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Research Article / Araştırma

Farklı fiziksel aktivite düzeylerine sahip non-spesifik boyun ağrılı kadınlarda uyku kalitesi, fonksiyonellik ve farkındalığının incelenmesi*

The investigation of sleep quality, functionality and neck awareness in woman with non-specific neck pain with different physical activity levels

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ABSTRACT

Aim: The aim of the study is to examine pain, sleep quality, neck functionality and awareness in woman with non-specific neck pain (NSNP) with different levels of physical activity. **Materials-Methods**: 124 women with NSBP who had neck pain complaints for at least three months, were included in the study. The pain severity of the individuals was evaluated with the Visual Analogue Scale, physical activity levels with the International Physical Activity Questionnaire Short Form, functionality with Neck Disability Scale, neck awareness with Fremantle Neck Awareness Questionnaire and sleep quality with Pittsburgh Sleep Quality Index. The individuals were compared after they were grouped according to their physical activity levels as physically inactive, low and adequately physical activity level. **Results**: The mean age of the women participating in the study was 40.19±12.22 years. While the group with the least neck pain during rest, activities and throughout the night consisted of women who did adequate physical activity, the group with the most pain was the low physical activity group ($p=0.001$). While the group with the best neck functionality consisted of women who did adequate physical activity, it was seen that the inactive group had the least functionality ($p=0.001$). It was found that the group with the worst sleep quality was the physically inactive group ($p=0.001$). **Conclusions**: It was determined that the level of physical activity made a difference in terms of pain severity, sleep quality, functionality, and neck awareness in women with non-specific neck pain. It is suggested to add behavior changes to increase physical activity levels to the rehabilitation programs of patients who consult the clinic with NSNP.

ÖZ

Amaç: Farklı fiziksel aktivite düzeylerine sahip non-spesifik boyun ağrılı kadınlarda ağrı, uyku kalitesi, boyun fonksiyonellik ve farkındalığını incelemektir. **Gereç-Yöntem:** Çalışmaya en az 3 aydır boyun ağrısı şikâyeti olan 124 kadın katıldı. Bireylerin ağrı şiddetleri Vizuel Analog Skalası ile, fiziksel aktivite seviyeleri Uluslararası Fiziksel Aktivite Anketi Kısa Formu ile, fonksiyonellikleri Boyun Özür Ölçeği ile, boyun farkındalığı Fremantle Boyun Farkındalık Anketi ile, uyku kalitesi Pittsburgh Uyku Kalitesi İndeksi ile değerlendirildi. Bireyler fiziksel aktivite seviyelerine göre inaktif, az aktif ve yeterince aktif olarak üç gruba ayrılarak karşılaştırıldı. **Bulgular**: Çalışmaya katılan kadınların yaş ortalaması 40.19±12.22 yıl idi. İstirahatte, aktivitede ve gece boyunca boyun ağrısı en az olan grup yeterince aktif fiziksel aktivite yapan kadınlar iken, ağrısı en fazla olan grup az aktif olan gruptu ($p=0.001$; $p<0.01$). Boyun fonksiyonelliği en iyi olan grup yeterince aktif fiziksel aktivite yapan kadınlar iken, inaktif grup en az fonksiyonelliğe sahip bulundu ($p=0.001$; $p<0.01$). Uyku kalitesinin en kötü olduğu grup fiziksel olarak inaktif olan grup olduğu bulundu ($p=0.001$; $p<0.01$). **Sonuç**: Non-spesifik boyun ağrılı kadınlarda fiziksel aktivite seviyesinin ağrı şiddeti, uyku kalitesi, fonksiyonellik ve boyun farkındalığı açısından farklılık yarattığı bulundu. Kliniğe non-spesifik boyun ağrısı ile başvuran hastaların rehabilitasyon programlarına fiziksel aktivite (yürüyüş, aerobik egzersiz vb.) seviyesini arttırmaya yönelik davranış değişikliklerinin eklenmesi önerilmektedir.

