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Abstract

Purpose: De Quervain's Tenosynovitis is inflammation of extensor pollicis brevis and abductor pollicis longus tendons that run from the side of the wrist to the base of the thumb. To see the frequency of De Quervain's Tenosynovitis and work related risk factors in carpenters of Punjab, Pakistan

Methodology: It was a cross-sectional study. Sample size of the research was 492. Study was conducted at the province Punjab, Pakistan. Inclusion criteria of the study were carpenters of age between twenty to fifty years having experience of more than 2 years. Data was collected to the selected population, through convenient sampling technique. Duration of the study was 8 months. Outcome measures of the study were Finkelstein test, Visual analogue scale and a structured questionnaire. The collected data was analyzed by using SPSS version 25.

Findings: Out of 492 participants, De-Quervain's Tenosynovitis was found to be present in 46% of carpenters Punjab. 25.6% of the participants had moderate, while 22.3% had extreme discomfort in lower back. 19.91% reported not to have an enough space for work. 55.69% didn't take adequate breaks while working. 69.91% reported to have no back rest while working, 63% reported not use any wrist support or brace while working and 35.36% reported not to have any proper training for this work.

Conclusion: De Quervain's Tenosynovitis is prevalent in carpenters of Punjab, Pakistan. Work-related discomfort was found in various regions of body including eyes, neck, shoulders, arms, wrist and hand. Contributing work-related risk factors for De Quervain's Tenosynovitis among carpenters encompass insufficient training, absence of wrist support, and inadequate breaks during work.

Keywords: *Carpenters, De-Quervain's Tenosynovitis, Prevalence, Punjab*

1.0 INTRODUCTION

De Quervain's Tenosynovitis is inflammation of extensor pollicis brevis and abductor pollicis longus tendons that run from the side of the wrist to the base of the thumb (1). De-quervain is thought to be caused by anatomical variations, hormonal effects, rheumatic diseases, trauma, or medications (2). Recurrent stress from wrist ulnar deviation and thumb abduction, as well as an increased anatomical angle of the tendon, are characteristics of De Quervain Tenosynovitis. De Tenosynovitis Quervain's disease is a condition that affects people who repeatedly practice hand and wrist workouts, causing damage and chronic pain (3).

De Quervain tenosynovitis affects women more frequently than men, with 1.3% of female cases and 0.5% of male cases. While performing daily activities, it is a little uncomfortable. Quervain tenosynovitis pain is most common in people in their 40s and 50s (4). People are more likely to develop it if they have previously had medial or lateral epicondylitis. New mothers and childcare providers are frequently experienced bilaterally, but after child lifting, spontaneous resolution is less likely (5). A positive Finkelstein's test (which reproduces pain at the radial styloid) and the presence of a tender nodule over a radial styloid are usually used to make the diagnosis. A positive test results in pain over the abductor pollicis longus and extensor pollicis brevis tendons at the wrist, indicating para-tendonitis of these two tendons (6).

Non-invasive treatments such as immobilisation of the wrist and hand in a cast or injection of corticosteroids and local anaesthesia into the first dorsal compartment have been routinely used to treat DQT. Furthermore, a variety of therapeutic techniques, ranging from splinting to surgical release, are used to address this illness (7). The majority of the subjects are given corticosteroid injections, however the effects of the splint with and without steroids are unclear. Ultrasound-guided injections are also useful for the problem and have no adverse effects (8). Musculoskeletal disorders (MSDs) are among the most frequent workplace health concerns. It is well documented that ergonomic risk factors such as repetition, Work-related musculoskeletal illnesses (WMSDs) are caused by poor posture and unacceptable levels of contact stress and force (WMSDs) (9).

M. Ramdan et al. undertook a cross-sectional study in 2022 on 60 motorcycle repair technicians in the Indonesian city of Samarinda with the goal of identifying De Quervain's disease (DQD) prevalence and risk variables. A Finkelsteins test was used to determine DQD. Direct interview was used to collect the data related mechanic's age, education background, working duration, working time each day, and frequency of repetitive motion. The study revealed that De Quervain's Disease prevalence was 63.3%. It is strongly related to age, working duration, educational background, working time each day, and frequency of repetitive motion (10). According to Habib's findings in Bangladesh, sewing machine operators are exposed to elevated risk factors for these disorders. Sewing and mending various fabrics, blankets, and cloth items are part of the technique. Sewing machine operators regularly use their hands to handle and manage the equipment, and they repeat the same actions for long periods of time (11).

