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Original investigation

The Relationship Between Pain Level and Sleep Quality, Quality of Life and Psychological Status in Patients with Chronic Neck Pain

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ABSTRACT

Objectives: Chronic neck pain is one of the most common musculoskeletal diseases. This pain may negatively affect the quality of sleep, quality of life, and psychological status of individuals. This study aimed to investigate the relationship between pain level and quality of life, quality of sleep, and psychological status in patients with chronic neck pain.

Materials And Methods: Seventy-three female (n=56) and male (n=17) patients (mean age 47.04±13.54 years) with chronic neck pain were included in the study. Pain severity was evaluated by McGill Melzack Pain Questionnaire (MMPQ), quality of sleep was evaluated by Pittsburgh Sleep Quality Index (PSQI), quality of life was evaluated by Short Form-36 (SF-36), depression level was evaluated by Beck Depression Inventory (BDI), and anxiety level was evaluated by Beck Anxiety Inventory (BAI).

Results: The pain level score of the patients was found 32.12±16.86; sleep quality score was severe (7.24±3.11); SF-36 physical function component score was low (71.23±20.52); SF-36 pain component score was low (57.32±17.30); depression and anxiety level scores were mild (10.50±7.73, 15.00±10.14, respectively). There was a negative correlation between the level of pain of patients and sleep quality and a positive correlation between the level of pain of patients and SF-36 pain component score and anxiety level.

Conclusion: . It is thought that sleep quality, quality of life, and anxiety management should be taken into consideration during the rehabilitation of patients with chronic neck pain.

Keywords: pain, quality of life, quality of sleep, anxiety

INTRODUCTION

Neck pain is a significant public health problem that one in every two individuals around the world has experienced at least once in their lifetime (1). However, the incidence is increasing both in the general population and in certain occupational groups (2). Especially in the past decade, it has become a significant cause of failure worldwide (3). There is also a negative impact on the daily life activities of individuals with chronic neck pain (4). Besides, this situation can negatively affect the psychological state of individuals and make daily life more difficult (5).

Pain; a sensory, effective, unpleasant sensation that is related to the individual's past experiences, originating from any part of the body, accompanied by real or possible tissue damage (6). While carrying the sense of pain with nerve fibres indicates that pain is an objective sense; its relationship with emotional states indicates that pain is also a subjective sense. Also, it is stated in the literature that psychosocial factors of individuals are an essential determinant and risk factor in neck pain (7). Besides, it is reported that the evaluation of psychosocial factors such as anxiety and depression may be a complementary approach in the treatment of neck pain (5). It is reported that pain will cause sensory problems and affect the quality of life negatively (8). When pain becomes chronic, the rate of occurrence of psychosocial problems increases.

Similarly, it is stated that there is a similar relationship between chronic pain and sleep quality. Chronic pain adversely affects sleep quality and life, while poor sleep quality can worsen the level of pain (9). However, in the literature, it is observed that

