

Association between Prior Pain Intensity, Back Function and The Characteristics of Episodes in Patients with Low Back Pain

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Abstract

There is little information about causes of recurrence and why low back pain (LBP) transit to recurrent LBP. The aim of this study was to identify the recurrence proportion of LBP, and the relation between baseline pain intensity, back function and the number, duration and mean pain intensity of subsequent episodes in patients with recurrent LBP. Four hundred and sixty-four patients were included in this study. The mean age of the participants was 38.70 ± 13.10 (ranges from 20 to 65 years). Demographic data were recorded. Prior pain intensity (VAS), back function (FBPS) and subsequent pain episodes (pain diary) were assessed at baseline and over 6 months. Recurrence proportion of LBP was 39.2% during 6-month follow-up. Baseline pain intensity and back function were significantly different in patients with recurrent LBP compared to patients without recurrent LBP ($p < 0.001$). Baseline VAS score was found positively related with the number of episodes ($r=0.544$, $p<0.001$), the mean duration of episodes ($r=0.381$, $p<0.001$), the mean pain intensity at episodes ($r=0.779$, $p<0.001$). Baseline FBPS score was negatively correlated with the number of episodes ($r=-0.380$, $p<0.001$), the duration of pain episodes ($r=-0.287$, $p<0.001$) and the mean pain intensity at episodes ($r=-0.520$, $p<0.001$). Patients with recurrent back pain had higher pain intensity and lower back function prior to the pain attacks. Prior pain intensity and back function were related with the number and duration of episodes and mean pain intensity at episodes.

Keywords: "Association, functional status, recurrence, risk factors."

1. Introduction

Chronic low back pain (CLBP) is defined as pain, muscle tension or stiffness lasting longer than 3 months, with or without symptoms radiating to the leg. Symptoms are located between the inferior border of the costal margin and superior border of the lower gluteal folds. [1,2]. The point, annual, and lifetime prevalence of chronic low back pain were 12, 23, 38, and 40%, respectively [3,4]. In 80% of chronic low back pain cases, symptoms resolve within a few weeks, while 20% develop chronic disability. Individual factors, psychological factors or socio-professional factors lead the pain to become chronic [5], however, few studies have investigated the risk factors for recurrence [6].

LBP is a long-term condition that includes symptomatic episodes, remission, and relapse [6]. The most accepted definition for recurrent low back pain in the literature is 'return of LBP lasting at least 24 hours with pain intensity of 3 or more in the Visual Analog Scale' [7]. While the annual prevalence of recurrent low back pain ranges from 25% to 80% [8], the number of relapses, duration of pain, intensity and episodes of pain, and patient characteristics explain the varying prevalence [7].

Researchers reported that due to the multidimensional effects of LBP, not only pain intensity but also functionality must be evaluated [9]- [11]. It was shown that a positive and uniform linear relationship between CLBP pain intensity and disability [12].

Little is known about the cause of recurrence of low back pain [8,13,14] and the studies investigating the effect of recurrent low back pain on low back function are limited. Therefore, this study was planned to identify the recurrence proportion of LBP,

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and the relation between baseline pain intensity, back function and the number, duration and mean pain intensity of subsequent episodes in patients with recurrent LBP.

2. Materials and Methods

2.1. Design

This prospective observational study was carried out in the Servergazi State Hospital Outpatient Physical Therapy and Rehabilitation Clinic in Turkey between February 2020 and July 2021. Patients completed and signed the informed consent form. Current study was approved by the University Clinical Research and Ethics Committee and was conducted in accordance with the principles of the Declaration of Helsinki.

2.2. Participants

Inclusion criteria of the study were: being diagnosed with non-specific LBP, age between 20 and 65 years, pain duration > 3 months. Exclusion criteria were: low back-related conditions (spondylolisthesis, spinal stenosis etc.), red flags indicating serious spinal pathology, neurological conditions (nerve root compromise, neurological signs, disc herniation, radicular symptoms etc.), rheumatologic or immunologic conditions, psychiatric disorder, cancer, had previous surgery related to the back, pregnancy, other current treatment, participant's prior experience with a given treatment.

A total of 747 patients assessed for eligibility. One hundred and twenty seven of them were excluded for not meeting the inclusion criteria. Finally, 620 patients were followed with a pain diary for 6 months.

2.3. Outcome Measures

The demographic data (age, body mass index) of the patients were recorded. Baseline pain intensity, back function and subsequent pain episodes were assessed. After the baseline assessment, the patients were instructed to fill in the pain diary, and they were reminded every month with phone call to fill it if they had pain episode. This follow-up was continued for 6 months.

