

## The Effect of Personality Type on the Response to Physical Therapy Methods in Chronic Low Back Pain

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### ABSTRACT

Low back pain is a common health problem that can cause morbidity. Chronic low back pain is associated with physical disability and depressive mood. The main purpose in the management of chronic pain is to improve quality of life and decrease pain and increase mobility and social relationships. Although there are studies assessing chronic pain prevalence, psychological effects, and chronic pain-personality relation studies; there are no studies about personality effect on treatment response in chronic pain.

We evaluated patients who applied to our clinic due to chronic low back pain between 2020-2021. The study group was comprised of 64 patients with back pain that exceeded 6 months' duration. The patients were given a home based exercise program. Also 15 sessions of physiotherapy program during 3 weeks, consisting of TENS, ultrasound and hot pack. All scales and measurements were performed 2 times in all patients: at study initiation (before-treatment scores), as soon as treatment was completed (after-treatment scores).

This study is planned to investigate the effect of personality type on chronic low back pain and quality of life and also the effect of personality type on the response to physical therapy methods applied in chronic low back pain. Relationship between personality and chronic low back pain, quality of life and response to physical therapy is hypothesized but there is no statistically significant difference. Further studies with more patients needed to investigate relationship between chronic low back pain and personality.

**Keywords:** Inflammation; Aging; Cytokines; Delirium; Dementia; Brain; Conditional logic; Boolean

### INTRODUCTION

Low back pain is a common health problem that can cause morbidity. Low back pain causes more disability than any other health condition has shown in literature [1].

Chronic low back pain is associated with physical disability and depressive mood [2]. Chronic pain cause physical effects including muscle strength, limited range of motion, a lack of energy and changes in appetite, sleep disorders; emotional effects such as anger, depression, anxiety and fear; and also mental effects including decreased memory and concentration [3]. Patient with low back pain seen mild depression in approximately 15% [3,4]. The presence of mild depression at the onset of low back pain was accepted as an indication of the chronic progression of pain

[5-8]. The main purpose in the management of chronic pain is to improve quality of life and decrease pain and increase mobility and social relationships [9]. Chronic pain has multiple treatment interventions; single modality treatments are often ineffective for patients because of the complexity of the condition and associated challenges in its assessment. To develop better prevention and treatment approaches, chronic pain needs to be identified in the context of each patient's biological, psychological, physical and occupational features.

Although there are studies assessing chronic pain prevalence, psychological affects chronic pain-personality relation studies; there are no studies about personality effect on treatment response in chronic pain.

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This study is planned to investigate the effect of personality type on chronic low back pain and quality of life and also the effect of personality type on the response to physical therapy methods applied in chronic low back pain.

## MATERIALS AND METHODS

This study was planned as an intervention trial that evaluated patients who applied to our clinic due to chronic low back pain between 2020-2021. The study group was comprised of 64 patients with back pain that exceeded 6 months' duration. The study was approved by the Clinical and Laboratory Research Ethics Committee.

### Inclusion criteria

- Being aged between 40-65 years.
- Having back pain for more than 6 months without spread to regions other than the lumbar, sacral and lumbosacral regions.
- Being able to comply with the outpatient program.
- Agreeing to participate in the study.

### Exclusion criteria

- Having neurological deficit (motor, sensory and reflex).
- Having a history of uncontrolled cardiovascular disease.
- Being pregnant.
- Having severe osteoporosis or osteomalacia.
- Uncontrolled DM, hypertension.
- Having any infectious disease, rheumatic disease or history of malignancy.
- Having history of back surgery.
- Having received electrotherapy program within the last six months.

The patients were given a home based exercise program. Also 15 sessions of physiotherapy program during 3 weeks, consisting of tens, ultrasound and hot pack. All scales and measurements were performed 2 times in all patients: at study initiation (before-treatment scores), as soon as treatment was completed (after-treatment scores).

Exercise programs were explained to the patients in the clinic and the first set was performed under the supervision of a physician. Home-based physical exercise program consisting mobility exercises, muscular stretching and strengthening exercises of spine They were asked to perform the given exercise routine 3 times a day (each one comprised of 10 sets of the routine).

Physical therapy was applied five days a week with one session per day. Hot pack therapy was performed for 20 minutes. Ultrasound therapy was given for five minutes in continuous form with an intensity of 1 w/cm<sup>2</sup> and a frequency of 1 Mhz. Transcutaneous Electrical Nerve Stimulation (TENS) therapy was applied in continuous form (100 Hz, 40 µsn for 30 minutes).

### Parameters used

**Pain:** It was evaluated by Visual Analogue Scale (VAS). The

patients were given a 10-cm horizontal paper numbered from 1 to 10 and were told to grade their pain in consideration that '0' meant no pain while '10' meant the most severe pain they had suffered in their life. Additionally, patients completed the 'Pain Disability Index' questionnaire in order to determine how much of an effect their pain had on their daily life.

