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Evaluation of Anxiety, Quality of Life and Quality of Sleep in Patients with Chronic Low Back Pain

Kronik Bel Ağrılı Hastalarda Anksiyete, Yaşam Kalitesi ve Uyku Kalitesinin Değerlendirilmesi

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Abstract

Objective: This study aims to (i) determine the presence of chronic neuropathic low back pain (LBP) in young patients and (ii) evaluate the anxiety, quality of life and quality of sleep in neuropathic and nociceptive LBP.

Materials and Methods: A total of 83 young patients (aged 18-45 years) with chronic LBP who were followed by the family medicine and physical treatment outpatient clinics in a tertiary hospital were enrolled in this observational, cross-sectional study. The leeds assessment of neuropathic symptoms and signs, douleur neuropathique-4, short form-36 (SF-36), state-trait anxiety inventory (STAI) and Pittsburgh Sleep Quality index (PSQI) scales were used to evaluate neuropathic pain, quality of life, anxiety and quality of sleep.

Results: Neuropathic LBP was reported in 42 of 83 patients (50.6%). The mean age and work-life duration of the patients were 32.6±7.0 and 11.9±7.7 years. Although there was a significant difference in the groups' income levels between neuropathic and nociceptive LBP (p=0.034), there was no difference regarding age, gender, marital status, education, height, weight, Body Mass index, occupation and standing or sitting posture at work. The results of STAI, SF-36 and PSQI in the neuropathic LBP group were significantly worse (p=0.000, p=0.000 and p=0.000, respectively) than in the nociceptive LBP group. Cut-off values of ≥44 points on the STAI scale [area under the curve (AUC): 0.90; 95% confidence interval (CI): 0.84-0.96; p<0.001] and ≥8 points on the PSQI scale (AUC: 0.87; 95% CI: 0.80-0.95; p<0.001) were calculated as predicted cutoff points for the presence of neuropathic LBP.

Conclusion: In this study, low socio-economic status, poor quality of life, poor quality of sleep and increased level of anxiety were significantly demonstrated in patients with neuropathic LBP. No difference was noted regarding occupation or working body posture.

Keywords: Low back pain, neuropathic pain, quality of life, quality of sleep, anxiety

Öz

Amaç: Bu çalışmada (i) genç hastalarda kronik nöropatik bel ağrısı (NBA) prevalansını belirlemek, (ii) nöropatik ve nosiseptif tip bel ağrısında anksiyete, yaşam kalitesi ve uyku kalitesini değerlendirmek amaçlanmıştır.

Gereç ve Yöntem: Bu gözlemsel kesitsel çalışmaya, kronik bel ağrısı olan ve üçüncü basamak bir hastanede aile hekimliği ve fizik tedavi kliniklerine başvuran 83 genç hasta (18-45 yaş) alındı. NBA varlığı, anksiyete, yaşam kalitesi ve uyku kalitesini değerlendirmek için leeds nöropatik semptom ve bulgu değerlendirmesi, DN4, kısa form-36 (SF-36), durumluk sürekli kaygı düzeyleri envanteri (STAI) ve Pittsburgh Uyku Kalitesi indeksi (PSQI) ölçekleri kullanıldı.

Bulgular: Çalışmada 83 hastanın 42'sinde (%50,6) NBA saptandı. Hastaların ortalama yaşı ve çalışma hayatı süreleri sırasıyla 32,6±7,0 ve 11,9±7,7 yıldı. NBA grubu ve nosiseptif bel ağrısı grubu arasında gelir düzeyleri arasında anlamlı fark olsa da (p=0,034), yaş, cinsiyet, medeni durum, eğitim, boy, kilo, Beden Kitle indeksi, meslek, ayakta veya oturarak çalışma postürü açısından fark bulunmadı. STAI, SF-36 ve PSQI sonuçlarının NBA grubunda, nosiseptif ağrı grubundan istatistiksel olarak daha kötü olduğu gözlendi (sırasıyla; p=0,000, p=0,000, p=0,000). NBA varlığında kesim değeri olarak STAI ölçeğinde ≥44 puan [eğrinin altındaki alan (EAA): 0,90; %95 güven aralığı (GA): 0,84-0,96; p<0,001], PSQI ölçeğinde ≥8 puan (EAA: 0,87; %95 GA: 0,80-0,95; p<0,001) hesaplandı.

