

Biomedical Communication

Effect of Tele-Rehabilitation Exercise Program on Pain and Functional Ability in Patients with Neck Pain

Amr Ahmad Fallatah^{1*}, Anwar Abdulgayed Ebid², Majed Abdulrahman Alghamdi³, Omar Ali Saleh Alqarni⁴ and Omar Ali Al-Amodi⁵

¹Physical Therapy Department, East Jeddah Hospital, Jeddah, Saudi Arabia

²Physical Therapy Department, College of Applied Medical Sciences, Umm Al-Qura University, Makkah, Saudi Arabia

³Physical Therapy Department, Comprehensive Rehabilitation Center, Jeddah, Saudi Arabia

⁴Physical Medicine and Rehabilitation Department, Dr Soliman Fakeeh Hospital, Jeddah, Saudi Arabia

⁵Physical Therapy Specialist. Makkah

ABSTRACT

Tele-rehabilitation plays a major role in reducing pain and functional ability of a patient with neck pain. It is the best way to communicate with patients to know their improvement status and moreover it works through video conferences and online chat services, using a cloud-based peer-to-peer software platform. The rapid development of telecommunication technologies requires continuous studies in order to establish the efficacy of these innovations. The present study was aimed to assess the impact of tele-rehabilitation exercise program on pain and functional ability of the patients with neck pain of the Western region Orthopedic Clinics in Saudi Arabia. A purposive sampling technique was used to collect the data from patients, which were all males where parameters like the neck disability index and numeric pain scale (NPS) were studied. The data was analyzed using IBMSPSS9 Statistical package for social science version.21 and also a person correlation coefficient was used to explain the association between the variables. The pre-numerical pain scale score (N=4) was associated with M=4.5(SD=2.03) by comparison of post-test (N=4) was associated with M=3(SD=2.03).to the t-test hypothesis that the pain score. The pre- neck disability index score (N=4) was associated with M=6.75(SD=4) by comparison of post-test (N=4) was associated with M=5(SD=4). All data were secured and locked for three years and then will be destroyed finally there was a highly significant correlation between the pain score and neck index from pre and post-test and great improvement with Tele-rehabilitation of neck pain. These results indicate the tele-rehabilitation can be a promising potential alternative standard of care, although some factors like unavailability of internet and materials always can negatively affect the therapy. The exercises program is important to treat patients with neck pain and furthermore the treatment sessions should focus on specific cervical muscles and their rehabilitation.

KEY WORDS: NECK DISABILITY INDEX, NECK PAIN, NUMERICAL PAIN SCALE, PATIENT PREFERENCE, TELE-REHABILITATION.

INTRODUCTION

Musculoskeletal disorders are considered as life threatening and more over having the potential to restrict daily activities, cause absence from work, and result in a change or discontinuation in employment. Neck pain is one of major problems that are affecting people in several parts of their life and a lot of studies have

recommended that the neck pain is most popular in the middle age with marked variations in its prevalence. The pain begins from cervical region and can rise to be of more complex nature; and may impact seriously the psycho-social lifestyles of patients, causing economic problems on health organizations. Mechanical neck pain is most common kind of neck pain disorder. The prevalence of neck pain is one the major challenging issues, because it directly affects the quality of life. There are more factors related to neck pain, including muscle strains, nerve compression, stiffness leading to

Article Information:*Corresponding Author: Aam_fallatah@hotmail.com
Received: 18/03/2021 Accepted after revision: 01/06/2021
Published: 30th June 2021 Pp- 570-573
This is an open access article under CC License 4.0 Published by Society for Science & Nature, Bhopal India. Online at: <https://bbrc.in/>
Article DOI: <http://dx.doi.org/10.21786/bbrc/14.2.20>

traumatic injuries (Bulk et al 2018, Suvarnato. 2019 Dias et al 2021).

The neck pain usually does not subside within days but can persist for months and be a signal of an underlying medical cause that needs to be urgently treated. Patient-centered design that addresses patients' preferences and needs is considered important aim for improving health care systems. In the current study, we have found that the field of pain rehabilitation including patients' preferences regarding tele rehabilitation remains unexplored and little is known about the optimal combination between human and electronic contact from the patients' perspective. The assessment of patients' preferences important regarding telemedicine because it is the step toward the design of effective patient-centered care, (Bulk et al.2018 Fiani et al 2020). The importance of tele-rehabilitation is focused to circumvent physical barriers, transportation concerns and financial limitations, concurrently, improving the quality of the health care environment, and giving more attention to reduce the number of such cases. Studies have shown that tele rehabilitation should be developed and implemented with well planned strategies particularly pointed towards ensuring an adequate level of rehabilitation, (Dias.2021).

