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PREVALENCE OF PLANTAR FASCIITIS ASSOCIATED WITH FOOTWEARAMONG HEAVY VEHICLE DRIVERS

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ABSTRACT

Background *Plantar fasciitis is a term used to describe non traumatic pain and diffuse progressively start the foot or ankle,that gradually worsen preventing progress. It is a common condition characterized by inflammation of plantar fascia, the connective tissue that runs along the bottom of the foot from the heel to the toes. These disorders may be due to overuse, biomechanical de-arrangement of the foot, nerve entrapment, inflammatory arthritis or even stress fracture.* ***Objective*** *The objective of this study is to find the prevalence of planter fasciitis associated with foot wear among heavy vehicle drivers.* ***Methodology*** *The study was conducted in various settings, including in terminals, roads, and textile industry and sugar mills. This was observational cross-sectional study whose sample size was 250. The test determination, measures incorporated the truck drivers with plantar fasciitis. The data was collected through a questionnaire and the tool was used "WINDLASS TEST". Data was analyzed by SPSS to determine how much drivers experiences symptoms while long hour driving with open and close shoe wear.* ***Results*** *The study shows 25% drivers lies in 30 years of age, 50% lies in 35 years of age, 75% lies in 40 years of age. It also shows 99.2% drivers, drive in between 12-14 hours, and 0.8% drive more or less than 14 hours, 75.6% drivers wear open shoes and 24.4% wear close shoes, 2.8% drivers wear boots, 73.2% wears slippers, 18.4% wears sandals, 5.6% wears sneakers,24.4% have thick sole shoe and 75.6% have flat sole shoe, 60.4% drivers have pain due to prolonged driving and 39.6% have no pain due to prolonged driving, 57.6% drivers right foot affected, 3.6% drivers left foot is affected and 38.8% drivers no foot affected, 39.6% drivers have no pain, 38.8% have moderate pain, 18.8% have very severe pain, 1.2% have worst pain possible, 60.4% drivers windlass test positive and 39.6% have negative test. The hypothesis test shows that overall model is significant. (p>0.05).****Conclusion:*** *The prevalence based study was carried out on heavy vehicle drivers to determine the incidence of plantar fasciitis associated with footwear. Data was obtained from participants by having them inquire whether they are suffered from plantar fasciitis or not. Respondents who reported pain during long hours of driving, were analyzed through windlass test and pain scalescoring rate. For this purpose two parameters were assessed;*

in order to check these parameters, visual analogue scale for pain scoring, windlass test for assessment that indicates the presence and absence of plantar fasciitis.

Keyterms: *Plantar fasciitis, footwear, heavy vehicle drivers.*

INTRODUCTION

Heel pain is the main cause of plantar fasciitis. During standing, walking activities plantar fascia origin and insertion points stretched. In morning, it causes intense stabbing pain. After prolonged standing, or getting up from a sitting position it increases the pain which relates to plantar fasciitis. The foot arch is supported by plantar fascia which acts as shock absorber. When tension occur on plantar fascia, it may limits of tissues exceeds that develop tears in the fascia. The inflamed and painful fascia would cause by repetitive tension and tearing of fascia. PF is more frequent in runners but also seen in workers who have prolonged standing. Many people with heel pain face footwear related problem. The role of footwear in causing PF is less known (1). Low back pain is caused due to long time of sitting with uncomfortable posture. MSK diseases are the big reason for defection of professional drivers. The starting treatment of plantar fasciitis include stretching exercise and physiotherapy. The overall prevalence of noninfectious inflammation is about 10 percent. Plantar fasciitis is not associated with gender and athletes (2). Professional drivers whose job is to drive motor vehicles such as cars, bus, truck, drivers. There is a probability to have disorders of musculoskeletal in foot and ankle joints due to repetitive peddling operation. Drivers work in highly uncomfortable conditions like prolonged driving, workplace area of poorly designed. Prolonged sitting, poor posture, exposure to whole body vibration, long time driving, poor diet or psycho social factors causes' pain. Foot position maintained by dorsi flexors muscles on the accelerator paddle. Older age (between 40 or 60), female gender, different type of exercise that plays higher level of pressure on heel and tissue, defective foot mechanics l (flat feet, high arches, abnormal walking) obesity, prolonged standing and inappropriate shoes (thin sole, high heeled, lose or lacking arch support) are the risk factors for plantar fasciitis (3).

