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Original Article

The relationship of illness perceptions with demographic features, pain severity, functional capacity, disability, depression, and quality of life in patients with chronic low back pain

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ABSTRACT

Objectives: The aim of this study was to evaluate the relationship of illness perceptions (IPs) with demographic features, severity of pain, functional capacity, disability, depression, and quality of life in patients with chronic low back pain (CLBP).

Patients and methods: Between January 2015 and July 2015, a total of 114 patients with non-specific CLBP (86 females, 28 males; mean age 47.1±15.2 years; range, 18 to 85 years) were included. Non-specific CLBP was defined as low back pain not attributable to a recognizable, known specific pathology such as infection, tumor, inflammation for ≥12 weeks. The IPs using the revised Illness Perception Questionnaire (IPQ-R), pain severity using the visual analog scale (VAS), functional capacity using the Six-Minute Walk Test (6MWT), disability using the modified Oswestry Disability Index (m-ODI), depression using the Beck Depression Inventory (BDI), and quality of life using the Short Form-36 (SF-36) were assessed.

Results: There was a significant, positive correlation between the age, body mass index, duration of disease, pain scores, and IPQ-R-consequences, timeline (acute/chronic), and emotional responses subunits, whereas there was a significant, negative correlation between the IPQ-R-personal and treatment control subunits ($p<0.001$). The IPQ-R-timeline (acute/chronic), consequences, and emotional response subunits were positively and personal and treatment controls and illness coherence subunits were negatively correlated with the BDI and m-ODI ($p<0.001$). The IPQ-R-consequences and emotional responses subunits were negatively and timeline (acute/chronic), personal and treatment controls, and illness coherence subunits were positively correlated with the SF-36 subunits ($p<0.05$).

Conclusion: The IPs were negatively affected by advanced age, high body mass index, longer duration of disease, and increased severity of pain in CLBP patients. Based on these findings, positive IPs may be related with reduced disability and depression, and improved quality of life and functional capacity in this patient population. Developing new strategies for improving the negative IPs of patients with CLBP may be useful.

Keywords: Depression, disability, illness perception, low back pain, quality of life.

Illness perceptions (IPs) are cognitive and emotional representations that patients have about their illnesses. The IPs are not only based on symptoms, but also on the illness-related consequences and past experiences, and associated anxiety. Patients develop their own ideas about their illness to make sense of and adapt to the difficulties that their illness causes.[1,2] The IPs have been examined previously in several chronic disorders such as chronic fatigue syndrome, rheumatoid arthritis, coronary artery disease, psoriasis, fibromyalgia, and sports injuries.[3-9] The results of previous studies have supported that negative IPs are associated with maladaptive illness behavior, a greater level of dysfunction, increased psychological stress, and poor treatment adherence and treatment outcomes in patients with chronic pain.

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Chronic low back pain (CLBP) represents a major health problem and an economic burden for society, considering that 70 to 85% of all individuals have low back pain at some time in their life and 4 to 20% of them would develop into a chronic condition.[10,11] It is not fully understood why low back pain leads to CLBP in some patients. With respect to the transition from acute to CLBP, evidences demonstrate the importance of psychosocial factors such as emotional distress, pain catastrophizing, fear avoidance beliefs and kinesiophobia.[12-15] The IPs of the patient about his/her low back pain may be contributing factor for CLBP. Furthermore, negative IPs experience may be associated with poor clinical outcomes in patient with CLBP. A recent research has highlighted the need of evaluating and treating patients from a biopsychosocial perspective.[16] The most common psychological outcome measures in CLBP are instruments assessing depression, anxiety, fear avoidance, and kinesiophobia.[17] The IPs are another psychological construct that has received increasing attention in low back pain researches, although limited data exist in the literature about the IPs of low back pain patients,[18-20] and studies examining the role of IPs on quality of life, functional and psychological status of the same CLBP patient group are essentially lacking.

In the present study, we aimed to evaluate the relationship of IPs with demographic features, severity of pain, functional capacity, disability, depression, and quality of life in patients with CLBP.

