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Effects of Routine Physical Therapy with and Without Home-based Exercise Manual on Pain and Disability in Patients of Postural Neck Pain: A Randomized Controlled Trial

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[1-3]Conception and design, Collection and assembly of data, [2-6]Analysis and interpretation of the data, [3-5]Critical revision of the article for important intellectual content, Statistical expertise [1-6]Final approval and guarantor of the article.

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A B S T R A C T

Background: Neck pain is the second most commonly occurring musculoskeletal ailment after back pain. Persistent pain in the neck which might be due to the poor posture of the neck has the capability to cause alteration in the cervical spine biomechanics.

Objective: The objective of this study was to evaluate the effect of routine physical therapy with and without a home-based exercise manual on pain and disability in patients with postural neck pain.

Methodology: Seventy-five participants suffering from postural neck pain were recruited and sealed envelope method was used for the randomization of participants into group A (RPT treatment) and group B (RPT treatment, along with a manual of home-based exercises). All the participants were interviewed about history of their postural neck pain and completion of physical examination before 1st treatment session and then physical assessment was done after 3 weeks. Both the groups visited the physical therapy department for physical therapy followed the instructions and performed exercises at their homes. The main outcome measure was the Numeric Pain Rating Scale and secondary outcome measures included functional disability i.e. Neck Disability Index.

Trial registry number: NCT05261698

Results: Seventy-five participants who completed a follow-up of 3 weeks were 71.4% males and 28.6% females in Group A, and 77.5% males and 22.5% females in Group B. The results regarding comparison of pain showed mean, SD at baseline were 8.22±.80 and 7.10±1.15, at 1st week 6.97±.61 and 4.82±1.05, and 3rd week 5.77±0.58 and 2.32±.97, in Group A and Group B respectively, and for Neck Disability Index showed at baseline 33.71±3.38 and 29.62±2.57, 1st week 28.68±3.40 and 22.62±3.75, and 3rd week 23.82±3.14 and 11.75±2.52 in RPT Group and RPT along with home-based exercise manual Group while improvement was significant, p-value <0.001.

Conclusion: The study concluded that the home-based exercise manual along with RPT illustrated significant effects among the postural neck pain patient, reduced the intensity of pain and the risk of disability.

Keywords: Disability, Exercise, Pain, Physical therapy, Postural neck pain.

Introduction

Neck pain is the second most common musculoskeletal disorder and considered as high risk factor for disability after back pain. According to the assessment and estimation, forward head posture can be seen among 60% of patients suffering from neck pain. Individuals have altered postural behaviors suffering from neck pain due to the office work that require prolonged sitting including paper work and computer based tasks. Constant pain in the neck because of the bad posture of the neck has the probability to lead change in the cervical spine biomechanics. Office working individuals

especially those with prolonged sitting in front of computers and other paperwork are much more prone to alter their biomechanics of the cervical spine.[1-3]

The most commonly occurring musculoskeletal problem in the population is postural neck pain, affecting roughly 70% of the individuals at some point in their life. Musculoskeletal problems most commonly cause disability among individuals with office-based occupations and lead to considerable financial consequences caused by worker's compensation and medical expenses. In correlation with other professionals, dentists and other dental health workers report a higher frequency of work related musculoskeletal disorders.[4-6]

In Europe and North America, home-based rehabilitation of the cardiac have been established in an attempt to enhance uptake, particularly for the old age patients, socially isolated people and ethnic minorities, and those from underdeveloped areas who face hurdles in utilizing center-based facilities.[7]

Self-structured along with prescribed home exercise programs brings positive rehabilitative effects among patients with disability or limited availability of on-site physical therapy treatment.[8] Prescribing patients with resistance and endurance training may give rise to physiological and as well as functional reserve, therefore initiating a safe edge to fulfill potential high needs of other physical capacities and cardiac output at the time of illness and rehabilitation.[9-11] Rehabilitation plan before undergoing treatment and rehabilitative training during and after rehabilitation has shown the emerging beneficial clinically relevant improved physical fitness among patients.[12]

Methodology

It was a randomized controlled trial and consecutive sampling was used. The study duration was 9 months from August 2021–April 2022 and was conducted at Physiotherapy Department of Pakistan Society for the Rehabilitation of the Disabled (PSRD) Lahore, Pakistan. The patients aged 18–50 years were included in the study, postural neck pain with symptoms initiates minimally one time in a week and for a period of more than 3 months. Individuals with postural neck pain who reported that their condition worsened due to prolonged postural loading and was improved by posture adjustment were also considered eligible for participation in the study. The participants were assessed through posture grid. Whereas the exclusion criteria consisted of patients with pain in the neck because of any particular reasons i.e. congenital deformity of the spine, neurological disorder, inflammatory rheumatic disease, disc protrusion, any traumatic history of spine, stenosis of spinal canal, pregnant women and those patients who had gone through any spinal surgery or any other medical or surgical treatment of the spine within the previous 4 weeks.

