

ACTIVE STRETCHING HAS AN EFFECT ON FUNCTIONAL ABILITY IN ONLINE MOTORCYCLE TAXI DRIVERS EXPERIENCING CARPAL TUNNEL SYNDROME

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ABSTRACT

Carpal Tunnel Syndrome (CTS) is a common medical condition that occurs when the median nerve is pinched or compressed as it passes through the wrist due to continuous long-term movement. The research aims to determine the effect of Active Stretching on the functional ability of the hands in online motorcycle taxi drivers who experience Carpal Tunnel Syndrome. The type of research is quasi-experimental with sample collection techniques using the purposive sampling method. The research was carried out in May-June 2023, with a population of 35 people and a sample size of 10 people who were given intervention 9 times. Measurements in this study used the Wrist/Hand Disability Index (WHDI). The results of research on Active Stretching showed that the average functional ability of the hand before the intervention was 58 and after the intervention was given it was 43,2. The p value = 0.0005 means there is an increase in functional ability. The results of the research can be concluded that there is an influence of Active Stretching exercises on increasing the functional abilities of the hands in online motorcycle taxi drivers who experience Carpal Tunnel Syndrome.

Keyword : Active Stretching, Carpal Tunnel Syndrome, Functional Ability

BACKGROUND

Online motorcycle taxi services have become widely used for goods delivery. According to (Wallsten, 2015), online transportation service providers connect potential passengers with drivers through smartphones. Online motorcycle taxi drivers use motorcycles as their primary mode of transportation, and one common issue they face is Carpal Tunnel Syndrome (CTS). The pathophysiology of CTS involves a combination of mechanical trauma, increased pressure, and ischemic injury to the median nerve within the carpal tunnel (Ibrahim, 2012). Compression in CTS typically results from biomechanical pressure caused by repetitive hand movements, gripping or pinching motions, extreme positions of the wrist, direct pressure on the carpal tunnel, and the use of vibrating tools (Sekarsari, Pratiwi and Farzan, 2017). Carpal Tunnel Syndrome (CTS) is one of the upper extremity disorders caused by narrowing in the carpal tunnel, leading to pressure on the median nerve located at the wrist. CTS presents several symptoms, including pain, numbness, tingling, and paresthesia. Any condition that results in the narrowing of the carpal tunnel, one of which is jobs involving tapping or repetitive flexion and extension of the wrist, can compress the median nerve (Hakim *et al.*, 2016).

There are two mechanisms that cause CTS in online motorcycle taxi drivers: repetitive cumulative pressure and wrist injury while riding motorcycles. First, the motorcycle handlebars receive a significant amount of vibrations from the engine and uneven road surfaces. Second, the controls on the handlebars are operated by the motorcycle rider, with the right hand controlling the throttle (to increase or decrease gas) and front brake, while the left hand controls the clutch. This can add repetitive pressure to the wrist (Farhan, 2018). Repetitive movements can cause a tendon sheath, resulting in pressure on the wrist tendons. If muscle contraction exceeds 20%, blood circulation to the muscle decreases, oxygen supply to the muscle diminishes, the work of nerves innervating the muscles is disturbed, and metabolic processes are hindered. As a result, there is an accumulation of lactic acid, which causes muscle pain (Lazuardi, Ma'arufi and Hartanti, 2016).

Stretching is the process of extending muscles to prepare the body for activity and to relax the muscles (Nohantiya, 2017). Active stretching, or active stretching, is a type of stretching procedure that is done independently after being given instructions and is performed without the help of external forces. (Kisner & Colby, 2017). Stretching regularly during work breaks can be beneficial for the body, including reducing muscle tension, improving blood circulation, reducing anxiety, feelings of stress and fatigue, reducing the risk of injury, and making one feel better. The study on carpal tunnel syndrome conducted by (Pande *et al.*, 2019) on the administration of active wrist stretching to blacksmiths in Sidan Village, Gianyar Regency, found that complaints of carpal tunnel syndrome, which interfere with daily activities such as gripping, pinching, and other hand activities while working, can be reduced by performing active stretching.

