

Original Article

Disability and Depression in Patients with Chronic Pain: Pain or Pain-Related Beliefs?

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Background: Physical disability and depression in patients with chronic pain have been shown to be associated with pain intensity and pain self-efficacy beliefs. However, little is known about whether pain self-efficacy beliefs can predict depression and physical disability when this relationship is controlled for pain intensity and other related demographic variables. The aim of the current study was to replicate and extend previous research on the relationship between pain-related beliefs, depression, and disability by examining these relationships in a heterogeneous sample of Iranian patients with chronic pain.

Methods: A group of 430 patients with chronic pain participated in the study and completed questionnaires on demographic variables, pain intensity, pain self-efficacy beliefs, physical disability, and depression.

Results: Correlation analyses revealed that patients with higher education were less depressed and less physically disabled. Younger patients were more physically disabled. Pain intensity and pain self-efficacy beliefs were significantly related to physical disability and depression. In hierarchical multiple regression analyses, after controlling for patients' background variables and pain intensity, pain self-efficacy beliefs accounted for significant variance in depression and physical disability over and above the effect of demographic variables and pain intensity. Patients with higher pain self-efficacy, compared to those with lower self-efficacy, were less depressed and less physically disabled.

Conclusion: Pain self-efficacy was more strongly related to depression and physical disability than pain intensity and demographic variables. The findings of the present study suggest the importance of targeting pain self-efficacy beliefs for modification in treatment of patients with chronic pain.

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Introduction

Chronic nonmalignant pain has been defined as pain experienced every day for three of the previous six months.¹

Chronic pain can be associated with disability and depression. For example, in a large-scale survey in Australia, 11% of male and 13.5% of female patients with chronic pain reported to have some degree of interference with daily activities because of the pain.² Another study surveyed 1,624 people

from a general population regarding the presence of chronic low back pain. The six-month prevalence of low back pain was 41.8%, while the pain was linked to disability in only 8.2% of the patients.³

Similarly, many studies have shown depression to be prevalent among people with chronic pain.⁴⁻⁶ In clinical samples, rates of major depression in such patients can range from 30 to 54%,^{7,8} which is significantly higher than the rate of 5 – 8% found in the general population.⁹ Currie and Wang in a study on 118,533 Canadians, reported rates of major depression as 5.9% for pain free and 19.8% for people with chronic back pain.¹⁰

Thus, disability and depression are prevalent among patients with chronic pain; however, having persistent pain does not, by itself, mean that a

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person will become disabled or depressed. Because chronic pain is not necessarily associated with depression and disability, the identification of factors contributing to the development of disability and depression among patients with chronic pain has both clinical and theoretical importance.¹¹ Knowing these factors may help those at risk for developing disability and depression.¹²

Pain intensity is consistently documented as a predictor for physical disability,¹³⁻¹⁵ and the present literature supports, to some extent, an association between pain intensity and depression.^{8,16} However, biopsychosocial approaches to chronic pain have emphasized the importance of pain self-efficacy beliefs (i.e., the patient's beliefs about his/her ability to accomplish a range of activities despite his/her pain) in the development of disability and depression among patients with chronic pain.¹⁷⁻²¹ For example, Asghari and Nicholas in a study of patients with chronic pain found significant associations between pain self-efficacy beliefs and depression, disability, and avoidance behavior.¹⁹ In that study, lower pain self-efficacy beliefs were predictive of depression, disability, and avoidance behavior over the nine-month study period.

In summary, the literature supports the view that both pain and pain self-efficacy beliefs are predictive of disability and depression among patients with chronic pain. However, the studies reviewed here were conducted in a predominantly Western environment (i.e., Australia, Europe, and North America). No published data are available to date on the impact of pain-related beliefs on mood and physical disability amongst Iranian patients with chronic pain.

The aim of the current study was to replicate and extend previous research on the relationship between pain-related beliefs, depression, and disability by examining these relationships in a heterogeneous sample of Iranian patients with chronic pain. In this study, we examined the role of a pain-related belief, namely pain self-efficacy, in explaining differences in levels of physical disability and depression observed among patients with chronic pain, while controlling for pain intensity and demographic variables.

Materials and Methods

Participants

A cross-sectional study was conducted on 430

patients with chronic pain who were referred to six medical centres in Tehran and Gazvin for possible treatment. The patients were enrolled into the study provided that they met the inclusion criteria including a history of chronic pain (i.e., pain experienced every day for three months in the previous six months), the ability to read and speak in Persian, and willing to participate in a research program.