Lumbar pain intensity was assessed with VAS. Patients were asked to record whether they had a pain episode for 6 months and pain recurrence was defined as the onset of LBP lasting at least 24 hours. with a VAS score of 3 or more pain intensity [7]. If the patients had LBP episode, they were instructed to record how many hours the pain episodes lasted (pain duration at episodes), and the intensity of their pain in the pain diary (VAS at episodes).

Back function was assessed with Functional Back Pain Scale (FBPS). FBPS is a self-administered questionnaire with 12 items to measure patient's functional capacity. Each item is graded on a Likert Scale (range 0-5), '0' indicates inability to perform the activity due to back pain, and '5' indicates that it can be done easily. The total score is in the range of 0 to 60. The total lower score represents lower functional abilities. The Turkish version of FBAS was made by Koç and Bayar [9] and permission was obtained from Koç and Bayar for the study.

2.4. Statistical Analysis

The overall effect size of reference study was low ($r=0.27$) [10]. According to the power analysis, considering that a lower effect size ($r=0.2$) could be obtained; when at least 191 participant were included in the study, that would result in 80% power with %95 confidence level.

SPSS Statistics (Version 21; IBM, Armonk, NY, USA) was used to analyze the obtained data. Continuous variables were presented as mean \pm standard deviation, maximum and minimum and categorical variable values were presented as absolute frequency and percentages. The conformity of continuous variables to normal distribution was evaluated using the Shapiro-Wilk test.

Independent sample t test and Mann Whitney U test was used to compare baseline FBPS and VAS scores according to subsequent episode characteristic, respectively. The correlation between the baseline FBPS score and the mean VAS at episodes was analyzed by Pearson Correlation analysis and baseline FBPS score and the number and duration of episodes, and between baseline VAS score and all variables was analyzed by Spearman's Correlation analysis. If an r value of > 0.8 is considered very strong, then $0.8 > r \geq 0.6$ is strong, $0.4 > r \geq 0.4$ is moderate, $0.4 > r \geq 0.2$ is weak and < 0.2 is poor [11]. A p value was accepted at ≤ 0.05 level.

3. Results

Six hundred and twenty patients were followed with a pain diary for 6 months. 156 patients were excluded from the study because they did not recorded follow-up data to their diary. The response rate was 74.8%. Finally, current study was conducted with 464 patients with the mean age of 38.70 ± 13.10 (281 of them were female and 183 of them were male). Recurrence LBP proportion was 39.2% for 6 month. Descriptive and clinical data of patients were shown in Table 1.

Table 1. Demographic and clinical data of the patients

Variables		Ort \pm SS	
Age (year)		38.70 \pm 13.10	
BMI (kg/m ²)		26.16 \pm 4.48	
Prior VAS (cm)		6.03 \pm 1.86	
Number of episodes (n=182)		3.22 \pm 1.58	
Duration of episodes (hour) (n=182)		28.13 \pm 87.66	
VAS at episode (n=182)		6.00 \pm 1.07	
Prior FBPS (n=182)		32.45 \pm 11.10	
		n (%)	
Recurrent LBP	Yes	182	32.9
	No	282	67.1
Gender	Female	281	60.6
	Male	183	39.4
Exercise habit	Yes	70	15.1
	No	394	84.99

BMI: Body Mass Index; FBPS: Functional Back Pain Scale; LBP: Low Back Pain; VAS: Visual Analog Scale

Table 2 shows that, baseline VAS score of the patients with recurrent LBP was significantly higher than not having recurrence ($p < 0.001$). Baseline FBPS score of patients with recurrent LBP was significantly lower than not having recurrence ($p < 0.001$) (Table 2).

Table 2. Comparison of prior VAS and FBPS scores of patients with recurrent back pain or not

Variables	Recurrent back pain		<i>p</i>
	Yes (n=182)	No (n=282)	
VAS	7.12 \pm 1.64	5.33 \pm 1.65	<0.001
FBPS	32.45 \pm 11.1	40.66 \pm 1.65	<0.001

FBPS: Functional Back Pain Scale; VAS: Visual Analog Scale

The correlation between baseline VAS, baseline FBPS and the number of episodes, mean pain duration at episodes and mean pain intensity at episodes was shown in Table 3. There was a moderate positive correlation between baseline VAS and the number of episodes ($r = 0.544$, $p < 0.001$), a weak positive correlation with the mean duration of pain episodes ($r = 0.381$, $p < 0.001$) and a strong positive correlation with the mean pain intensity at episodes ($r = 0.779$, $p < 0.001$). A weak negative correlation was found between the baseline FBPS score and the number of episodes ($r = -0.380$, $p < 0.001$), and the duration of pain episodes ($r = -0.287$, $p < 0.001$), while a moderately negative correlation was found between the mean pain intensity at episodes ($r = -0.520$, $p < 0.001$) (Table 3).