Based on data from two courier offices in Bukittinggi, the estimated number of drivers is around 35, a number expected to increase over time due to the growing demand for online motorcycle taxi services. This increased operational activity can have health impacts on online motorcycle taxi drivers. Active Stretching is a form of muscle stretching aimed at reducing the impact of injuries, improving body flexibility, and relaxing muscles. It can be used as an exercise in this study (Novianthi Sidiartha, 2018). Considering the above, online motorcycle taxi drivers frequently perform flexion and extension movements while adjusting the motorcycle's gas flow, coupled with the fact that they experience a significant amount of vibrations from the engine and uneven road surfaces. Therefore, this research is crucial. Thus, the researcher is interested in conducting a study titled The Effect of Active Stretching on the Functional Ability of the Hand in Online Motorcycle Taxi Drivers with Carpal Tunnel Syndrome.

METHOD

This research was conducted at two courier offices in Bukittinggi, namely Meme Antar and Jam Gadang Kurir, in May-June 2023. The Wrist/Hand Disability Index (WHDI) was used as a measurement tool to assess the functional ability of the respondents' hands. The research employed a quasi-experimental research method. In this study, the sample size was 10 out of a population of 35, selected through purposive sampling based on inclusion and exclusion criteria. The inclusion criteria were willingness to be a respondent, age between 20-40 years, and being a rider experiencing Carpal Tunnel Syndrome (CTS). The exclusion criteria were sensory disturbances, fractures in the wrist area, and open wounds on the wrist. The data obtained by the researchers in this study were analyzed to determine the effect of active stretching on the functional ability of online motorcycle taxi drivers experiencing carpal tunnel syndrome using statistical tests, namely the Wilcoxon Test, where based on the results of the Wilcoxon Test, a p-value of 0.0005 ($P < 0.05$) was obtained.

RESULT

Univariate Analysis

The average functional ability of the hands before the Active Stretching intervention in online motorcycle taxi drivers experiencing Carpal Tunnel Syndrome (CTS) Based on the research findings, from 10 respondents the average value of hand functional ability before the Active Stretching intervention was 58, with a standard deviation of 5.812. The lowest functional ability score is 50, and the highest score is 70. The average functional ability of the hands after the Active Stretching intervention in online motorcycle taxi drivers experiencing Carpal Tunnel Syndrome (CTS) Based on the research findings, from 10 respondents the average value of hand functional ability after the Active Stretching intervention was 43.2, with a standard deviation of 4.917. The lowest functional ability score is 36, and the highest score is 50.

Bivariate Analysis

The Influence of Active Stretching Intervention on the Functional Ability of Hands in Online Motorcycle Taxi Drivers with Carpal Tunnel Syndrome (CTS)

Table 1. The Influence of Active Stretching Intervention on the Functional Ability of Hands in Online Motorcycle Taxi Drivers with Carpal Tunnel Syndrome (CTS)

Variable	N	Mean	SD	P Value
Before Active Stretching	10	58	5,812	0,0005
After Active Stretching		43,2	4,917	

Based on table 1, from 10 respondents, the average functional hand ability before the intervention is 58, with a standard deviation of 5.812, while the average functional hand ability after the intervention is 43.2, with a standard deviation of 4.917. The p-value obtained is 0.0005 ($P < 0.05$), indicating that there is an influence of Active Stretching intervention on the functional hand ability in online motorcycle taxi drivers experiencing Carpal Tunnel Syndrome (CTS).

DISCUSSION

Univariate Analysis

The average functional ability of the hands before the Active Stretching intervention in online motorcycle taxi drivers experiencing Carpal Tunnel Syndrome (CTS) Based on the results of the study conducted on 10 online motorcycle taxi drivers experiencing Carpal Tunnel Syndrome, the average functional hand ability measured with

WHDI before the Active Stretching intervention is 58. Carpal Tunnel Syndrome (CTS) is a common medical condition that occurs when the median nerve is pinched or compressed as it passes through the wrist. This syndrome is characterized by pain in the hand, numbness, and tingling in the distribution of the median nerve. Carpal Tunnel Syndrome (CTS) is caused by prolonged and continuous movements with a static position, disrupting blood supply to the wrist, hand, and nerves (Utamy, Kurniawan and Wahyuni, 2020).