Sonuç: Bu çalışmada, düşük sosyo-ekonomik durum, kötü yaşam kalitesi, zayıf uyku kalitesi ve artmış anksiyete düzeyinin NBA olan hastalarda anlamlı olduğu gösterilmiştir. Meslek grubu veya vücut duruşuna göre çalışma açısından fark saptanmamıştır.

Anahtar Kelimeler: Bel ağrısı, nöropatik ağrı, yaşam kalitesi, uyku kalitesi, anksiyete

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Introduction

Chronic low back pain (LBP) is defined as the pain localized below the costal margin and above the inferior gluteal region for longer than 3 months (1). Globally, disability duration caused by LBP has been increased by about 54% between 1990 and 2015, which was linked to an increase in aging population, especially in low-and middle-income countries (2). In the United States, chronic LBP has a prevalence of 13.1%, rising with age up to 27.4% in 50- to 59-year-olds, and in Europe, the estimates suggest a prevalence of approximately 40% (3). Chronic LBP is divided into two categories on the basis of the underlying pathophysiological mechanisms as neuropathic and non-neuropathic (nociceptive). Neuropathic pain is present in 16-55% of the patients with chronic LBP (1).

Chronic LBP may be accompanied by behavioral symptoms-including depression, fatigue, and sleep disturbance-which intensify pain and reduce the quality of life (4). Growing evidence suggests that depression, anxiety, and sleep disturbances correlate well with the degree of pain (5). The treatment of depressive disorders, such as depression and anxiety, in patients with neuropathic pain positively affects the prognosis of the disease (6).

Despite some studies in the literature reporting high levels of anxiety and low quality of life caused by LBP, the effect of sleep disturbance on LBP is understudied (7). This study aimed to evaluate the relationship between neuropathic LBP and demographic characteristics, quality of sleep, anxiety, and quality of life.

Materials and Methods

Selection criteria

This was an observational, cross-sectional study. The study sample comprised 83 patients out of 262 with LBP who were admitted to a tertiary hospital (physical medicine-rehabilitation and family medicine outpatient clinics) between June and September 2019. Figure 1 shows a flowchart of the study. Only volunteers aged 18-45 years who had chronic LBP (axial) for longer than 12 weeks and a work-life duration of at least 1 year were enrolled in the study. Patients with metabolic and/or endocrine disorders (such as diabetes mellitus and hypothyroidism), history of spinal surgery, central or peripheral nervous system diseases, inflammatory rheumatologic diseases, or cancer were excluded. Since housework involves a massive amount of random work for women, it was thought that excluding housewives might be more appropriate in order to establish the relationship between gender and pain. The etiology of LBP was based on clinical examination and spinal imaging (computed tomography or magnetic resonance imaging). A questionnaire was administered to collect socio-demographic data of the participants, such as age, gender, marital status, educational status, occupation, height, weight, and the presence of chronic diseases. The leeds assessment of neuropathic symptoms and sign (LANSS), douleur neuropathique-4 (DN-4), short form-36 (SF-36), state-trait anxiety inventory (STAI), and Pittsburgh Sleep Quality index (PSQI) scales were applied to all participants. On the basis of neuropathic pain evaluation using the LANSS and DN-4 scales, the study sample was divided into neuropathic and nociceptive LBP groups.

LANSS scale: The Turkish validation LANSS scale for the differential diagnosis of neuropathic pain was performed in 2004 (8). A score of ≥12 points on the LANSS scale indicates the presence of neuropathic pain (9).

DN-4 questionnaire: It is used to measure the prevalence of neuropathic pain in both general population and specific clinical conditions (such as diabetic neuropathy), and a total score of ≥4 out of 10 points indicates the presence of neuropathic pain (8).

PSQI: Turkish validity and reliability of the scale consisting of 24 questions were made by by Agargun et al. (10) A score of ≥5 points on this scale indicates poor quality of sleep.

SF-36: This is a reliable scale translated into Turkish by Koçyiğit et al. (11) to evaluate the quality of life. The score ranges from 0 (lowest) to 100 (highest), and higher scores indicate a better quality of life. Scores between 87-100 points are classified as excellent; those 75.5-86.9 points mean very good; between 56.0-75.4 points mean good; between 30.6-55.9 points mean bad and between 0.0-30.5 points mean very bad (11).

STAI: State anxiety indicates anxiety related to the present moment while trait anxiety indicates a stable dimension of personality. The cut-off points have been suggested to define the categories of symptoms of trait-anxiety levels: low is less than 33 points, medium ranges from 33 to 49 points, and high is above 49 points (12). The total score is between 20 and 80 points. A low score indicates a low level of anxiety, and a high score indicates a high level of anxiety (13).

