International Journal of Yoga, Physiotherapy and Physical Education
Online ISSN: 2456-5067; Impact Factor: RJIF 5.24
www.sportsjournal.in
Volume 2; Issue 4; July 2017; Page No. 30-32

Correlational study of chronic neck pain and hand grip strength in physiotherapy practitioners

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Abstract
Background and Objective of Study: Chronic Neck pain is the 2nd most prevalent musculoskeletal disorder seen in Physiotherapists after Low Back Pain. Awkward postures, movements while handling patients, lifting, shifting and mobilizing the patients have been found to be risk factors for chronic neck pain in Physiotherapists. Physiotherapists need to have a good grip strength while mobilizing and treating patients. Chronic pain has been known to have a deleterious effect on muscle strength. The current study intended to find the association of neck pain as measured by Visual Analogue Scale (VAS), Neck Disability as measured by Neck Disability Index (NDI) with grip strength measured by hand held dynamometer in Kilogram (Unit).
Materials &Methods: 40 Physiotherapists working/practicing in different hospitals, clinics with chronic neck were selected for the study using Convenience Random Sampling. Readings were taken for neck pain, Neck disability and hand grip strength.
Result & Discussion: Results of the study showed a significant negative correlation between neck pain and grip strength(r-0.35684) and neck disability and grip strength (r-0.419).Based on the results it can be concluded that Physiotherapists with chronic neck pain had reduced grip strength. Interference with ability of Nervous system to activate hand muscle through Motor Units may cause a reduction in Grip Strength and Grip Endurance. More over fear avoidance response as seen in patients with chronic neck pain for fear of injury leads to disuse atrophy and reduction in capacity to generate and retain force.

Keywords: chronic neck pain, neck disability index (NDI), visual analogue scale (VAS), grip strength, dynamometer

Introduction

Neck Pain is a common medical condition and is also a common Work Related Musculo Skeletal Disorders (WRMSD) seen in different types of Professions such as Dentists, Physiotherapists, Software Professional etc. Chronic Neck pain is a pain which persist for more than 3 months. Physiotherapists are at risk for developing WRMSD's and its life time prevalence according to a study by Cromie *et al* is 91% [1]. Neck pain was found to be the second most prevalent WRMSD after Low Back Pain (LBP) in Physiotherapists in a study by Babatunde OA Adegoke [2]. Mobilization, manipulation have been identified as risk factors to the occurrence of Upper Limb and neck pain in Physiotherapists [3]. Hand Grip Strength is the force applied by the hand to pull or suspend from objects and is a specific part of hand strength. Hand grip strength can be quantified by measuring the amount of static force that the hand can squeeze around a dynamometer and is commonly measured in kgs &lbs. Grip Strength is important for various professions where people must work with their hands. Physiotherapist's specifically Manual therapists are involved in activities like gripping, handling, transferring shifting patients and must have an excellent hand grip strength to give effective treatment. People with upper extremity WRMSD are limited in their daily activities by reduced grip strength which is attributed to both physical and psychological factors.
So the purpose of current study was to find out whether an effect on the hand grip strength of Physiotherapists is suffering from chronic neck pain.

Material &Methods

Study Design: Cross sectional Co relational Study Design.40 Physiotherapy professionals 18 males and 12 females working in different Private hospitals and Clinics in Gurugram were selected for the study.

Sampling Technique: Convenience Random Sampling

Inclusion Criteria
Chronic Neck Pain (> 3 MONTHS)
Both Male and Female Physiotherapists
In practice for at least a year
Working Hrs-7 hrs or more
No of Patients seen in a day-10 or more
Age Range-20-40yrs
Willing to participate

Exclusion Criteria
H/o fracture, Surgery of Neck, Upper limb
Cervical PIVD
Carpal Tunnel Syndrome
Dequervaines's disease etc
Deformities in elbow or hand

Intervention
Subjects were screened based on Inclusion and Exclusion Criteria and a written consent form was taken. All the selected subjects were explained about the procedure.
After a thorough assessment of the patient the Pain intensity was measured using Visual Analogue Scale (VAS) with 0 as no pain and 10 as Unbearable pain.
Neck Disability Index-is a reliable and valid scale used to measure as to how neck pain has affected ability of the patient to manage in everyday life [4].

Measurement of Grip Strength [5]

The standard adjustable Jamar Dynamometer was used for measuring hand grip strength. For standardization it was set at second handle position for all subjects. The dynamometer was lightly held around read out dial by examiner to prevent inadvertent dropping. The subjects were in sitting position with their shoulder adducted, neutrally rotated elbow flexed at 90 degree forearm in neutral position, wrist between 0-30 degree dorsiflexion and 0-15 degree ulnar deviation for each strength test scores of 3 successive trials were recorded for each treatment. Therapist was standing in front of subject to read amount of force.1 minute rest was given between each attempt to prevent fatigue.

Result and Data Analysis

The study was done on 40 Physiotherapists. A Correlation was drawn between VAS and Grip strength, NDI and Grip strength. The data analysis was done on SPSS 15 software. Descriptive analysis was done (Mean, SD Value, p value). The demographic data for Age, weight, height, BMI, VAS Score, NDI Score and Grip Strength is summarized is Table 1.Karl Pearson test was used to find correlation between VAS and Grip Strength (Table 2 and Fig1), NDI and Grip Strength (Table3 and Fig 2). The results of the study indicated that there was a significant negative correlation between VAS and Hand Grip Strength and NDI and Hand Grip Strength.

