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Araştırma Sunumu | Research Article

Sleep Quality, Body Awareness and Neck Disability Differences Between Patients with Nonspecific Mechanic Neck Pain and Healthy Individuals: A Cross-sectional Study / *Spesifik Olmayan Mekanik Boyun Ağrısı Olan Yetişkinler ve Sağlıklılarda Uyku Kalitesi, Vücut Farkındalık ve Boyun Özrünün Farkları: Kesitsel Bir Çalışma*

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Öz

Giriş: Spesifik olmayan mekanik boyun ağrısı; yetişkinlerde iş kalitesinde azalma, uyku bozukluğu, özre neden olabilir. Spesifik olmayan mekanik boyun ağrısı olan erişkinlerde uyku kalitesi, beden farkındalığı ve boyun özürlülüğü ile ilgili literatürde halen çalışmalara ihtiyaç vardır. Amaç: Bu çalışmada, spesifik olmayan mekanik boyun ağrısı ve boyun ağrısı olmayan yetişkinlerde uyku kalitesi, vücut farkındalığı ve boyun özrünü karşılaştırma amaçlandı. Gereç ve Yöntemler: Spesifik olmayan mekanik boyun ağrısı olan yetişkinler (n=89) ve aynı yaştaki asemptomatik kontroller (n=90) bu kesitsel çalışmaya dahil edildi. Vücut farkındalığı, uyku kalitesi ve boyun özür durumu çevrimiçi anketler kullanılarak değerlendirildi. Uyku kalitesi, Pittsburgh Uyku Kalitesi İndeksi ile; beden farkındalığı, Beden Farkındalığı Anketi ile ve boyun özrü, Boyun Bournemouth Anketi ile değerlendirildi. Bulgular: Genel olarak 179 yetişkin (ortalama yaş: 20.09 ± 0.94 yıl), spesifik boyun ağrısı olanlar ve olmayanlar olarak iki gruba ayrıldı. Örneklemin %70.2'sini (n=125) kadınlar oluşturmuştur. Kontrollerde spesifik olmayan mekanik boyun ağrısı olanlara kıyasla uyku kalitesi daha iyi ve boyun özürlülüğü daha düşüktü ($p<0.05$). Sonuç ve Öneriler: Spesifik olmayan mekanik boyun ağrısı olan yetişkinlerde uyku kalitesini ve boyun özrünü etkilediği ancak vücut farkındalığını etkilemediği görülmüştür. Yetişkinler, daha iyi uyku kalitesi ve boyun özrünü iyileştirmek için postural egzersiz programlarına ve rehabilitasyona yönlendirilebilir.

Anahtar Kelimeler: *Mekanik Boyun ağrısı, uyku, farkındalık, yetişkinler*

Abstract

Introduction: Non-specific mechanical neck pain (NMNP) may cause decrease of work quality, sleep disturbance, disability in adults. There is still a need for studies in the literature on sleep quality, body awareness and neck disability in adults with nonspecific mechanical neck pain. Aim: The study aimed to compare sleep quality, body awareness, and neck disability in adults with and without NMNP. Adults with non-specific mechanical neck pain (n=89) and age-matched asymptomatic controls (n=90) were included in this cross-sectional study. Body awareness, sleep quality, and neck disability were assessed using online questionnaires. Sleep quality was assessed using the Pittsburgh Sleep Quality Index, body awareness was assessed using the Body Awareness Questionnaire, and neck disability was evaluated with the Neck Bournemouth Questionnaire. Results: Overall, 179 adults (mean age: 20.09±0.94 years) were divided into two groups of those with and without nonspecific mechanic neck pain. Females comprised 70.2% (n=125) of the sample. Sleep quality was better and neck disability was lower in participants without NMNP ($p<0.05$). Conclusion: NMNP affects sleep quality and neck disability but not body awareness in adults. Adults can be oriented to postural exercise programs and rehabilitation for better sleep quality and improving neck disability.