PATIENTS AND METHODS

This cross-sectional study was conducted at the Department of Physical Medicine and Rehabilitation of Ondokuz Mayıs University Medical Faculty between January 2015 and July 2015. The study sample included a total of 114 patients with non-specific CLBP (86 females, 28 males; mean age 47.1±15.2 years; range, 18 to 85 years). Nonspecific CLBP was defined as low back pain not attributable to a recognizable, known specific pathology such as infection, tumor, osteoporosis, lumbar spine fracture, structural deformity, inflammatory disorder, radicular syndrome, or cauda equina syndrome for ≥12 weeks.[21] *Inclusion criteria were as follows:* patients aged over 18 years with non-specific CLBP for ≥12 weeks. *Exclusion criteria were as follows:* acute low back pain, presence of red flags, specific CLBP such as inflammatory, metabolic, or metastatic infections, lumbar surgery, severe somatic and psychiatric disorders and cognitive dysfunctions which could affect the outcomes. Data including demographic and clinical characteristics of the patients such as age, sex, body mass index (BMI), educational and marital status, employment status, and duration of CLBP were recorded.

A written informed consent was obtained from each patient. The study was approved by the Ondokuz Mayıs University Medical Faculty Ethics Commitee (OMU-EC 2015/176). The study was conducted in accordance with the principles of the Declaration of Helsinki.

Outcome measures

Pain severity

The severity of low back pain of the patients was evaluated by a 10-cm visual analog scale (VAS) where the 0 indicates no pain and 10 indicates unbearable pain.[22] Pain was evaluated at rest and/or during physical activity.

Functional capacity

The Six-Minute Walk Test (6MWT) was used to measure the distance (in meters) the patient could walk in six min. It is a practical test which can be implemented easily on a submaximal effort level.[23]

Disability

The modified Oswestry Disability Index (m-ODI) is a self-administered questionnaire which assesses disability, consisting of 10 items and each item is scored from 0-5. Items include pain intensity, personal care, lifting, walking, sitting, standing, sleeping, employment/homemaking, traveling, and social life.[24] The total score ranges from 0 to 50. The disability level increases by an increased total score. The reliability and validity of the Turkish version of m-ODI have been shown by Duruöz et al.[25] In a previous study, the normative score of the ODI was defined as 8.73 and the optimal cut-off value of the ODI was calculated as 12.[26]

Illness perceptions

The Illness Perception Questionnaire-revised (IPQ-R) is a questionnaire with good short- and long-term retest reliability and is used in several groups of patients with musculoskeletal disorders to assess IP with acceptable psychometric properties.[27] It was originally developed by Weinman et al.[28] and revised by Moss-Morris et al.[27] The Turkish version of the IPQ-R was used to assess IPs.[28] It has three sections: the first section is identity component and is concerned with symptoms such as pain, fatigue, and nausea that the patients associate with their illness. The patients are asked whether they experience a specific symptom and whether they believe that this symptom is related to CLBP. The sum of the Yes-rated items on the second question forms the identity subscale. The second section, in particular beliefs domain, comprises of 38 items with a five-point Likert scale response format (strongly agree to strongly disagree) in seven dimensions: timeline acute/chronic (beliefs about the duration of illness), timeline cyclical (beliefs about stability of illness symptoms over time), consequences (beliefs about illness severity and impact on physical, social, and psychological functioning), personal control (belief about one's own ability to control symptoms), treatment control (belief in cure through treatment), illness coherence (comprehension or understanding of the illness), and emotional representation (perception of negative emotions generated by the illness). High scores for timeline, consequences, cyclic dimension, and emotional representations reveal strongly held beliefs regarding the number of symptoms attributed to the illness, as well as the chronicity and the cyclical nature of the negative consequences and emotions regarding the condition. High scores for the personal control, treatment control and illness coherence dimensions reflect positive beliefs regarding the illness and the understanding of the illness.[27,29] The third section consists 18 possible causes which patients might attribute to CLBP in four dimensions: psychological attributions, risk factors, immunity, and chance. Previous researches investigating IPQ-R focused on the 38 items of the seven-dimensional IPQ-R section.[4,19,30] Similarly, in this study, the second section of IPQ-R was evaluated, since symptoms in the identity section and causes in the third section are not always relevant for CLBP.

