

The Relation between Pain and Compliance with Home Exercise Program in Patients with Chronic Nonspecific Neck Pain

Kronik Nonspesifik Boyun Ağrısı Bulunan Hastalarda Ev Egzersiz Programına Uyum ve Ağrının İlişkisi

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ABSTRACT

Objective: In our study, it was aimed to investigate the compliance of patients diagnosed with non-specific neck pain with home exercise program treatment, the factors affecting compliance, and the effect of compliance on pain and functionality.

Method: Ninety-three people aged 18-65 years with nonspecific neck pain lasting longer than 6 months were included in the study. Each patient was given a home exercise program. It was planned to give an exercise program as 2 sets a day for 4 weeks. All patients were evaluated by the same physiatrist with VAS score, Neck Disability Index and The Bournemouth Neck Questionnaire at admission (baseline) and 1 month later.

Results: In the 1st month follow-ups of the patients, there was a statistically significant improvement in VAS and NDI values in all evaluations of the patients who regularly performed their exercises, and in those who partially performed the exercises ($p<0.05$). No significant improvement was observed in both pain and disability assessments in patients who did not perform the exercises. When the comparison between the groups was made, the patients who exercised regularly showed a significant improvement in tVAS and Bournemouth pain values compared to the individuals who partially performed the exercises and those who did not ($p<0.05$). When comparing NDI values between the groups, those who regularly performed the exercises showed a significant improvement compared to those who did not ($p<0.05$).

Conclusion: The results of our study showed that compliance with home rehabilitation was associated with relief of neck pain. We observed that as the commitment to home rehabilitation increases, the pain decreases. We recommend using it as video images to increase compliance with the exercise program.

Keywords: Exercise adherence, home exercises, nonspecific neck pain

Öz

Amaç: Çalışmada nonspesifik boyun ağrısı tanısı alan hastaların ev egzersiz programı tedavisine uyumunun, uyumu etkileyen faktörlerin, uyumun ağrı ve işlevsellik üzerine etkisinin araştırılması amaçlandı.

Yöntem: Çalışmaya altı aydan uzun süren nonspesifik boyun ağrısı olan 18-65 yaş arası 93 kişi dahil edildi. Her hastaya evde egzersiz programı verildi. Dört hafta boyunca günde iki set egzersiz programı verilmesi planlandı. Tüm hastalar, başvuru sırasında (başlangıçta) ve bir ay sonra vizuel analog skala (VAS) skoru, boyun özürülük indeksi [Neck Disability Index (NDI)] ve Bournemouth boyun anketi (The Bournemouth Neck Questionnaire) ile aynı fizik tedavi uzmanı tarafından değerlendirildi.

Bulgular: Hastaların birinci ay takiplerinde düzenli egzersiz yapan ve kısmen egzersiz yapan hastaların tüm değerlendirmelerinde VAS ve NDI değerlerinde istatistiksel olarak anlamlı düzelme saptandı ($p<0,05$). Egzersiz yapmayan hastalarda hem ağrı hem de özürülük değerlendirmelerinde anlamlı bir iyileşme

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gözlenmedi ($p>0,05$). Gruplar arası karşılaştırma yapıldığında, düzenli egzersiz yapan hastaların VAS ve Bournemouth ağrı değerlerinde egzersizleri kısmen yapan ve yapmayanlara göre anlamlı düzeyde iyileşme olduğu görüldü ($p<0,05$). Gruplar arasındaki NDI değerleri karşılaştırıldığında, egzersizleri düzenli yapanlar yapmayanlara göre anlamlı bir gelişme gösterdi ($p<0,05$).

Sonuç: Çalışmanın sonuçları evde rehabilitasyona uyumun, boyun ağrısının giderilmesiyle ilişkili olduğunu göstermiştir. Evde rehabilitasyona bağlılık arttıkça ağrının azaldığı gözlemlenmiştir. Egzersiz programına uyumu artırmak için video görsellerinin kullanılması önerilmiştir.