Ethical considerations

This study was reviewed and approved by the Clinical Research Ethics Committee of Taksim Training and Research Hospital (İstanbul, Turkey) on May 22, 2019 (approval no: 0076). The study was performed in accordance with the principles of the Helsinki Declaration. All patients gave informed consent prior to participation.

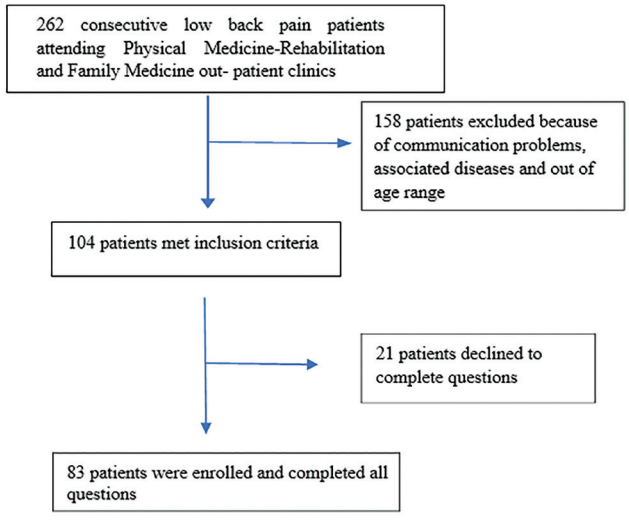

Figure 1. Flowchart of the study

Statistical Analysis

Data was analyzed using SPSS Statistics (v.22; IBM Corp., Armonk, NY, USA). Normality control was performed by using the Kolmogorov-Smirnov test, histogram, and Q-Q plot. Frequency, percentage, mean, standard deviation, and median values were used as descriptive statistics. Student's t-test and Mann-Whitney U test were performed for parameters with and without normal distribution, respectively. The chi-square test was conducted to compare nominal parameters. The correlation coefficients were evaluated as follows: excellent r≥0.91, good 0.90≥ r≥0.71, fair 0.70≥ r≥0.51, weak 0.50≥ r≥0.31, and little or none r≥0.3. Significance was accepted as the level of $p<0.05$.

Results

The socio-demographic characteristics of the participants are presented in Table 1. A total of 83 patients-including 39 (47%) females and 44 (53%) males-participated in the study from 15 June to 15 September 2019. According to the scores on the DN-4 and LANSS scales, 50.6% (n=42) of the patients had neuropathic LBP. The mean work-life duration was 11.9±7.7 years. The mean age and Body Mass index (BMI) were 32.6±7.0 years and 25.1±4.6 kg/m^2, respectively. No significant difference was found between the groups with neuropathic LBP and nociceptive LBP in terms of age, gender, marital status, educational status, height, weight, BMI, and occupation. On the other hand, the level of income was lower in neuropathic LBP patients than in those with nociceptive LBP ($p=0.034$).

The scores of all scales used in the study are provided in Table 2. The SF-36, STAI, and PSQI scores in the neuropathic LBP group were significantly different from those in the non-neuropathic LBP group. Higher STAI anxiety scores, worse general health scores in SF-36, and poorer sleep quality based on higher PSQI scores were dominant in neuropathic LBP compared to non-neuropathic LBP, as seen in Table 2.

Table 1. Evaluation of demographic characteristics of chronic LBP in patients with neuropathic and nociceptive types of LBP

