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The Effect of Shoulder Pain on Sleep Quality

Omuz Ağrısının Uyku Kalitesine Etkisi

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The Effect of Shoulder Pain on Sleep Quality

Abstract

Objective: Shoulder pain, a musculoskeletal issue, is most prevalent in patients aged 50-59. It can cause sleep problems and reduce sleep quality. We aimed to explore the relationship between sleep quality, pain, and disability in patients with shoulder pain, despite limited literature on this issue.

Material and Method: Study involved ninety-one patients aged 18-80 with persistent shoulder pain sought out at a physical medicine and rehabilitation outpatient clinic. Factors such as age, gender, education level, symptom duration, body mass index (BMI), occupation, and pain severity were recorded. Severity of pain was assessed using the visual analogue scale (VAS), pain and disability using the Shoulder Pain and Disability Index (SPADI), and sleep quality using the Pittsburgh Sleep Quality Index (PSQI).

Results: The mean age was 54.9 (±10.5). There were 28% men and 63% women among the patients. Fourteen percent of the patients had heavy work above shoulder level. A positive correlation was detected between PSQI and VAS and SPADI (*p value 0.004* and *0.003, respectively*) (correlation coefficient 0.304 and 0.305, respectively). No significant relationship was found between PSQI and BMI and symptom duration (*p value 0.464 and 0.718, respectively*) (*correlation coefficient 0.08 and 0.039, respectively*). While there was a significant difference in SPADI values between two groups with and without heavy work above the shoulder level, no significant difference was detected in PSQI values (*p value 0.021 and 0.36, respectively*).

Conclusion: We found that the patient's VAS and SPADI values and sleep quality were negatively related to shoulder pain. Sleep disturbance due to pain at night can also affect daytime disability. Pain and sleep quality disorders can enter a vicious circle.

Keywords: Musculoskeletal system, shoulder pain, sleep quality.

Özet

Amaç: Bir kas-iskelet sistemi sorunu olan omuz ağrısı, en çok 50-59 yaş aralığında görülür. Omuz ağrısı, uyku sorunlarına yol açarak uyku kalitesini düşürebilir. Literatürde omuz ağrısı ve uyku kalitesi ile ilgili yeterli çalışmaya rastlanmadığından omuz ağrılı hastalarda uyku kalitesi ve uykunun ağrı ve dizabilite ile ilişkisini incelemeyi amaçladık.

Gereç ve Yöntem: Çalışmaya omuz ağrısı şikayetiyle fizik tedavi ve rehabilitasyon polikliniğine başvuran 18-80 yaş arası 91 hasta dahil edildi. Yaş, cinsiyet, eğitim düzeyi, semptom süresi, vücut kitle indeksi (VKİ), meslek, ağrı şiddeti kaydedildi. Ağrının şiddeti vizüel analog skala (VAS), ağrı-disabilite Omuz Ağrısı ve Disabilite İndeksi (SPADI) ve uyku kalitesi Pittsburgh Uyku Kalite İndeksi (PUKİ) kullanılarak değerlendirildi.

Bulgular: Ortalama yaş 54,9 (±10,5) idi. Hastaların %63'ü kadın, %28'i erkekti. Bunların %14'ü omuz hizasının üzerinde ağır işlerde çalışıyordu. PUKİ ile VAS ve SPADI arasında pozitif bir korelasyon tespit edildi (sırasıyla *p değeri 0,004 ve 0,003*) (*korelasyon katsayısı 0.304 ve 0.305*, sırasıyla) . PUKİ ile VKİ ve semptom süresi arasında anlamlı bir ilişki bulunamadı *(sırasıyla p değeri 0,464 ve 0,718*) (*korelasyon katsayısı 0.08 ve 0.039*, sırasıyla). Omuz seviyesi üzeri ağır iş yapan ve yapmayan iki grup arasında SPADI değerlerinde anlamlı fark bulunurken, PUKİ değerlerinde anlamlı fark saptanmadı (sırasıyla *p değeri 0,021 ve 0,36*).

Sonuç: Hastanın VAS ve SPADI değerleri ile uyku kalitesinin omuz ağrısı ile negatif ilişkili olduğunu bulduk. Gece ağrıya bağlı uyku bozukluğu gündüz disabiliteyi de etkileyebilir. Ağrı ve uyku kalitesi bozuklukları bir kısır döngüye girebilmektedir.

