disability and pain). Disability is an appropriate clinical factor for evaluation of diseases effects.^[15] CLBP is a multifactorial disease which exact clinical and radiographic evaluation cannot predict the extend of patient disability. Regards to the important role of psychiatric factors on clinical manifestations, it is still unclear that which of these factors is a better predictor for disability. The results of different studies about the effect of

psychiatric factors on disability are controversial. Moix reported that anxiety is an important factor for disability.^[16]

Kim showed that state anxiety and pain intensity were more related to disability than depression and trait anxiety.^[17] Hung showed that depression was the most important factor related to disability.^[9] In our study, due to regression analysis, severity of depression was more related to disability. Fatigue, weakness, and lack of motivation are depressive symptoms, which reduce physical activity. Depression is operational on subjective pain perception; this may be a possible explanation for pain intensity as the second factor reported in our results. In spite of reciprocal relation between depression and pain, the effect of depression on disability supports the hypothesis which states that fear of pain and injury is more disabling than pain itself.^[18]

Different results of studies about the relation of depression, anxiety, and disability can be due to different causes. For example, different tools were used in studies for depression, anxiety, and disability. Even distress used in some studies is not an indicator of depression. Furthermore, CLBP patients may be a heterogeneous group; for example, smoking is a related factor for CLBP^[21] and even is more effective than demographic factors and some psychological factors in predicting disability,^[9] and this factor was not considered in many studies like ours.

In our study, the effect of depression on disability was more than pain. This result may be related to this fact that depressed individuals underestimate their ability and daily function.^[19] The relationship between demographic factors such as age, sex, job, and marital status with psychological factors (anxiety, depression, disability, and pain) were evaluated in our study. Due to statistical analysis, sex only was related to anxiety ($P = 0.02$), but the correlation coefficient of 0.2% between these two factors could not be considered as a strong relationship. Many studies that evaluated the relationship between sex and psychological factors did not show any relationship between pain and sex.^[22-26] Robinson reported that although there was not a significant relation between sex and psychological factors, anxiety in males led to experience of more extensive pain.^[27] Due to low sample size, our data had not enough power to evaluate sex differences.

Our cross-sectional study could not evaluate the relation between depression, anxiety, pain, and disability during the time. Patients follow-up and evaluation of this relation during the time and in different intervals could be suggested for future studies. Our data were collected from university referral hospital that usually accepts more complex cases referred from primary care settings. Patients with chronic pain suffering from loss of concentration, insomnia, and low energy level may report over concerns in subjective measures.^[22,28]

CLBP intensity and disability are related to psychological factors. Management of psychiatric comorbidities, as a part of biopsychosocial approach, could influence other treatment outcome and improve quality of life of CLBP patients. Future longitudinal studies should further explore these outcomes after treatment.

Table 2: Correlation between VAS, Oswestry, HADS-A, and HADS-D scores

Parameter	VAS	HADS-A	HADS-D	Oswestry
Oswestry	0.595**	0.593**	0.657**	
HADS-D	0.53**	0.776**		
HADS-A	0.46**			

** $P < 0.05$, * $P < 0.01$. VAS: Visual analog scale, HADS-D: HADS was used to assess the severity of depression, HADS-A: HADS was used to assess the severity of anxiety, HADS: Hospital anxiety depression scale

Table 3: Regression analysis showed the effect of independent factors (depression, anxiety, and pain) related to disability

Parameter	β	T	P value
HADS-D	0.357	2.606	0.011
HADS-A	0.163	1.243	0.218
VAS	0.331	3.4	0.001

VAS: Visual analog scale, HADS-D: HADS was used to assess the severity of depression, HADS-A: HADS was used to assess the severity of anxiety, HADS: Hospital anxiety depression scale

Table 4: Multiple regression analysis showed the effect of depression on dependent factors (anxiety, disability, pain)

Parameter	β	T	P value
HADS-A	0.657	6.66	<0.0001
Oswestry	0.357	2.6	0.011
VAS	0.215	1.33	0.18

VAS: Visual analog scale, HADS-A: HADS was used to assess the severity of anxiety, HADS: Hospital anxiety depression scale

Conclusion

- Our results showed the significant relationship between psychiatric (depression and anxiety) and clinical factors (disability and pain) in patients with CLBP
- In patients with CLBP, the score of disability was higher than pain intensity
- Depression was the most important predictor factor of disability which must be recognized and treated in CLBP patients.

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