Depression

The Beck Depression Inventory (BDI) is a self-reported questionnaire which assesses depressive symptoms during the week prior to the interview. It consists of 21 items.[31] Each of 21 items on the BDI consists of four statements. These statements are placed in an order from a neutral state (0 points) to the worst state (3 points). The highest score is 63 and the higher score shows increased depression of the individual. The reliability and validity of the Turkish version of BDI have been shown by Hisli.[32] The cut-off score for no depression to depression used was 9 (10 or more indicates depression). The cut-off score for moderate-to-severe depression used was 17 (18 or more indicates moderate-to-severe depression).[33]

Quality of life

The Short Form-36 health survey (SF-36) is a widely used measure of quality of life and consists of 36 items evaluating physical functioning, physical role functioning, emotional role functioning, social role functioning, general health, mental health, bodily pain, and vitality. Scores for eight domains are calculated by summing up the item scores, which are coded in such

Table 1. Demographic and clinical characteristics of patients with CLBP (n=114)

Characteristics	n	%	Mean±SD	Median	Min-Max
Age (year)			47.1±15.2	47	18-85
Duration of disease (months)			41.1±59.3	15	3-360
Body mass index (kg/m²)			27.7±5.5	26.7	17.9-43.7
Sex					
Female	86	75			
Male	28	25			
Marital status					
Married	83	73			
Other	31	27			
Education					
Uneducated	46	40			
Primary education	33	29			
Secondary education + college	35	31			
Employment status					
Housewife	54	47.4			
Retired	5	4.4			
Working	14	12.3			
Officer	20	17.5			
Other	21	18.4			

CLBP: Chronic low back pain; SD: Standard deviation; Min: Minimum; Max: Maximum.

a way that each domain is scored from 0 to 100, with 0 indicating the worst health status and 100 indicating the best health status.[34] The reliability and validity of the Turkish version of the SF-36 have been shown by Kocyigit et al.[35]

Statistical analysis

Statistical analysis was performed using the IBM SPSS version 22.0 software (IBM Corp., Armonk, NY, USA). The Kolmogorov-Smirnov test was used to analyze normal distribution assumption of the quantitative outcomes. Continuous variables were expressed in mean ± standard deviation and median (min-max), whereas categorical variables were presented in number and frequency (%). Data were analyzed using the Student's t-test and Mann-Whitney U test for normal and non-normal data, respectively. Varying frequencies among the categorical groups were evaluated using the chi-square test. The Spearman's correlation test was used for the correlation analysis. A priori power analysis using data from a previous study[36] assessing IP in CLBP indicated that a sample of 114 patients would have 0.99 power. A *p* value of <0.05 was considered statistically significant.

RESULTS

Demographic and clinical characteristics of the patients with CLBP are shown in Table 1. The mean disease duration was 41.1±59.3 (range, 3 to 360) months.

Clinical variables of the patients with CLBP are summarized in Table 2. The mean pain VAS score was 6.2±1.5 (range, 3 to 10) cm. The mean ODI score was 18.4±11.7 and the mean BDI score was 12.1±10.5, indicating that the study population consisted of patients with mild depression and mild disability.

The relationship IP with demographic and clinical variables in patients with CLBP are shown in Table 3. There was a weak or moderate, positive, and significant correlation between the age, BMI, duration of disease, pain scores, and IPQ-R-consequences, timeline (acute/chronic), emotional responses subunits, whereas personal and treatment control subunits showed a weak, negative, and significant correlation (p<0.001). There was also a moderate to strong, positive, and significant correlation between the BDI, m-ODI scores, and IPQ-R-emotional responses, and timeline (acute/chronic), consequences

Table 2. Clinical variables of patients with CLBP (n=114)