The estimated sample size for the neck disability index had a mean score of 32 in each group. This was adjusted to account for a predicted 20% dropout rate, resulting in a final mean score of 38. The sample size was calculated using the OpenEpi online calculator with a confidence interval of 95%, power of 80%, and a sample size ratio of 1.[13, 14]

Results

The results regarding the gender of participants showed that there were 25 (71.4%) males and 10 (28.6%) females in group A and 31 (77.5%) males and 9 (22.5%) females in group B. The results regarding the site of postural neck pain in participants showed that there were 14.3% of subjects had pain on the right side and 28.6% subjects had pain on the left side and 57.1% subjects had pain on both sides in group A and while postural neck pain in participants showed that there were 5.0% subjects having pain on the right side and 32.5% subjects having pain on the left side and 62.5% subjects having pain on both sides in group B. The results regarding descriptive statistics of the duration of symptoms showed that mean, SD were found to be 4.17±1.01 for Group A (RPT) and 4.12±1.01 for Group B (RPT and exercise manual).

The results regarding the comparison of pain using numeric pain rating scale (NPRS) before treatment at baseline showed that mean, SD of pain score were found to be 8.22±0.80 and 7.10±1.15, mean ranks 3.00 and 3.00 in Group A (RPT) and Group B (RPT along with exercise manual) while improvement was significant p-value <0.001. The results regarding the comparison of pain after treatment at 1st Week showed that mean, SD of pain score were found to be 6.97±0.61 and 4.82±1.05, mean ranks 2.00 and 2.00 in Group A (RPT) and Group B (RPT along with exercise manual) while there was significant improvement, p value <0.001. The results regarding comparison in pain after treatment at 3rd Week showed that mean, SD of pain score were found to be 5.77±0.58 and 2.32±0.97, mean ranks 1.00 and 1.00 in Group A (RPT) and Group B (RPT and exercise manual) while improvement was significant, p-value <0.001.

The results of the comparison of the NDI (NDI) at baseline revealed that the mean, SD were 13.71±3.38 and 29.62±2.78, the mean ranks in Group A (RPT) and Group B (RPT and exercise manual) were 3.00 and 3.00, and improvement was significant (p-value 0.001) between the two groups. The results of the NDI (NDI) comparison at the end of the first week of treatment revealed a mean, SD of 28.68±3.40

and 22.62±3.57, respectively, and mean ranks of 2.00 and 2.00 in Group A (RPT) and Group B (RPT and exercise manual), respectively. Improvement was significant, with a p-value of 0.001, between the two groups. The results of the NDI (NDI) comparison at the end of the third week of treatment revealed mean, SD values of 23.82±3.14 and 11.75±2.52, respectively, with mean ranks of 1.00 and 1.00 in Group A (RPT) and Group B (RPT and exercise manual), respectively. There was also a significant improvement, with a p value of 0.001, between the two groups.

Test of normality was applied that showed that the data was not normally distributed so Friedman test was used to compare groups and statistics showed that improvement was significant in numeric pain rating scale at each level of assessment i.e. 1st Assessment at baseline the mean was 8.22, at 2nd Assessment 6.97, and at 3rd assessment after treatment the mean was 5.77 with a DF 2 and p-value <0.001 at level of assessment in group of RPT whereas the mean was 7.10 at the baseline assessment, 4.82 at 2nd assessment, and 2.32 at 3rd assessment in group of conventional exercise therapy along with manual of home-based exercises.

Friedman's Test showed that improvement was significant in NDI at each level of assessment i.e. at baseline assessment the mean was 33.71, at 2nd assessment that was 28.68 and whereas at 3rd assessment the mean was 23.82 in group of RPT with a DF 2 and p value <0.001 at level of assessment, whereas the mean was 29.62 at based line treatment, 22.62 at 2nd assessment and 11.75 at third assessment in group of conventional exercise therapy along with manual of home-based exercises.