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Key Words: Neck Pain, Physical Activity, Sleep, Women

Anahtar Kelimeler: Boyun Ağrısı, Fiziksel Aktivite, Uyku, Farkındalık, Kadın

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INTRODUCTION

Non-specific neck pain, (NSNP) which is a frequently seen musculoskeletal problems in the general population, is defined as pain located anatomically between the superior nuchal line and the spinous process of Thoracic 1 vertebra, in the posterior and lateral of the cervical area, which is not related to neurological symptoms, acute traumas, fracture, tumors, infections and different musculoskeletal pathologies (1,2). NSNP with multifactorial etiology is more common in women than men (3). Although the causes of NSNP are not exactly known, some biomechanical factors such as bad work desk design and work posture, repetitive movements and physical traumas, erroneous postural habits and use of smart phones can cause development of NSNP as well (4). Chronic neck pain, which is known to be an important public health problem, leads to serious economic losses since it causes treatment costs and loss of labor all over the world (5,6).

NSNP can have negative effects on the physical, social and psychological well-being of individuals as it causes negative experiences in daily-life activities and work life (7). It is important to identify mechanic problems at early stages and to understand which structures can increase pain and discomfort in order to improve functional state and quality of life in adults with NSNP (8). In the treatment of NSNP, medical applications, posture training, ergonomic changes in daily-life activities, electrotherapy, stretching, suitable exercise approaches and numerous conservative approaches such as physiotherapy modalities which involve manual therapy techniques are used (7). The severity of the pain felt during treatment, degree of tissue damage, recovery level, psychological state of the individual, physical activity state, posture, ergonomics and sleep pattern should be given importance to (9). It is important to choose the accurate treatment modality to treat neck pain and to take precautions before musculoskeletal system pain develops (2,9).

Physical activity (PA) positively affects psychological and physical health in all age groups (10). It is stressed that exercises of different intensity or intense physical activity have different effects on neck and waist pain (11). It is reported that strengthening exercises are effective in decreasing the severity of pain and increasing spine functions (12). Regular physical activity contributes to better muscle strength, balance, aerobic capacity, metabolic and immunological functions in individuals (10,13). It is indicated that high levels of strengthening exercises and physical fitness have very positive effect and that the prevalence of neck and waist pain can be decreased through exercises (14). It is stated that with the increasingly aging populations in countries with middle and low income, the prevalence of neck pain will be increasing significantly in the coming years. This shows that there is a need for further proof for the risk factors which may cause pain, preventive and/or recuperative interventions (5).

This study focuses on the subject of physical activity which we think can be one of the preventive treatment approaches. In the study, it was aimed at classifying women with NSNP according to their physical activity levels and analyzing the relationship between pain, sleep quality, neck functionality and awareness.

MATERIALS-METHODS

This study of cross-sectional study design was carried out with patients who consulted the Fiziform Fitness Center with complaints of neck pain, diagnosed with non-specific neck pain and referred to the physiotherapy unit by a specialist doctor. A total of 124 women aged 18-65, who experienced neck pain for at least 3 months, had no disc hernia and radiculopathy in their cervical magnetic resonance scans and were diagnosed with NSNP were included in the study. Women who had sleep apnea, used psychiatric medication, had a body mass index > 30, were pregnant, previously had shoulder, cervical, thoracic, lumbar area spinal surgery and related pain were excluded from the study.

Within the scope of the study, the socio-demographic and clinical characteristics of the participants were recorded. Their pain severity during rest, activity, and night time, physical activity levels, sleep quality, neck functionality and neck awareness were evaluated. The individuals were separated into three groups as physically inactive, low physical activity and adequate physical activity.

All of the evaluations were carried out through the face-to-face evaluation method. The pain severity, neck functionality, neck awareness and sleep quality of the groups were compared. The study was carried out in line with the Helsinki Declaration. The study was approved in by Baskent University, Medical and Health Sciences Research Board (KA19\278). The informed consent of all of the participants included in the study were taken. The power calculation of the study was done by Gpower. According to the Post hoc power analysis; the study was completed with 95 % reliability for One Way ANOVA hypothesis (1-α), 95 % test power (1-β), f=0,394 effect size with a total of 124 individuals in 3 groups.

