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ORIGINAL ARTICLE

Assessment of psychiatric disorders and sleep quality in chronic lateral epicondylitis

Kronik lateral epikondilitte psikiyatrik bozuklukların ve uyku kalitesinin değerlendirilmesi

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Summary

Objectives: Psychiatric disorders including somatization impact pain severity and chronicity. This study aimed to determine sleep quality and the presence of psychiatric disorders in patients with chronic lateral epicondylitis (LE) and to investigate the effect of these comorbidities on pain levels.

Methods: This study included 46 patients diagnosed with chronic LE and 46 healthy controls. Visual analog scale (VAS) was used for the assessment of pain intensity. The prevalence of depression and other psychological factors was examined using Beck Depression Inventory (BDI) and the Symptom Checklist-90-Revised test (SCL-90-R). Pittsburgh Sleep Quality Index (PSQI) was used to evaluate sleep quality.

Results: The mean BDI ($p<0.001$), all subdivisions of SCL-90-R including somatization ($p<0.001$), and the mean global PSQI scores ($p=0.002$) were found to be significantly higher in patients with chronic LE than those in the control group. The presence of depression according to BDI was 41.3% in the patient group. About 60.8% of the patients had somatization and 71.7% had poor sleep quality. VAS scores were significantly higher in the patients with depression, somatization, and low sleep quality indicating a low positive linear relationship ($r=0.357$, $r=0.360$, and $r=0.463$, respectively, and all $p<0.05$).

Conclusion: Psychiatric disorders and poor sleep quality are frequently observed in patients with chronic LE. These comorbidities negatively affect pain levels and may be linked to pain chronicity. Therefore, the potential coexistence of psychiatric disorders should be kept in mind when determining the treatment protocols for patients with chronic LE and adjunctive treatment should be given if necessary.

Keywords: Depression; lateral epicondylitis; sleep quality; somatization.

Özet

Amaç: Somatizasyon başta olmak üzere psikiyatrik bozukluklar ağrının şiddetini ve kronikliğini etkilemektedir. Bu çalışmada, kronik lateral epikondilitli hastalarda uyku kalitesi ve psikiyatrik bozuklukların varlığının belirlenmesi ve bu komorbiditelerin ağrı düzeylerine etkisinin araştırılması amaçlandı.

Gereç ve Yöntem: Bu çalışmaya kronik lateral epikondilit tanılı 46 hasta ve 46 sağlıklı kontrol dahil edildi. Ağrı şiddetinin değerlendirilmesi için görsel analog skala kullanıldı. Depresyonun yaygınlığı ve diğer psikolojik faktörler, Beck depresyon envanteri ve Belirti Kontrol Listesi-90-Revize Testi kullanılarak incelendi. Uyku kalitesini değerlendirmek için Pittsburgh Uyku Kalitesi İndeksi kullanıldı.

Bulgular: Ortalama Beck depresyon envanteri ($p<0,001$), Belirti Kontrol Listesi-90-Revize Testinin somatizasyon dahil tüm alt bölümleri ($p<0,001$) ve ortalama global Pittsburgh Uyku Kalitesi İndeksi skorları ($p=0,002$) kronik lateral epikondilitli hasta grubunda kontrol grubundan anlamlı olarak yüksek bulundu. Hasta grubunda Beck depresyon envanterine göre depresyon varlığı %41,3 idi. Hastaların %60,8'inde somatizasyon vardı, %71,7'sinin uyku kalitesi kötüydü. Depresyon, somatizasyon ve düşük uyku kalitesi olan hastalarda görsel analog skorları anlamlı olarak daha yüksekti ve bu düşük pozitif doğrusal bir ilişkiye işaret ediyordu (sırasıyla; $r=0,357$, $r=0,360$, $r=0,463$ ve tümü $p<0,05$).

Sonuç: Kronik lateral epikondilitli hastalarda psikiyatrik bozukluklar ve kötü uyku kalitesi sıklıkla görülmektedir. Bu komorbiditeler ağrı düzeylerini olumsuz etkiler ve ağrı kronikliği ile bağlantılı olabilir. Bu nedenle kronik lateral epikondilitte tedavi protokolleri belirlenirken psikiyatrik bozuklukların olası birlikteliği akılda tutulmalı ve gerekirse ek tedavi uygulanmalıdır.

