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Do Patients of Chronic Low Back Pain have Psychological Comorbidities?

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Abstract

Background Individuals with chronic pain have been reported to have an increased incidence of psychological morbidities. We aimed to examine the prevalence of anxiety, depression, disability, alexithymia, insomnia, and sleep quality in patients having chronic low back pain (LBP) and study their association with the severity of pain and any disability arising from it.

Methods This descriptive study was conducted in a tertiary care teaching hospital setting. Fifty adults with nonspecific LBP of > 6-week duration were included. Study instruments employed were patient health questionnaire-9 for depression, generalized anxiety disorder-7 for anxiety, visual analogue scale (VAS) score for pain, Oswestry disability index (ODI) to assess disability, Toronto alexithymia scale-20 for alexithymia, and insomnia severity index and Pittsburgh sleep quality index for insomnia. Descriptive results were expressed as numbers, means, and proportions. Association study between variables was performed using Fisher's exact test.

Results Mean ODI score was 31.54% (95% CI, 26.09–36.99); mean VAS score was 6.08 (95% CI, 5.35–6.81). Insomnia of varying severity was found in 29 patients. Sleep quality was reported as good by 23 patients. One patient had alexithymia. There was significant association between the level of disability and depression, anxiety, insomnia, and sleep quality. The severity of pain had significant association with insomnia but the association with anxiety, depression, alexithymia, and sleep quality was not significant.

Conclusions Patients with chronic LBP do have associated psychological comorbidities of varying extent. A "patient-centric" approach when treating patients with chronic LBP is necessary, so that appropriate evaluation of psychiatric and psychosocial comorbidities, sleep problems, and quality of life is done as part of their routine management to ensure the desired outcomes.

Keywords
- low back pain
- psychological
- comorbidity
- anxiety
- depression
- alexithymia
- insomnia

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Introduction

Low back pain (LBP) is a common musculoskeletal impairment experienced by approximately 70 to 85% of the general population at some point during their lifetime.[1] While most people experience LBP of a short duration, which improves over time irrespective of the treatment taken, few people fail to get adequate pain relief.[2] LBP lasting longer than 7 to 12 weeks is often termed as a chronic LBP.[1] The incidence of chronic LBP has been reported to be around 9% to 21%.[2] Chronic LBP is often ranked as a leading cause of disability and inability to work and is a common reason for seeking specialist medical consultations.[3] From an Indian context, Sharma et al found that joint pain was the commonest musculoskeletal condition observed across three Indian cities, followed by back pain with a prevalence of 7.08%, 11.52% and 9.53%, respectively, at these centers.[4]

While a well-defined underlying cause for pain might not be apparent or identifiable in many individuals, any pain lasting or recurring over a long period of time could be labeled as a chronic pain.[1] Persistent chronic pain has been suggested to result in a range of structural, functional, and neurochemical changes in the cortical areas of human brain involved in the recognition of emotions, and a close correlation has been suggested between affective pain component and the extent to which these changes occur.[5,6] The corticolimbic system, comprising the prefrontal cortex, anterior cingulate cortex, amygdala, hippocampus, nucleus accumbens, and periaqueductal gray matter, is a mediator of chronic pain and plays an important role in the development, maintenance, and amplification of chronic pain.[7,8]

Individuals with chronic pain have been reported to have an increased incidence of psychological morbidities like high levels of emotional distress presenting with mood and anxiety symptoms.[7,9-11] For example, studies by Western researchers have documented an increased incidence of anxiety, depression, alexithymia, and disability in patients with chronic LBP.[7,12-15] Alexithymic individuals experience difficulty in communicating feelings, which may make them to incorrectly interpret signs of emotional arousal as signs of a disease. They may fail to take the comfort of other people, as they have difficulties in communicating their psychological distress. Although there is a high prevalence of alexithymia in many chronic pain conditions, yet the relationship between pain intensity and alexithymia is not firmly established. Sleep impairment has also been reported among these patients and shares a close relationship with pain severity.[2,15,16]

However, little is known about the prevalence of psychological comorbidities with chronic LBP in developing countries, where much of the world's population lives.[17,18] This descriptive questionnaire-based study aimed to examine the prevalence of anxiety, depression, disability, alexithymia, insomnia, and sleep quality in patients having chronic LBP and study their association with disability and the severity of pain.

