Association of Chronic Neck Pain with Hand Grip Strength and Function among Tailors in Lahore

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ABSTRACT:

Background: Chronic neck pain is a common issue in adults, being the fourth leading cause of disability. Work-related prolonged neck pain has been demonstrated to elicit avoidance and escape responses leading to weakness, impairment, and dysfunction.

Objective: This study aimed to determine the association of chronic neck pain with hand grip strength and function among tailors.

Methodology: In this cross-sectional study, a non-probability sampling technique was used to collect the data from 200 tailors in Lahore. The study duration was 4 months after the approval of the synopsis. A neck disability index questionnaire was used for data collection, and a hand-held dynamometer and Sollerman hand function test were used to measure hand grip strength and functions, respectively. Pain intensity was measured through NPRS. SPSS was used to analyze the data.

Results: The results show that out of 200 participants, 105(52.5%) males and 95(47.5%) females were in this study. There were 117(58.5%) and 68(34%) participants who had hand grip strength between 1-20 and 21-40 respectively. The NDI frequency showed that 75(37.5%), 67(33.5%), 28(14%), and 28(14%) participants had mild, moderate, severe, and complete disability respectively. Sollerman's test for the dominant hand function showed that 37(18.5%) and 163(81.5%) participants had a hand function between 1-40 and 41-80 scores respectively. The p-value=0.169 showed that there was no association between NDI and Dynamometer and p-value=0.000 showed that there was a strong association between NDI and the function of the dominant hand of the tailors.

Conclusions: This study concluded that there was no association between NDI and Dynamometer (hand grip strength) in the tailors who participated in this study. However, there was a strong association between NDI and the functions of the dominant hand of the tailors.

Keywords: Chronic neck pain, Dynamometer**,** NDI, Sollerman's test

INTRODUCTION:

Over the last few decades, musculoskeletal disorders have become becoming more prevalent globally. It is one of the most prevalent complications associated with work for working individuals. The degree, frequency, and intensity of neck discomfort are constantly increasing due to lifestyle choices, which may result in stiffness and tension in certain neck regions. Both episodic and chronic neck pain, accompanied by stiffness may radiate into the shoulder and occiput (1).

Many occupational groups, including office workers, healthcare professionals like nurses and therapists, engineers, and manual laborers like tailors, are prone to work-related neck-shoulder pain (WRNSP) (2).

Chronic neck pain is a common issue in adults, being the fourth leading cause of disability. It is estimated that during their lifetime, 50% of adults suffer from a clinical episode of cervicalgia (neck pain). Cervical degenerative radiculopathy, which results from irritation or compression of the cervical nerve roots, is frequently linked to neck pain. It is characterized by a burning or tingling sensation and weakness that follows a dermatome distribution in one of the upper extremities. The radicular symptoms may be linked to motor deficits in the affected upper extremity (3).

Chronic pain is categorized as pain that lasts more than three months. The emergence of persistent musculoskeletal pain is attributed to many pathogenic processes. Prolonged pain has been demonstrated to elicit avoidance and escape responses, and it is closely linked to kinesiophobia (4).

Clinical recommendations indicate that a multimodal combination of therapy be used to manage neck pain and impairment, with exercise being a key component. Exercise has short-term advantages, but its long-term efficacy is questionable because 70% of people will experience chronic non-specific neck pain that is recurrent or persistent (CNSNP) (5).

In rehabilitation, hand grip strength (HGS) is employed clinically and is suggested as an essential measurement for assessing musculoskeletal function, weakness, and disability. The HGS, determined by using a manual dynamometer, produces an isometric strength measurement that can detect both upper limb muscle weakness and general strength. Additionally, it has a significant impact on the functionality assessed. A manual dynamometer is a quick, easy, affordable, and non-invasive investigation, HGS is also considered as a reliable health indicator (6).

Numerous previous studies have discovered an association between older individuals' functional impairments and handgrip strength. However, researchers have also shown that variations in body size, composition, and other anthropometric factors account for the variation in grip strength levels among populations (7).