MATERIAL AND METHODS

A quasi-experimental study approach was used including 4 patients with neck pain at western region orthopedic clinics in Saudi Arabia during the period of 2021 January to May. The subjects were assigned in to one group pre-test-post-test design and the study intends to assess the effect of Tele rehabilitation exercise program on pain and functional ability of patients with neck pain. The sample size was calculated with using an online sample size calculator (American Association for Public Opinion Research.2015). A purposive sampling technique used to collect the data including patient's demographic data such as age, gender, educational level and moreover the data were collected by the researchers personally for a period of three months to recruit as many eligible patients as possible.

The patients who met the inclusion criteria were approached with explaining the study purpose and assurance to protect their information and received signature on a consent form. The numerical pain scale score and neck index used in the assessment sheet of patient to assess the neck pain and the quality of patient life via Tele rehabilitation or zoom videos conferences to conduct the tele-sessions with using personal computers. The exclusion criteria for sample selection included history of cervical and thoracic spine fracture and dislocation, surgery of the cervical and thoracic spine, spinal infections and the intake of analgesic medication to reduced pain. (Morphine, Paracetamol). Pre-test and post-test analysis were conducted personally by the researchers and placed into large envelopes for confidentiality. Each session took around 30 minutes for completion.

The data were collected through the use of ZOOM video conference (Zoom Video Communications. 2019) to evaluate by assessment sheet treat the patients, neck disability index to measure the functional ability for Neck. Numerical Pain Scale to measure pain intensity (Schofield.2018) and more over Personal computer used to keep all data. The Tele-rehabilitation exercises program session was 2 per week. The participants were instructed to repeat the same exercises program daily at home. The exercises program started with active range of motion exercises, flexed and extended their neck slowly without holding at the end ranges. Participants rotated their neck slowly to right and left without holding at the end ranges, bending their neck in bilateral side without holding at the end ranges. The repetition was 10 times in 3 sets, in each direction, with adequate rest between of about 30 seconds in each set, followed by stretching exercises, which they performed by stretching toward lateral flexion and general through stretching exercises for extensor neck muscles. The exercises were performed for 30 seconds /10 times with a 30 second rest between each set, thus finishing 10 isometric strengthening exercises: The strengthening exercises were performed as isometric neck strength exercises with holding for 10 seconds /10times in each direction sets, (Ylinen.2007).

Figure 1. Distribution of patients based on age group

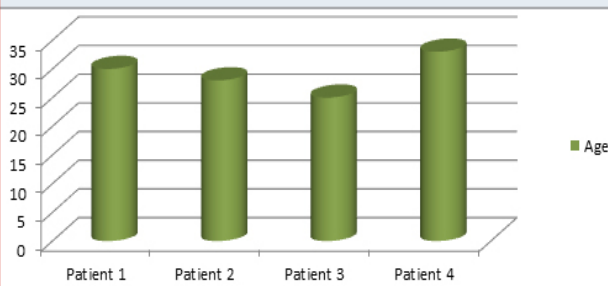
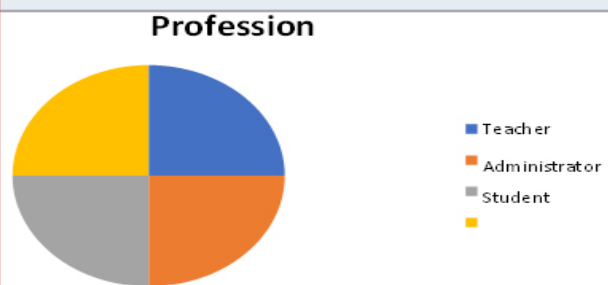


Figure 2: Distribution of patients based on profession



RESULTS AND DISCUSSION

The statistical values provided an explanation of the relationship between demographic characteristics of the patient and factors that influence neck pain as well as the quality of tele rehabilitation. All statistical analysis were conducted using IBM SPSS Statistics version 21. Data, which was presented as descriptive analysis, frequencies, percentages and mean \pm standard deviation. The results of the study are presented in this section .showing the

descriptive analysis of socio demographic details where a paired t-test was used to analyze the difference between the mean of groups. It is expected that the results of this study will add to the existing database of body knowledge regarding tele-rehabilitation in KSA.