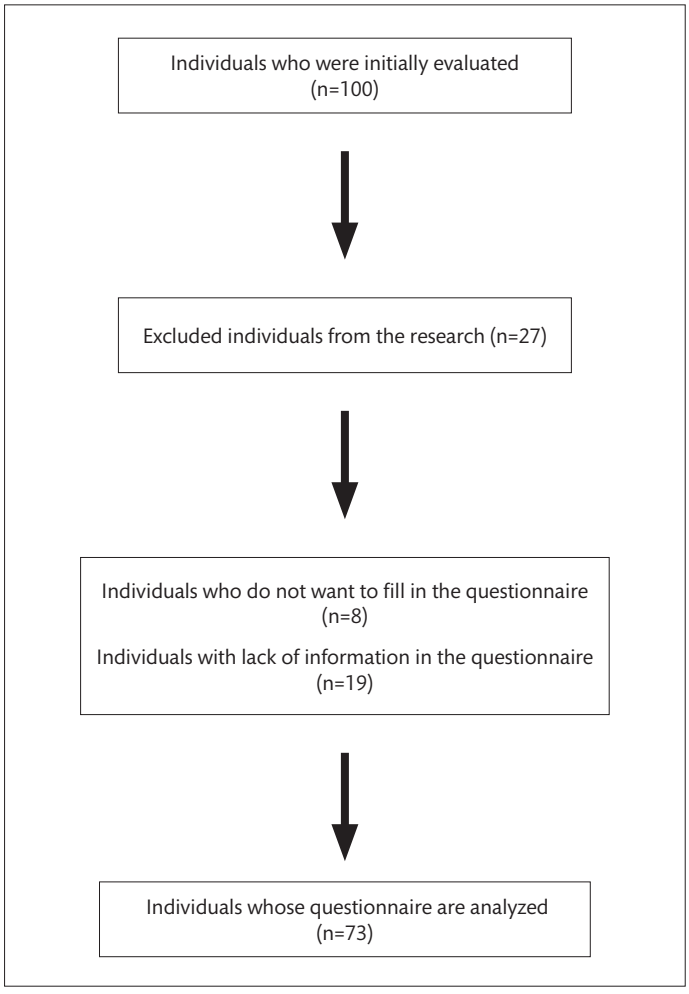

Figure 1. Flowchart

there is a relationship between pain severity and different sub-components of health-related quality of life in cases of chronic pain, and studies examining the sleep quality are inadequate. Thus, more studies are needed to determine the relationship between chronic pain and sleep disturbance was reported in the literature (10). This study aims to investigate the relationship between pain level and quality of life, sleep quality, and psychological state in patients with chronic neck pain.

METHODS

The study, which was planned as a survey study, carried out on patients with a neck pain complaint who applied to individual Physical Therapy and Rehabilitation Centre in Izmir between February 2019 and September 2019. The ethics committee approval required for the study was obtained from the Izmir Kâtip Çelebi University Non-Interventional Clinical Research Ethics Committee on 06.02.2019. Also written and verbal consent was obtained from the patients.

A hundred patients between the ages of 20–80 were evaluated. Twenty-seven people were excluded from the study due to various reasons. Seventy-three patients were included in the study (Figure 1). Patients between the ages of 20–80, who have been experiencing pain complaints for at least three months, and volunteers to participate are included in the study. Patients with any systemic, neurological, or psychiatric disease, having a history of surgery or fracture in the past three months, diagnosed with severe osteoporosis, using anticoagulants or long-term corticosteroid drugs, were excluded from the study.

The demographic information of the patients (age, gender, height, weight, etc.) was recorded on the data recording form. Also, the pain level was evaluated by McGill Melzack Pain Questionnaire (MMPQ), sleep quality was evaluated by Pittsburgh Sleep Quality Index (PSQI), the quality of life was evaluated by Short-Form 36 (SF-36), the depression level was evaluated by Beck Depression Inventory (BDI), and the anxiety level was evaluated by Beck Anxiety Inventory (BAI).

Melzack developed MMPQ in 1975, and its Turkish validity and reliability study was performed in 2003 by Kuğuoğlu et al. (11). Where is the pain is questioned in the first part, the feature of pain is questioned in the second part; the severity of pain is questioned in the third part, and the relationship between pain and time is questioned in the fourth part of the survey is questioned. The scores obtained from the parts of the survey were collected, and the pain level of the patients was determined.

PSQI was developed by Buyyse et al. (12). In addition, the Turkish validity and reliability study of the scale was performed by Ağargün et al. (13). The total scores of the patients were recorded by calculating the answers given to the questions on the scale. The total score ranges from 0–21 and total score is greater than 5 indicates poor sleep quality.

SF-36 evaluates the quality of life of patients, and its Turkish validity and reliability study was performed by Koçyiğit et al. (14). SF-36 is a scale which consists of eight sub-parameters and 36 items. Scoring is done over 100 points, and the scores are between 0 and 100 points for each sub-parameter (15). High score indicates good quality of life. The total scores of the patients were recorded by calculating the answers given to the questions on the scale.

BDI is a scale that consists of 21 questions, and 63 points measure the mental state of patients within the last week. Its Turkish validity and reliability study was performed (16). A high score indicates that the level of depression is high. The total scores of the patients were recorded by calculating the answers given to the questions on the scale.

BAI is a scale that consists of 21 questions and a total of 63 points, including some symptoms that patients experienced when they were anxious or anxious within the past week, and its Turkish validity and reliability study was performed (17). A high score indicates that the level of anxiety is high. The total scores of the patients were recorded by calculating the answers given to the questions on the scale.

The sample size required for the study was calculated using the G-Power 3.1.9.4. Program. As a result of the sample size

calculation, it was concluded that a total of 70 individuals should be included. The level of significance of the study was 80%; p=0.05 was accepted.