Carpenters are always prone to musculoskeletal diseases. Their work comprises of subtasks that generate nonfatal injuries and discomfort in various body parts (12). There are also a number of other tasks that call for working for a long period of time while adopting a variety of strange positions and motions. Movements requiring intense physical effort over an extended period of time, as well as a sustained movement of the wrist and hand, are indicators of work-related issues (13). Several studies have shown that carpenters suffer from a variety of musculoskeletal problems

that affect various parts of the body. However, there are very limited research in the literature that have investigated the prevalence and work-related risk factors of De-Quervain's Tenosynovitis in carpenters especially in Pakistan, therefore this study was carried out to see the frequency of De-Quervain Tenosynovitis and work-related risk factors in carpenters of Punjab, Pakistan.

2.0 METHODOLOGY

It was a cross-sectional study. Sample size of the research was 492, calculated by online Epitool software. Study was conducted at the province Punjab of Pakistan. Population of the study was carpenters of Punjab. Inclusion criteria of the study were carpenters of age between twenty to fifty years having experience of more than 2 years. Only males were included in the study. Participants with any structural deformity of hand, history of fracture or recent surgery of upper extremity, history of malignancies and people with carpal tunnel syndrome were excluded from the study. Data was collected to the selected population, through convenient sampling technique. Duration of the study was 8 months. Outcome measures of the study were Finkelstein test, Visual analogue scale and a structured questionnaire. All participants were guided about the research process and purpose of this research prior to the data collection. An informed consent form was signed by all participants. Then therapist performed Finkelstein test on all individuals and filled the questionnaires by asking questions to the study participants.

To diagnose De Quervain's syndrome, the Finkelstein test was employed. Finkelstein's test reliability in determining the presence or absence of pain demonstrated a moderate agreement (Kappa=0.410.60). Inter-rater reliability exhibited a moderate percentage of agreement (Kappa=0.410.60) when assessing the presence or absence of pain, and a medium percentage of agreement (Kappa result=0.210.40) when pain was quantified using VAS, with statistically significant (p 0.05) findings (14). To administer the test, the patient sat comfortably and relaxed on the examining table. The patient's hand was then inspected in the air, while the other hand rested directly near the body. The patient is then asked to create a fist around a thumb and then perform an ulnar deviation to stretch the muscles of the first extensor compartment. If the patient complained of discomfort or pain in the first extensor compartment of the wrist, the test was considered positive (15).

Visual analogue scale was used to check the work-related level of pain or discomfort in various regions of the body. The consistency and accuracy of VAS is quite good. Vertical VAS and horizontal visual analogue scale are two terms used to describe the continuous scale that is of 100mm having intensity of pain ranging from nil to extreme. Vertical and horizontal VAS have a strong association. However, the horizontal VAS score is somewhat lower than the vertical VAS score (16). All ethical concerns were taken into account. The study received the ethical approval from institutional review board. The participation in the research was entirely voluntary. The privacy and dignity of all participants was prioritized. All the collected data were kept confidential. The collected data was analyzed and interpreted by using SPSS version 25.

3.0 FINDINGS

Demographic statistics is presented in Table 1. Age was divided into three categories, age distribution showed that 35.3% were from the age of 20 to 30 years, 39.4% were from the age of 30 to 40 years and 25.2% participants were within the age limit of 40 to 50 years. 18.6% carpenter

reported to work for 5 to 8 hours per day, 65% reported to work for 9 to 12 hours and 16.2% work more than 13 hours per day.

Table 1: Demographic Statistics		
Gender	Male	492(100%)
Age	20-30y	174(35.3%)
	30-40y	194(39.4%)
	40-50y	124(25.2%)
Working hours	5-8h	92(18.6%)
	9-12h	320(65.0%)
	>13h	80(16.2%)
	n	**492(100%)**

Finkelstein Test was performed on all selected participants to see the presence of de-Quarvain Tenosynovitis. Test was positive on 46% of the patients and 54% patients showed negative results (Figure 1).