Adverse effect of foot wear on individuals having difficulties like comfort and fit, it causes heel pain or plantar heel pain. Biomechanical measures predict foot wear related difficulties in people and heel pain. Foot posture in plantar heel pain have high level evidence but it is not associated with foot morphology or deformity. Due to poor fitting shoe wear, people experience difficulties in their foot function. Some other effect may also include like lethargy, pain in heel side, reduction of grip and also loss of control due to slippery shoes. This condition may cause drivers to feel uncomfortable and their focus distract. Due to discomfort and pain in the feet, distract their intention and their overall performance of the driving will decrease. A pronated foot is linked with this condition but it hasn't found to be a risk factor. The prevalence and prognosis are unclear but in most of the people the symptoms with Time but in some cases it can take years (5).To operate the motor vehicles, is the main task of the professional drivers such as, taxi and ambulance drivers, other heavy vehicle drivers (Bylund et al, 1997). The health of the experienced drivers is much important, for passengers and Driver's safety purposes (Winkle by et al 1988). For Sciatica (Heliovaara, 1987), intervertebral discs move (Bovenzi and Zadini 1992; Kelsey and Hardy, 1975), deterioration of lumbar spine (Luoma et al, 1998) and non-specific lower back pain, the professional drivers are at higher risk(Anderson, 1992; Bovenzi and Zadini, 1992).Primary issues in drivers are MSK diseases, 22 epidemiological studies are reviewed (Winkleby et al, 1988). A 249 HV drivers, this study shows that 60% of the individuals have symptoms of MSDs, along low back pain (57%), follow by neck pain (21%) pain in leg (24%) and (Costa et al, 2001). The repetitive, forceful movement and mal-alignment posture are the main factors in MSD (Armstrong et al, 1993). Drivers try to communicate with passengers in a twisting manner along fixed pelvis due to this reason car interior is not comfortable for drivers . The previous studies optimize the position of the pedal, and the distance between center of car and panel, the angle of the seat, in this way it is a safe and comfortable posture for drivers (Brook et al 2009). AT has become more popular than a MT because it may need one foot for controlling the accelerator and breaks pedals, with repetitive movements on ankle (dorsiflexion and plantar-flexion). Through the accelerator and breaks pedal, driver's spinning the ankle on the heel, in stopping and go traffic (7 Foot plantar

pressure distribution is one of the new biomedical application. Between shoe sole and the foot plantar surface, there is a interference f pressure, that measure the foot pressure. A lower extremity problem, biomechanics of sport, designs of footwear, prevention from injury there are the pressure measure that give information and use for gait and posture research. In neurological disorders and biomechanical applications, foot pressure is very useful. Through gait analysis, revealed that decrease stride length should increase variability in gait parameters of healthy people. The age was associated with the low pressure under the mid foot, halluxband hell in the analysis of multivariate. In walking, Measurement of foot pressure (FDP) which is used in health for young and old to demonstrate the pressure, force and relative loads. The technology is less-expensive that why giving benefits for a small cost instrument with reliability and higher accuracy (8).

It is the non-inflammatory condition that almost 10% people with the experience throughout the lifetime. Many factors that may include are BMI, standing, ankle dorsiflexion. In the morning, stabbing pain, non-radiating pain may also experience. Tenderness is felt by palpation of the proximal plantar fascia. The most reasonable and inexpensive diagnostic tool for patient with pain of plantar fasciitis is Ultrasonography. Almost cases that represents planter fasciitis in the result of fault in foot are due to biomechanical relation. In which foot is undergo in the abnormal pronation position. Many other condition/disorders may also include that all foot fault and disturb foot biomechanics. Pain in the foot is sometime in the one area and sometime radiating towards the mid of foot or the toes. All hoses conditions may diagnose through history of medical, the patient assessment. Windlass test may also include for diagnoses of plantar fasciitis .It is also unexpansive tool and their reliability and validity authentic (9).