Anahtar kelimeler: Ev egzersizleri, egzersiz uyumu, nonspesifik boyun ağrısı

INTRODUCTION

A significant number of people suffer from chronic neck and back discomfort, which contributes to a significant cost on society. At some point in their life, as many as 70% of the global population will suffer from neck discomfort, and of those, 50–85% will feel it again within one to five years.^[1,2]

This makes neck pain a global burdensome problem and contributes to a rapidly increasing trend in health care expenditures related to spinal pain.^[3] According to some studies, muscle soreness may be caused by insufficient strength in the neck and shoulder muscles.^[4–6] Clinical guidelines^[7] support many types of physical activity, including strengthening, range of motion, motor control, stretching, and proprioceptive training, and they are frequently utilized as a management approach in the first-line therapy of neck discomfort.^[8]

Exercises advised for home use (home exercises) are successful at alleviating neck pain and preventing recurrences of neck pain (re-exacerbations) in patients who adhere to home exercise regimen.^[9,10] However, adherence, which is initially high, tends to wane over time, diminishing the home exercise program's beneficial long-term effects.^[11–13] This decline is attributed to patient-related factors (loss of self-efficacy, fear of pain, difficulty to incorporate exercises into daily life), program characteristics (lack of supervision during learning sessions, excessive number of exercises), and the care providers' style (lack of monitoring or feedback).^[14]

Home exercises, which are taught individually and prescribed for home use, are beneficial in reducing neck pain and preventing recurrence of neck pain (re-exacerbations) in patients who adhere to the home exercise program.^[9,10] Ineffective adherence to a home-based fitness regimen, on the other hand, diminishes the treatment's efficacy.^[15,16]

In our study, it was aimed to investigate the compliance of patients diagnosed with non-specific neck pain with home exercise program treatment, the factors affecting compliance, and the effect of compliance on pain and functionality.

METHOD

The study was carried out between May 1st 2021 and August 1st 2021 in Kanuni Sultan Suleyman Training and Research Hospital, Physical Medicine and Rehabilitation Clinic.

Sample size calculations were made using the G*Power 3 program (Heinrich-Heine-Universität Düsseldorf, Düsseldorf, Germany) correlation (two tail) with a power of 80%, significance level of 0.05, and medium effect size ($d=0.3$). We obtained a sample size of 84 participants. With a 10% drop probability, 93 people were planned to be included in the study. Ninety-three people aged 18–65 years with nonspecific neck pain lasting longer than 6 months were included in the study.

Exclusion criteria were cognitive impairment, history of fracture or surgery around the neck region, inflammatory disease, infection in the neck region, presence of neoplasia, and spinal stenosis in the cervical region. Patients with any of these diagnoses were excluded from the study.

The study protocol was approved by the ethics committee of Kanuni Sultan Suleyman Training and Research Hospital (Ethics committee no: 128), and all patients gave written informed consent to participate. The study was conducted in accordance with the principles of the Declaration of Helsinki.

Each patient was given a home exercise program. It was planned to give an exercise program as 2 sets a day for 4 weeks. The exercise program consisted of cervical joint (forward neck flexion, posterior neck extension, neck rotation and right and left lateral neck flexion), stretching and strengthening exercises that did not require specific tools and lasted approximately 10 minutes at any time of the day.^[17–19]

The patients were informed individually by a physiatrist. They were shown how to do each exercise and encouraged to exercise regularly at home. Written and illustrated material explaining the home exercises and a video showing the exercises were given to all patients. Paracetamol 500 mg twice a day was recommended to the patients. An exercise diary was given to determine the compliance of the patients.

All patients were evaluated by the same physiatrist at admission (baseline) and 1 month later. Age, sex, BMI and sociodemographic information were obtained in the admission evaluation of the patients. Patients' neck pain intensity was measured on a 10-point visual analog scale (VAS; measured from 0 [no pain] to 10 [unbearable pain]).