Measures

Following is a brief overview of the independent and dependent variables measured for the purpose of this study:

Demographic

Age, gender, education, marital, and occupational status were included as demographic variables.

Pain-related medical history

Data were collected on pain duration, pain site, and health-care utilization because of the pain.

Average pain intensity over the past six months

Pain intensity was measured using a Numerical Rating Scale (NRS). The NRS required patients to rate their pain intensity on a 0 to 10 (11-point) scale where 0 indicates "no pain" and 10 means, "pain as bad as it could be". The validity of the NRS and its sensitivity to treatment effects has been well documented.²²

Pain Self-Efficacy Questionnaire

A Persian-language version of the Pain Self-Efficacy Questionnaire (P-PSEQ) was used to measure pain self-efficacy beliefs. As in the original version of the PSEQ,²³ the P-PSEQ consists of 10 items. The P-PSEQ is based on Bandura's,²⁴ concept of self-efficacy and measures both the strength and generality of a patient's beliefs about his/her ability to accomplish a range of activities despite his/her pain. Each item on the P-PSEQ is rated, selecting a number on a seven-point scale, where 0 equals "not at all confident" and 6 equals "completely confident". A total score is calculated by summing scores for all ten items, yielding a maximum possible score of 60. A high score reflects strong self-efficacy beliefs. The test-retest coefficient (reliability) of the P-PSEQ among a sample of Iranian patients with chronic pain (n=20) after a nine-day interval was acceptable ($r=0.66$, $P=0.001$).²⁵ In the current

study, internal consistency of the P-PSEQ was excellent (Cronbach $\alpha=0.93$).²⁶

Physical Disability Questionnaire

The Roland and Morris Physical Disability Questionnaire (PDQ) was originally developed and validated for assessing the functional impact of back pain.²⁷ A Persian-language version of the PDQ was used to measure current physical disability. Because the present study was conducted on a heterogeneous group of patients with chronic pain, the participants were asked to relate the items to their pain, regardless of site.^{19,28} Test-retest coefficient (stability) of the PDQ in a sample of Iranian patients with chronic pain ($n=20$) with a nine-day interval was acceptable ($r=0.90$, $P=0.001$).²⁵ In the current study, internal consistency of the PDQ was good (Cronbach $\alpha=0.87$).²⁶

Beck Depression Inventory (BDI)

The revised version of the BDI was used to measure mood.²⁹ The inventory consists of 21 categories of symptoms. The total score, which can range from 0 to 63, is obtained by summing scores on each category. Higher scores indicate more severe depression.²⁹ The BDI is a widely-used self-report measure of depressive symptoms in clinical situations.³⁰ Psychometric properties (i.e., validity and reliability) of the BDI have been confirmed in an Iranian sample.³¹ In the current study, the BDI was found to have a good internal consistency with a Cronbach alpha of 0.85.²⁵

Results

Sample characteristics

The results were analyzed using SPSS software version 14.0. The participants were predominantly females (60%) and married (86.5%). Most of them (55.4%) had at least a high-school diploma (i.e., 12 years formal education). The mean (\pm SD) age of the participants was 42.00 (\pm 13.96) years. In terms of employment, 34.2% (147) were homemakers, 50.5% (217) reported that they had a full-time job, 11.2% (48) were retired, and 4.2% (18) were unemployed because of various reasons, including pain.

Table 1 summarizes the data related to pain characteristics of the participants. On average, the patients had experienced pain for almost 3.5 years (range= 3 – 360 months). Nearly half of the patients reported that pain affected their hands and

Table 1. Pain-related characteristics of the participants in the study.

Characteristics	Mean (SD)
Pain duration (month)	40.80 (54.06)
Present pain intensity	5.4 (2.1)
Highest pain intensity in the past 6 months	8.2 (2.2)
Average pain intensity in the past 6 months	5.4 (2.9)
Pain-related treatment	
	<i>n</i> (%)
Visit at least a general practitioner	399 (93)
Medication usage	339 (79)
Hospitalization	89 (21)
Surgery	66 (15)
Pain site	
Hand and foot	206 (48)
Back and lower back	145 (34)
Shoulder	24 (5.5)
Head and neck	23 (5.3)
Pelvic	19 (4.2)
Chest and abdomen	14 (3.2)

feet. Almost one third reported that pain affected their backs and lower backs. The remainder had pain in various other areas. The average level of pain during the past six months was rated as 5.4 (range= 0 – 10, SD=2.9) out of 10. Most of the patients searched actively for pain relief; 93% visited a general practitioner, 21% had at least one pain-related hospitalization, 15% reported at least one pain-related surgery, and 79% reported that they used medication for pain relief at the time of study.