**Functional deficiency measurement:** The Modified Oswestry low back pain disability form was used for this purpose. This scale is recommended as a precision scale in the measurement of functional disability in patients with low back pain due to its value and repeatability. The Turkish-language validity and reliability of the form was performed by Yakut et al. [10]. There are 10 questions in the form, each of these questions are answered by choosing one of 6 choices scored from 0 to 5 points. The patient is asked for to select the expression that best describes his/her condition. The highest possible score is 50. The patient is considered to have mild functional disability with a score between 1-10 points, moderate functional disability between 11-30 points and severe functional disability between 31-50 points [10,11].

**Depression measurement:** The Beck Depression Scale was used for this purpose. This scale has been shown to an accurate measure of depression level [12]. The Turkish-language validity and reliability study of the scale was performed by Hisli, et al. The scale is comprised of 21 questions, each with 4 choices which correspond to 0-3 points, and the patient is asked to choose the appropriate sentence considering his/her condition in the last week. The highest possible score is 63. A total score between 0-9 points indicates no depression, 10 to 18 points indicates mild depression, 19 to 29 points indicates moderate depression and >30 points indicates severe depression [12,13].

**Personality measurement:** Eysenck Personality Questionnaire (Revised Short Form): Francis, et al. created the by reviewing the Eysenck Personality Questionnaire and the short form (48 items) of the same questionnaire. The questionnaire has 24 items and evaluates personality in three main factors as extraversion, neuroticism, and psychoticism [14].

### Statistical analysis

All analyses were performed on SPSS v 25 (SPSS Inc, Chicago, IL, USA). For the normality check, the Kolmogorov-Smirnov test was used. Data are given as mean ± standard deviation or median (1st quartile-3rd quartile) for continuous variables according to normality of distribution and as frequency (percentage) for categorical variables. Before and after treatment scores were analyzed with the Wilcoxon signed ranks test. Spearman correlation coefficients were calculated to evaluate relationships between Eysenck Personality Questionnaire scores and improvement in pain assessment scores after treatment (difference between before and after treatment scores). Two-tailed p-values of less than 0.05 were considered statistically significant.

## RESULTS

We included 64 patients (7 males and 57 females) into our study, mean age was 50.88 ± 6.09 (range 39-64). Most of the patients were housewife (56.25%) and were graduated from high school (35.94%). Median duration of disease was 16.5 (range 6-60) months. Thirty-four (53.13%) patients had comorbidities and

the most common comorbidity was hypertension (20.31%). Median Eysenck Personality Questionnaire (EPQ) Psychoticism score was 2 (range 0-6), median EPQ Extraversion score was 2.5 (range 0-12), median EPQ Neuroticism score was 2 (range 0-9) and median EPQ Lie score was 3 (range 0-6) (Table 1).

**Table 1:** Summary of patients' characteristics and EPQ scores.

Characteristics	Scores
Age	50.88 ± 6.09
Gender	
Male	7 (10.94%)
Female	57 (89.06%)
Body mass index	25.54 ± 3.70
<b>Occupation</b>	
Retired	8 (12.50%)
Housewife	36 (56.25%)
Officer	10 (15.63%)
Self-employment	10 (15.63%)
<b>Education</b>	
Primary school	16 (25.00%)
Secondary school	16 (25.00%)
High school	23 (35.94%)
University	9 (14.06%)
<b>Marital status</b>	
Single	64 (100.00%)
Duration of disease, year	16.5 (9-36)
<b>Comorbidities</b>	
Diabetes mellitus	1 (1.56%)
Hypertension	13 (20.31%)
Renal diseases	1 (1.56%)
Fibromyalgia syndrome	7 (10.94%)
Thyroid diseases	4 (6.25%)
Asthma	2 (3.13%)
Hyperlipidemia	3 (4.69%)
Anemia	1 (1.56%)
Gastric problems	4 (6.25%)
<b>Eysenck personality questionnaire</b>	
Psychoticism	2 (0-2.5)
Extra version	2.5 (1-5)
Neuroticism	2 (1-4)
Lie	3 (1-4)

**Note:** Data are given as mean ± standard deviation or median (1st quartile-3rd quartile) for continuous variables according to normality of distribution and as frequency (percentage) for categorical variables.

After treatment Visual Analogue Scale (p<0.001) and Modified Oswestry low back pain disability questionnaire (p<0.001) scores were significantly lower than before. After treatment SF-36 Physical functioning (p<0.001), Role limitations due to physical health (p<0.001), Pain (p<0.001), General health (p=0.005), Energy/fatigue (p=0.028) and Social functioning (p=0.014) scores were significantly higher than before. There were no significant differences between before and after scores of the Beck Depression Inventory, SF-36 Role limitations due to emotional

problems and SF-36 Emotional well-being scores (Table 2).