Neck disability was assessed with the Neck Disability Index (NDI). This test includes 10 items: pain intensity, self-care, weight lifting, reading, headache, concentration, work, driving, sleep, and fun. Each item is scored from 0 (no pain or restriction) to 5 (maximum pain or restriction). It gives an overall NDI score between 0 and 50 points. Higher scores indicate greater disability (0–4=absent, 5–14=mild, 15–24=moderate, 25–34=severe, and >34=complete).^[19]

The Bournemouth Neck Questionnaire consists of seven questions and the answers are scored between zero and 10. The maximum score that can be obtained from the questionnaire is 70, and a high score indicates high disability.^[20]

The number of exercise practices and compliance were questioned in the 1st month follow-up of the patients.

Statistical Analysis

IBM SPSS (Statistical Package for the Social Sciences Statistics for Windows, Version 25.0. Armonk, NY: IBM Corp.) was used for statistical analysis of all data. In descriptive statistics of data, in parametric tests, mean and standard deviation values; in nonparametric tests, median values, lowest and highest values were used.

The distribution of variables was checked with the Kolmogorov-Smirnov test. While the Paired T-Test was used for repeated measurements with normal distribution, the Wilcoxon test was used for data without normal distribution. Correlation studies were performed with the Pearson test. Results were evaluated at 95% confidence interval and $p < 0.05$ was defined as statistical significance.

RESULTS

Ninety-three people diagnosed with non-specific neck pain were included in our study. Seven of the patients were excluded from the study because they did not come for follow-up examinations, and the data were analyzed according to the results of 86 patients. Mean age of the patients included in the study was 39 ± 7.1 years, and the BMI was 25 ± 2.9 kg/m². Of the patients, 61 (70.9%) were females and 25 (29.1%) were males. While 47 of the patients were actively working, 39 were not working. When the education levels of the patients were evaluated, 32 were primary school graduates, 36

were high school graduates, and 18 were university graduates. Mean neck pain VAS score of the patients was 6.1 ± 1.8 , and the duration of complaints was 15 ± 4.8 months.

When the patients were questioned whether they were able to exercise and their compliance with the exercise in their follow-up visits 1 month later, 18 stated that they did not do the exercises, 37 stated that they did it partially, and 29 stated that they did it regularly. Of the 66 patients who stated that they practiced exercises partially and regularly, 36 said they benefited from video exercises, 12 from brochure exercises, and 6 from both. When the reasons why 18 patients who did not practice the exercises were questioned, 7 people stated that they increased their pain, 5 said that they could not find the opportunity, 4 people had a lack of motivation, and 2 people did not like to exercise. All of the patients stated that the exercise sheets and video lectures were understandable and applicable.

In the 1st month follow-ups of the patients, there was a statistically significant improvement in VAS and NDI values in all evaluations of the patients who regularly performed their exercises, and in those who partially performed the exercises. No significant improvement was observed in both pain and disability assessments in patients who did not perform the exercises. When the comparison between the groups was made, the patients who exercised regularly showed a significant improvement in the VAS and Bournemouth pain values compared to the individuals who partially performed the exercises and those who did not. When comparing the NDI values between the groups, those who regularly performed the exercises showed a significant improvement compared to those who did not (Table 1).

DISCUSSION

In our study, it was observed that individuals who used home exercise program had lower pain and disability values, while no improvement in pain and disability was observed in individuals who did not exercise. It was observed that patients who regularly perform the home exercise program have more improvement in pain values at the end of 1 month than those who partially performed. These results confirm previous reports on the usefulness of a home exercise program.^[11,21,22]

The most common variables discovered to be responsible for nonadherence are a lack of time to exercise and an inability to incorporate the workouts into one's daily routine. According to research, some aspects of the care provider's approach, such as offering positive incentives to patients, monitoring their exercise performance at home, and provid-

Table 1. Comparison of the 1st month results within and between the groups

Clinical evaluation	No (n=18)	Partially (n=37)	Regularly (n=29)	p ^{**}
VAS score				0.002
PreT	6.3±0.68	5.7±0.83	5.6±0.81	
PostT	5.4±1.7	4.7±1.5	3.3±1.9	=0.038 ^a
Difference	0.88±1.6	0.94±1.7	2.3±1.7	=0.004 ^b
p [*]	0.053	0.003	<0.001	
Bournemouth				=0.007
PreT	30±11	29±10	28±9.0	
PostT	28±12	27±10	20±8.9	=0.020 ^a
Difference	1.4±5.3	2.5±8.6	8.0±8.1	=0.018 ^b
p [*]	0.267	0.082	<0.001	
NDI score				=0.026
PreT	24±8.3	23±7.6	20±6.3	
PostT	23±8.7	21±10	15±9.3	=0.041 ^b
Difference	1.0±4.4	2.0±5.3	4.9±5.5	
p [*]	0.324	0.028	<0.001	