Characteristics	Mean±SD	Median	Min-Max
Pain (VAS, 0-10 cm)	6.2±1.5	6	3-10
6MWT (m)	349.2±182.3	410	5-620
m-ODI (0-50)	18.4±11.7	16	1-45
Beck depression inventory (0-63)	12.1±10.5	9	0-48
SF-36 (0-100)			
Physical functioning	55.4±33.1	60	0-100
Physical role limitations	43.8±33.1	60	0-100
Bodily pain	45.5±18.9	50	0-84
General health	49.8±22.9	50	0-92
Vitality/energy	50.4±20.8	50	5-90
Social functioning	60.1±26.5	62	0-100
Emotional role	50.8±43.6	66	0-100
Mental health	53.8±16.2	52	0-88
IPQ-R (0-30)			
Acute/chronic timelines	13.9±3.8	16	4-20
Cyclical timeline	15.6±3.5	16	4-20
Consequences	16.7±5.7	17	7-30
Personal control	20.7±4.4	22	8-30
Treatment control	18.2±3.6	18	5-25
Emotional representations	17.8±6.1	19	7-30
Illness coherence	16.8±4.4	18	5-25

CLBP: Chronic low back pain; SD: Standard deviation; Min: Minimum; Max: Maximum; VAS: Visual analog scale; 6MWT: Six minute walk test; m-ODI: Modified Oswestry Disability Index; SF-36: Short form 36; IPQ-R: Revised Illness Perception Questionnaire.

Table 3. Correlation between illness perceptions and demographic and clinical variables in patients with CLBP (n=114)

	IPQ-R domains						
	Acute/chronic timelines	Cyclical timeline	Consequences	Personal control	Treatment control	Emotional representations	Illness coherence
	r	r	r	r	r	r	r
Age (year)	0.272**	-0.014	0.412**	-0.250**	-0.289**	0.261**	-0,07
BMI (kg/m^2)	0.229**	0.004	0.307**	-0.217**	-0,244**	0.227**	-0,247**
Duration of disease (month)	0.350**	0.219*	0.382**	-0.171	-0.202*	0.291**	-0.097
Pain (VAS, 0-10 cm)	0.372**	-0.019	0.598**	-0.228**	-0.248**	0.344**	-0,098
6MWT (m)	-0.419**	0.048	-0.658**	0.284**	0.305**	-0.371**	0,185
m-ODI (0-50)	0.511**	-0.060	0.746**	-0.416**	-0.376**	0.515**	-0,216**
BDI (0-63)	0.493**	-0.025	0.701**	-0.353**	-0.368**	0.616**	-0,228**
SF-36 (0-100)							
Physical functioning	0.764*	0.143*	-0.724*	0.428*	0.467*	-0.521*	0.263*
Physical role	0.677*	0.098	-0.578*	0.374*	0.418*	-0.450*	0.286*
Bodily pain	0.805*	0.206*	-0.694*	0.432*	0.408*	-0.514*	0.245*
General health	0.777*	0.066	-0.754*	0.487*	0.489*	-0.677*	0.353*
Vitality/energy	0.693*	0.106	-0.650*	0.436*	0.435*	-0.655*	0.284*
Social functioning	0.478*	0.156*	-0.716*	0.428*	0.448*	-0.617*	0.317*
Emotional role	0.703*	0.042	-0.516*	0.352*	0.391*	-0.426*	0.214*
Mental health	0.609*	0.009	-0.612*	0.359*	0.460*	-0.629*	0.330*

CLBP: Chronic low back pain; IPQ-R: Revised Illness Perception Questionnaire; BMI: Body mass index; VAS: Visual analog scale; 6MWT: Six minute walk test; m-ODI: Modified Oswestry Disability Index; BDI: Beck depression inventory; SF-36: Short Form 36; * p<0.05; ** p<0.001; r: Spearman's correlation coefficient.

Table 4. Comparison of illness perceptions and other clinical variables of female and male patients