Keywords*: Mechanic neck pain, sleep, awareness, adult*

1. Introduction

Non-specific mechanical neck pain (NMNP) that may produce varying degrees of disability is highly prevalent in adults (Lochman et al.,2019). The lifetime prevalence of neck pain is approximately 48.5%. NMNP is usually improved over three to six months, but 14% of patients complain of repeated or sustained pain. The neck pain, seen for more than three months, is called chronic pain (Lauche et al.,2012). NMNP is characterized by long-term excess activity of cervical muscles, muscle fatigue and reduced power and range of motion (Çelenay et al, 2016). To increase functionality and life quality in adults with NMNP, first, it is necessary to identify mechanical problems and understand which structures can cause pain and discomfort (Alfawaz et al., 2020). Although NMNP's causes are not fully stated, authors believe that some biomechanical factors, such as poor ergonomic design and work posture, repeated movements, high physical loads and long-term use of telephones or computers, may be the factors that have caused the development of NMNP. (Çelenay et al., 2021).

A progressive decline in posture, sleep quality, quality of life, and body awareness have been observed recently, particularly under circumstances of immobilization (Erden et al.,2013; Pinto et al.,2020). It has been reported that regular physical activity can prevent postural problems, and sleep disorders, while at the same time helping to avoid diminished body awareness (Lauche et al., 2017; Wunsch et al., 2017). Research suggests that pain and disability may lead to misstimulated neuroplastic changes (Wand et al.,2011). Perceptual levels and proprioceptive awareness examined in painful situations, postural deformities and neck pain affects sensorial defects (Ünlüer and Ateş, 2021). An increased interest in body awareness has just begun to develop, and there is evidence that body awareness assessment can be effective in various conditions including pain. A lack of body awareness is associated with functional insufficiency, headache, migraine, fibromyalgia, and anxiety, but not with sleep disorders and nonspecific mechanical neck pain (Sertel et al., 2021). Erden et al (2013) have stated that the main purpose of body awareness

measurement is to define body awareness and general body functions with emotional components. Painful conditions cause individuals to suffer from poorer sleep quality, lessening body awareness, and neck disability (Sertel et al., 2021; Munoz et al.,2012). However, as far as the authors know, no research data relate sleep quality in the case of NMNP nor about the effect of NMNP on body awareness, sleep quality and neck disability in adults. It is worth noting that there is an uncertainty in the literature with respect to the concept of body awareness and NMNP in adults. Our study aimed to compare sleep quality, body awareness, and neck disability in adults with and without NMNP.

2. Materials and Methods

2.1. Research Design

This is cross-sectional research.

2.2. Research Location and Time

This study was carried out at Ankara, Turkey, University of Health Science Turkey, Faculty of Gulhane Health Sciences, between June and September 2021. There were 179 adults with NMNP registered at this center.

2.3. Participants and Study Design

First- and second-year students at the Gulhane Faculty of Health Sciences were recruited as study participants, comprising a total of 179 adults with a primary complaint of NMNP between the ages of 20-45. The recruitment was handled via flyers and word-of-mouth. In the screening that took place, adults with NMNP who were assessed as having mild or moderate neck pain according to the Visual Analog Scale (VAS) (<3 - <7) were included in the study (Lohman et al., 2019). Those with similar age and body mass index levels and who had no mechanical neck pain were assigned to the asymptomatic control group (Figure 1). Written informed consent was obtained from all of the adults participating in the study.