According to Francisco J. Martin-Vallejo (2023), neck pain is a widespread musculoskeletal condition. Women experience neck pain more frequently than men do, with symptoms increasing in middle age. Neck pain is associated with a lower quality of life when it comes to one's health, less productivity at work, and more visits to the doctor, all of which have a significant financial impact on society (8).

Handgrip strength (HGS), according to Seung Hoo Lee in 2020, is the effort required to grab an object and is required for various functional activities in daily life. HGS is linked to several chronic diseases, mortality, hospital stay length, and cognitive deterioration (9).

According to Marina N. Samaan's 2018 declaration, excessive smartphone use has been linked to physical health issues like neck and wrist pain. The most frequent adverse effect of prolonged,

sustained use of a mobile device or tablet involves forward head position (FHP), which results in discomfort (10).

Numerous treatments are available for this illness, such as multimodal physiotherapy approaches that seem to produce better results in terms of enhanced function, reduced pain, and improvements in strength and health-related quality of life. All of these outcomes seem to benefit from active strengthening exercises, the advantages of an exercise intervention seem to be increased when stretching and aerobic exercise components are added (11).

Neck pain is the most common disorder nowadays. A prolonged period of static sitting in a variety of occupations might result in neck pain due to many factors such as age, gender, and body mass index. Chronic neck pain may impair functional activity and hand grip strength if left untreated, which could reduce productivity. The study aimed to find out the relationship of neck pain with hand grip strength and function among tailors. The impact of this study was to provide the tailor community with guidelines and effective treatments that they might use in everyday life to prevent neck pain and related issues.

OBJECTIVE:

The objective of this study was to find out the association of chronic neck pain with hand grip strength and function in tailors.

METHODOLOGY:

This research was a cross-sectional study. Non-probability convenience sampling technique was used to collect the data. Data was collected from tailors from different areas in Lahore. The research was completed in 4 months after the synopsis approval from the ethical review committee of Riphah International University, Lahore. The sample size was calculated using the NPDI questionnaire from a previous research and a sample size of 200 tailors was included in the research (22). Tailors both male and female gender with 20 to 40 years of age and suffering from intermittent type chronic neck pain for more than 3 months were included in this study. Tailors suffering from Carpel tunnel syndrome, De Quervain tenosynovitis, Rheumatoid arthritis, any other serious medical condition, any postural deformity, or having any spinal/joint pathology or recent fracture and deaf and dumb tailors were excluded. Data was collected from participants who met the criteria after giving written consent. Data collecting tools included a Neck pain disability index questionnaire to check the severity of chronic neck pain. A hand-held dynamometer was used the check the hand grip strength. NPRS was used to measure the intensity of pain. Sollerman hand function test was used to measure the functional status. That is a standardized hand function test that consists of 20 activities of daily living. The data was analyzed by using the SPSS version 23. For this frequencies and percentages were used to describe the demographic data. And chi-square test was used to demonstrate the association of neck pain (NDI) with hand grip strength (dynamometer) and function (solerman's test).

RESULTS:

Table 1:

Variables		Frequency (N)	Percent (%)
Age (Years)	20-35	152	76.0
	35-50	48	24.0
Gender	Male	105	52.5
	Female	95	47.5
Working Hours	Less than 5 hours	70	35.0
	Less than 10 hours	107	53.5
	Less than 15 hours	23	11.5
Working Experience (Years)	1-10	103	51.5
	11-20	91	45.5
	21-30	6	3.0
Dynamometer	0	3	1.5
	1-20	117	58.5
	21-40	68	34.0
	41-60	12	6.0
NDI	No disability	2	1.0
	Mild disability	75	37.5
	Moderate disability	67	33.5
	Severe disability	28	14.0
	Complete disability	28	14.0
NPRS	No pain	9	4.5
	Mild pain	50	25.0
	Moderate pain	99	49.5
	Severe pain	42	21.0
Sollerman Dominant Hand	1-40	37	18.5
	41-80	163	81.5
Sollerman Non-Dominant Hand	1-40	87	43.5
	41-80	113	56.5
Total		200	100.0