Outcome Measure

Pain severity: Pain severity during rest, activity, and night time was evaluated with the visual analogue scale (VAS). It was seen that all the individuals had pain, 10 of them

defined intolerable pain and they were asked to mark pain severity on a 10 cm horizontal line. The measured value was recorded as the current pain severity of the individuals (15).

Physical activity level: The participants' physical activity levels were evaluated with the short form of International Physical Activity Questionnaire (IPAQ). The questionnaire provides information about the time spent for walking, and moderate and vigorous activities. The time spent for sitting is evaluated separately (16). The individual's activity level is determined through the MET method based on the duration, frequency and intensity of the movement and the three different levels of the data are determined as physically inactive (<600 MET-min/week), low physical activity (600-3000 MET-min/week), and adequate physical activity (beneficial for health) (>3000 MET- min/week) (17). The scale has Turkish validity and reliability (16).

Functionality: The individuals' functionality was evaluated with the Neck Disability Scale. The scale assesses pain sensitivity, personal care, lifting, reading, headaches, concertation, work, driving, sleeping and recreation. The highest score is 50 and the lowest is 0. Low scores indicate that functionality is better. The scale has Turkish validity and reliability (18).

Neck awareness: Neck awareness was evaluated with the Fremantle Neck Awareness Questionnaire. It is a Likert type questionnaire which evaluates how individuals perceive the communication between their necks and bodies and their body position and assesses the different perceptions of the individuals through nine questions. The total score ranges from 0-36, with an increase in score indicating a poor prognosis. The scale has Turkish validity and reliability (19,20).

Sleep quality: Sleep quality was evaluated with the Pittsburgh Sleep Quality Index (PSQI). The index consists of a total of 24 questions which give information on sleep quality in the last one month and type and severity of sleep disorder. Parameters such as subjective sleep quality, sleep latency, sleep duration, habitual sleep efficiency, sleep disorder, use of sleeping medication and daytime dysfunction are questioned. While sleep quality of those with a total score of ≤5 and lower is accepted as "good", > 5 is accepted as bad sleep quality. The index has Turkish validity and reliability (21).

Statistical Analysis

The statistical analysis of the data was done with SPSS (Version 20, Chicago IL, ABD). The qualitative data related to descriptive data were expressed as numbers and percentages, while quantitative data were expressed as arithmetic averages, standard deviation and minimum-maximum values. Normal distribution of the data was analyzed using the Kolmogorov Smirnov test. Non-normal data were analyzed using the Shapiro-Wilk test. While Kruskall-Wallis test was used in the comparison of the three groups which did not display normal distribution of quantitative data, Mann-Whitney U test was used in the comparison of the two groups. The relationship between quantitative data which did not display normal distribution, Spearman's Correlation analysis was used. The statistical significance was evaluated at $p<0.01$ and $p<0.05$ levels.

Ethics Committee Approval

The study was evaluated by the Başkent University Medical and Health Sciences Research Board on 12.09.2019 and found ethically appropriate with the decision numbered KA19\278.

RESULTS

A total of 124 women with an age average of 40.19±12.22 participated in the study. After the groups were separated according to their physical activity levels, they were homogenous in terms of demographic characteristics. The descriptive characteristics of the individuals in the study are given in Table 1.

While the group with the least neck pain during rest, activity, and night time was the adequately active group, the pain level of the low physical activity group was the highest ($p=0.001$; $p<0.01$). The adequately active group was the best group in neck functionality, whereas the physically inactive group had the least functionality ($p=0.001$; $p<0.01$). While the group with worst sleep quality was the low physical activity group, the group with best sleep quality was the adequately active group ($p=0.00$; $p<0.01$) (Table 2).

