

Prevalence of Dorsal Wrist Syndrome and its Association with Scaphoid Instability among Rikshaw drivers of Sargodha, Pakistan

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ABSTRACT

Objective: The purpose of this study was to identify prevalence of dorsal wrist syndrome and its association with scaphoid instability among rickshaw drivers.

Methods: Descriptive cross-sectional study design was used to recruit 236 participants according to selection criteria of study, through non-probability convenient sampling technique, from May to August 2022 study. A self-generated questionnaire, scaphoid shift test and finger extension test were to collect necessary data. Analysis of data was done by using SPSS version 21. gathered from rickshaw drivers of Sargodha district.

Results: Mean age of participants was 32.601 ± 6.620 . Findings revealed 50.4% prevalence of dorsal wrist syndrome and its significant association with scaphoid instability (p value < 0.000). Right hand was affected in 62.7% rickshaw drivers and left hand in 37.3%. 50.4% drivers had positive finger extension test while 49.6% drivers had negative test and 47.5% of population

were having positive scaphoid shift test and 52.5% were having negative test.

Conclusion: The study concluded that the prevalence of dorsal wrist syndrome is high among rickshaw drivers and scaphoid instability is significantly associated with occurrence of dorsal wrist syndrome.

Keywords: Dorsal wrist syndrome, scaphoid instability, hyperextension, rickshaw drivers.

INTRODUCTION

Wrist is a small joint with a great degree of complexity. Its overall motion is the result of interactions between the various carpal bones, as well as interactions proximally with radius and ulna and distally with the bases of the metacarpals. Radial side of wrist bears 80% of weight whereas, ulnar side bears the remaining 20% of the weight.(1) Due to the presence of both intrinsic and extrinsic ligaments in the wrist, it maintains the equilibrium between physiological forces and articulations. Because of significant number of high loads, this equilibrium gets disturbed, which causes instability.(2)

The most frequent cause of wrist pain is dorsal wrist syndrome, which has a repeatable clinical manifestation of hyperextension and scaphoid instability. This condition includes both the overload wrist and pre-dynamic rotatory subluxation of the scaphoid. Its prevalence is unknown, however there are several risk factors, such as flexible wrists, a very small muscle frame, and is more common in younger and male people, and those who regularly carry heavy objects.(3) Some common symptoms include unpleasant odd sounds like clicks and clunks, swelling, tingling, temperature changes, or deformity when the wrist is in hyperextension or twisting with ulnar deviation. Weakening in the grip and discomfort while performing daily tasks.(2) It is challenging to control chronic wrist discomfort brought on by repetitive motion. A thorough medical history and physical examination are essential.(4)

Rickshaw is the mass transit mode of transportation. Drivers are at high risk of developing occupation related musculoskeletal disorders especially due to poor posture, repetitive movements of hands, extended hours of work and poor ergonomic designs of rickshaws.

Hyperextension or backward bending of wrist can cause pain and instability of scaphoid bone. The popularity of the auto-rickshaw is rising in our nation along with the demand for urban transportation. Auto rickshaw driving exposes the driver to repetitive hand and wrist movements. Engaging the clutch and making certain twisting motions with hands to change gears or accelerate are repetitive actions involved in driving an auto-rickshaw. Muscles, nerves, and tendons in the wrist can be damaged by repetitive strain injuries, which are brought on by overusing muscles and joints.(5)

The country's most accessible and affordable form of public transportation is the auto-rickshaw. Drivers of rickshaws engage in strenuous activity while transporting passengers. They work 12 hours a day or more of the day in an atmosphere that is polluted with emissions gases, as well as being exposed to vehicle noise and having poor posture when driving. Literature reports that 9.1% of drivers have musculoskeletal problems in their hands and wrists. Due to a number of factors, including postural stress and vibration exposure, they are more susceptible to musculoskeletal problems associated with their job(6) Another cross-sectional survey was conducted in 2018 on the prevalence and risk factors of musculoskeletal impairments among auto-rickshaw drivers in a city in central India. It was found that age, years of driving, vehicle age, and BMI were all substantially linked with the occurrence of MSD.(7)