Variables Mean ± SD		Neuropathic LBP pain	Nociceptiveq LBP pain	Total	p
		Mean ± SD	Mean ± SD		
Age (year)		33.31±7.35	31.95±6.66	32.64±7	†0.380
Work-life duration (year)		13.07±7.57	10.76±7.83	11.93±7.74	†0.175
Height (cm)		170.02±7.64	170.34±9.52	170.18±8.57	†0.867
Weight (kg)		73.81±15.86	72.32±15.99	73.07±15.85	†0.671
BMI (kg/m^2)		25.43±4.67	24.65±4.54	25.05±4.6	†0.443
		n (%)	n (%)	n (%)	
Gender	Female	20 (47.6%)	19 (46.3%)	39 (47%)	‡1.000
	Male	22 (52.4%)	22 (53.7%)	44 (53%)	
Marital status	Married	27 (64.3%)	27 (65.9%)	54 (65.1%)	‡1.000
	Single	15 (35.7%)	14 (34.1%)	29 (34.9%)	
Educational status	Elementary school	18 (42.9%)	9 (22%)	27 (32.5%)	§0.142
	Middle school	6 (14.3%)	6 (14.6%)	12 (14.5%)	
	High school	9 (21.4%)	9 (22%)	18 (21.7%)	
	University	9 (21.4%)	17 (41.5%)	26 (31.3%)	
Working body posture	By sitting	8 (19%)	7 (17.1%)	15 (18.1%)	‡1.000
	By standing	34 (81%)	34 (82.9%)	68 (81.9%)	
Occupation	Worker	27 (64.3%)	30 (73.2%)	57 (68.7%)	¶0.158
	Teacher	3 (7.1%)	3 (7.3%)	6 (7.2%)	
	Accountant	3 (7.1%)	0 (0)	3 (3.6%)	
	Health professional	2 (4.8%)	5 (12.2%)	7 (8.4%)	
	Hairdresser	2 (4.8%)	1 (2.4%)	3 (3.6%)	
	Driver	2 (4.8%)	0 (0)	2 (2.4%)	
	Engineer	1 (2.4%)	0 (0)	1 (1.2%)	
	Security guard	2 (4.8%)	0 (0)	2 (2.4%)	
	Office worker	0 (0)	2 (4.9%)	2 (2.4%)	
Economic status	Less income than expense	1 (2.4%)	1 (2.4%)	2 (2.4%)	**¶0.034***
	Equal income to expense	29 (69%)	18 (43.9%)	47 (56.6%)	
	More income than expense	12 (28.6%)	22 (53.7%)	34 (41%)	

†Student t-test, ‡Continuity (yates), §chi-square test ¶Fisher Freeman Halton test *p<0.05, LBP: Low back pain, SD: Standard deviation

In the neuropathic LBP group, a correlation between work-life duration and the global sleep score of PSQI scale (p=0.028, r=0.339), sleep duration items of PSQI scale (p=0.004, r=0.434), and subjective sleep efficiency items of PSQI (p=0.031, r=0.334) was found. The BMI of the neuropathic LBP group was related to global sleep score (p=0.011, r=0.390), sleep disturbance (p=0.007, r=0.413), and daytime sleep dysfunction (p<0.001, r=0.543) items of PSQI scale. There was a statistically significant negative correlation between the BMI of the neuropathic LBP group and physical function items of PSQI (p=0.017, r=-0.367). Figure 2 shows the receiver operating characteristic (ROC) curve for STAI scores in the presence of neuropathic LBP diagnosis. A STAI score of ≥44 points [Area under the curve: 0.90 (95% confidence interval (CI): 0.84-0.96, p<0.001); sensitivity: 0.86, specificity: 0.78; positive predictive value: 80.0, negative predictive value: 84.2] was found as a predictive value for anxiety level in patients with neuropathic LBP.

Figure 3 shows the ROC curve for PSQI sleep scores in the presence of neuropathic LBP. A PSQI sleep score of≥8 points [Area under the curve: 0.87 (95% CI: 0.80-0.95, p<0.001); sensitivity: 0.90, specificity: 0.90; positive predictive value: 87.5,

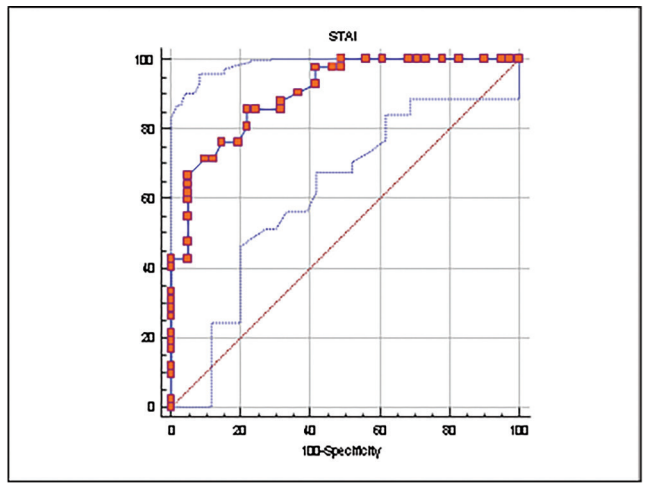

Figure 2. ROC curve for STAI scores measuring anxiety level in patients with neuropathic low back pain