Statistical analysis of all data obtained was made using SPSS 21.0 program. All data analysed using IBM SPSS Version 21.0 Statistics. The normality of data was analysed with the Kolmogorov-Smirnov test. The relationship between pain levels and sleep quality, quality of life, levels of depression, and anxiety in patients with chronic neck pain were analysed with Pearson Correlation Analysis, which is a parametric test.

RESULTS

Seventy-three patients with chronic neck pain were included in the study. The detailed demographic information of the patients are given in Table 1.

Patient's mean scores and standard deviations (SD) of MMPQ, PSQI, SF-36, BDI and BAI are given in Table 2 and 3 accordingly to range of age and gender.

There was a low to moderately positive significant relationship between the MMPQ score and PSQI score of the patients (r=0.376/p<0.001) and low positive significant relationship between the MMPQ and SF-36 pain component score (r=0.238/p=0.043) and BAI score (r=0.2234/p=0.047) (Table 4). In addition, relationship between the individuals scores are given table 4 and 5 accordingly range of age and gender.

DISCUSSION

In this study, it was aimed to determine the relationship between pain level and quality of life, sleep quality, and psychological status in patients with chronic neck pain. The results of the study, it is seen that there is a relationship between the pain level and pain component quality of life, sleep quality, and anxiety in such patients. Accordingly, these results, in patients with chronic neck pain, low-moderate negative correlation between the level of pain and sleep quality, low positive correlation between the level of pain and pain component of quality of life, and low positive correlation between the level of pain and anxiety level were found.

Chronic neck pain is currently the most common musculoskeletal problem after low back pain (18). Different levels of pain in

Table 1. Demographic information of patients

	n	Mean ± SD	%
Age (year)	73	47.04±13.54	100
Range of age			
20–39 (year)	23	31.52±4.98	31.50
40–59 (year)	33	48.63±5.70	45.20
60–79 (year)	17	64.94±5.86	23.30
Gender			
Female	56	46.44±13.69	76.72
Male	17	49.00±13.25	23.28
BMI	73	26.08±4.72	100
Education status			
Illiterate	0		0
Primary education	9		12.33
High school	22		30.14
University	42		57.53
Smoking			
Yes	23		31.51
No	50		68.49

BMI: body mass index; **SD:** standart deviation; **n:** number of patients.

Table 3. Pain, sleep quality, quality of life, depression and anxiety level scores of the patients according to range of age

Variables	Mean ± SD (aged of 20–39) (n=23)	Mean ± SD (aged of 40–59) (n=33)	Mean ± SD (aged of 60–80) (n=17)	p value
MMPQ	33.13±15.69	30.06±18.33	34.76±15.84	0.615*
PSQI	6.73±2.15	7.27±3.12	7.88±4.10	0.523*
SF-36 PF	78.26±16.96	72.27±18.50	59.70±24.52*	0.015*
SF-36 PRF	51.08±12.95	27.27±15.55	38.23±17.62	0.081*
SF-36 ERF	47.82±16.95	36.42±14.54	41.17±13.34	0.684*
SF-36 Vitality	46.52±12.47	48.78±12.24	55.58±10.13	0.056*
SF-36 Pain	47.78±15.16*	60.60±16.68	63.88±16.59	0.004*
SF-36 GHP	54.86±6.73	56.39±9.90	59.76±9.55	0.230*
SF-36 MH	54.78±7.94	57.69±11.18	62.58±8.93*	0.049*
SF-36 SRF	45.68±13.72	37.37±12.29	52.20±11.88	0.134
BDI	9.26±6.00	10.21±7.69	12.76±9.68	0.356*
BAI	11.43±6.93	14.27±7.76	21.23±14.69*	0.007*

MMPQ: McGill Melzack pain questionnaire; **PSQI:** Pittsburgh sleep quality index; **SF:** short form; **PF:** physical functioning; **PRF:** physical role functioning; **ERF:** emotional role functioning; **GHP:** general health perception; **MH:** mental health; **SRF:** social role functioning; **BDI:** Beck depression inventory; **BAI:** Beck anxiety inventory; ***:** One-way ANOVA; post-hoc Bonferroni test. *level of significance 0.05

Table 2. Pain, sleep quality, quality of life, depression and anxiety level scores of the patients according to gender