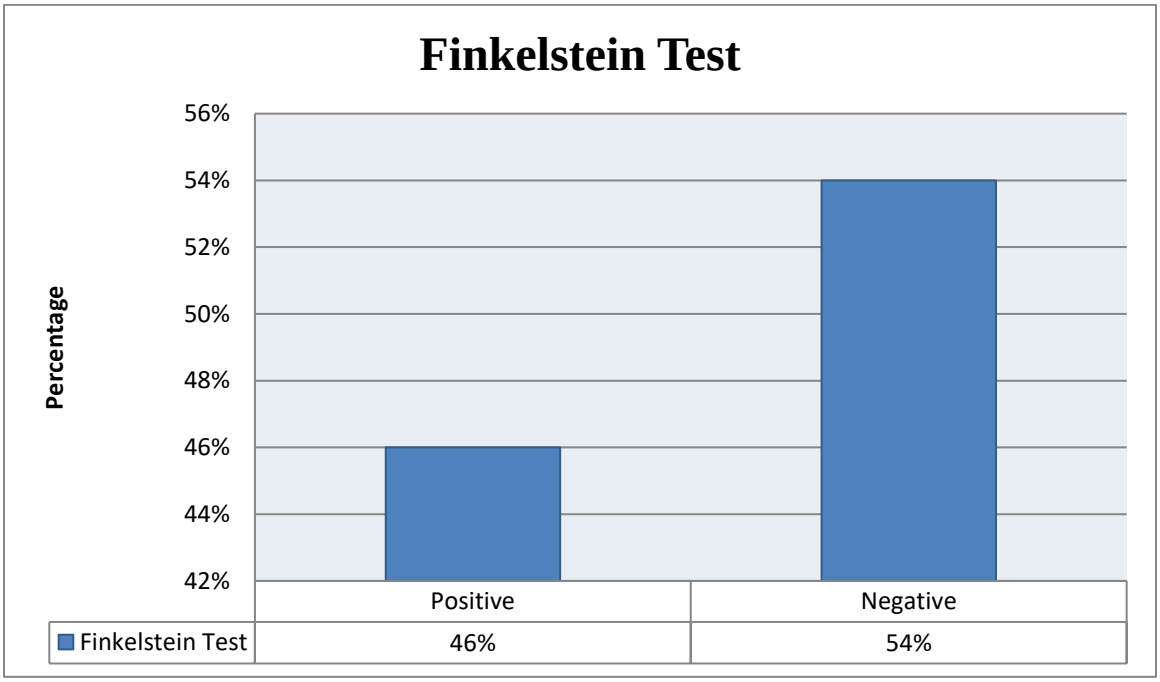

Figure 1: Finkelstein Test Results

Table 2 showed the frequency and percentage of work-related discomfort/pain to various parts of the body in carpenter. 18.2% of the participants had mild, 30.0% of the participants reported to have a moderate strain on eyes while working and 4.4% claimed to have an extreme discomfort on eyes. 25.6% of the patients reported mild, 27.2% had moderate, 18.6% had severe and only 4.0% reported to have extreme discomfort in neck region. On asking about shoulder pain, 21.5% reported to have no pain or discomfort while all other claimed to have discomfort in shoulder region ranging from mild to extreme. 44.3% participants had no pain in elbow while 28.04% reported mild discomfort in elbow region. 30.8% of the participants reported moderate discomfort in upper back region. On asking about low back pain majority (25.6%) had moderate, while 22.3%

had extreme pain or discomfort in lower back. Most of the carpenters (42.6%) claimed to have no pain in arms, while 35.3% had mild discomfort. 26.4% had mild discomfort in wrist or hand, 26.0% had moderate pain, while 2.03% reported extreme discomfort in hand and wrist.

Table 2: Work Related Discomfort

	No	Mild	Moderate	Severe	Extreme
Eye	152(30.8%)	90(18.2%)	148(30.0%)	80(16.2%)	22(4.4%)
Neck	120(24.3%)	126(25.6%)	134(27.2%)	92(18.6%)	20(4.0%)
Shoulder	106(21.5%)	122(24.7%)	144(28.2%)	92(18.6%)	28(5.6%)
Elbow	218(44.3%)	138(28.04%)	118(23.9%)	12(2.4%)	6(1.2%)
Upper back	122(24.7%)	118(23.9%)	152(30.8%)	80(16.2%)	20(4.0%)
Low back	92(18.6%)	74(15.0%)	126(25.6%)	90(18.2%)	110(22.3%)
Arm	210(42.6%)	174(35.3%)	76(15.4%)	24(4.8%)	8(1.6%)
Wrist/Hand	198(40.2%)	130(26.4%)	128(26.0%)	26(5.2%)	10(2.03)

Table 3 showed the frequency and percentages of risk factor that can cause work related risk factors in carpenters. 19.91% reported not to have an enough space for work. 55.69% didn't take adequate breaks while working. 69.91% reported to have no back rest while working, 63% reported not use any wrist support or brace while working and 35.36% reported not to have any proper training for this work.