Scaphoid bone articulates lunate and capitate medially, trapezium and trapezoid bone distally, and radius proximally. The unique form of the scaphoid bone allows it to take part in both proximal and distal row kinematics. Its capacity to function properly may be compromised by some incomplete tears of various ligaments that are supporting the scaphoid, which may lead to persistent pain and dysfunction with severe loading or repetitive tasks.(8) A study was done on wrist carpal instability, and it was found that scapholunate ligament and lunotriquetral ligament directly stabilize the scaphoid. If either of these ligaments is damaged, a pattern of instability develops. Acute instances may be treated conservatively, but stubborn ones necessitate surgical stabilization.(9)

Most daily tasks are carried out within 60°-70° of entire extension of a typical wrist. However, a hyperextension injury is thought to be the cause of carpal instability.(10) Five clinical symptoms

of scaphoid rotatory subluxation have been described which include dorsal scapholunate synovitis, discomfort, a positive response on the finger extension test, and an aberrant scaphoid

shift test result. Patients with carpal instabilities frequently report pain when moving their wrists, reduced mobility, and click-clunk sounds.(4)

Rickshaw drivers' strenuous physical activity leads to musculoskeletal issues such chronic joint and muscular pain. To assess the level of handicap brought on by the wrist issue, it is necessary to monitor how the patient's wrist condition affects his or her capacity to work and carry out daily activities. The major goal of current research was to determine whether scaphoid instability and dorsal wrist syndrome in rickshaw drivers are correlated or not.

Materials and Methods

Cross-sectional observational study design was used to determine the prevalence of dorsal wrist syndrome. Non-probability convenient sampling technique was used to recruit the individuals for study. Data was collected from 236 rickshaw drivers from Sargodha district through formula $n = z^2 p(1-p) / d^2$ (11) by using 19% value of prevalence from previous study.(12) Male rickshaw drivers with age above 25 year's driving rickshaw for more than 2 years were included. Drivers with any co-existing morbidity or any recent trauma/deformity were excluded.(12) Informed consent was taken in both English and Urdu. A self-generated questionnaire, finger extension test (13) and scaphoid shift test (14) were used to check prevalence of dorsal wrist syndrome and its association with scaphoid instability. SPSS 24.0 was used for descriptive analysis of data.

RESULTS

In this cross-sectional observational study 236 population of rickshaw drivers was assessed for presence of dorsal wrist syndrome. Mean age of participants was 32.601 ± 6.6209 . Results showed that prevalence of dorsal wrist syndrome was 50.4%.

About 25.4% of rickshaw drivers were using auto rickshaw while 74.6% use Qin chi rickshaw. and 39.4% had been working for more than 10 years, with 8-12 hours of daily working in 59.7% cases. (Table 1) Right hand was affected in 62.7% rickshaw drivers and left hand in 37.3%. Percentage of drivers who experienced pain around thumb/wrist in their daily activities was 48.7% while 51.3% had no pain. Tenderness around snuff box was experienced by 34.3% while 65.7% had no tenderness. Finger extension test for confirmation of dorsal wrist syndrome was found positive in 50.4% and negative in 49.6%. Scaphoid shift test was performed to assess

scaphoid instability, 47.5% of population were having positive scaphoid shift test and 52.5% were having negative test. (Table 2) Pearson chi square test was used to analyze the association of dorsal wrist syndrome with scaphoid instability. Results showed p value of 0.000 indicating significant association between dorsal wrist syndrome and scaphoid instability. (Table 3)

Table 1: Descriptive statistics of age, type of rickshaw, years, and hours of driving.

Age	N= 236, Mean±S.D = 32.601±6.6209
Type of Rikshaw	Auto Rikshaw= 25.4% Qin chi= 74.6%
Years of driving	2-5years= 26.7% 5-10years= 33.9% More than 10years= 39.4%
Daily hours of driving	7-8 hours= 32.6% 8-12 hours= 59.6% More than 12 hours= 7.6%

Table 2: Descriptive statistics of affected hand, pain, tenderness, scaphoid shift test, and finger extension test.