	IPQ-R domains						
	Female (n=86)			Male (n=28)			
	Mean±SD	Median	Min-Max	Mean±SD	Median	Min-Max	*p*
Duration of CLBP (months)	47.5±65.5	24	3-360	22.1±29.3	12	3-144	0.08
Pain (VAS, 0-10 cm)	6.3±1.5	7	3-9	6.0±1.7	6	4-10	0.22
6MWT (m)	345.8±181.2	390	5-620	359.5±188.5	425	5-580	0.59
m-ODI (0-50)	19.0±11.7	16.5	1-45	16.5±11.7	12.5	2-44	0.27
BDI (0-63)	12.7±9.9	11	0-39	10.3±12.3	4	0-48	0.12
SF-36							
Physical functioning	52.7±33.0	50	0-100	63.8±32.6	75	0-100	0.10
Physical role limitations	40.9±41.3	25	0-100	52.5±42.5	50	0-100	0.17
Bodily pain	45.3±18.1	51	10-84	46.2±21.2	51	0-84	0.69
General health	4.0±22.8	45	0-92	52.2±23.6	59.5	5-87	0.40
Vitality/energy	49.9±21.0	50	5-90	51.8±20.5	55	5-80	0.47
Social functioning	59.6±25.9	62.5	0-100	61.6±28.7	62.5	0-100	0.57
Emotional role	45.5±43.9	33.3	0-100	67.0±38.8	83.5	0-100	0.01*
Mental health	54.4±14.8	52	0-88	51.9±20.2	52	0-80	0.96
IPQ-R (0-30)							
Acute/chronic timelines	19.5±5.0	19	6-28	19.8±5.9	19,5	6-30	0.97
Cyclical timeline	14.1±3.8	16	4-20	13.4±4.0	14.5	7-20	0.34
Consequences	17.1±5.3	18	7-25	15.5±6.6	13.5	8-30	0.13
Personal control	20.5±4.4	21	9-30	21.2±4.7	23	8-27	0.26
Treatment control	18.0±3.9	18	10-25	19.0±4.2	20	5-25	0.08
Emotional representations	18.0±5.8	20	7-30	17.1±6.9	16	7-30	0.53
Illness coherence	16.9±4.4	17	9-25	16.4±5.9	19	5-25	0.84

CLBP: Chronic low back pain; IPQ-R: Revised Illness Perception Questionnaire; BDI: Beck depression inventory; 6MWT: Six minute walk test; m-ODI: Modified Oswestry Disability Index , SF-36: Short Form 36; * p<0.05; ** p<0.001; r: Spearman's correlation coefficient.

subunits, whereas the IPQ-R-personal and treatment control and illness coherence subunits showed a weak or moderate, negative, and significant correlation ($p<0.001$). There was a weak, positive, and significant correlation between the 6MWT and IPQ-R-personal and treatment control subunits, whereas the IPQ-R-consequences, timeline (acute/chronic), and emotional responses subunits showed a moderate or strong, negative, significant correlation ($p<0.001$). The correlations between the SF-36 subunits and IPQ-R-consequences and emotional responses subunits were strong or moderate, negative, and significant ($p<0.05$), whereas the IPQ-R-timeline (acute/chronic), personnel and treatment control subunits showed a strong or moderate, positive, and significant correlation ($p<0.05$).

Comparison of the IPs and other clinical variables of female and male patients are shown in Table 4. There were no statistically significant differences between the female and male patients in the IPQ-R domains, duration of CLBP, 6MWT, m-ODI, BDI, and SF-36 scores (expect for SF-36 emotional status subscores) ($p>0.05$) (Table 4).

DISCUSSION

According to a limited number of studies in CLBP patients, negative IPs were associated with maladaptive illness behavior, a greater level of dysfunction, and poor treatment adherence and treatment outcomes.[2,13,18] These results highlight the need to elicit and address patients' IPs of their low back problems. Accordingly, in the present study, we aimed to evaluate the relationship of IPs with demographic and clinical features in patients with CLBP. Our study results showed that negative IPs were closely associated with advanced age, high BMI, longer duration of disease, increased severity of pain, decreased functional capacity, increased disability and depression levels, and poor quality of life in patients with CLBP. However, there was no significant difference in the IPs of male and female patients.

Although it was reported that age may influence patients' IPs,[37] the relationship between age and IPs in CLBP patients has not been well known. Our study showed that negative associations between age, and personal control and treatment control subunits, indicating that as the patient ages, he/she may have negative beliefs about personal abilities to control his/her CLBP and about the ability of treatment to control CLBP. Additionally, the present study showed that positive associations between age and IPQ-R-consequences, timeline (acute/chronic), emotional responses subunits. In other words, as the patients suffering from low back pain became older, they believed that their injury had serious consequences and had longer duration, and that their pain had more emotional effects.