Table I: Friedman's Test Pain Numeric Rating Scale

Group		Mean Rank	Mean± SD	P Value
Group A (RPT)	Pre_ Pain	3.00	8.22±0.80	<0.001
	Pain_1st week	2.00	6.97±.61	
	Pain_3rd week	1.00	5.77±0.59	
Group B (RPT and exercise manual)	Pre_ Pain	3.00	7.10±1.15	<0.001
	Pain_1st week	2.00	4.82±1.05	
	Pain_3rd week	1.00	2.32±0.97	

Friedman's Test showed that improvement was significant in pain across the three assessments with a p-value of 0.001 and a DF of 2. The improvement was observed from the baseline assessment at the beginning of treatment to the second and third assessments after treatment.

According to Friedman's Test, improvement was significant in pain over the course of the three assessments, as indicated by a p-value of 0.001 and a DF of 2. This improvement was observed from the first assessment at baseline to the second and third assessments after treatment.

Table II: Friedman's Test Neck Disability Index

Group		Mean Rank	Mean ± SD	P Value
Group A (RPT)	Pre_ NDI	3.00	33.71± 3.38	<0.001
	NDI _1st week	2.00	28.68±3.40	
	NDI _3rd week	1.00	23.82±3.14	
Group B (RPT and exercise manual)	Pre_ NDI	3.00	29.62±2.57	<0.001
	NDI _1st week	2.00	22.62±3.75	
	NDI _3rd week	1.00	11.75±2.52	

Discussion

Postural neck pain is a most frequent musculoskeletal disorder in the population, with a significant impact on people and their families, health-care systems, and communities. As it is considered most sustainable musculoskeletal pain syndrome with episodic occurrence with inconsistent improvement and recovery between episodes. Due to the imbalance in cervical musculature forward head posture occurs which is the most commonly occurring fault in the cervical spine in the sagittal plane and also linked with considerable reduction in the range of motion of the cervical spine, most commonly the neck rotations and side flexions.[15]

Conventional exercise therapy group along with manual of home-based exercises, was more effective in treating postural neck pain as it lowered the severity of pain in the neck and the risk of disability compared to a controlled group that only received RPT. However, the trial showed that patients randomized to experimental group demonstrated greater improvements.

A study was conducted in China to explore the impact of home exercises among old age patients with osteoarthritis of the knee joint. All patients were randomly assigned to the intervention group and the other two centers were randomly assigned to the control group. According to the results of the study, the control group showed betterment in the severity of pain and reduced the risk of disability among elderly patients with knee osteoarthritis.[16]

Patients with postural neck pain suffer from weakness in the neck muscles due to prolonged periods of poorly adopted posture. The findings of this study demonstrate that both groups saw a significant improvement in the numeric pain rating scale at each level of evaluation, although the experimental group displayed superior outcomes compared to the control group receiving standard care. Whereas on the other side there was also a marked improvement in NDI in both groups. There was a

great reduction of disability in both the groups, but experimental group revealed much better outcomes.

In order to determine the effects of home exercise regimens on individuals with generalized or particular neck pain, a study was done in the USA. The aim of the study was to investigate the benefits of a therapeutic home exercise program on pain, function, and disability in patients with neck pain brought on by whiplash, non-specific, or neck pain, with or without radiculopathy, or cervicogenic headache. According to the study's findings, home exercise regimens that include either self-mobilizations as part of an enhanced regimen to target particular spinal levels or strengthening and/or endurance activities are efficient at lowering neck discomfort, function, and impairment.[17]

Another study was carried out in India to examine the effects of static stretching and muscular energy method on pain and functional impairment in people with mechanical neck pain. The muscular energy approach and control group were randomly assigned to 60 patients with mechanical neck pain. According to the study's findings, those with mechanical neck pain who received muscular energy techniques had better pain relief and less functional handicap than those who received stretching techniques.[18]

There are multiple reasons for nonadherence including both situational and psychological factors. Poor adherence to the prescribed home-based exercise programs attenuates optimum clinical benefits and therefore reduces the overall effectiveness of rehabilitation.[19] The success of certain medical interventions depends mainly on adherence of patients to advice and the prescribed rehabilitation systems. After injury or surgery, most of the patients are given particular exercises to perform unsupervised at home to assist their recovery.[20]

Conclusion

The study concluded that the home-based exercise manual along with RPT showed significant effects among postural neck pain patients, reducing the intensity of pain and the risk of disability.

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