Materials and Methods

We conducted a cross-sectional observational study after obtaining formal approval of the institutional human ethics committee of All India Institute of Medical Sciences (AIIMS), Bhopal, India (LOP/2015/STS0045–2015). The study was conducted over a period of 2 months on patients diagnosed to have nonspecific chronic LBP who were attending the orthopedic outpatient clinic of our institute. The patients underwent investigations like imaging of the lumbosacral spine and blood tests to rule out a structural or infective cause for the LBP. Fifty patients satisfying the inclusion and exclusion criteria were enrolled. Inclusion criteria were 1) age > 18 years and 2) LBP which had failed to improve over past 6 weeks. Patients with LBP of < 6-week duration, chronic LBP combined with other diagnosed musculoskeletal diseases, patients with history of back surgery, individuals who were incapable of understanding and answering the questionnaires, and those who did not consent were excluded.

Detailed information about the study was provided to all patients before obtaining their consent. Particulars like age, gender, number of family members, occupation, socioeconomic status, marital status, education, requirement for analgesics and sleep medication, substance abuse (alcohol, tobacco products), and preexisting nonmusculoskeletal medical, surgical or psychiatric illness and medications for their treatment were recorded apart from the specific study instruments.

The specific study instruments employed in this study were as follows: patient health questionnaire (PHQ-9), generalized anxiety disorder (GAD-7), Visual Analogue Scale (VAS) score for perception of pain, Oswestry disability index (ODI), Toronto alexithymia scale-20 (TAS-20), insomnia severity index (ISI), and Pittsburgh sleep quality index (PSQI).[19-25]

The severity of depression was assessed using PHQ-9 and graded as none/minimal (0–4), mild (5–9), moderate (10–14), moderately severe (15–19), and severe (20–27). GAD-7 questionnaire includes questions on the seven core symptoms of generalized anxiety, namely, nervousness, inability to stop worrying, excessive worry, restlessness, difficulty in relaxing, easy irritation, and fear of something awful happening. It rates how often the patients were bothered by each of these core symptoms over the past 2 weeks; the scores of the GAD-7 range from 0 to 21. VAS score was used to assess patients' perception of current pain; on a 10 mm VAS scale, the patients' ratings are graded as no pain (0), mild pain (1 to 3 mm), moderate pain (4 to 6 mm), and severe pain (7 to 10). ODI was used to assess the limitations of various activities of daily living; the scores are assessed as minimal disability (0% to 20%), moderate disability (20% to 40%), severe disability (40% to 60%), crippled (60% to 80%), and bedbound or exaggerating (80% to 100%). TAS-20 scale was used to assess the level of alexithymia. It consists of 20 items which load on three factors, namely, difficulty in identifying feelings, difficulty in describing feelings, and externally oriented thinking. ISI is used to assess insomnia severity, sleep satisfaction, sleep interference with daytime

functioning, noticeability of sleep impairment, and distress caused by insomnia over the last 2 weeks; the scores are assessed as no significant insomnia (0 to 7), subthreshold insomnia (8 to 14), moderate insomnia (15 to 21), and severe insomnia (22 to 28). PSQI was used to evaluate sleep quality over the last 1 month. It consists of 19 items to evaluate the seven aspects of sleep quality (sleep onset latency, sleep duration, efficiency, quality, disturbances, medication, and day-time dysfunction); a higher score indicates poor sleep quality.

All the data was collected in a Microsoft Excel sheet. It was then coded, entered, and analyzed using Statistical Package for Social Science (SPSS version 26, Armonk NY). The descriptive results were expressed as numbers, means, and proportions. Association study between the variables was performed, statistical significance was calculated using Fisher's exact test, and p value of < 0.05 was taken as statistically significant.