Furthermore, it may be expected that longer disease duration may lead to negative beliefs about CLBP. On the other hand, patients with CLBP for a longer time may worry less about their illness and have strong perceptions about their CLBP due to their experience and competence. The present study showed a significant, positive correlation between the duration of disease and IPQ-R-consequences, timeline (acute/chronic, cyclical) and emotional responses subunits. It seems that the patients with longer disease duration are more likely to have negative beliefs about CLBP.

The IPs have a strong relationship with the degree of pain;[38] in particular, impaired IPs are related to the pain severity.[7,8] In accordance with the literature, in the present study, pain scores were closely and positively correlated with the IPQ-R-consequences, timeline (acute/chronic), and emotional responses subunits, whereas the pain scores were closely and negatively correlated with personal and treatment control subunits in the patients with CLBP. The perception of serious consequences, the belief that the problem was long-term, impaired mood, and weaker controllability beliefs might cause impaired perception of pain in these patients. These findings suggest that impaired IPs may play a major role in increased pain perception in these patients. On the other hand, the patients with higher pain scores might be expected to have a greater level of impaired IPs, as their illness was more severe.

There are only few researches examining the role of IP in explaining functional disability and physical activity in patients with CLBP.[13,19] Foster et al.[13] suggested that IPs were better predictors of disability at six months than fear avoidance, catastrophizing or depression in non-specific low back pain patients. Recently, in a cross-sectional study, Leysen et al.[19] reported that IPs appeared closely related to disability. Patients with a lower functional capacity measured by the 6MWT and higher disability scores measured by the m-ODI would be expected to have a poor physical condition. Our study showed a significant relationship between negative IPs and decreased functional capacity and increased disability in the patients with CLBP. These data indicate the importance of monitoring a patient's IP, as it is closely related to the current functional and disability level of the patient. Additionally, these findings suggest that modified illness beliefs may have a beneficial effect on physical condition in patients with CLBP. Therefore, when inadequate or negative IP are present, specific patient education is indicated.

Poor IPs have been also shown to related to increased psychological stress in fibromyalgia patient populations.[7,8] Although depression is frequently reported in CLBP,[39] the relationship of IP with depression has not been well studied in CLBP patients. To the best of our knowledge, our study is the second to investigate this unrevealed relationship in patients with CLBP. In our study, we found a significant relationship between negative IP and increased depression scores in the patients with CLBP. Spinhoven et al.[40] found that a reduction of catastrophic thinking mediated the reduction of depression in patients with CLBP. The association between the IP and depression scores in CLBP patients may be mutual. The patients may perceive their illness more negatively, as depression or negative beliefs of the patients about their CLBP may make them more depressive. Thus, longitudinal studies are needed to identify the direction of causality in this relationship.

The IPs have been shown to predict changes in quality of life in different patient populations such as fibromyalgia, rheumatoid arthritis, and ankylosing spondylitis.[2,41] To the best of our knowledge, the current study is the first to assess the relationship of the IP with quality of life in patients with CLBP. Our results are also consistent with previous studies involving different populations, showing that positive IPs of the patients are closely related to improved quality of life.[2,41] Enhancing illness beliefs and reducing catastrophic thinking, therefore, seem crucial factors in the quality of life of patients with CLBP.

Nonetheless, there are some limitations to this study. First, this study is cross-sectional; therefore, it is not possible to identify the temporal nature of any observed associations. Second, there is no healthy, age-matched control group with similar characteristics. Third, the sample of our study is a convenience sample of patients with CLBP who agreed to participate. Therefore, this sample may not be representative of all patients with CLBP. On the other hand, the main strength of the study is that it was able to evaluate both physiological and psychological statuses which could affect IP in a single study group. Additionally, the study included both women and men; therefore, the results can be extrapolated to both sexes.

In conclusion, the current study highlights the importance of positive IPs for improved health outcomes such as quality of life, and functional and emotional status in patients with CLBP. The negative IPs are associated with advanced age, high BMI, and increased severity of pain. These results indicate that IP should be also addressed to improve health outcomes. It is conceivable that modified illness beliefs and improved information status may affect the health status. Therefore, when CLBP patients are evaluated in terms of clinical variables, IP should be managed simultaneously. Strategies for preventing impaired IP may be of the utmost importance in these individuals.

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