Anahtar Sözcükler: Kas-iskelet sistemi, omuz ağrısı, uyku kalitesi.

Introduction

One of the most prevalent musculoskeletal system concerns is shoulder pain (1). The joint and the soft tissues around are the source of pain (2). The underlying causes of this common symptom of Physical Medicine and Rehabilitation practice include rotator cuff problems, adhesive capsulitis, calcific tendinitis, acromioclavicular joint degenerations, glenohumeral joint osteoarthritis, and glenohumeral instability (3). In the general population, shoulder pain that causes limitation is prevalent at a rate of 20% (4). It is known that shoulder pain is most common between the ages of 50-59, however, due to a reduction in physical activity, a lack of exercise, increased computer usage, and increased smartphone use, shoulder pain in young people is progressively escalating (5,6).

The future prospects for shoulder pain varies; 40–50% of patients report continuing discomfort 6–12 months after initial symptoms come up (7). The biological processes, physiological recuperation, learning, memory, cognitive activities, and emotional well-being are all significantly impacted by sleep (8). The incidence of sleep problems in the general adult population ranges from 15% to 20%, making it one of the most prevalent health conditions (9).

Inability to fall asleep or stay asleep due to shoulder pain might result in sleep issues. It can reduce sleep quality, and shifting positions while sleeping can also worsen shoulder pain (10). Shoulder pain may cause awakening from sleep (11). Reduced sleep duration and quality might have an impact on the shoulder muscle's ability to relax and repair (12).

Most of the time, sleep disorder is one of the main reasons that direct the patient to shoulder surgery. Generally, in contrast to loss of shoulder function, patients' complaints are nighttime soreness that, in the near term, disrupts sleep. Shoulder pain and persistent problematic posture during the night have a particular negative impact on sleep quality (13). Important complaints that have an intricate relationship with one another and impact the person's bodily and behavioral health are pain and sleep disruption. Chronic pain frequently interferes with sleep and might make it difficult to function during the day. Proper identification and treatment of sleep issues can help break this vicious cycle by relieving pain symptoms (14).

There is very little information about this problem in the literature. We aimed to examine sleep quality, and the relationship between sleep, and pain and disability in patients with shoulder pain.

Material and Method

Ethics committee approval of the local institute was received for the study (date: 16.05.23 Decision no: 05) and it was conducted in accordance with the principles of the Declaration of Helsinki. The study procedure was explained to the participants and consent was obtained. Ninety-one patients between the ages of 18 and 80, who consecutively applied to the physical medicine and rehabilitation (PMR) outpatient clinic with complaints of shoulder pain that had persisted for at least 3 months, were included. Exclusion criteria are: 1-) history of surgery or infection on the affected shoulder, 2-) pregnancy, 3-) history of neurological or rheumatic disease (such as rheumatoid arthritis) or malignancy, 4-) uncontrolled diabetes mellitus (DM), hypertension (HT) or patients with heart/lung disease, 5-) cervical radicular pain, 6-) morbid obesity and sleep apnea, and 7) psychiatric disease.

The patients' age, gender, education level, symptom duration (3-6 months, 6-12 months and longer than 12 months), body mass index (BMI), occupation (those with or without a profession above shoulder level) information were recorded. Plasterers, assembly line workers, and construction workers who performed heavy lifting at shoulder level were among the professional groups that were included.

The severity of shoulder pain was evaluated with the visual analogue scale (VAS). Pain and disability were evaluated with Shoulder Pain and Disability Index (SPADI). Sleep quality was evaluated with Pittsburgh Sleep Quality Index (PSQI). Pain intensity was assessed using a standard 10-cm VAS; at one end, 0 meant "no pain," and at the other end, 10 meant "unbearable pain" (15). Shoulder functional status was assessed using SPADI, which consists of 5 items assessing pain and 8 items assessing disability. The score ranges from 0% to 100%; A higher score indicates more pain and disability (16). SPADI has pain and activity limitation subparameters and a total score. The pain subparameter consists of 5 questions about shoulder pain during daily living activities, and the activity limitation consists of 8 questions about difficulty in performing daily living activities. Responses are marked numerically by patients between 0 and 10, and the scores of all responses are summed and divided by the number of questions in that subparameter to determine the value of each subparameter. The total SPADI score is determined by averaging the 2 subparameter scores. A high score indicates increased pain and impaired shoulder functions (17,18).