Table 1 Summary of the demographic details of the study participants

Particulars		Numbers (%)
Gender	Male	23 (46%)
	Female	27 (54%)
Marital status	Married	39 (78%)
	Unmarried	11 (22%)
Educational qualification	Postgraduation	3 (6%)
	Graduation	9 (18%)
	Matriculation	10 (20%)
	Higher Secondary	11 (22%)
	Primary education	17 (34%)
Occupation	Homemaker	16 (32%)
	Service	10 (20%)
	Student	9 (18%)
	Farmer	5 (10%)
	Businessman	3 (6%)
	Tailor	1 (2%)
	Retired	6 (12%)
Alcohol intake	Yes	8 (16%)
	No	42 (84%)
Tobacco product consumption	Yes	10 (20%)
	No	40 (80%)
Frequent need of pain medications	Yes	31 (62%)
	No	19 (38%)
Frequent need of sleep medications	Yes	3 (6%)
	No	47 (94%)

Table 2 Table showing the mean scores and the SD of the different study instruments used

Parameter	Mean	SD
ODI score	31.54%	19.17%
VAS for pain	6.08	2.56
GAD-7 score	7.98	6.88
PHQ-9 score	8.82	6.59
TAS-20 score	37.10	5.97
ISI score	9.76	6.94
PSQI score	6.84	5.07

Abbreviations: GAD-7, generalized anxiety disorder; ISI, insomnia severity index; ODI, Oswestry disability index; PHQ-9, patient health questionnaire; PSQI, Pittsburgh sleep quality index; TAS-20, Toronto alexithymia scale-20; VAS, visual analogue scale score for perception of pain.

Results

A total of 78 patients diagnosed with nonspecific chronic LBP were approached during the study period. Of which, 50 who satisfied all the inclusion and exclusion criteria were enrolled. Among these, 23 (46%) were males and 27 (54%) were females. The mean age of patients was 42.78 years (± 15.93). The level of education was graduation and above for 12 (24%) patients; 39 patients (78%) were married. Most patients did not consume alcohol or use tobacco (n = 42 and n = 40, respectively). Frequent requirement of pain-relief medications for the LBP was reported by 31 (62%) patients. However, only 3 (6%) participants required frequent sleep-inducing medications. The demographic details of the patients are shown in ►Table 1.

The mean ODI score was 31.54% (95% CI, 26.09–36.99). Most patients were minimally or moderately disabled but 15 (30%) were either severely disabled or crippled. The mean VAS pain score was 6.08 (95% CI, 5.35–6.81). Severe LBP was reported by 18 (36%) patients. Nine (18%) patients reported no anxiety, while 10 (20%) reported severe anxiety. Moderate-to-severe depression was found in 30 (60%) patients. Insomnia of varying severity was found in 29 (58%) patients. Sleep quality was reported as good by 23 (46%) patients and an almost equal number (n = 27) reported it to be poor. Only one patient possibly had alexithymia. The prevalence of various psychological comorbidities in patients with chronic LBP is shown in ►Table 2 and ►Fig. 1.

An analysis of the level of disability in relation to other parameters showed a statistically significant association between the level of disability and depression, anxiety, insomnia, and sleep quality. However, no statistically significant association was found between the level of disability with pain severity and alexithymia (►Table 3). Severity of pain had statistically significant association with insomnia (p = 0.021) but the association with anxiety, depression, alexithymia, and sleep quality (P > 0.05) was not significant (►Table 4).