The Guidelines of heel pain plantar fasciitis link the ICF (International classification of functioning and disability)structure of body (foot and ankle, fascia and ligaments) and functions of body (lower limb pain, radiating pain in different region of segment with the World Health Organization (ICD) International Statistical Classification of Disease. (10)

The difference of our research from other research is that they focused on heel pain associated with walking, the longtime standing, but in our research we focused on plantar fasciitis associated with the foot wear among the heavy vehicle drivers. Objective: The objective of this study is to find the prevalence of the plantar fasciitis associatedwith the foot wear among heavy vehicle drivers. The study on the impact of plantar fasciitis association with foot wear in heavy vehicle drivers would likely focus on the symptoms and prevalence of the condition on the ability of individuals to operate a vehicle safely. Because it is a main cause of heel pain and can make it difficult for individuals to walk or stand for a long period of time. It can have a significant impact on people who spend a lot of time driving, as the condition can cause discomfort and pain. This can affect a person's ability to drive safely and comfortably, and may also lead to increase absenteeism from work. Additionally, plantar fasciitis can also make it difficult other daily activities, such as walking or standing for long periodof time, which can make it harder for a person to perform their job. It is important for people who spend a lot of time driving and may experiencing symptoms of plantar fasciitis to manage their pain and improve their quality of life.

METHODOLOGY

The cross sectional study was conducted to determine the plantar fasciitis prevalence, associated with footwear among heavy vehicle drivers. The study setting was, the Dry port Faisalabad. Duration of this study is 4 months after approval of synopsis as its needed a reasonable time period for observing the prevalence of plantar fasciitis associated with footwear among heavy vehicle drivers. Population includes heavy vehicle drivers. The sample size is 250.The level of confidence is 95%, The margin of error was 2%. The sample technique was Simple random sampling. The screening of the study population is by Windlass test Visual analogue scale Self-made questions INCLUSION CRITERIA, Age 22-50 years, Prolonged driving (12-14 hours),Previous injury not significant, Footwear (open shoes),(close shoes) Exclusion Criteria, Malignant disease, Systemic inflammatory disease, Lumbar spine lesion, Previous heel surgery, Neurological signs, Foot deformity. WINDLASS test for diagnosis of plantar fasciitis Visual analogue scale for pain scoring Descriptive data analysis was performed using

frequency table, pie chart, bar charts etc. Multiple linear regression tests were used and through this test interpret the results. In which we use one dependent variable and three independent variables.

RESULTS

Descriptive statistic was used to evaluate the outcomes. The demographics were calculated using percentages, frequencies, means and standard deviations. The link between plantar fasciitis/ pain with footwear in heavy vehicle drivers was assessed using multiple linear Regressions. The demographic were described using descriptive statistics. For all demographic data, percentages and frequencies were calculated. The age of the respondents, which was the only continuous variable, was given a mean and standard deviation. Age lies minimum and maximum in between (22-52), shows 25% drivers lies in 30 years of age, 50% lies in 35 years of age, 75% lies in 40 years of age. Almost 99.2% drivers, drives in between 12-14 hours, and 0.8% drive more or less than 14hours. Results shows 75.6% drivers wear open shoes and 24.4% wear close shoes. Out of all participants 24.4% have thick sole shoe and 75.6% have flat sole shoe. 80% drivers wear shoes with arch support and 20% wear shoes without arch support.

Pain due to prolonged driving, 60.4% drivers have pain due to prolonged driving and 39.6% have no pain due to prolonged driving. 57.6% driver's right foot affected, 3.6% drivers left foot is affected and 38.8% drivers no foot affected. 2% drivers have pain in toes, 8% have pain in mid sole, 52% have pain in bottom of heel and 38% have no pain. 43.6% driver's pain lasts for less than one hour, 16.4% driver's pain lasts for one to two hours, 2.4% driver's pain lasts for more than two hours and 37.6% drivers have no pain. **Table 1**