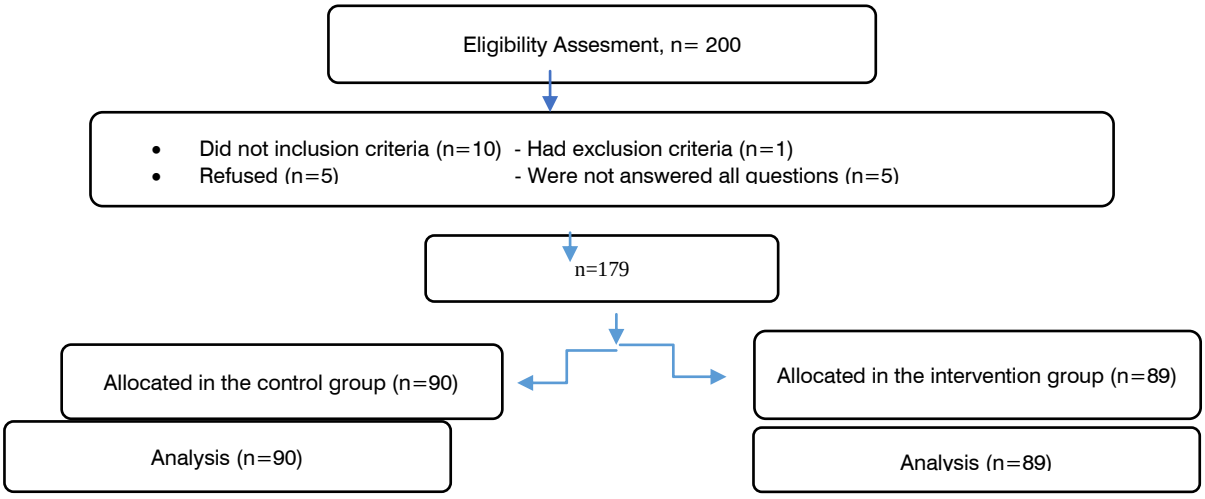

Figure 1. Flow Diagram of The Trial

Inclusion criteria were being aged 20 years or over, volunteering to take part in the study, being a student of online education, without a history of any neurological or orthopedic problem, with resting neck pain (as measured by the VAS) lasting ≤30 days and that is aggravated by movement without extending distal to the shoulders. The exclusion criteria included a neck pain, rheumatological diseases, malignity or structural deformities, previous surgical intervention related to the neck region, and severe pain (more than 7 in 0 to 10 VAS).

2.4. Data Collection

A demographic data form, the Body Awareness Questionnaire, Pittsburgh Sleep Quality Index, Neck Bournement Questionnaire were used to collect data about the adults with and without NMNP (Lohman et al., 2019; Munoz et al.,2012).

2.5. Data Collection Forms

Demographic Data Form

This form, prepared by the authors, collects information on sex (female/male), age (in years), height (in cm), weight (kg) of the participants. It also includes a question to assess neck pain levels (Çelenay et al., 2016).

Body Awareness Questionnaire

Body awareness was examined using the Body Awareness Questionnaire (BAQ) (Shields et al., 1989; Karaca et al.,2017). BAQ evaluates the self-reported level of sensitivity to bodily processes, and the ability to anticipate bodily reactions. Participants must answer 18 questions on a seven-point Likert-type scale. BAQ includes the four subgroups of changes in the body process, the sleep–wake cycle, estimation of disease onset, and the estimation of body reactions. Higher scores indicate better body awareness (Karaca et al.,2017). Karaca et al showed that the Turkish version of this scale and found it very high (ICC=0.830) (Karaca et al.,2017).

Pittsburgh Sleep Quality Index

Pittsburgh Sleep Quality Index (PSQI), subjective sleep quality, sleep delay, sleep time, and daily sleep efficiency, is a 19-question survey that includes sleep disorder, use of drugs that encourage sleep, and daily dysfunction (Buysse et al.,1989; Ağargün et al. 1986). In PSQI, each question is scored 0-3 points, the total of 7 titles is ranked from 0-21 to 5, and if the total score is higher than, sleep quality is low (Buysse et al.,1989). Ağargün et al. adapted the PSQI questionnaire to Turkish patients (Ağargün et al. 1986).

Neck Bournemouth Questionnaire

Neck Bournemouth Questionnaire (NBQ) was used to examine the neck disability of participants (Bolton et al.,2002; Aslıyüce et al.,2019). The NBQ contains 7 basic elements to evaluate adults who had neck pain in biopsychosocial terms. NBQ research daily activities, social activities, anxiety, emotional aspects of depression, kinesiophobia and ability to control pain. Since each question consists of a 10-point numerical scale, the total score from the survey is between 0 and 70. Increasing NBQ results indicate that the patient's

condition has deteriorated. Aslıyüce et al (Aslıyüce et al.,2019) stated that the Turkish version of this questionnaire was valid and reliable.

2.6. Ethical Considerations

The study was conducted in accordance with the rules of the Declaration of Helsinki. The Ethics Committee of the Gulhane Scientific Research at University of Health Science Turkey approved the study protocol (Approval No. GO 2021/244).

2.7. Statistical Analysis

Statistical analysis was performed using SPSS version 22. Descriptive statistical data were obtained on all the variables in the study through measures of central tendency and dispersion. Afterwards, the Kolmogorov–Smirnov test was employed to evaluate if variables followed normal distribution. Since it was determined that the sleep quality, body awareness and neck disability values of individuals with and without NMNP were not normally distributed, non-parametric statistical tests were used. The Mann-Whitney U test was used for continous in intergroup comparisons of variables. In comparison of categorical variables between groups, the chi-square test was used. In the study, the descriptive statistics for the variables used are given as median (25^{th} percentile-75^{th} percentile), and the descriptive statistics of categorical variables as percentage (%).