DISCUSSION

In current study, pain, sleep quality, neck functionality and awareness were investigated in individuals with non-specific neck pain (NSNP) with different levels of physical activity. In terms of physical activity, it was found that adequately physically active women were more advantageous in pain neck severity during rest, activity and night time, neck functionality and neck awareness, whereas the sleep quality of physically inactive women was bad.

In the literature, there are conflicting views on the relationship between pain and physical activity. In Briggs et al.'s study on an adolescent group, it was determined that pain/shoulder pain did not have a

Table 1. The descriptive characteristics of the individuals

	Groups	N	X±SD	p
Age (years)	Physically Inactive	44	42.88±10.89	0.058
	Low Physical Activity Level	38	43.39±11.44	
	Adequate Physical Activity Level	42	34.47±12.45	
Weight (kg)	Physically Inactive	44	66.11±7.99	0.089
	Low Physical Activity Level	38	67.60±6.06	
	Adequate Physical Activity Level	42	63.90±10.44	
Height (cm)	Physically Inactive	44	161.11±5.58	0.225
	Low Physical Activity Level	38	161.47±5.72	
	Adequate Physical Activity Level	42	163.70±5.36	
BMI(kg/m^2)	Physically Inactive	44	25.59±3.65	0.070
	Low Physical Activity Level	38	26.09±2.74	
	Adequate Physical Activity Level	42	23.78±3.77	

BMI: Body mass index; cm: centimeters; kg: kilogram; n: number m:meter; X±SS: average ± standard deviation; p: Chi-square test;

Table 2. Difference in neck pain severity, functionality, awareness and sleep quality between the groups

Pain Severity (cm)		N	X±SD	Min max	p
Rest	Physically Inactive	44	5.34±1.58	0-9	0.001$^{b.c}$
	Low Physical Activity Level	38	5.63±1.4	3-8	
	Adequate Physical Activity Level	42	2.57±2.26	0-10	
Activity	Physically Inactive	44	6.14±1.75	0-8	0.001$^{b.c}$
	Low Physical Activity Level	38	6.55±0.98	4-8	
	Adequate Physical Activity Level	42	3.21±2.41	0-10	
Night	Physically Inactive	44	6.02±1.56	0-8	0.001$^{b.c}$
	Low Physical Activity Level	38	6.42±1.11	4-9	
	Adequate Physical Activity Level	42	2.52±1.9	0-8	
Neck Disability Index Score					
Physically Inactive		44	15.09±7.35	3-30	0.001$^{a.b.c}$
Low Physical Activity Level		38	23.89±6.07	10-37	
Adequate Physical Activity Level		42	11.36±5.9	1-25	
Fremantle Neck Awareness Questionnaire Score					
Physically Inactive		44	17.3±9.02	2-36	0.001$^{b.c}$
Low Physical Activity Level		38	19.16±4.64	9-30	
Adequate Physical Activity Level		42	9.29±7.17	0-30	
Pittsburgh Sleep Score					
Physically Inactive		44	5.93±4.12	0-15	0.001$^{a.c}$
Low Physical Activity Level		38	9.08±3.69	1-14	
Adequate Physical Activity Level		42	6.07±3.59	0-16	

* Kruskall Wallis Test. p<0.05; X±SS: average ± standard deviation; p^a: Mann-Whitney U (physically inactive- low physical activity level); p^b: Mann-Whitney U (inactive-adequately active); P^c : Mann-Whitney U (low physical activity level -adequately physical activity level). cm: centimeters

relationship with physical activity level, activity intensity or sedentary life-style (22). Ashina et al. underlined that people with tension type headache and neck pain have a very low physical activity level (23). Dimitiriadis et al. reported that physical activity level influenced pain and psycho-social state in individuals with chronic neck pain (24). A recent meta-analysis found that prolonged sitting is related with neck pain (25); however, as different in our study, it was found that prevalence of neck and shoulder pain in individuals who did high levels of physical activity was higher. While another study indicated that aerobic exercise has positive effects on 1quality of life and pain when done at the accurate activity level, it was reported that contributions related to endurance increased patient mobility in daily life (26). In the current study, higher level of pain in the physically inactive group and lower level of pain in the adequately physically active group is a finding parallel to the literature. We think that regular physical activity increases oxygenation of tissues at the cellular level and indirectly lowers pain through a healthier circulatory system.