According to (Ibrahim, 2012), Carpal Tunnel Syndrome occurs when there is an increase in pressure within the space of the wrist that accommodates tendons and nerves. As the pressure rises, it compresses the nerve known as the median nerve. This nerve innervates the thumb, index finger, middle finger, and half of the ring finger, leading to clinical manifestations in those specific areas. Risk factors for CTS include obesity, repetitive wrist activities, pregnancy, genetic inheritance, and rheumatoid inflammation. Carpal Tunnel Syndrome is more commonly observed in women compared to men. Typically, CTS often occurs in the age range of 40-60 years; however, it is undeniable that CTS can also occur in individuals of all age groups (Huntley and Shannon, 1988).

Two mechanisms cause cumulative repetitive pressure and wrist injuries when riding a motorcycle. First, the handlebars receive a significant amount of vibrations from the engine and uneven road surfaces. Second, the devices on the handlebars are controlled by the motorcycle rider. The rider's right hand controls the throttle (to increase or decrease gas) and front brake, and the left hand controls the clutch. This can add repetitive pressure to the wrist (Manes, 2012). According to Harahap (2003), one of the factors that can cause Carpal Tunnel Syndrome (CTS) is trauma due to repeated flexion-extension movements of the wrist with sufficient force, such as in certain jobs that require frequent wrist movements. This is what motorcycle taxi drivers do while riding a motorcycle. The findings of this study align with research conducted by (Darmawijaya, Yani and Permadi, 2020) titled "Active Stretching of the Wrist Reduces Complaints of Carpal Tunnel Syndrome in Blacksmith Workers in Sidan Village, Gianyar Regency." It was found that before the administration of active stretching of the wrist, the complaints perceived by the samples were in the moderate category. Judging from the mean value of 33.60, median value of 33.00, minimum value of 26.00, and maximum value of 40.00.

According to the researcher's assumption, some online motorcycle taxi drivers complain of pain and limited movement due to prolonged use of vehicles, resulting in discomfort and pain in the wrist. Risk factors that also contribute to carpal tunnel syndrome in online motorcycle taxi drivers include muscle pressure, vibrations, temperature, non-ergonomic work postures, age, work methods, work equipment, and high-frequency activities such as repetitive movements. In line with the research results, the functional hand ability of online motorcycle taxi drivers measured with the Wrist Hand Disability Index (WHDI) resulted in an average of 58%, indicating a severe disability. It is highly likely that carpal tunnel syndrome in online motorcycle taxi drivers can interfere with their work and daily activities. The average functional ability of the hands after the Active Stretching intervention in online motorcycle taxi drivers experiencing Carpal Tunnel Syndrome (CTS)

Based on the results of the research conducted on 10 online motorcycle taxi drivers experiencing Carpal Tunnel Syndrome, the average value of hand functional ability measured with WHDI after the Active Stretching intervention is 43.2. Active Stretching is a type of stretching procedure performed independently after receiving instructions and is done without external force assistance (Kisner & Colby, 2017). To improve muscle flexibility, stretching can be done at least once a day or, if possible, several times a day. The principle is that continuous stretching is better than doing it once in a single intense session. Complaints related to carpal tunnel syndrome can significantly disrupt daily activities that involve hand functionality, such as gripping and pinching. These complaints can be reduced by performing active stretching (Darmawijaya, Yani and Permadi, 2020).

The results of this study are in line with previous research conducted by (Darmawijaya, Yani and Permadi, 2020) titled "The Provision of Active Stretching of the Wrist Reduces Complaints of Carpal Tunnel Syndrome in Blacksmith Workers in Sidan Village, Gianyar Regency." After the administration of active stretching of the wrist, the perceived complaints of the samples were in the moderate category, with a mean value of 27.00, a median value of 27.00, a minimum value of 20.00, and a maximum value of 32.00. According to the researcher's assumption, stretching exercises or stretching therapy are beneficial not only for reducing pain but also for restoring flexibility in stiff muscles. Stretching itself can keep muscles flexible, preparing them to move during activities without causing tension, making it suitable for alleviating pain and increasing movement in individuals with carpal tunnel syndrome. Stretching should be done every day for 15-30 seconds, repeated 4 times. Regular stretching during breaks at work can benefit the body by reducing muscle tension, improving blood circulation, reducing anxiety, feelings of pressure and fatigue, reducing the risk of injury, and making one feel better. This exercise can be easily done anywhere without the need for equipment, using only the hands, and can be done anytime.