Male and female participants were compared on study variables, using a series of independent sample *t*-tests. The assumption of equal variance between males and females was examined by Levene's test for equality of variance. In order to control for the risk of type I errors, a Bonferroni adjustment was used ($0.05/5=0.01$). Only *P* values at or below the 0.01 alpha level were considered significant. The results of these analyses are presented in Table 2. As can be seen in this table, there were no gender-related differences in the study measures among the participants. So the data for male and female patients with chronic pain were combined.

Prediction of depression and disability

Table 3 summarizes the results of two separate hierarchical regression analyses examining the relationship between pain self-efficacy beliefs and depression and disability, after controlling for any possible confounding factors. Before running these regressions Pearson correlations were calculated

Table 2. Gender and some of the study variables (n = 430).

Variable	Total(SD) n=430	Male(SD) n=175	Female (SD) n=255	P value
Age (18 – 86)	42.00(13.90)	42.97(14.89)	41.35(13.27)	0.23
Pain duration (3 – 360)	40.84(54.06)	37.66(51.20)	43.03(55.93)	0.31
Physical disability (0-24)	10.74(5.80)	10.56(6.01)	10.87(5.657)	0.58
Depression (0 – 63)	16.96(9.41)	16.42(9.27)	17.32(9.51)	0.32
Self-efficacy beliefs (0 – 60)	35.84(13.39)	35.20(14.02)	36.27(12.96)	0.41
Average pain intensity in the past 6 months (0 – 10)	5.38(2.04)	5.60(2.10)	5.24(1.95)	0.31

between depression, physical disability, and possible confounding variables including age, education, pain duration, and average pain intensity over the past six months. These analyses revealed significant associations between pain intensity and both depression and disability (for pain intensity and depression, $r=0.24$, $P=0.001$ and for pain intensity and physical disability, $r=0.33$, $P=0.001$). Patients who were younger reported more severe physical disability ($r=0.12$, $P=0.01$).

Finally, significant associations were found between level of education and both depression and disability (for education and depression, $r=-0.15$, $P=0.01$ and for education and physical disability, $r=-0.28$, $P=0.001$). Patients with fewer years of education reported more severe depression and physical disability.

In each regression, all variables found to be significantly related to the criterion variables in the correlation analysis were entered first into the regression equation to control for any possible confounding effect on criterion variable. Furthermore, in order to control the risk of type I error, a Bonferroni correction was applied to levels of significance (i.e., 0.05 divided by the number of statistical tests in each equation). Thus, for depression, alpha level was set at 0.01 (this regression has five statistical tests, two tests from step I and three tests from step II). For physical disability, alpha level was set at 0.007 (each of these regressions has seven statistical tests, three

tests from step I and four tests from step II).

As can be seen in Table 3, the block of control variables significantly predicted depression and physical disability. Of these, pain intensity showed independent and significant associations with depression and disability. However, these associations were somewhat weak (beta weights range between 0.14 and 0.16). Higher education was an independent and significant predictor of physical disability (beta=-0.16, $P=0.001$) but not depression (beta=-0.06, $P=0.12$).

The second step of the analysis showed that the presence of pain self-efficacy beliefs was a significant predictor of depression and physical disability. More specifically, pain self-efficacy beliefs significantly explained additional variance (14% for depression and 19% for physical disability) in each of the criterion variables, after controlling for demographic variables and pain intensity. As can be seen in Table 3, pain self-efficacy was more strongly related to depression and physical disability measures than either pain intensity or demographic variables. Patients with higher pain self-efficacy had lower levels of depression and disability than patients with lower pain self-efficacy.

Discussion

The current study was designed to replicate and extend previous findings on the predictive effect of

Table 3. Summary of the hierarchical regression analyses for depression and physical disability measures.