Descriptive features of individuals were provided as means, standard deviation and frequencies. The Mann–Whitney U test and Chi-square test were used to determine differences in age, height, weight, and BMI among patients with and without NMNP. The level of statistical significance was accepted as $p \leq 0.05$. Cohen's d calculation between group difference measurements was used to determine effect sizes. Cohen described a small effect size as 0.2, a moderate effect size as 0.5 and a large effect size as 0.8 (Cohen,1988).

The software program G*power (version 3.0.10 Universität Düsseldorf, Düsseldorf, Germany) was used to estimate sample size (Faul et al.,2008). In determining sample size, a post-hoc power analysis was performed such that the statistical significance of alpha was 5% and the confidence interval was taken as 95%; the analysis indicated that the power (1-β) of the study was 95%. The primary outcome was determined according to the Neck Bournemouth Questionnaire for neck disability. Effect size was found to be 1.539.

3. Results

A total of 179 volunteer adults with a mean age of 20.09 years (SD 0.94) participated in the study. Females constituted 70.2% (n=160) of the sample. There were no significant differences in descriptive characteristics between groups (p>0,05) (Table 1).

The BAQ, PSQI, and NBQ scores were 89.52±14.81, 7.53±2.64, 27.54±11.60, respectively, in the group with NMNP. The BAQ, PSQI, and NBQ scores were 86.21±1.76, 6.11±2.50, and 12.07±8.21, respectively, in the group without postural problems.

There were significant differences between the total score PSQI ($p<0.001$) and NBQ ($p<0.01$) scores in the groups. There was no significant difference in terms of BAQ between the groups ($p=0.224$) (Table 1).

For the subscales of PSQI, there were statistically significant differences between groups in terms of sleep latency ($p=0.051$), sleep disorder ($p=0.009$), and daytime sleep dysfunction ($p=0.003$). But there were no statistically significant differences between groups for sleep quality ($p=0.061$), sleep duration ($p=0.551$), habitual sleep activity ($p=0.372$), and use of sleep medication ($p=0.093$) (Table 1).

There was a clinically moderate and large difference in effect size according to Cohen's d calculation between the groups (total sleep quality index value of Cohen's d= 0. 0.552 and neck disability value of Cohen' d=1.539).

Table 1. Comparison of Each Groups with and without Non-Mechanic Neck Pain

Parameters		**Group With NMNP (n=89) n (%)**	**Group Without NMNP (n=90) n (%)**	χ^2	**P**
Sex	Female	81(91)	79(87.8)	0.493 0.483 0.493	
	Male	8(9)	11(12.2)		
		Median (Q1-Q3)	**Median (Q1-Q3)**	Z	p
Age (years)		20(19-21)	20(19-20)	-0.843	0.399
Height (cm)		165(161-169)	165(160-169)	-0.465	0.642
Weight (kg)		58(52-64)	59(52.75-65)	-0.108	0.914
BMI (kg/m^2)		21.07(19.46-23.27)	21(19.33-24)	-0.215	0.830
Total Score PSQI		7(6-9)	6(4-7)	-3.630	0.000*
Sleep Quality		1(1-2)	1(1-2)	3.351	0.061
Sleep Latency		2(1-3)	2(1-3)	3.811	0.051*
Sleep Duration		0(0-0)	0(0-0)	0.355	0.551
Habitual Sleep Activity		0(0-0)	0(0-0)	0.789	0.372
Sleep Disorder		1(1-2)	1(1-2)	6.756	0.009*
Use of Sleep Medication		0(0-0)	0(0-0)	2.820	0.093
Day Time Sleep Dysfunction		2(1-2)	1(1-2)	8.719	0.003*
Body Awareness		92(80-99)	88(76.75-98.25)	-1.215	0.224
Neck Disability		25(19.50-36.50)	10(6-17)	-8.404	<0.001*

NMNP: Non-specific Mechanic Neck Pain; χ^2: Chi- square Test; Q1:25th percentile; Q3: 75th percentile; Z=Mann Whitney U Test; BMI: Body Mass Index; kg: kilogram, m^2: metersquare; PSQI: Pitsburgh Sleep Quality Index, *p<0.005

4. Discussion

This study investigated the effects of NMNP on sleep quality, body awareness and neck disability in this study. The study verifies a decrease of sleep quality and increase of neck disability in young adults with NMNP and we found no difference in the body awareness of young adults with or without NMNP.