PSQI allows evaluating sleep quality, amount of sleep, and the presence and severity of sleep

disorders in the last 1 month. This scale consists of 7 subcomponents; subjective sleep quality, time to fall asleep, sleep duration, habitual sleep efficiency, sleep disorders, use of sleeping pills, and daytime dysfunction. The total PSQI score is obtained by summing the 7 subscores and ranges from 0 to 21 points. PSQI total score indicates good sleep quality (≤5) and poor sleep quality (>5) (19,20).

Statistical Analysis

Data analysis was done with the SPSS for Windows 22.0 package program. Whether continuous variables showed a normal distribution was examined with the Shapiro Wilks test. Descriptive statistics were shown as mean ± standard deviation or median (minimum-maximum) for continuous variables, and as number of observations and (%) for nominal variables. The significance of the difference between the paired groups in terms of all parameters and continuous variables was investigated with the Student's t-test. The correlations were evaluated with Pearson correlation tests. Results were considered significant for $p<0.05$.

Results

The mean age was 54.9 (±10.5). There were 28% men and 63% women among the patients. Fourteen percent of the patients had heavy work above shoulder level (Table I). A positive correlation was detected between PSQI and VAS and SPADI (Table II). No significant relationship was found between PSQI and BMI and symptom duration (Table II). While there was a significant difference in terms of SPADI values between the group with heavy work above the shoulder level and the group without, there was no significant difference in terms of PSQI values (Table III).

Discussion

In our study where we aimed to examine sleep quality, and its relationship with pain and disability in patients with shoulder pain, we found that pain and disability increase when sleep quality is poor. In general, the incidence of shoulder pain in women is higher than in men, and the psychological stress in particular is directly linked to shoulder pain in women. (21).

In the study of Akalin et al. (3), it was reported that 68% of the patients were female and 32% were male. It was similar for us too. The mean age was found to be 55.16 in this study, and the mean age of our patients was found to be 54.9, which was similar to this study. There were 28% men and 63% women among the patients. Fourteen percent of the patients had heavy work above shoulder level. The mean age and female gender predominance were found to be consistent with the literature.

Table I. Demographic data and VAS, SPADI, PSQI

	N=91
Age mean (SD)	54.89(10.5)
Gender n (%)	
Female	63(69.2)
Male	28 (30.8)
Symptom duration n (%)	
3-6 months	34(37.4)
6-12 months	17(18.7)
>12 months	40(44)
BMI	30.0 (6.8)
Education (%)	
Illiterate	14(15.4)
Primary school	42(46.2)
Middle school	5(5.5)
High school	16(17.6)
College	2(2.2)
University	12(13.2)
Occupation	
Severe heat above shoulder level	14 (15.4)
No heavy heat above shoulder level	77 (84.6)
VAS mean (SD)	6.69(1.74)
SPADI mean (SD)	66.2(17.4)
PSQI mean (SD)	8.3(4.4)

BMI: Body mass index; VAS: Visual analog scale; SPADI: Shoulder pain and disability index; PSQI: Pittsburgh sleep quality index

It is known that more than 40% of patients state that their pain has been present for more than 12 months when they consult a physician (22). In 44% of our patients, the pain complaint continued for more than 12 months. The severity of a woman's shoulder limitations increases with the severity of her shoulder pain (23). Sleep may be a period when shoulder muscles relax and recover. However, if sleep is of low quality, shoulder muscles cannot unwind and recuperate, which may cause shoulder problems during the day (11,12). Therefore, it is possible to expect that shoulder issues will be decreased if a technique is used to enhance sleep quality in addition to shoulder pain reduction measures (23).

While the mean PSQI of the patients in the study of Tekeoğlu et al. (11) was 11.6, the mean PSQI of the patients in the study of Edward P. et al. (24) was 8.59. We found the mean PSQI to be 8.3. In a cross-

sectional investigation of the associations between middle-aged women's sleep quality, neck discomfort, shoulder pain and disability, physical activity, and health perception, the total PSQI mean score was found to be 8.88 (25). While there was a significant difference in terms of SPADI values between the group with heavy work above the shoulder level and the group without, there was no significant difference in terms of PSQI values.