Study Variable	Percentage	Percentage
Affected Hand	Right = 62.7%	Left = 37.3%
Pain around thumb or wrist	Yes = 48.7%	No = 51.3%
Tenderness around snuff box	Yes = 34.3%	No = 65.7%
Finger Extension Test	Positive = 50.4%	Negative = 49.6%
Scaphoid Shift Test	Positive = 47.5%	Negative = 52.5%

Table 3: Association of Dorsal wrist syndrome with Scaphoid instability.

Study variable	N of valid cases: 354	Value	df	Sig
Association b/w dorsal wrist syndrome and scaphoid instability	Pearson Chi Square	76.403 ^a	1	.000
	Likelihood ratio	81.286	1	.000
	Linear-by-linear association	76.080	1	.000

DISCUSSION

Dorsal wrist syndrome is the term used to describe chronic wrist pain in hyperextension. Localized dorsolateral radiocarpal joint discomfort is a defining feature of its clinical presentation. Other symptoms include swelling, soreness, loss of grip strength, and an excessive workload makes the pain worse.(15)

Rickshaw drivers frequently report wrist pain. In a prior study it has been found that professional drivers have a high prevalence of musculoskeletal discomfort, which is followed by pain in the shoulder, neck, wrist, ankle, upper back, and lower back. The prevalence of musculoskeletal discomfort ranges from 43.1% to 93% according to an analysis of a total of 56 research studies done in 23 different countries over a total of 14 distinct types of occupational transportation.(16) In the current study, prevalence rate of dorsal wrist syndrome was 50.4%. About 48.7% of rickshaw drivers stated thumb/wrist pain and 34.3% reported tenderness around snuff box.

According to a previous study, prolong overuse activities and stress on the hand and wrist are to blame for dorsal wrist syndrome in rickshaw drivers. This is because they have spent many years in a job that involves repeated movements that overload the hand and wrist.(17) Current study's findings also indicated that majority of drivers have worked for more than ten years which put

them at a significant risk of developing dorsal wrist syndrome. An earlier study found that lengthening the workday can raise the risk of dorsal wrist syndrome.(18) This is consistent with present study, which showed a greater percentage of drivers who work more than 8 to 10 hours per day which make them more prone to develop dorsal wrist syndrome.

In right-handed patients, the dominant hand is noticeably stronger, whereas in left-handed subjects, no such notable difference could be confirmed. Results from previous comparisons between individuals' dominant and non-dominant hands indicated a substantial difference was seen in power grip strength, and pulp-to-pulp pinch strength.(19) In current study, 62.7% of surveyed population had affected right hand being the dominant one to use while driving, whereas 37.3% had DWS in left hand.

One of the most common causes of wrist pain, scapholunate instability is brought on by a rupture or attenuation of supporting ligaments, which is assessed through scaphoid shift test. In a prior study, 25 healthy volunteers (50 wrists) were evaluated clinically and fluoroscopically during a scaphoid shift test. Based on the amount of palpable carpal motion experienced during the clinical evaluation, and scanned pictures of the carpals at rest and at maximal displacement, the prevalence of a positive scaphoid shift test was found to be 36%. This correlates with present study in which 47.5% drivers had scaphoid instability.(20)

An aberrant scaphoid slide may occur under repetitive load because of wrist injury, repeated wrist sprains, and hyperextension. This leads to a common clinical condition of dorsal wrist syndrome. Rickshaw drivers perform a job that requires a lot of wrist, forearm, and hand movements. So, there is high possibility of developing dorsal wrist syndrome (DWS), and repeated motion has a strong correlation with scaphoid instability.(21) This is in accordance with present study results which indicated that rickshaw drivers have a substantial incidence of dorsal wrist syndrome and a significant correlation with scaphoid instability as a result to overload and repetitive hand movements.

CONCLUSION

This study concluded that prevalence of dorsal wrist syndrome is high among rickshaw drivers and scaphoid instability is significantly associated with occurrence of dorsal wrist syndrome.

This emphasizes simultaneous implementation of specialist care and exercise to correct vehicle ergonomics and body posture by encouraging more physically active lifestyle for the comprehensive prevention of musculoskeletal issues among rikshaw drivers.

Disclaimer:

This research has not been presented or published in any conference or book.

Conflict of interest:

All authors have declared no conflicts of interest with respect to the authorship and publication of this article.

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