Figure 3: Distribution of patients numerical pain score based on pre and post-test

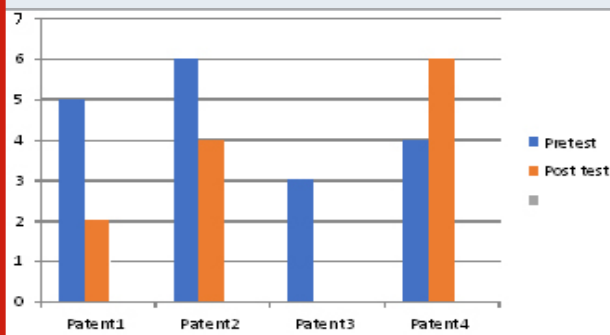
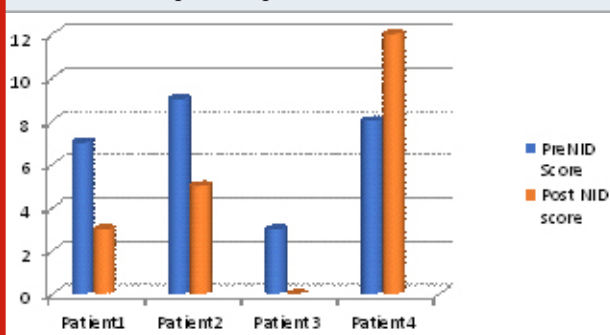


Figure 4: Distribution of patients neck disability index score based on pre and post test



The pre-numerical pain scale score (N=4) was associated with M=4.5(SD=2.03) by comparison of post-test (N=4) was associated with M=3(SD=2.03), to the t-test hypothesis that the pain score. The pre- neck disability index score (N=4) was associated with M=6.75(SD=4)

by comparison of post-test (N=4) was associated with M=5(SD=4).

Tele rehabilitation has become more expanded and moreover the people are trying to understand the benefits of the same rapidly. The fast development of telecommunication technologies require continuous study in order to establish the efficacy of technologies. Data of the present work show that the neck exercises are one of important treatment modalities in treat neck pain and play prime role in reducing pain and improving the functional ability in neck patients. It strengthens the weak muscles and improves neck posture as well. Suvarnato, et al (2019) have also shown that excurses are highly beneficial and have effect on specific deep cervical muscles decreasing the functional disability and pain intensity in a randomized controlled trial.

The overall aim of the present study was to measure the effectiveness of tele rehabilitation exercise program on pain and functional ability in patient neck pain. The socio demographic data revealed that all patients responded were males and the age between 25 to35 years. Also the current study showed there was an improvement in the statistical difference at p<0.1 between pre and post- test in both numerical pain score and neck disability index. From the Findings of the study includes, 4 patients were participated and three among the patients showed improvement were as one among them pain score and neck index became 0 after post- test and one patient increased pain and neck index score after the session. The result of the present study showed more significance among the score of both pre and post -test in numerical pain score as well as neck disability index .The use of tele-rehabilitation was associated with minimizing the time, expense and inconvenience of receiving rehabilitative care These results indicate the tele rehabilitation can be a promising potential alternative standard of care although some factors like unavailability of internet and materials always negatively affect the therapy.

Table 1

Variable	Mean pre test	Mean post test	P-value	T-value	Inference
Numerical Pain scale	4.5	3	0.48345	2.044	Not Significant
Neck disability index	6.75	5	0.2158	1.225	Not Significant

The exercises program is important to treat patients with neck pain and furthermore the treatment sessions should focus on specific cervical muscles. The study was limited to the patients who came to participate in this study additionally the small sample size was another challenge because of COVID 19 crisis and more over the study could only choose the patients with neck pain, although we did not observe for other diagnosis. Furthermore the study was conducted among male patients only and during the sample collection the patients were willing to participate only for the part of study due to covid-19 pandemic, the number of patients of this study was quite low.

CONCLUSION

In this part the conclusion of the present study in addition their recommendation for further study of practice, education, and research implication was discussed. The result of the present study showed more significance among the score of both pre and post -test in numerical pain score as well as neck disability index .The use of tele-rehabilitation was associated with minimizing the time, expense and inconvenience of receiving rehabilitative care These results indicate the tele rehabilitation can be a promising potential alternative standard of care

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ACKNOWLEDGEMENTS

We would like to thank the experts involved in the facilitation of data collection for this research project from Western region orthopedic clinics in Saudi Arabia. Without the patient's passionate participation and input, it could not have been successfully conducted.

Ethical Statement: Registration No. in National committee of Bio Ethics: HAPO-02-K-012 Date: 22/2/2021 University: Umm Al-Qura University, Saudi Arabia.

Conflict of Interest: Authors declares no conflicts of interests to disclose.

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