ROC: Receiver operating characteristic, STATI: State-trait anxiety inventory

Table 2. Evaluation of quality of life, anxiety, and sleep quality between the patients with neuropathic and non-neuropathic (nociceptive) pain

Mean ± SD (median)		Neuropathic LBP pain	Nociceptive LBP pain	Total score	P
		Mean ± SD (median)	Mean ± SD (median)		
STAI		58.26±12.2	35.54±11.77	47.04±16.51	†**0.000***
SF-36	**Physical function**	40.24±20.63	80.24±14.1	60±26.73	†**0.000***
	Difficulty in role (physical)	1.79±11.57 (0)	59.76±44.33 (75)	30.42±43.31 (0)	‡**0.000***
	Difficulty in role (emotional)	21.43±41.53 (0)	75.61±42.18 (100)	48.19±49.7 (0)	‡**0.000***
	Vitality (energy)	8.81±12.44 (5)	47.2±26.9 (45)	27.77±28.34 (20)	‡**0.000***
	Mental health	14.95±17.27 (6)	55.73±25.39 (56)	35.1±29.74 (32)	‡**0.000***
	Social function	33.63±26.98	71.95±26.48	52.56±32.83	†**0.000***
	Pain	17.44±18.42 (12.5)	46.59±20.32 (45)	31.84±24.2 (35)	‡**0.000***
	General health	27.02±17.46	53.48±21.99	40.09±23.78	†**0.000***
Pittsburgh (PSQI)	**Global score**	10.88±4.5 (11)	4.83±2.73 (5)	7.89±4.8 (6)	‡**0.000***
	Sleep quality	2.19±0.83 (2)	0.98±0.91 (1)	1.59±1.06 (2)	‡**0.000***
	Sleep latency	2.21±0.75 (2)	1.51±0.95 (2)	1.87±0.92 (2)	‡**0.001***
	Sleep duration	1.69±1.14 (2)	0.71±0.9 (0)	1.2±1.13 (1)	‡**0.000***
	Sleep efficiency	1.19±1.15 (1)	0.12±0.51 (0)	0.66±1.04 (0)	‡**0.000***
	Sleep disturbance	1.95±0.73 (2)	1.34±0.48 (1)	1.65±0.69 (2)	‡**0.000***
	Sleep medication	0.38±0.99 (0)	0±0 (0)	0.19±0.72 (0)	‡**0.013***
	Daytime sleep dysfunction	1.26±1.4 (0)	0.17±0.54 (0)	0.72±1.19 (0)	‡**0.000***

†Student t-test, ‡Mann-Whitney U test, *p<0.05, SD: Standard deviation, PSQI: Pittsburgh Sleep Quality index, STAI: State-trait anxiety inventory, SF-36: Short form-36, LBP: Low back pain

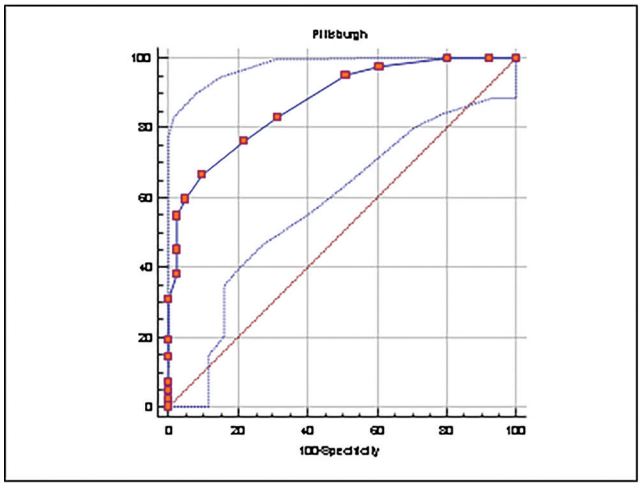

Figure 3. ROC curve for PSQI scores measuring sleep quality in patients with neuropathic low pain pain

ROC: Receiver operating characteristic, PSQI: Pittsburgh Sleep Quality index

negative predictive value: 72.6] was reported as a predictive value for sleep quality in patients with neuropathic LBP.

Discussion

This study shows that low socio-economic status, poor quality of life, poor quality of sleep, and increased levels of anxiety were present in patients with neuropathic LBP more than nociceptive LBP. All patients with a STAI score of ≥44 points, and a PSQI score of ≥8 points had neuropathic LBP diagnosis reporting that a moderate level of anxiety and poor sleep quality were present in patients with neuropathic LBP.