Anahtar sözcükler: Depresyon; lateral epikondilit; somatizasyon; uyku kalitesi.

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Introduction

Lateral epicondylitis (LE) is a painful musculoskeletal condition of the wrist extensor tendons, which attach at the lateral epicondyle of the humerus. Objective physical examination findings may not be correlated with the severity of the symptoms in several chronic pain conditions such as LE due to occupational, psychological, and physiological factors.[1] Cognitive-behavioral models of chronic pain emphasize that the pain experience is complex and that the somatic, cognitive, emotional, and behavioral domains of pain should also be evaluated.[2]

The relationship between chronic pain and depression is becoming increasingly recognized. The severity of depression and anxiety is found to be associated with greater pain intensity and disability in chronic tendinopathies.[3] Depression is found to be related to delayed recovery in chronic pain and affects prognosis. Somatization, one of the psychosocial factors, is defined as the presence of physical complaints that cannot be explained by any somatic disease.[4] Somatization can temporarily increase the sensation of pain, making them more persistent.[5] On the other hand, sleep disturbances are highly prevalent among people with chronic pain closely related to the mechanism of central sensitization.[6] Treating both the conditions together is essential for an appropriate treatment outcome for chronic pain syndromes.

In this study, we investigated psychiatric disorders and sleep quality among chronic LE patients. We also aimed to determine the effect of the presence of these disorders on pain levels of patients with chronic LE.

Material and Methods

Design and participants

This multicentric cross-sectional study was conducted with 46 chronic LE patients and 46 healthy controls at two outpatient clinics of physical medicine and rehabilitation. Patient recruitment took place between January 2021 and May 2021. The eligibility criteria included participants diagnosed as LE with a symptom duration of ≥3 months. Patients who had previous elbow surgery, limited elbow joint, symptoms of radicular, neurological, or systemic arthritic diseases were excluded from the study.

LE diagnosis was based on painful local palpation at the humeral epicondyle, positive Cozen's, and middle finger's tests. All patients underwent US to confirm the diagnosis of LE and some of the patients were also screened with magnetic resonance imaging to exclude differential diagnosis before the initiation of the study. Age, gender, body mass index, affected elbow site, dominant hand, time since LE symptom onset, and presence of occupational predisposing factor were recorded. Patients were assessed in regard to occupational risk factors such as exposure to hand-arm vibration, physically demanding work with high repetition for upper extremities, or repetitive use of wrist extensor muscles. Healthy participants with similar demographic characteristics were included in the control group.

Outcome measurements

Visual analog scale (VAS) was used to evaluate pain intensity. It is an instrument of 10 cm line with anchor statements on the left (no pain) and on the right (extreme pain). The patient marks their current pain level on the line. VAS scores range from 0 to 10. All participants also completed the following scales.

Beck depression inventory (BDI)

The BDI is a self-report scale that consists of 21 items and measures the presence and severity of depression. Each item is rated on a 4-point scale (0–3) with possible total scores ranging from 0 to 63. A cutting score of 17 or over represents depression.[7]

Symptom checklist-90-revised test (SCL-90-R)

Evaluation of participants for potential psychopathologies was performed by the Turkish version of the SCL-90-R test. The Likert-type question-answer model was used in the SCL-90 (none=0 and too much=4). The questions are aimed to assess a range of psychological symptoms and psychopathological features on nine subscales: Somatization, obsessive compulsion, interpersonal sensitivity, depression, anxiety, hostility, phobic anxiety, paranoid ideation, and psychoticism. Subscale scores 1 or more than 1 indicate the presence of relevant psychopathology.[8] This present study examined all SCL-90-R test subscales.