Variables	Mean ± SD (Female) (n=56)	Mean ± SD (Male) (n=17)	p value	Mean ± SD (Total) (n=73)
MMPQ	32.28±16.94	31.58±17.09	0.882*	32.12±16.86
PSQI	7.33±3.02	6.94±3.47	0.647*	7.24±3.11
SF-36 PF	69.19±21.40	77.94±16.11	0.125*	71.23±20.52
SF-36 PRF	35.71±18.98	42.64±11.23	0.528*	37.32±19.33
SF-36 ERF	41.66±13.69	41.17±14.92	0.968*	41.55±13.66
SF-36 Vitality	49.91±11.30	48.82±15.15	0.750*	49.65±12.19
SF-36 Pain	60.51±16.92	46.82±14.49	0.004*	57.32±17.30
SF-36 GHP	56.69±9.20	56.70±8.56	0.997*	56.69±9.00
SF-36 MH	57.92±10.48	57.88±8.73	0.987*	57.91±10.04
SF-36 SRF	47.99±11.62	49.26±9.34	0.681*	48.28±11.08
BDI	10.67±8.47	9.94±4.68	0.733*	10.50±7.73
BAI	15.69±10.77	12.70±7.56	0.290*	15.00±10.14

MMPQ: McGill Melzack pain questionnaire; **PSQI:** Pittsburgh sleep quality index; **SF:** short form; **PF:** physical functioning; **PRF:** physical role functioning; **ERF:** emotional role functioning; **GHP:** general health perception; **MH:** mental health; **SRF:** social role functioning; **BDI:** Beck depression inventory; **BAI:** Beck anxiety inventory; ***:** independent samples **T:** test. **P=***level of significance 0.05

Table 4. Relationship between pain levels and other parameters in patients according to gender

	Level of pain					
	Female (n=56)		Male (n=17)		Total (n=73)	
	r	p	r	p	r	p
PSQI	0.420**	0.001**	0.256	0.322	0.376**	0.001**
SF-36 PF	0.012	0.932	0.058	0.826	0.002	0.983
SF-36 PRF	-0.240	0.075	-0.231	0.373	-0.225	0.056
SF-36 ERF	-0.307*	0.021*	0.323	0.207	-0.141	0.234
SF-36 Vitality	0.176	0.194	0.137	0.599	0.146	0.218
SF-36 Pain	0.241	0.073	0.265	0.305	0.238*	0.043*
SF-36 GHP	0.121	0.373	0.042	0.873	0.132	0.264
SF-36 MH	0.027	0.841	0.281	0.275	0.073	0.541
SF-36 SRF	-0.066	0.630	0.015	0.956	-0.057	0.633
BDI	0.201	0.137	0.247	0.339	0.211	0.073
BAI	0.205	0.129	0.336	0.188	0.234*	0.047*

PSQI: Pittsburgh sleep quality index; **SF:** short form; **PF:** physical functioning; **PRF:** physical role functioning; **ERF:** emotional role functioning; **GHP:** general health perception; **MH:** mental health; **SRF:** social role functioning; **BDI:** Beck depression inventory; **BAI:** Beck anxiety inventory.
*Pearson correlation coefficient.
*level of significance 0.05, **level of significance 0.001

Table 5. Relationship between pain levels and other parameters in patients according to range of age

	Level of pain					
	Aged of 20–39 (n=23)		Aged of 40–59 (n=33)		Aged of 60–80 (n=17)	
	r	p	r	p	r	p
PSQI	0.451*	0.031*	0.397*	0.022*	0.254*	0.025*
SF-36 PF	0.084	0.703	-0.126	0.483	0.232	0.369
SF-36 PRF	-0.239	0.271	-0.331	0.060	-0.124	0.636
SF-36 ERF	-0.091	0.680	-0.276	0.120	-0.124	0.634
SF-36 Vitality	0.076	0.730	0.259	0.145	0.002	0.994
SF-36 Pain	0.371	0.081	0.336	0.056	0.063	0.812
SF-36 GHP	0.235	0.280	0.173	0.336	0.271	0.292
SF-36 MH	0.094	0.670	0.022	0.904	0.017	0.947
SF-36 SRF	-0.068	0.706	-0.088	0.624	-0.031	0.905
BDI	0.097	0.658	0.253	0.155	0.282	0.272
BAI	0.261	0.230	0.250	0.160	0.181	0.487

PSQI: Pittsburgh sleep quality index; **SF:** short form; **PF:** physical functioning; **PRF:** physical role functioning; **ERF:** emotional role functioning; **GHP:** general health perception; **MH:** mental health; **SRF:** social role functioning; **BDI:** Beck depression inventory; **BAI:** Beck anxiety inventory.
*Pearson correlation coefficient
*level of significance 0.05, **level of significance 0.001

individuals with low back and neck pain also cause emotional problems, and this negatively affects the parameters such as sleep and quality of life of individuals (19). Considering that the emotional conditions of individuals are associated with functional disabilities, this will negatively affect the functional capacity of individuals and the effectiveness of applied physiotherapy and rehabilitation programs (8, 20, 21).