**Table 2:** Summary of pain assessment scores before and after treatment.

	Before	After	p
Visual Analogue Scale	7 (6-8)	2 (0-3)	<0.001
Modified Oswestry Questionnaire	23 (19.5-29)	12 (8-18)	<0.001
Beck Depression Inventory SF-36	9.5 (6-15)	10 (4-13)	0.068
Physical functioning	55 (37.5-70)	72.5 (52.5-85)	<0.001
Role limitations due to physical health	0 (0-29.17)	50 (25-100)	<0.001
Pain	41 (31-41.5)	51 (41-74)	<0.001
General health	45 (35-53.5)	53.5 (41-67)	0.005
Energy/fatigue	40 (30-50)	47.5 (35-55)	0.028
Social functioning	50 (37.5-75)	62.5 (50-75)	0.014
Role limitations due to emotional problems	0 (0-100)	66.67 (0-100)	0.173
Emotional well-being	52 (44-66)	60 (44-72)	0.374

**Note:** Data are given as mean ± standard deviation or median (1st quartile-3rd quartile) for continuous variables according to normality of distribution and as frequency (percentage) for categorical variables.

When we evaluated relationships between improvement in pain assessment scores after treatment and EPQ scores, we found patients with higher EPQ Extraversion score had less increase in SF-36 physical functioning score after treatment (r=0.274, p=0.028). We found no significant correlations between EPQ scores and improvement in visual analogue scale, Modified Oswestry low back pain disability questionnaire and other SF-36 scores (Table 3).

**Table 3:** Relationships between Eysenck Personality Questionnaire scores and improvement in pain assessment scores after treatment.

		Psychoticism	Extraversion	Neuroticism	Lie
Visual analogue scale	r	0.063	-0.076	0.026	0.085
	p	0.624	0.551	0.836	0.507
Modified Oswestry questionnaire	r	0.134	-0.023	-0.106	-0.156
	p	0.29	0.86	0.404	0.219
Physical functioning	r	0.14	-0.274	0.061	-0.028
	p	0.271	0.028	0.634	0.823
Role limitations due to physical health	r	0.052	-0.167	0.076	0.058
	p	0.686	0.188	0.55	0.648

Pain	r	-0.005	-0.053	0.003	-0.089
	p	0.968	0.679	0.98	0.482
General health	r	-0.054	0.18	0.148	-0.066
	p	0.674	0.155	0.243	0.603
Energy/fatigue	r	0.103	-0.076	0.132	-0.116
	p	0.418	0.548	0.299	0.363
Social functioning	r	0.022	0	-0.094	-0.099
	p	0.863	0.999	0.459	0.437

Note: r-Spearman correlation coefficient.

## DISCUSSION

Characteristics including physical and emotional sensitivity and anxious personality type have been observed in individuals with non-specific chronic low back pain. Personality type may contribute to the development of symptoms in chronic pain by affecting central sensitization [15]. To date, there is no research that has considered both personality types on quality of life and physical therapy responses in chronic low back pain. The aim of this study is to investigate the effect of personality type on chronic low back pain and quality of life and the effect of personality type on the response to physical therapy methods applied in chronic low back pain.

Bio psychosocial factors role are less important in acute low back pain, but these factors more important in chronic low back pain. In addition, since most patients with chronic low back pain tend to have somatization disorder, the results of personality questionnarie and psychological tests are important [16,17]. Therefore, in our study, we evaluated the personality, depression, quality of life and pain of patients with chronic low back pain at the beginning of the study, and after physiotherapy sessions in order to evaluate the changes in pain and quality of life. In addition, in our study, we found depressive symptoms in most of our chronic low back pain patients, which was in agreement with the literature, but none of our patients had high enough values for the diagnosis of major depression. In a recent large-scale study with data from 43 different countries, it was reported depression are associated with an increased pain [18]. These results suggest that pain perception and depressive feelings may show a proportional relationship in patients with chronic low back pain and quality of life. Therefore, we believe that personality in our patients was associated the pain-decreasing features of physical therapy and exercise treatment.

The three personality dimensions (neuroticism, psychoticism and extroversion) according to Eysenck's personality model in FM patients with the Eysenck Personality Questionnaire Revised-Abbreviated (EPQR-A) were evaluated. The FM group showed higher levels of neuroticism and no significant difference on psychoticism and extroversion levels [19]. We evaluated relationships between improvement in pain assessment scores after physical therapy treatment and EPQ scores, we found patients with higher EPQ Extraversion score had less increase in SF-36 physical functioning score after treatment, but this was

statistically significant (p=0.028).

## CONCLUSION

Further studies need for the effect of personality to physical therapy responses on low back pain and quality of life. This will provide more detailed information about the effectiveness of physical therapy responses in the treatment of chronic low back pain. We planned this study for relationship between personality and chronic low back pain, quality of life and response to physical therapy but there is no statistically significant difference. Further studies with more patients needed to investigate relationship between chronic low back pain and personality.

## CONFLICT OF INTEREST STATEMENT

The authors report no potential conflicts of interest in the development and publication of this article.

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