Table 3. The relationship between prior pain intensity, BPFS scores and the number, duration and mean pain intensity of subsequent episodes

Variables		VAS	BPFS
Number of episodes	<i>r</i>	0.544	-0.380
	<i>p</i>	<0.001	0.001
Mean VAS at episodes	<i>r</i>	0.779	-0.520
	<i>p</i>	<0.001	<0.001
Duration of episodes (hour)	<i>r</i>	0.381	-0.285
	<i>p</i>	<0.001	<0.001

FBPS: Functional Back Pain Scale; VAS: Visual Analog Scale

4. Discussion

This study planned to identify the recurrence proportion of LBP, and the relation between baseline pain intensity, back function and the number, duration and mean pain intensity of subsequent episodes in patients with recurrent LBP. Recurrence proportion of LBP was 39.2% for 6 month follow-up. Patients with recurrent LBP had higher pain intensity and lower functional status prior to follow-up. According to the results of this study, prior pain intensity and back function were found to be related with the number of episodes, mean episode duration, and mean pain intensity at episodes.

There is no a single description of a recurrence of LBP in literature [12-14]. We preferred to use the definition of Stanton et al. because there was a substantially consensus on this definition (95%) [7]. We defined recurrent LBP as ‘a return of LBP lasting at least 24 hours with a pain intensity of 3 or more on VAS’. We followed our patients for 6 months and detected that the LBP recurrence proportion was 39.2%. In the literature, the results and methods of studies reporting recurrence of LBP episodes differed from each other. [8,12,15]. The onset period of pain is less than 3 months in some studies [12,15]. According to Hancock et al [16] LBP recurrence proportion was 54% during the 1 year follow-up. We followed 182 patients for 6 months immediately after recovery from LBP. We trained the patients to take note of pain parameters and contacted with them every month. The short follow-up period of the current study and the fact that it followed the patients immediately after recovering a new episode may have affected the recurrence proportion. Because of different definition, inception periods and follow up periods, the recurrent LBP proportions may be different in literature.

Stevans et al investigated the risk factors associated with transition from acute to chronic LBP but little researches investigated risk factors for recurrent LBP [6,8,13]. In literature, the proven potential risk factors for recurrent LBP were MRI findings [6] and the number of LBP episodes before the most recent episode [8]. Melloh et al suggested that recurrent LBP was related to impaired health-related factors [10]. We hypothesized that pain intensity and functional status before the LBP pain episode could be the risk factors for recurrence. We confirmed our hypothesis. This suggests that prior pain intensity and back function were the determinants of recurrence.

It is important to eliminate risk factors for better back health. To eliminate the risk factors, the relationship between the risk factors and the characteristics of the next back pain attack should be determined. In literature occupational risk factors and general health status were associated with recurrence [14]. Patients' self-reported LBP triggers, as well as possible prognostic associations with different trajectories, are under investigation by Ardakani et al [17], but the study is not yet complete. We found that baseline pain intensity and back function were related to the number of subsequent episodes, pain duration, and mean pain intensity within episodes. This suggests that these risk factors triggers the characteristics of subsequent back pain episode.

This study has some limitations; such as relatively short follow up time and not questioning the number of previous pain episodes. One year follow up with monthly contact would better reflects recurrence proportion. It has been stated in previous studies that the number of previous pain episodes is a risk factor for recurrence [8]. We did not question this in our study. Determining the relationship between the number of previous pain episodes and the characteristics of subsequent pain attacks could have contributed significantly to the literature. However, current study is the first to investigate the association between baseline pain intensity and function and the characteristics of subsequent pain episode in patients with recurrent LBP.

We investigated the recurrence proportion of LBP in small sample. And we detected the association between prior pain intensity, prior back function and the characteristics of pain episodes at recurrence for 6 months. The recurrence proportion of LBP was 39% and prior pain intensity and back function were associated with the number, duration and intensity of subsequent pain episodes. Therefore, we thought that pain severity and pain-related disability should be controlled in order to reduce recurrent LBP episodes. The results of this study provided new insights into recurrent LBP.

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Conflict of interest: No conflict of interest was declared by the authors.

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