Bivariate Analysis

The Influence of Active Stretching Intervention on the Functional Ability of Hands in Online Motorcycle Taxi Drivers with Carpal Tunnel Syndrome (CTS) Based on the research results involving 10 online motorcycle taxi drivers experiencing Carpal Tunnel Syndrome, there is a difference in the average functional hand ability before and after the Active Stretching intervention. The statistical analysis yielded a p-value of 0.0005 ($P < 0.05$), indicating that Active Stretching has a significant impact on the functional hand ability of online motorcycle taxi drivers (Darmawijaya, Yani and Permadi, 2020) with Carpal Tunnel Syndrome (CTS). Stretching is a form of muscle elongation or stretching for each body part to reduce injury vulnerability, enhance body flexibility, and relax muscles (Novianthi Sidiartha, 2018). Regular stretching can be beneficial for the body, reducing muscle tension, improving blood circulation, alleviating anxiety, feelings of pressure and fatigue, and reducing the risk of injuries (Darmawijaya, Yani and Permadi, 2020).

Stretching exercise therapy, in addition to reducing pain, is also beneficial in restoring flexibility to muscles that have become stiff. With stretching exercises, symptoms of cellular oxygen deficiency can be reduced, which can lead to an increase in lactic acid and thus cause pain (Wiwit Nurdianti, Ganya Tri Utami, 2015). The administration of tendon stretch and nerve gliding exercises conducted over 3 weeks has shown that these exercises are beneficial for carpal tunnel syndrome (Kaur, Kumar and Arora, 2016). Exercise therapy involving stretching is beneficial not only for reducing pain but also for restoring flexibility in stiff muscles. Stretching itself helps to maintain muscle flexibility, preparing the muscles for movement in various activities without causing tension (Mujiyanto, 2013). The stretching mechanism falls under the category of mechanical stimulation that can activate the functions of thick non-nociceptive nerve fibers (A alpha and A beta) and close the gate control, preventing the transmission of pain signals carried by thin nerve fibers (A delta and C) to the brain (Rovitri Anestia, 2015).

The findings of this study are consistent with the research conducted by (Darmawijaya, Yani and Permadi, 2020) titled "The Provision of Wrist Active Stretching Reduces Complaints of Carpal Tunnel Syndrome in Blacksmith Workers in Sidan Village, Gianyar Regency." The significant result of 0.000 ($0.000 < 0.05$) indicates that providing active stretching of the wrist can reduce complaints related to carpal tunnel syndrome in blacksmith workers in Sidan Village, Gianyar Regency. According to the researcher's assumption, active stretching is beneficial not only for reducing pain but also for restoring flexibility in stiff muscles. This reduction in pain experienced by Carpal Tunnel Syndrome patients is attributed to the ability of active stretching to reduce symptoms of oxygen deficiency in cells, which can lead to an increase in lactic acid causing pain. Active stretching keeps muscles flexible, prepares them to move during activities without causing tension, and can stretch the median nerve, making the hands of individuals with carpal tunnel syndrome more comfortable. It is recommended to perform active stretching as often as possible during leisure time to achieve optimal results, as active stretching is highly beneficial without side effects and can be done anytime.

CONCLUSION

Based on the research results, after studying 10 online motorcycle taxi drivers experiencing Carpal Tunnel Syndrome in 2 courier offices in the city of Bukittinggi, it was found that there is an influence of providing Active Stretching exercises on hand functional ability. There is a difference and improvement between the average values before and after the intervention. A suggestion for future researchers is to consider adding the latest interventions in exercise applications aimed at improving the functional ability of hands in online motorcycle taxi drivers experiencing Carpal Tunnel Syndrome.

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