*: Within-group p value; **: Between-groups p value of preT-post T difference. ^a: Partially and regularly; ^b: No and regularly. PreT: Pretreatment; PostT: Posttreatment; NDI: Neck Disability Index

ing feedback on progress and therapy, when combined, can affect adherence to a home exercise program.^[23,24]

In studies examining patients with chronic neck pain, decrease in cervical muscle strength and endurance, and muscle atrophy have been reported.^[25,26] Accordingly, studies have suggested that strengthening exercises may change the size of neck muscles.^[27] Studies have shown that certain types of exercise, including motor control, yoga/Pilates/Tai Chi/Qigong, and strengthening exercises, have positive effects on pain intensity and pain-related disability in people with chronic non-specific neck pain compared to the control group. However, it is seen that there is no superior type of exercise for patients.^[28] In our study, we determined an exercise program consisting of stretching and strengthening exercises in the light of this information.

Our study investigated the short-term effects of the exercise program, and when other studies affecting the short-term effect of exercise were examined, Tunwattanapong et al.^[17] have found that a regular stretching exercise program applied for four weeks reduced pain and improved neck functions and quality of life for office workers with chronic moderate-to-severe neck pain compared to the control group. In a study conducted by Li et al.^[29] examining the short-term effects of strengthening programs, they have stated that strengthening exercises are an effective method for relieving pain, improving mobility, and strengthening neck muscle. In our

study, it was determined that the stretching and strengthening program provided a decrease in the pain and disability of the patients at the end of 4 weeks, in line with the literature.

Adherence to home rehabilitation has been shown to be strongly associated with relief of neck pain. It has been observed that the higher the commitment to rehabilitation at home, the lower the pain.^[21,30] Hayden et al.^[31] have shown that inadequate compliance with home exercises may reduce the effectiveness of treatment. In other studies, it has been observed that neck pain was lower in patients who underwent home rehabilitation compared to those who did not.^[11,12] In our study, in accordance with the literature, the most improvement was found in those who regularly practiced the exercises, while less improvement was observed in those who partially applied them. In addition, there was no change in the complaints of those who did not exercise.

Compliance with home exercise programs is strongly influenced by pain perception and pain-related barriers. The effect of pain on adjustment has also been reported in other studies, and they found that the severity of neck pain affects adjustment and that there is an inverse relationship between initial pain and adjustment.^[23,32,33] In our study, seven patients stated that they could not perform the exercise program due to increased pain, and this was the most important reason affecting compliance with exercise in our study. In addition, home rehabilitation compliance is also affected by the reha-

bilitation program. Some authors have shown that patients with chronic neck pain have poor compliance with home rehabilitation when the exercises are long and difficult to perform and the program includes more than 8 exercises.^[14,34] In our study, we arranged the home exercise program not to be long and not exceed 10 minutes, and we did not receive any negative feedback from the patients.

CONCLUSION

The results of our study showed that compliance with home rehabilitation was associated with relief of neck pain. We observed that as the commitment to home rehabilitation increases, the pain decreases. In chronic neck pain, if the home exercise program given to the patients is followed, neck pain decreases and the recurrence of neck pain can be prevented. Therefore, investigating the compliance of the patients with the home exercise program and determining its relationship with pain may provide more benefits in the treatments to be given to the patients.

Disclosures

Ethics Committee Approval: The study was approved by the University of Health Sciences Kanuni Sultan Suleyman Training and Research Hospital Clinical Research Ethics Committee (No: 128, Date: 07/04/2021).

Informed Consent: Written informed consent was obtained from all patients.

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