In some epidemiological studies, patients with chronic neuropathic pain have been reported to have higher levels of anxiety, depression, sleep disorders, and decreased quality of life in compared to those with chronic non-neuropathic pain (14,15). Our study was a cross-sectional research into pain that examined LBP as a special region.

One study from the United Kingdom (16) and one from Denmark (17) have indicated the presence of a possible neuropathic pain in 16.0% and 19.3% of the patients with LBP, respectively. These studies have diagnosed neuropathic components by using LANSS or DN-4 scales. The strength of our study was that we used both LANSS and DN-4 questionnaires together. The presence of neuropathic LBP was found as 50.6% in our study which was in line with the results of another study by Erhan et al. (18) from Turkey, reporting a prevalence of 43.9%.

In terms of gender, females seem to be more commonly affected from neuropathic pain in the literature. In a study by Selimoğlu et al. (19), 109 (87.2%) women compared to 16 (12.8%) men were found to have significantly more frequent neuropathic pain, and in a study by Ouédraogo et al. (20), 35 (66.04%) women compared to 18 (33.96%) men were affected. In our study, 20 women (47.6%) and 22 men (52.4%) had neuropathic LBP, but the difference was not significant.

A rise in the incidence of LBP after the third decade, in particular, has been shown (21). According to a study by Kaki et al. (22), conducted on patients older than 18 years suffering from chronic LBP, neuropathic pain was a more common finding among an older group of patients than was nociceptive pain; however, the mean age for both groups was 46.7±12.6 years. In our study, a young study sample was chosen to minimize the effect of aging on pain, which may explain the lack of difference in age between neuropathic and non-neuropathic LBP.

Another study indicates that the use of cigarettes, female gender, marriage, low level of education, and presence of chronic disease are independent risk factors for LBP (23). In our study, socio-demographic variables were not different between the neuropathic and nociceptive LBP groups, except for the low levels of income, which was significantly lower in neuropathic LBP.

In a study conducted by Çebi (6), high levels of depression and anxiety and poor quality of sleep were reported in patients with chronic neuropathic pain. Prolonged pain deteriorated the quality of life and caused depression and anxiety in the patients (24). In our study, patients with neuropathic LBP were found to have moderate level of anxiety and poor quality of sleep. Sleep disturbances independent of pain have also been reported in at least 50% of patients with chronic neuropathic LBP (25). Our study found that as the work-life duration increased in the neuropathic LBP, the total PSQI score and incidence of poor sleep quality increased, as expected.

Study Limitations

As LBP is affected by the cultural and environmental factors, the findings cannot be generalized to general population worldwide. The subjective assessment of sleep without objective measurements, the small size of the study sample, and the lack of the distribution of the occupations were among the limitations of this study. Also, there was no exact classification of working body postures. Further, housewives were excluded from the study, which might constitute selection bias.

The strength of this study was that both tools, LANSS and DN-4, were used together to determine neuropathic or nociceptive LBP. In addition, predictive values for PSQI measuring and STAI measuring of neuropathic LBP which would help early diagnosing and choosing additional treatment plans for neuropathic pain, including treatments for lower sleep quality and anxiety.

Conclusion

The primary aim of this study was to evaluate the differences between the neuropathic and nociceptive types of chronic LBP in terms of quality of life, quality of sleep, and the level of anxiety in young working population. Half of the patients with LBP had neuropathic pain that was accompanied by high levels of anxiety, bad quality of life, and poor quality of sleep.

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of Gaziosmanpaşa Training and Research Hospital) for her suggestions on the assessment of chronic neuropathic LBP.

Ethics

Ethics Committee Approval: This study was reviewed and approved by the Clinical Research Ethics Committee of Taksim Training and Research Hospital (İstanbul, Turkey) on May 22, 2019 (approval no: 0076). The study was performed in accordance with the principles of the Helsinki Declaration.
Informed Consent: All patients gave informed consent prior to participation.
Peer-review: Internally peer-reviewed.

Authorship Contributions

Concept: S.G.D., M.M.B., O.B., Design: S.G.D., M.M.B., O.B., Data Collection or Processing: S.G.D., M.M.B., O.B., Analysis or Interpretation: S.G.D., M.M.B., O.B., Literature Search: S.G.D., M.M.B., O.B., Writing: S.G.D., M.M.B., O.B.
Conflict of Interest: No conflict of interest was declared by the authors.
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