Pittsburgh sleep quality index (PSQI)

Sleep quality was assessed with PSQI in this study. The questions of the index evaluate sleep quality in

Table 1. Sociodemographic data and clinical features of the participants

Parameters	Patient group (n=46)		Control group (n=46)		p
	n	%	n	%	
Age (mean±SD)	39.35±10.22		38.33±7.6		0.70
Gender (F/M)	36/10		35/11		0.33
BMI (mean±SD)	25.21±4.48		23.34±4.51		0.08
Dominant hand					
R	42	91.3	42	91.3	1.00
L	4	8.7	4	8.7	
Affected site					
R	20	43.4	–		–
L	8	56.6	–		
Bilaterally	18	39.1	–		
Presence of occupational predisposing factor	20	43.4	20	43.4	1.00
Symptom duration (month)	15.13±8.99		–		–

SD: Standard deviation; F: Female; M: Male; BMI: Body mass index; R: Right; L: Left.

many ways such as sleepiness, medication status, sleep latency, sleep duration, habitual sleep efficiency, sleep disturbances, and daytime dysfunction. The components are scored between 0 and 3 points as a Likert scale. A global score between 0 and 21 is generated from these components and a total score of "5" or >5 indicates poor sleep quality.[9]

Sample size calculation

To determine the sample size; the "G Power Analysis" program was used. According to the data of the studied studies, the size of the effect size was evaluated as 1. We reached the conclusion that we could obtain meaningful data when we included a minimum of 45 patients in the evaluations where we received Type I error amount (alpha-α value or p-value) 0.05 and Type II error amount (beta-β value) 0.20.

The protocol for this study was approved by the local clinical ethics committee (numbered 2021/02-23, dated January 18, 2021) and performed in accordance with the principles of the Declaration of Helsinki. A written declaration of informed consent was obtained from each participant.

Statistical analysis

The IBM SPSS version 21.0 software (IBM Corp., Chicago, Illinois, USA) was used to perform statistical analysis. Chi-square test was used for categorical variables. Descriptive statistics of evaluation results were as follows: Number and percentage for categorical variables, mean and standard deviation for numerical variables. The normality of variables was assessed using the Kolmogorov–Smirnov test. Mann–Whitney U-test was used for comparison of groups, and correlation analysis was done by Spearman test. Statistical significance level and correlation data were set at $p<0.05$ and $r\geq0.30$.

Results

Data from a total of 46 participants in the patient group and 46 participants in the control group were reviewed. No significant differences were determined for age, gender, body mass index, dominant hand, and presence of occupational risk factors ($p>0.05$). The sociodemographic and clinical parameters are summarized in Table 1.

Among patients with chronic LE, the mean score of VAS was 6.52±1.68. Of the patients, 19 (41.3%) had BDI scores ≥17 compatible with depression. Thirty-three (71.7%) of them had PSQI scores of ≥5 indicating poor sleep quality, whereas 28 (60.8%) of them had somatization (subscale score ≥1). The mean BDI ($p<0.001$), all subdivisions of SCL-90-R ($p<0.001$), and the mean global PSQI scores ($p=0.002$) were found

Table 2. Comparison of clinical data between the groups

Clinical data	Patient group (n=46) mean±SD	Control group (n=46) mean±SD	p
VAS	6.52±1.68	–	
PSQI components			
Subjective sleep quality	1.33±0.97	1.09±0.66	0.21
Sleep latency	1.42±1.01	0.94±0.93	0.03
Sleep duration	0.52±0.81	0.35±0.60	0.31
Habitual sleep efficiency	0.30±0.59	0.33±0.67	0.70
Sleep disturbances	1.67±0.90	1.20±0.58	0.003
Use of sleep medication	0.48±1.05	0.00±0.00	0.003
Daytime dysfunction	1.48±0.94	0.78±0.94	<0.001
PSQI global score	7.18.±7.07	4.67±2.92	0.002
BDI	14.91±10.71	5.24±4.21	<0.001
SCL90-R components			
Somatization	1.25±0.77	0.36±0.29	<0.001
Anxiety	0.99±0.83	0.35±0.35	<0.001
Obsessive-compulsive	1.24±0.75	0.47±0.38	<0.001
Depression	1.12±0.84	0.29±0.29	<0.001
Interpersonal sensitivity	0.96±0.82	0.31±0.27	<0.001
Psychoticism	0.80±0.64	0.20±0.27	<0.001
Paranoid ideation	1.08±0.76	0.40±0.46	<0.001
Hostility	1.11±0.76	0.28±0.25	<0.001
Phobic anxiety	1.01±0.78	0.29±0.35	<0.001
Additional items	0.95±0.78	0.27±0.35	<0.001
Global severity index	1.07±0.72	0.32±0.24	<0.001