Table 1 shows the demographic data. This table shows that the total population is 200 of which 152(76%) participants were under the age of 20-35 years and the remaining 48(24%) participants were under the age of 36-50 years. From a total population of 200, there were 105(52.5%) males and 95(47.5%) females. According to this table, 70(35%) participants work for 1-5 hours, 107 (53.5%) participants work for 6-10 hours, and 23(11.5%) participants work for 11-15 hours a day. Out of the 200 sample size, 103(51.5%) participants have working experience of 1-10 years, 91(45.5%) participants have working experience of 11-20 years, and 6(3%) participants have working experience of 21-30 years. The table also shows the frequency of the dynamometer for hand grip strength. This table shows that 3(1.5%) participants have 0 hand grip strength, 117(58.5%) participants have hand grip strength between 1-20, 68(34%) participants have hand grip strength between 21-40 and 12(6%) participants have hand grip strength between 41-60. The

frequency of NDI that is used for neck pain disability is also shown. Out of 200 participants, 2(1%) participants have no disability, 75(37.5%) participants have mild disability, 67(33.5%) participants have moderate disability, 28(14%) participants have severe disability and 28(14%) participants have complete disability. NPRS was used to measure the intensity of pain. This table shows that 9(4.5%) participants have no pain, 50(25%) participants have mild pain, 99(49.5%) participants have moderate pain and 42(21%) participants have severe pain. Sollerman's test was used for the dominant hand function assessment. So, 37(18.5%) participants have a hand function between 1-40 score, and 163(81.5%) participants have a hand function between 41-80 score. Sollerman's test was also used for the non-dominant hand function assessment. Therefore, 87(43.5%) participants have a hand function between 1-40 score and 113(56.5%) participants have a hand function between 41-80 score.

Table 2:

Variables		NDI					Total	df	Pearson Chi-Square (P-value)
		No	Mild	Moderate	Severe	Complete			
Dynamometer	0	0	0	1	0	2	3	12	.169
	1-20	2	46	40	15	14	117		
	21-40	0	21	23	12	12	68		
	41-60	0	8	3	1	0	12		
Total		2	75	67	28	28	200		
Sollerman Dominant Hand	1-40	2	6	16	3	10	37	4	.000
	41-80	0	69	51	25	18	163		
Total		2	75	67	28	28	200		

Table 2 shows the association of Dynamometer and Sollerman Dominant Hand scoring with NDI. So, the value of 0.169 is considered a non-significant value, showing that there was no association between NDI and Dynamometer (hand grip strength) in the tailor's population who participated in this study. However, the value of 0.000 is considered a highly significant value, showing that there was a strong association between NDI and the function of the dominant hand of the tailor's population.

DISCUSSION:

According to Francisco J. Martin-Vallejo (2023), neck pain was a widespread musculoskeletal condition. Women experience neck pain more frequently than men do, with symptoms increasing in middle age. Neck pain was associated with a lower quality of life when it comes to one's health, less productivity at work, and more visits to the doctor, all of which have a significant financial impact on society. The current study reveals similar results that neck pain affects function and causes disability among tailors. NDI and the function of the dominant hand of the tailor's population have a strong association (8).

X Chen did a cross-sectional study in 2018, in which neck pain was associated with occupation, leading to a decrease in ROMs and disability. This study's results are similar to the current study results showing that work-related neck pain causes disability among tailors (12).

MN Samaan conducted a study in 2018, on the effect of prolonged smartphone use on the cervical spine and hand grip strength in adolescence. Results show that prolonged use of smartphones in adolescence leads to increased forward head position angle and neck pain, without affecting handgrip strength. In contrast, the current study shows that neck pain can affect hand grip among tailors (10).

CONCLUSION:

This study concluded that there was no association between NDI and Dynamometer (hand grip strength) in the tailors who participated in this study. However, there was a strong association between NDI and the functions of the dominant hand of the tailors.

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