No statistically significant associations were found (Fisher's exact test) between the patient's gender and any of the studied instruments. While no significant difference in the frequency of consumption of pain-relieving medication and sleep medication was observed between males and females, males consumed alcohol and tobacco much more frequently than females (at the ratios of 7:1 and 8:2, respectively). No significant association was found between consumption of alcohol and tobacco products with

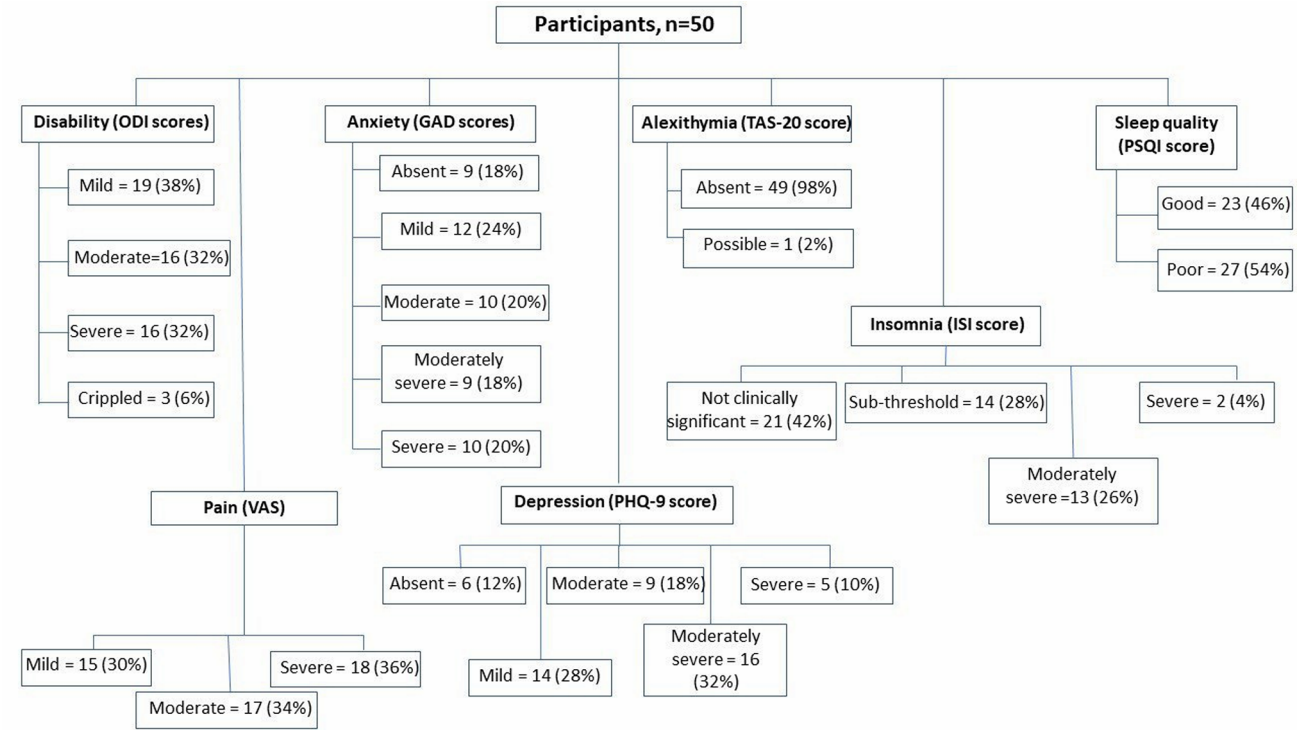

Fig. 1 The number and percent of participants with chronic low back pain (LBP) and various psychological comorbidities.

Table 3 Table showing the association of disability (measured with ODI) with the different psychological comorbidities in study participants

Disability based on ODI scores	Pain (VAS score)		Anxiety		Depression		Alexithymia		Insomnia		Sleep quality	
	Mild	Moderate-to-severe	No anxiety	Mild-to-severe anxiety	No depression	Mild-to-severe depression	No alexithymia	Possible alexithymia	No insomnia	Insomnia (different grades)	Good sleep quality	Poor sleep quality
Minimal disability	8	11	9	10	5	14	18	1	14	5	15	4
Moderate/ severe disability/ crippled	7	24	0	31	1	30	31	0	7	24	8	23
p-value (Fisher's exact test)	0.144		0.000		0.015		0.197		0.000		0.000	

Abbreviations: ODI, Oswestry disability index; VAS, visual analogue scale score for perception of pain.