SD: Standard deviation; VAS: Visual analog scale; PSIQ; Pittsburg Sleep Quality Index; BDI: Beck Depression Inventory; SCL90-R: Symptom Checklist-90-Revised test.

to be significantly higher in patients with chronic LE than those in the control group. Comparison of clinical data between the groups is shown in Table 2. In the patient group; VAS was positively correlated with BDI, PSQI, and somatization subscale score while BDI was positively correlated with VAS, PSQI, somatization subscale score, and global severity index of the SCL-90-R test. Somatization subscale score was positively correlated with VAS, BDI, PSQI, and global severity index of the SCL-90-R test. The correlations between VAS, BDI, PSQI, somatization subscale, and global severity index of SCL-90-R test in the patient group are shown in Table 3.

Discussion

Previous researches showed that structural changes in tissues may not seem to be correlated with improvement in pain and disability in refractory pain syndromes.[10,11] On the other hand, coexisting abnormal psychiatric status has been shown to alter pain, disability, and other symptoms. Given the fact that psychological variables are known factors to impact perceptions of pain and treatment outcomes, physicians should consider assessing the comorbidity of psychological disorders with appropriate validated scales as a part of the management for chronic painful diseases.[3] Depressive symptoms have been found to be associated with disabilities of the arm, shoulder, and hand scores for various common disorders of the upper extremity as well as pain and disability.[12] Beleckas et al.[13] demonstrated that patients with carpal tunnel syndrome, trapeziometacarpal arthritis, or shoulder diseases reported significantly worse anxiety and depressive symptoms. About 17% of the patients reported anxiety based

Table 3. The correlations between VAS, BDI, PSQI, somatization subscale, and global severity index of SCL90-R test scores in patient group

Measurement tool	VAS	BDI	PSQI	Somatization	Global severity index
VAS	r=1.00	r=0.357	r=0.463	r=0.360	r=0.275
		p=0.015	p=0.001	p=0.014	p=0.065
BDI	r=0.357	r=1.00	r=0.788	r=0.674	r=0.783
	p=0.015		p<0.001	p<0.001	p<0.001
PSQI	r=0.463	r=0.788	r=1.00	r=0.625	r=0.721
	p=0.001	p<0.001		p<0.001	p<0.001
Somatization	r=0.360	r=0.674	r=0.625	r=1.00	r=0.866
	p=0.014	p<0.001	p<0.001		p<0.001
Global severity index	r=0.275	r=0.783	r=0.721	r=0.866	r=1.00
	p=0.065	p<0.001	p<0.001	p<0.001	

VAS: Visual analog scale; BDI: Beck Depression Inventory; PSIQ: Pittsburg Sleep Quality Index; SCL90-R: Symptom Checklist-90-Revised test.

on the generalized anxiety disorder 7 scale, and 14% of the patients reported depression based on patient health questionnaire-9 depression scale. However, there are conflicting data from several study designs surrounding the relationship between depression, anxiety, and LE.[14–16] Our results illustrated a significant coexistence of depression, anxiety, somatization, and other several psychiatric disorders in chronic LE as well as low sleep quality. We used the SCL-90-R test which is rarely used in psychiatry but it is commonly helpful in other medical disciplines or investigations to evaluate several psychiatric disorders. Patients with underlying diagnosis of depression had significantly higher pain scores similar to what Pensak et al.[17] reported.