Studies have shown that pain in the cervical area is caused by the decrease in the strength and endurance of cervical muscles (26,27). There are publications which show that risk of neck pain can be reduced by 14 % through an increase of 1000 steps in daily life in sedentary individuals. Epidemiological studies have underlined that adopting bad postures for extended periods is related to sedentary lifestyle and this may cause neck pain (28). It is suggested that maintaining bad postures or sitting for extended periods during work hours may increase the physical load in different parts of the body and this may cause muscle fatigue and discomfort. It is thought that changes that develop due to muscle fatigue play a role in the pathogenesis of body tissues and cause neck pain (5). The findings of this study are in parallel with the literature, as it was found that the highest functionality according to neck disability index was seen in the adequately physically active group, whereas the least functionality was seen in the physically inactive group. Current study shows that physical activity which is low-cost, easily accessible and above the suggested dose has positive effects on the musculoskeletal system and that when we are able to increase our physical activity level, we may contribute to neck functionality.

There is a very limited number of studies which analyze the relationship between physical activity level and body and neck awareness (29). It has been shown that, individuals who are actively involved in sports have a high body awareness compared to their peers who do not do sports (30). Kalkısım et al., have shown that there is a positive relationship between physical activity level and body awareness (31). Gözgen et al. have determined that women who have a low level of physical activity have low body awareness (32). In addition, Vatansever et al. have indicated that positive gains are in question in body postures through increased body awareness in physically active individuals (33). In this study, it was similarly found that neck awareness of the physically inactive group was worse compared to the other groups and that neck awareness of the physically adequately active group was high. This result may be suggesting that good posture habits in women who have an adequate physical activity level lead to better neck awareness. Emotional and psychological states that may be effective on neck awareness were not analyzed in this study. It is suggested to evaluate these states of the individuals in detail in future studies, considering that they are important factors which affect awareness.

Studies report that physical activity positively affects sleep quality (34,35). It is stated that exercise is a very important behavior change to improve sleep quality. It is indicated that exercise done within three hours prior to sleeping negatively affects sleep quality in terms of sleep hygiene (36). According to a meta-analysis in which the effect of acute exercise on sleep was analyzed, it was found that exercise done in the morning hours does not have any effect on sleep and it was suggested to do physical exercise in the afternoon, towards night time to improve sleep quality (37). The finding that the physically inactive group has the lowest sleep quality in this study is in parallel with the literature. The reason for lower sleep quality in the adequately active group compared to the low physical activity group may be explained as the relationship between exercise based on very different parameters and sleep quality and the obtained results can be associated with the hours during which exercise is done. Although a definite relationship has not been found in studies dealing with exercise-sleep relationship, the type of physical exercise, duration of the exercise and the hour during which exercise is done during the day can change sleep quality with different perspectives. However, both the positive physical and psychological effects of exercise in general improve sleep quality as well.

The strong aspects of the study are that numerous parameters were evaluated together and that it is one of the first studies which analyzes the relationship between neck awareness and physical activity. The limitation of the study is that objective evaluation methods were not used. It is suggested to carry out studies of larger samples with devices that present more objective measurements in the future.

CONCLUSION

It was found that the level of physical activity made a difference in terms of pain severity, sleep quality,

functionality, and neck awareness in women with NSNP. This study showed the importance of the evaluation of physical activity level in the clinical assessment of NSNP which is clinically frequently seen by physiotherapists. Behavioral changes on increasing physical activity level (walking, aerobic exercise, etc.) should be added as well to the rehabilitation programs of patients who consult the clinic with complaints of NSNP.

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