Table 3: Work Related Risk Factors

Sufficient space	Yes	394(80.08%)
	No	98(19.91%)
Adequate breaks	Yes	218(44.30%)
	No	274(55.69%)
Back rest	Yes	148(30.08%)
	No	344(69.91%)
Wrist support	Yes	182(36.99%)
	No	310(63.0%)
Have adequate training	Yes	318(64.63%)
	No	174(35.36%)

Discussion

De Quervain's Tenosynovitis is inflammation of extensor pollicis brevis and abductor pollicis longus tendons that run from the side of the wrist to the base of the thumb (1). The purpose of the research was to see the frequency of De-Quervain Tenosynovitis and work-related risk factors in carpenters of Punjab, Pakistan.

The results of the recent study showed that Finkelstein Test was found to be positive in 46% of the participants and 54% carpenters showed negative results. A study by P. Maurya et al. detects the presence of De-Quervain's Tenosynovitis in tailors employing the Finkelstein test. De-Quervain's Tenosynovitis was discovered in 75% of the tailors out of 100 (13). Another study by N. Jannat et al. that employed the franklein test to examine the prevalence of de-quervains syndrome among barbers and tailors reported that De-Quervain's tenosynovitis had been present in 80% of the study

population (9). In present research, the study population was carpenters and the reported cases of De-Quervain's Tenosynovitis were much less than the tailors and barbers.

In present study, 30.0% of the participants reported to have a moderate strain on eyes while working. 25.6% of the patients reported mild, 27.2% had moderate, 18.6% had severe and only 4.0% reported to have extreme discomfort in neck region. On asking about shoulder pain, 21.5% reported to have no pain or discomfort while all other claimed to have discomfort in shoulder region ranging from mild to extreme. 28.04% reported mild discomfort in elbow region. 30.8% of the participants reported moderate discomfort in upper back region. On asking about low back pain majority (25.6%) had moderate, while 22.3% had extreme pain or discomfort in lower back.

Most of the carpenters (42.6%) claimed to have no pain in arms, while 35.3% had mild discomfort. 26.4% had mild discomfort in wrist or hand, 26.0% had moderate pain, while 2.03% reported extreme discomfort in hand and wrist. A study by Akodu Ak et al., reported that musculoskeletal problems were shown to be 92.0% prevalent throughout a 12-month period. The low back was the most usually affected body area (78.6%) (17). According to research by Brohi et al., of the 200 subjects, 91% exhibited WMSD symptoms in the previous 12 months. The majority of individuals (41.5%) reported having had lower back pain and discomfort in the previous 12 months (18).

A study by Akodu Ak et al., reported that Prolonged sitting (99.4%), sitting on a high chair (76.5%), sitting without a back rest (71.5%), and sitting on a low chair (24.0%) were the four major job risk variables found in the study (17). In current study several risk factor was found that can cause work related musculoskeletal problems in carpenters. 19.91% reported not to have an enough space for work. 55.69% didn't take adequate breaks while working. 69.91% reported to have no back rest while working, 63% reported not use any wrist support or brace while working and 35.36% reported not to have any proper training for this work. According to GK Lemasters et al., upper extremity conditions were the most common work-related musculoskeletal illnesses reported among all carpenters. Drywall or ceiling activities need a lot of repetitive motion and unnatural postures, frequently with arms lifted holding heavy dry walls in place, whereas form work requires a lot of lumbar flexion and have the two highest incidences of job-related musculoskeletal diseases (19).

4.0 CONCLUSION, LIMITATIONS AND RECOMMENDATIONS

Conclusion

The study concluded that, De Quervain's Tenosynovitis is prevalent in carpenters of Punjab, Pakistan. Work-related discomfort was found in various regions of body including eyes, neck, shoulders, arms, wrist and hand. Contributing work-related risk factors for De Quervain's Tenosynovitis among carpenters encompass insufficient training, absence of wrist support, and inadequate breaks during work.

Limitations

- Study was only limited to carpenters of Punjab, Pakistan.
- The cross-sectional methodology prevents following changes over time, limiting understanding of long-term prevalence and risk factors.
- The study could not account for all possible contributing variables in the individuals, such as prior wrist-related disorders, general health concerns, or mechanical factors.

Recommendation

- Further research is recommended with larger sample size in other provinces of Pakistan.
- A longitudinal design should be considered in future research to gain a more comprehensive understanding of causal relationships.
- Promoting ergonomic modifications in the setups of carpenters can involve the use of adjustable chairs, which can help reduce back pain and promote a more stable body posture. Proper training and incorporating breaks between tasks can aid in reducing continuous stress, subsequently decreasing discomfort in various body regions
- Further researches can be done to determine the role of workspace organization in reducing body discomforts among carpenter. More researches can be done to compare the level of discomforts in male and female carpenters.