Both depression and anxiety have been shown to correlate with painful upper limb diseases in the previous studies. Psychological factors were found to influence the development of chronic LE and the response to conservative treatment.[15,18] A recent cross-sectional study included 36 refractory LE patients and the SCL-90-R test was administered to the patients in line with our study. Authors reported that depression was observed in 66.6% and somatization was found in 77.8% of the patients.[19] High rates of these comorbidities may be explained by the longer duration of symptoms, they recruited patients suffering from LE more than 6 months. Lee et al.[20] conducted a study to determine the association between catastrophization and LE. They investigated LE patients using Pain Catastrophizing Scale and reported that patients with positive attitudes cope better than those who do not. Moreover, Aben et al.[21] reported that patients with LE were less agreeable, had more depressive feelings, and were more perfectionists than healthy controls. A pooled study analysis revealed that nine psychosocial factors had a meaningful relationship with LE, the largest of which was between physical exhaustion after work and LE.[22] Workplace factors leading to distress were also linked with LE previously.[23] Oflazoglu et al.[24] demonstrated a prevalence of untreated major depression as 12% among patients presenting to a hand surgeon. They have also identified that the severity of depressive symptoms was correlated with greater intensity of pain and disability. Similarly, this present study revealed that symptoms of depression and somatization were associated with higher pain scores and may result in functional loss.

The strength of this study includes the following points: A power analysis was performed to determine the appropriate sample size before the initiation of the study and patients were investigated by widely used, validated, and reliable scales. We included a control group and data were collected from two different hospitals which provided generativity. As a limitation, this cross-sectional study was not able to determine a cause-effect relationship between psychological disorders and LE due to its design. Second, the psychiatric status was not exam-

ined by a psychiatrist. An appropriate psychologic examination would have assured a better judgment of psychologic status in chronic LE.

This study demonstrated a high prevalence of psychiatric disorders assessed by the SCL-90-R test and low sleep quality within patients suffering from chronic LE. This observation addresses the importance of evaluating the presence of mood disorders on chronic pain syndromes such as LE. Failure of comprehensive treatment may result in the development of nociplastic pain. Treatment protocols may need to be adapted to manage possible coexisting psychological factors with a multidisciplinary team. Further exploration of psychiatric status and nociplastic pain in chronic LE is warranted.

Conclusion

LE can be refractory following conservative treatment and localized interventions may be insufficient to treat other underlying factors. Elevated prevalence of psychiatric disorders may point out the importance of psychological evaluation in chronic LE patients. The assessment of psychological status assists in optimizing the management for chronic LE when considering invasive surgical interventions may result in poor outcomes.

Ethical Approval: The study was approved by The Erzurum Regional Training and Research Hospital Clinical Research Ethics Committee (Date: 18/01/2021, No: 2021/02-23).