It is reported in the literature that older age is a period in which the issues of having difficulty falling asleep, waking up too early and experiencing non-restorative sleep are exacerbated (Landry et al., 2015; Aydın and Yiğitalp, 2021). Recently, however, pandemic may have been a factor that negatively affected psychological well-being and impaired sleep quality in adults as well. The pandemic had more of a pronounced effect on adults, leading to changes in their lifestyles, with additional worries of unemployment and economic issues (Pinto et al., 2020). Our participants with and without NMNP worked remotely from home and exhibited lower sleep quality. The results suggest similarities to the previous study which is reported by Juan et al (2020) for adults with chronic neck pain, showing a positive correlation between neck pain intensity and sleep quality. Muñoz et al (2012) stated that patients with mechanical neck pain exhibited higher disability and worse sleep quality than controls. The PSQI scores in our study were like those found by studies with different samples. Brown et al (2002) stated that variable sleep schedules, going to bed thirsty, environmental noise, and worrying while falling to sleep contribute to poor sleep quality in young adults. Cheng et al (2012) found that the younger adults have poor sleep quality. Fatıma et al (2016) concluded that female young adults have poorer sleep quality than males' ones. Sella et al (2021) examined that COVID-19 lockdown changes in young adults' sleep quality and dysfunctional beliefs about sleep. It is found that in this study more of a worsening in all PSQI components in the NMNP group compared to asymptomatic controls. Looking into previous studies, the evaluation of sleep quality is important in individuals with chronic neck pain, but there is not enough evidence about nonspecific mechanical neck pain (Munoz et al,2012). It is thought that this study will fill this gap in the literature.

Body awareness is an important concept that helps the individual have a better quality of life, expand body perception, and increase sensitivity toward perceiving the body. Although previous studies have shown that body awareness is affected by pain, the effect of NMNP on body awareness was first demonstrated in our study (Sertel et al., 2021; Erden et al.,2013). Pain-caused mis stimulated neuroplastic changes have a negative effect on body awareness (Wand et al.,2011). Baskan et al (2021) stated that cognitive impairment and pain should be reduced by improving body awareness among older adults. The results of this study however show that mechanical neck pain does not affect body awareness in adults. It is thought that this may be because the duration of mechanical neck pain is short and pain levels are moderate. Preventing and treating NMNP with appropriate postural training and approaches to exercise is important in averting the development of chronic neck pain and may also help prevent diminished body awareness at later ages.

Non-specific mechanical neck pain is an important cause for disability and loss of work performance. The findings in this study were that mean NBQ scores increased more in adults with NMNP compared to those without NMNP. Studies of different samples have reported that mechanical neck pain can lead to disability as much as low back pain and can also produce a loss of working days in individuals with mechanical neck pain (Çelenay et

al.,2016; Lohman et al., 2019). Choudhary et al (2021). showed that patients with chronic mechanical neck pain were found to have a substantial decrease in functional disability and that physiotherapy resulted in significant improvements in pain and functional disability. Due to all the above, neck pain can be considered a social problem that has a significant impact on patients and their daily lives (Martin Gomez et al.,2019; Zhang et al., 2022; de Campos et al.,2018). There was more of an increase in the neck disability mean scores of the NMNP group compared to the asymptomatic group. The findings of this study were similar as reported in previous studies.

The current study had some limitations. Firstly, the study involves similar age groups. Secondly, only sleep quality, body awareness and neck disorders were assessed in adults with and without NMNP. Further studies should involve larger sample groups, and different age groups so that the effects of age can be compared.

5. Conclusion and Suggestions

This study showed that sleep quality decreased, and neck disability increased in the NMNP group compared to the asymptomatic group, but there was no difference in body awareness. Since NMNP is a factor affecting sleep quality and neck disability, taking precautions such as posture exercises in situations that require long-term static posture where the risk of NMNP increases, may be beneficial in increasing the sleep quality of adults and reducing neck-related disability.

We observed in this study that adults with NMNP had worse sleep quality and increased neck disability compared to adults without postural problems. Therefore, adults may be oriented to exercise programs and rehabilitation for mechanical problems before a pathological diagnosis.

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Declarations

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