Table 1: Demographic data for the subjects

Variables	Mean	Standard Deviation
Age	20	1.33
Height ($m^{2)}$	2.70	0.33
Weight (Kg)	59.4	11.17
BMI	22.19	4.14
VAS	5.9	1.09
NDI	36.08	10.31
Grip Strength	35.31	6.09

Table 2: Correlation between VAS and Hand Grip Strength

Variables	r- value	p- value
VAS and Hand Grip Strength	-0.356	< 0.05

Fig1: Correlation between VAS and Hand Grip Strength

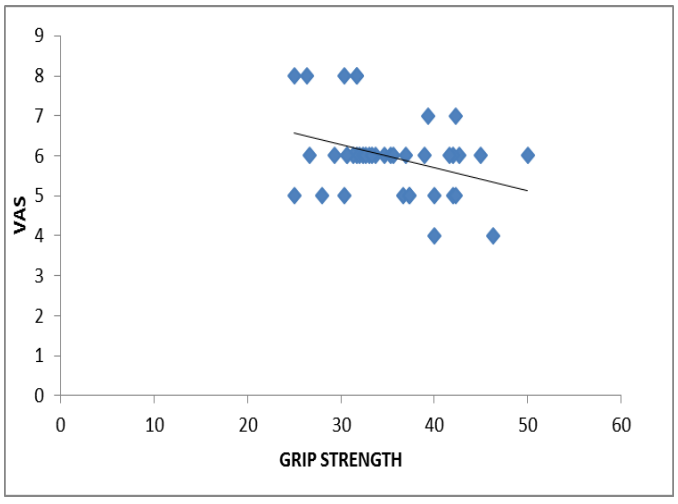
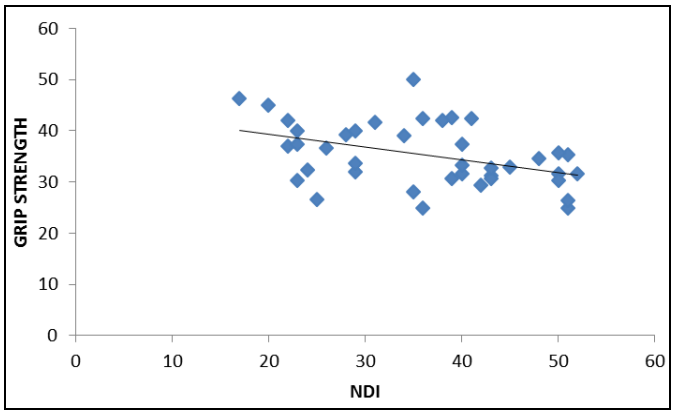


Table 3: Correlation between NDI and Hand Grip Strength

Variables	r- value	p- value
NDI and Hand Grip Strength	-0419.	< 0.05

Fig 2: Correlation between NDI and Hand Grip Strength



Discussion

In the present study 40 professional Physiotherapists practicing in different hospitals and clinics and having chronic neck pain were selected for the study. Both male and female Physiotherapists in the age range of 20-40 were selected for the study with mean age 20 yrs+ SD 1.33. The Mean and SD value for Neck pain on VAS was 5.9+1.09 and Grip strength was 35.31+6.09. The purpose of descriptive study was to determine association between chronic neck pain and grip strength and functional status of the subjects as measured by NDI with Grip strength. The results of the study indicated a significant negative correlation between VAS and Grip Strength and Neck Disability and Grip Strength.

The results of our study are in accordance with the results of Micheal O Egwu *et al* in which grip strength and endurance was reduced in patients with Cervical Spondylosis. Increased tissue pressure arising from degenerative conditions compromises myoneural conduction velocity and tissue blood flow and oxygenation. These factors interfere with ability of Nervous system to activate hand muscle through Motor Units to cause a reduction in Grip Strength and Grip Endurance [6].

Van Wilgen CP *et al* in their study found that Patients with chronic pain often avoid using the painful limb. This avoidance behaviour (disuse) may lead to physiological changes in the limb, such as atrophy. Avoidance may also lead to qualitative changes in muscle contraction such as abnormal co-ordination, resulting in ineffective contractions causing reduced muscle strength: A strength reduction of 20–30% in a painful limb seems to be 'normal' in chronic pain patients [7].

More over the pain coping response of patients with neck pain may be a fear avoidance response as seen in patients with cervical spondylosis patients who have reduced neck and hand movements for fear of injury leading to disuse atrophy and reduction in capacity to generate and retain force.

The results of our study are contrary to the results of study by Eman Samir Fayez in which they found a positive co relation between neck pain and grip strength in dentist's. They attributed it to sensory hyper excitability [8].

In the end it can be concluded that Grip strength was found reduced in Physiotherapists with chronic neck pain. It is one of the commonest WRMSD that develops in Physiotherapist professionals secondary to the awkward working postures and movements at neck during different activities like handling

patients, lifting, shifting, mobilizing. Using various tools for pressure application rather than manually may help in reducing the symptoms. Incorporating breaks and stretching in between work is essential to reduce exposure to muscle injury [9].

Limitations

In the study causes of chronic neck pain were not studied.
Sample size was small.

Future Scope

Causes for reduced strength with chronic neck pain could be studied.
Intervention based study can be done to see the effect on grip strength.
Difference in the strength of male and female Physiotherapists can be studied.

Conclusion

From the results of the study it can be concluded that grip strength is reduced in Physiotherapists with Chronic neck pain. There exists a negative correlation between neck pain, neck disability and grip strength.

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