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References

1. Brummel J, Baker CL 3rd, Hopkins R, Baker CL Jr. Epicondylitis: Lateral. Sports Med Arthrosc Rev 2014;22:e1–6. [CrossRef]
2. Knoerl R, Lavoie Smith EM, Weisberg J. Chronic pain and cognitive behavioral therapy: An integrative review. West J Nurs Res 2016;38:596–628. [CrossRef]
3. Mallows A, Debenham J, Walker T, Littlewood C. Association of psychological variables and outcome in tendinopathy: A systematic review. Br J Sports Med 2017;51:743–8.
4. Birket-Smith M. Somatization and chronic pain. Acta Anaesthesiol Scand 2001;45:1114–20. [CrossRef]
5. Karkkola P, Sinikallio S, Flink N, Honkalampi K, Kuittinen M. Pain self-efficacy moderates the association between pain and somatization in a community sample. Scand J Pain 2019;19:101–8. [CrossRef]
6. Nijs J, Mairesse O, Neu D, Leysen L, Danneels L, Cagnie B, et al. Sleep disturbances in chronic pain: Neurobiology, assessment, and treatment in physical therapist practice. Phys Ther 2018;98:325–35. [CrossRef]
7. Beck AT, Ward CH, Mendelson M, Mock J, Erbaugh J. An inventory for measuring depression. Arch Gen Psychiatry 1961;4:561–71. [CrossRef]
8. Derogatis LR, Lipman RS, Covi L. SCL-90: An outpatient psychiatric rating scale--preliminary report. Psychopharmacol Bull 1973;9:13–28.
9. Buysse DJ, Reynolds CF 3rd, Monk TH, Berman SR, Kupfer DJ. The pittsburgh sleep quality index: A new instrument for psychiatric practice and research. Psychiatry Res 1989;28:193–213. [CrossRef]
10. Drew BT, Smith TO, Littlewood C, Sturrock B. Do structural changes (eg, collagen/matrix) explain the response to therapeutic exercises in tendinopathy: A systematic review. Br J Sports Med 2014;48:966–72. [CrossRef]
11. de Schepper EI, Koes BW, Oei EH, Bierma-Zeinstra SM, Luijsterburg PA. The added prognostic value of MRI findings for recovery in patients with low back pain in primary care: A 1-year follow-up cohort study. Eur Spine J 2016;25:1234–41. [CrossRef]
12. Ring D, Kadzielski J, Fabian L, Zurakowski D, Malhotra LR, Jupiter JB. Self-reported upper extremity health status correlates with depression. J Bone Joint Surg Am 2006;88:1983–8. [CrossRef]
13. Beleckas CM, Wright M, Prather H, Chamberlain A, Guattery J, Calfee RP. Relative prevalence of anxiety and depression in patients with upper extremity conditions. J Hand Surg Am 2018;43:571.e1–e8. [CrossRef]
14. Coombes BK, Bisset L, Vicenzino B. Cold hyperalgesia associated with poorer prognosis in lateral epicondylalgia: A 1-year prognostic study of physical and psychological factors. Clin J Pain 2015;31:30–5. [CrossRef]
15. Alizadehkhaiyat O, Fisher AC, Kemp GJ, Frostick SP. Pain, functional disability, and psychologic status in tennis elbow. Clin J Pain 2007;23:482–9. [CrossRef]
16. Garnevall B, Rabey M, Edman G. Psychosocial and personality factors and physical measures in lateral epicondylalgia reveal two groups of "tennis elbow" patients, requiring different management. Scand J Pain 2013;4:155–62.
17. Pensak MJ, Carry PM, Entin JM, Lalka A, Shourbaji NA, Scott FA. Depression and anxiety among patients with atraumatic lateral epicondylitis and ulnar-sided wrist pain. J Wrist Surg 2019;8:295–9. [CrossRef]
18. Pallant JF, Bailey CM. Assessment of the structure of the hospital anxiety and depression scale in musculoskeletal patients. health qual life outcomes 2005;3:82. [CrossRef]
19. Gürçay E, Tamkan AU, Karaahmet ÖZ, Tombak Y, Güzel Ş, Çakci A. Depression and somatization in refractory lateral epicondylitis. Arch Rheumatol 2019;34:367–70. [CrossRef]
20. Lee DO, Gong HS, Kim JH, Rhee SH, Lee YH, Baek GH. The relationship between positive or negative phrasing and

patients' coping with lateral epicondylitis. J Shoulder Elbow Surg 2014;23:567–72. [CrossRef]

21. Aben A, De Wilde L, Hollevoet N, Henriquez C, Vandeweerdt M, Ponnet K, et al. Tennis elbow: Associated psychological factors. J Shoulder Elbow Surg 2018;27:387–92.
22. Thiese MS, Hegmann KT, Kapellusch J, Merryweather A, Bao S, Silverstein B, et al. Psychosocial factors related to lateral and medial epicondylitis: Results from pooled study analyses. J Occup Environ Med 2016;58:588–93. [CrossRef]
23. Haahr JP, Andersen JH. Prognostic factors in lateral epicondylitis: A randomized trial with one-year follow-up in 266 new cases treated with minimal occupational intervention or the usual approach in general practice. Rheumatology (Oxford) 2003;42:1216–25. [CrossRef]
24. Oflazoglu K, Mellema JJ, Menendez ME, Mudgal CS, Ring D, Chen NC. Prevalence of and factors associated with major depression in patients with upper extremity conditions. J Hand Surg Am 2016;41:263–9. [CrossRef]