Table 4 Table showing the association of pain (measured with VAS) with the different psychological comorbidities

Pain (based on VAS score)	Anxiety		Depression		Alexithymia		Insomnia		Sleep quality	
	No anxiety	Mild-to-severe anxiety	No depression	Mild-to-severe depression	No alexithymia	Possible alexithymia	No insomnia	Insomnia (different grades)	Good sleep quality	Poor sleep quality
Mild pain	3	12	2	13	14	1	10	5	9	7
Moderate-to-severe pain	6	29	4	31	35	0	11	24	15	20
p-value (Fisher's exact test)	0.810		0.849		0.123		0.021		0.496	

Abbreviation: VAS, visual analogue scale score for perception of pain.

Table 5 2 × 2 table constructed to study the odds of having multiple psychological comorbidities and chronic LBP

		LBP		Total
		Moderate-to-severe pain (% of 35)	Mild pain (% of 15)	
Number of psychological comorbidities	≥ 2	29 (82.9%)	12 (80%)	41
	≤ 1	6 (17.1%)	3 (20%)	9
Total		35 (70%)	15 (30%)	50
The odds of having moderate to severe LBP and ≥ 2 psychological comorbidities were 1.208 (CI—0.259–5.640; *p* value Fisher's exact test—0.549)				

Abbreviation: LBP, low back pain.

depression, disability level, anxiety, pain, insomnia, sleep quality, and alexithymia.

The odds of a patient of chronic LBP to be depressed and consuming alcohol were 0.94, while the odds of having anxiety and consuming alcohol were 0.6. The odds of experiencing moderate-to-severe pain and consuming alcohol were 0.667. Similarly, the odds of being depressed, having anxiety and being in moderate-to-severe pain, and consuming tobacco products were 0.444, 0.848 and 0.569, respectively. The odds of having two or more psychological comorbidities and moderate-to-severe back pain (VAS score) was 1.208 (►Table 5).

Discussion

In the present study, we found significant association between the levels of disability and depression, anxiety, insomnia and sleep disturbance with chronic LBP. While significant association was found between depression and insomnia with respect to severity of pain, significant association was not found between anxiety, sleep disturbance, alexithymia and severity of pain, and between alexithymia and the level of disability.

Studies in the past have demonstrated the correlation between LBP and psychological comorbidities like anxiety, depression, somatization symptoms, stressful responsibility, job dissatisfaction, mental stress at work, negative body image, ego weakness, and poor drive satisfaction.[12,18,26,27] Unrecognized and untreated psychopathology can significantly interfere with successful rehabilitation of chronic LBP and also increase pain intensity and disability, thus serving to perpetuate pain-related dysfunction.[5] Depression and anxiety are barriers to treatment adherence, and improving the mental health conditions have been reported to improve adherence and effectiveness of the treatment.[28] Therefore, from a clinical perspective, psychological factors are an important domain to assess treatment effectiveness.[29] Recent studies suggest psychological support and treatment to be important in patients with LBP to minimize depression and anxiety and improve their quality of life.[30] Biopsychosocial rehabilitation interventions that use a multidisciplinary approach have been reported to be more effective than usual care and physical treatments in decreasing pain and disability in persons with chronic LBP.[6,31] While studies in the past have looked at multiple coexisting chronic medical conditions, or coexisting pain conditions, we found no study looking at the prevalence of multiple psychological comorbidities in patients with chronic LBP.[32,33] The prevalence of multiple coexisting psychological comorbidities in our study is shown in ►Table 5.