Table II. Correlations

	VAS	SPADI	BMI	Symptom duration
	r/p	*r/p*	*r/p*	*r/p*
PSQI*	*0.304/0.004*	*0.305/0.003*	*0.08/0.464*	*0.039/0.718*

r: correlation coefficient; VAS: Visual analog scale; SPADI: Shoulder pain and disability index; PSQI: Pittsburgh sleep quality index
*: Pearson corelation test

The levels of cytokines and inflammatory mediators are elevated by insufficient sleep (26,27). Inflammation may mediate the relationship between poor sleep quality and quantity, other psychological risk factors, and neck, shoulder, and low back disorders, according to research (28) showing that chronic stress, obesity, and smoking also increase the concentration of inflammatory factors. It is known that obesity is a factor that negatively affects sleep quality (29,30). We did not detect a significant relationship between PSQI and BMI. A study showed that obesity may negatively affect sleep quality and daily living activity scores in patients with neck pain due to myofascial pain syndrome (31). Khazzam et al. (8) in their study evaluating the sleep quality of their patients with rotator cuff lesions, they reported that they could not find a correlation between poor sleep quality and the lesion, and that poor sleep quality was associated with depression. We found a positive correlation between sleep quality and VAS and SPADI. However, we did not detect a significant relationship between symptom duration and sleep quality. Austin stated that poor sleep quality may be related to pain levels in patients with rotator cuff lesions (32). Khazzam et al. (8) pinpointed specific characteristics such female gender, depression, the prevalence of low back pain, diabetes, cervical involvement, and high body mass index as being connected to poor sleep quality.

Holdaway et al. discovered that high-risk sleeping postures (free fall and starfish) were protective in their cross-sectional investigation comparing sleeping positions with shoulder discomfort (33). We did not question sleep position in our study. Longo et al. (34) showed that after rotator cuff repair, sleep disorders improved three to six months after surgery and quality of life increased.

Ansok et al. (35), in their study on objective sleep measurements, showed that sleep quality was poor, sleep duration was short, they woke up frequently, and productivity decreased in patients with rotator cuff tear. A recent study by Ha et al. (36) suggested that melatonin levels, which peak at night and in the early morning hours, may activate the inflammatory response and serve as a mediator that exacerbates pain complaints.

Table 3. Groups with and without heavy work above shoulder level
Comparison with SPADI and PSQI

Variable	Heavy work above shoulder level(n=14)	No heavy work above shoulder level (n=77)	*p**
SPADI mean(±SD)	56.4(±18.8)	68.01(±16.6)	*0.021*
PSQI mean(±SD)	6(±4.9)	8.7(±4.2)	*0.36*

SPADI: Shoulder pain and disability index; PSQI: Pittsburgh sleep quality index
*:Student t test

Recent studies have investigated the impact of mood and emotional experiences on sleep and pain-related behavioral symptoms (37,38). We did not include those with a history of psychiatric illness in our study. Sleep quality has been demonstrated to have a negative link with health perception and a favorable association with neck, shoulder, and disability pain (25). Similarly, we found a positive correlation between PSQI and VAS and SPADI.
Recent studies have demonstrated that rotator cuff repair patients who have surgery experience less insomnia and higher levels of sleep quality than the general population (32,39). Poor sleep quality is an important problem not only in shoulder pain but also in other musculoskeletal problems such as low back and neck.

Karatas et al. (40) observed that sleep quality was significantly impaired in patients with carpal tunnel syndrome (CTS) compared to healthy controls. Poor sleep quality was also discovered in those with mechanical neck pain (PSQI>8) (41). According to studies, those with persistent low back pain who have poor sleep have more intense pain (42,43). Intuitively, it seems sense that a poor night's sleep

would affect a person's regular circadian cycle. Sleep is a natural aspect of life for everyone. A restful night's sleep helps the body to regenerate and recover while keeping the mind's attitude and perspective in the right place. There are suggestions that identifying people with problematic shoulders who complain about their ability to sleep well would be a crucial initial step in developing a treatment strategy for this impairment (24).

The limitations of our study are the lack of a control group and our cross-sectional evaluation, as well as the insufficient number of patients. However, we think that it is important to draw attention to the fact that sleep quality is also a part of the evaluation in the evaluation of patients with shoulder pain.

Conclusion

We found that the patient's VAS and SPADI values and sleep quality were negatively related to shoulder pain. Sleep disturbance due to pain at night can also affect daytime disability. Pain and sleep quality disorders can enter a vicious circle.

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