Munoz et al. reported that patients with neck pain have poor sleep quality compared to healthy individuals in a study that they investigated pain, disability, and sleep quality in patients with neck pain (22). Artner et al. reported that there was a significant relationship between pain severity and sleep disturbance, and more studies are needed in their retrospective study with 1016 patients with chronic low back/neck pain (10). Auvinen et al. reported that the quality and amount of sleep is a risk factor especially for low back and neck pain, and the studies to be conducted should investigate whether the methods of improving sleep quality are useful in the treatment of pain in a study that they investigated whether insufficient sleep amount and quality are a risk factor for low back, neck and shoulder pain (23). Valenza et al. emphasized that sleep disorders are a common finding in patients with neck pain; this condition is associated with pain severity. It is essential to consider the pain and sleep disorder cycle in the treatment of these patients in a study that different types of neck pain patients examined the change in sleep quality and included 59 neck pain patients (24). As a result of our study, a significant negative correlation was found between pain level and sleep quality in patients with chronic neck pain.

Rezai et al. reported that there was a relationship between neck pain and quality of life, but this relationship was generally due to comorbidities in a cross-sectional study that examined the relationship between neck pain and health-related quality of life (25). On the other hand, Nolet et al. reported that there was a negative correlation between chronic neck pain and the physical component of health-related quality of life in a cohort study that 1100 patients with chronic neck pain followed for six months (26). Joslin et al. reported that nurses with chronic neck pain had significantly higher scores on the quality of life total score, mental and physical components of the quality of life scale and the psychological stress management could reduce the pain of patients in their study which included 34 nurses named neck pain and quality of life (27). In the literature, there is a relationship between chronic neck pain and different sub-components of quality of life. As a result of our study was found a significant relationship between pain severity and health-related quality of life only pain component.

Elbinoune et al. found that the level of depression was high in 55.7%. The level of anxiety was high in 68.4% of the patients in a study in which they investigated the prevalence of anxiety and depression in 80 patients with chronic neck pain (5). Dimitriadis et al. concluded that especially the level of anxiety was related to the severity of pain in a study that investigated whether there was a relationship between pain and psychological status in 45 patients with chronic neck pain (28). Demyttenaere et al. concluded that mental problems are associated with chronic low or neck pain as a result of the data obtained from the World Mental Health Researches of 85.088 adults living in 17 countries in total (29). Yalçinkaya et al. found that the level of anxiety and depression is higher in female patients. They suggested that as well as considering the anxiety and depression parameters in patients with chronic neck pain may help develop more useful strategies

in a study in which they investigated that whether parameters such as anxiety and depression differ in women and men (30). As a result of our study was found a significant relationship between pain severity and level of anxiety but was not found a relationship between pain severity and level of depression.

If we mention limitations of our study, although the targeted number of patients is reached in terms of statistical power, keeping the number of patients higher will minimize the level of error and increase the accuracy of the findings. The strengths of this study are data collection and statistical analysis are performed by different researchers, male and female individuals' inclusion in the study.

According to the results of our study, there is a negative impact on the pain component of quality of life, sleep quality, and levels of anxiety in patients with chronic neck pain. In order to achieve a more effective result, especially with physiotherapy and rehabilitation applications during the treatment of such patients, it is considered that it is a requirement to consider psychological status, sleep quality and quality of life under the name of the biopsychosocial model.

Informed Consent: From patients himself/herself

Compliance with Ethical Standards: İzmir Katip Çelebi University Non-Interventional Clinical Research Ethics Committee, 06.02.2019/54

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Author Contributions: Concept - ES, SGU; Design - ES, ING; Supervision - ES, FT; Fundings - FT, STK; Materials - FT, STK; Data Collection and/or Processing - ES, ING, SGU; Analysis and/or Interpretation - ES, ING; Literature Search - FT, STK; Writing Manuscript - ES; Critical Review - ING, SGU

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