Hong et al studied depression, anxiety, disability, sleep quality, and quality of life in patients with chronic LBP and found these patients to have considerable functional disability and significant impairment of psychological status with a low quality of life.[2] We agree with their suggestion of the importance of evaluating and managing the psychosocial illness and impairment of quality of life in patients with chronic LBP, and that these should be a part of the patient's regular follow-up. In a survey conducted among primary health care visitors, Bener et al compared LBP patients to patients without LBP and found a prevalence of psychological distress such as anxiety (9.5% versus 6.2%), depression (13.7% versus 8.5%), and somatization (14.9% vs. 8.3%) in the LBP patients.[34] Marčić et al studied the prevalence of depression and the relationship between depression and pain intensity in 99 LBP patients.[12] While general physical symptoms were most common (71%), they were closely followed by psychic anxiety (70%) and depressed mood (67%). They concluded that depression was more severe in LBP patients with severe disease compared with those with mild or moderate disease. Soysal et al compared disability, sleep quality, depression, physical activity level, and quality of life in preoperative chronic LBP patients, chronic LBP outpatients with a healthy control group and found that physical activity level was much more affected than the sleep quality, depression and quality of life parameters in preoperative chronic LBP patients than in others.[26]

Insomnia, the most common sleep disorder, is common in painful conditions and can adversely influence an individual's experience of pain through increasing perception of pain and decreasing pain tolerance and pain threshold.[35] O'Donoghue et al in an objective and subjective assessment of sleep in chronic LBP reported 87% participants having poor sleep quality and over half reporting threshold clinical insomnia.[16] In the present study, 54% patients reported poor sleep quality and 30% reported insomnia. Insomnia and poor sleep quality correlated with the severity of pain and level of disability. We agree with Alsaadi et al that given the prevalence of sleep disturbance in patients with chronic LBP and its likely effects like increased fatigue, daytime sleepiness and

low mood, it would be prudent to ensure that sleep problems are properly assessed and managed in these patients.[36]

We looked for the prevalence of alexithymia as well as its correlation with severity of pain and level of disability in our study sample. The prevalence of alexithymia in our sample (2%) was much lower than the prevalence rate reported in other studies (14.8 to 22%). The lower prevalence was surprising, considering that psychosomatic conditions have been traditionally associated with high rates of alexithymia. The relationship between alexithymia and culture has also been described to be complex.[37] Alexithymia was not found to correlate with the severity of pain and level of disability in the current study, a finding which was consistent with that of Turesky.[38] Literature available on alexithymia and disability is scant. As stated previously, the relationship between pain severity and alexithymia is not firmly established. One possible reason could be unidimensional measurement of pain that considers only the sensory component without measuring the affective component. The association is somewhat established in some studies that have measured affective component of pain in addition to sensory component.[39] We could not explain this low prevalence of alexithymia in the present study, which could have been due to the small sample size in our study.

Strengths

We were able to study the prevalence of a few common psychological comorbidities including alexithymia which has not been studied earlier, especially in the Indian context where cultural factors and stigma may be responsible for patients with psychological distress to often present with somatic symptoms.[40] We recognize the need for a large-scale multicentric study on this important subject and the need for a "patient-centric" approach when treating patients with chronic LBP, so that appropriate evaluation of psychosocial illness, sleep problems, and quality of life is done as part of routine management as well as during follow-up.

Limitations

We recognize that small sample size, heterogeneous sample, and lack of a control group are limitations of this study. Second, we may not have studied a representative sample of our population, but it does provide useful information on which future investigations can be based.

In conclusion, with this study, we were able to document that psychological comorbidities are prevalent in patients with chronic LBP. Although the prevalence rates vary, anxiety, depression, disability, insomnia, and poor sleep quality were found in these patients. Substance (alcohol and tobacco) abuse also had a bearing on the pain as well as on these comorbidities. Patients with chronic pain frequently use alcohol as a pain-relieving agent and self-medication of depression, thus setting up a vicious cycle. Similarly, tobacco is used as a self-medication as an anxiolytic agent.[41] We recommend that a "patient-centric" approach should be employed and potential comorbidities in all patients with chronic LBP should be explored and addressed to improve their quality of life and achieve a good clinical outcome.

Conflict of Interest

None declared.

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