Conflict of Interest: None

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REFERENCES

1. Allbrook V. 'The side of my wrist hurts':'De Quervain's tenosynovitis'. Australian Journal of General Practice. 2019;48(11):753-6.
2. Benites-Zapata VA, Jiménez-Torres VE, Ayala-Roldán MP. Problematic smartphone use is associated with de Quervain's tenosynovitis symptomatology among young adults. Musculoskeletal Science and Practice. 2021;53:102356.
3. Hassan K, Sohn A, Shi L, Lee M, Wolf JM. De Quervain tenosynovitis: an evaluation of the epidemiology and utility of multiple injections using a national database. The Journal of Hand Surgery. 2022;47(3):284. e1-. e6.
4. Sarfraz H, Waseem I, Arslan SA, Ahmed A, Adeel B, Rashid I. The PREVALENCE OF DE QUERVAIN'S TENOSYNOVITIS AND ITS ASSOCIATION WITH MOBILE TEXTING AMONG THE UNIVERSITY STUDENTS: Prevalence of De Quervain's Tenosynovitis and its Association with Mobile Texting. Pakistan BioMedical Journal. 2022:41-5.
5. Ramchandani J, Thakker A, Tharmaraja T. Time to Reconsider Occupation Induced De Quervain's Tenosynovitis: An Updated Review of Risk Factors. Orthopedic Reviews. 2022;14(4).
6. Fakoya AO, Tarzian M, Sabater EL, Burgos DM, Marty GIM. De Quervain's Disease: A Discourse on Etiology, Diagnosis, and Treatment. Cureus. 2023;15(4).
7. Larsen CG, Fitzgerald MJ, Nellans KW, Lane LB. Management of de quervain tenosynovitis: A critical analysis review. JBJS reviews. 2021;9(9):e21.
8. Saadat M. Frequency of De Quervain's Tenosynovitis in Carpenters of Lahore. The Healer Journal of Physiotherapy and Rehabilitation Sciences. 2021;1(2):68-75.
9. Jannat N, Islam F, Aslam M, Hannan MA, Raza A. PREVALENCE OF DE QUERVAINS SYNDROME AMONG TAILORS AND BARBERS.
10. Muhamad Ramdan I, Nur A, Sultan M, Adrianto R, Baharudin I. De Quervain's Disease among Motorcycle Repair Mechanics and Related Factors. Indian Journal of Public Health Research & Development. 2022;13(1).
11. Habib MM. Ergonomic risk factor identification for sewing machine operators through supervised occupational therapy fieldwork in Bangladesh: A case study. Work. 2015;50(3):357-62.
12. Akanmu A, Olayiwola J, Olatunji OA. Musculoskeletal disorders within the carpentry trade: analysis of timber flooring subtasks. Engineering, Construction and Architectural Management. 2020;27(9):2577-90.
13. Maurya P, Priyanka G, Palkar A. Prevalence of De-Quervain's tenosynovitis in tailors. International Journal of Health Sciences and Research. 2020;10(2):2249-957.
14. Cheimonidou AZ, Lamnisos D, Lisacek-Kiosoglous A, Chimonas C, Stasinopoulos D. Validity and reliability of the finkelstein test. Trends in Medicine. 2019;19(2):1-7.
15. Som A, Wermuth HR, Singh P. Finkelstein sign. StatPearls [Internet]: StatPearls Publishing; 2022.

16. Begum MR, Hossain MA. Validity and reliability of visual analogue scale (VAS) for pain measurement. Journal of Medical Case Reports and Reviews. 2019;2(11).

17. Ak A, Ba T, Adebisi O. Prevalence, pattern and impact of musculoskeletal disorders among sewing machine operators in Surulere Local Government Area of Lagos State, Nigeria. Indian Journal of Physiotherapy and Occupational Therapy. 2013;7(2):15.

18. Brohi S, Khokhar R, Marriam P, Rathor A, Memon AR. Prevalence of symptoms of work-related musculoskeletal disorders and their associated factors: A cross-sectional survey of sewing machine operators in Sindh, Pakistan. Work. 2022(Preprint):1-11.

19. Lemasters G, Atterbury M, Booth-Jones A, Bhattacharya A, Ollila-Glenn N, Forrester C, et al. Prevalence of work related musculoskeletal disorders in active union carpenters. Occupational and environmental medicine. 1998;55(6):421-7.