Variable	Summary of the model	Predictors	Beta	P	Sr ² (Incremental)
Depression	R ² =0.21 [F(3,426)=39.16, $P < 0.001$]	Step I: Education	-0.06	0.12	0.07**
		Average pain in previous 6 months	0.14	0.001	
		Step II: Pain self-efficacy	-0.39	0.001	0.14**
Physical disability	R ² =0.35 [F(4,224)=56.56, $P < 0.001$]	Step I: Education	-0.16	0.001	0.16**
		Age	0.04	0.24	
		Average pain in previous 6 months	0.21	0.001	
		Step II: Pain self-efficacy	-0.44	0.001	0.19**

pain intensity and pain-related beliefs on depression and physical disability among Iranian patients with chronic pain. The study showed that patients with more severe pain reported more severe depression and physical disability. However, these associations were weak; pain intensity by itself explained only 7% of variance of mood, and in conjunction with education, it explained 16% of variance in the severity of physical disability.

On the other hand, pain self-efficacy beliefs significantly explained 14% of variance on mood and 19% of the variance on disability over and above the effect of pain intensity and an important demographic factor (i.e., education). Consistent with the previous findings,³²⁻³⁴ these results indicate that in chronic pain, pain-related beliefs and cognitions have more influence on the development and maintenance of disability and distress than pain intensity. These findings support cognitive-behavioral models of chronic pain that view depression and disability in individuals with chronic pain as strongly influenced by individual appraisals of pain.

The clear message of these findings is that in understanding, managing, and treating disability and depression in chronic pain, psychological factors are important. These results also support cognitive-behavioral treatment of chronic pain that promote patients' beliefs regarding self-responsibility for managing pain, ability to control pain using strategies other than medications, and ability to participate in customary activities (i.e., not be disabled by pain).³²

Patients who reported stronger beliefs that they can do their activities despite pain were less depressed and less physically disabled even when the severity of pain remained constant. While consistent with previous findings that the pain self-efficacy construct is an important determining factor in the process of adjustment to chronic pain,^{17-21,35} these findings need justification; Why do patients with a higher confidence in their ability to function despite pain have lower levels of disability and depression when compared to those who endorsed items indicating lower confidence levels?

"Efficacy expectations are determine how much effort people will expend and how long they will persist in the face of obstacles and aversive experiences".²⁴ People with high pain self-efficacy convinced that they could exercise control over pain, hence, they did not conjure up apprehensive

cognitions and were not severely disturbed by pain.³⁶ In addition, it has been proposed that the self-efficacy construct may be related not only to specific behaviors, but also to broader constructs, such as coping behavior.³⁷⁻³⁹ From the above, it can be concluded that people with higher confidence that they can manage their lives despite persistent pain engaged in a broad range of activities, which might bring them less depression and disability.²¹

Apart from theoretical considerations, the finding that the construct of pain self-efficacy beliefs can explain a significant amount of variance in depression and disability after controlling for the effect of pain severity, has clinical implications. The first-line treatment of pain consists of a host of pharmacological agents. However, despite their frequent use, currently available literature supports the idea that, in many cases, when pain becomes chronic, complete and lasting pain relief is unlikely.¹¹ For example, in the treatment of neuropathic pain, tricyclic antidepressants, anticonvulsants, and relevant preparations are viewed as a treatment of choice. However, present data suggest that these pharmacological agents reduce pain intensity only by an average of 36%.^{40,41} In a review of the present literature Turk concluded that the average pain reduction for patients on long-term opioids was approximately 32%.⁴² In another review of studies that used opioids for treatment of chronic pain Nicholas et al. have concluded that oral opioids by themselves generally achieve only modest reductions in pain levels in patients with chronic noncancer pain.⁴³ Although these pain reductions are clinically significant and important, the intensity of pain and the severity of disability do not correlate well and are associated with different risk factors. There is evidence that clinically relevant improvements in the severity of pain may lead to almost unnoticeable changes in disability and quality of life.³³

In contrast to pharmacological agents, which target pain reduction, the focus in cognitive-behavioral pain management programs (CBPMP) rests more on ways of controlling pain and limiting its impact on patient's life rather than pain relief. Pain self-efficacy is not a static phenomenon. Bandera's pain self-efficacy theory would predict that a generalized confidence in the ability to function despite persistent pain would change in the light of personal achievement (in performance), observation of others performing relevant

behaviors, and verbal persuasion. All three elements could be said to exist in (group) CBPMP.⁴⁴ The effectiveness of CBPMP in achieving improvements in patients' self-efficacy beliefs (i.e., confidence to perform a range of daily living activities despite pain) while no clinical improvement in pain intensity was achieved has been well documented.⁴⁵⁻⁴⁷

From the findings of the present study it can be concluded that the CBPMP can reduce depression and physical disability among patients with chronic pain while significant reduction in pain intensity among this population remains elusive.

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