Table: 1 AFFECTED FOOT

	Frequency	Percent	Valid percent	Cumulative percent
Right	**144**	**57.6**	**57.6**	**57.6**
Left	**9**	**3.6**	**3.6**	**61.2**
None	**97**	**38.8**	**38.8**	**100.0**
Total	**250**	**100.0**	**100.0**	
PAIN LOCATION				
Toes	**5**	**2.0**	**2.0**	**2.0**
Mid sole	**20**	**8.0**	**8.0**	**10.0**
Bottom of heel	**130**	**52.0**	**52.0**	**62.0**
None	**95**	**38.0**	**38.0**	**100.0**
Total	**250**	**100.0**	**100.0**	
PAIN RELIEVED BY REST				
Yes	**125**	**50.0**	**50.0**	**50.0**
No	**33**	**13.2**	**13.2**	**63.2**
None	**92**	**36.8**	**36.8**	**100.0**
Total	**250**	**100.0**	**100.0**	

The hypothesis test shows that overall model is significant. ($p>0.05$) windlass test carries no significant impact on H1 (open/close shoe design). The variable that is dependent was regressed on independent variables to test the hypothesis H1. H1 significantly concluded windlass test (dependent variable), $F(3,246) = 3.351$, $p> 0.05$, which shows that the H1 cannot play a significant role in shaping windlass test ($b= -.027$, $p> 0.05$). There result clearly shows the negative effect of H1. In addition, $R^2 = .039$ represents that the model explain 39% of the variance in windlass test. The hypothesis test, windlass test carries no significant impact on H2 (type of sole). The dependent variable was regressed on independent variables to test the hypothesis H2.H2 significantly shows windlass test (dependent variable),$F(3,246) = 3.351$, $p> 0.05$, which shows that the H1 cannot play a significant role in shapping windlass test ($b= -.263$. $p<0.05$). There result clearly shows the negative effect of H2. .In addition,$R^2 = .039$ represents that the model explain 39% of the variance in windlass test. The dependent variable was regressed on independent variables to test the hypothesis H3. .H3 significantly predicted windlass test (dependent variable), $F(3,246) = 3.351$, $p> 0.05$,

which shows that the H3 cannot play a significant role in shapping windlass test (b= .075 p> 0.05). There result clearly shows the positive effect of H3. In addition, R^2 = .039 represents that the model explain 39% of the variance in windlass test. 60.4% drivers windlass test positive and 39.6% have negative test.The result of total prevalence of plantar fasciitis was analyzed by frequency distribution according to result out of250 participants ,60.4%participants were diagnose with planter fasciitis while 39.6% participants did not have plantarfasciitis. **Table 2**

Table: 2. PAIN SCALE SCORING

	Frequency	Percent	Valid percent	Cumulative percent
No pain	**99**	**39.6**	**39.6**	**39.6**
Moderate pain	**100**	**40**	**40**	**79.6**
Very Severe pain	**48**	**19.2**	**19.2**	**98.8**
Worst painpossible	**3**	**1.2**	**1.2**	**100.0**
Total	**250**	**100.0**	**100.0**	
ASSESSMENT OF WINDLASS TEST				
Positive	**151**	**60.4**	**60.4**	**60.4**
Negative	**99**	**39.6**	**39.6**	**100.0**
Total	**250**	**100.0**	**100.0**	

Association between windlass test and footwear shows significant impact of windlass test on these three independent variables, open shoes, close shoesdesign, type of sole, and shoes with arch support. **Table 3**

Table:3. ASSOCIATION BETWEEN WINDLASS TEST AND FOOTWEAR

Hypothesis	Regression(variables)	Beta coefficient	R^2	F	T-value	P-value
Constant	**Windlass test→ threeId variables**	**1.836**	**.039**	**3.351**	**3.192**	**.002**
H1	**open shoe design/close**	**-.027**	**.039**	**3.351**	**-.313**	**.754**
2	**type ofsole→ Windlasstest**	**-.263**	**.039**	**3.351**	**-1.300**	**.195**
H3	**shoes witharch support →Windlass test**	**.075**	**.039**	**3.351**	**.977**	**.329**

DISCUSSION

Plantar fasciitis is the condition in which you may experience pain in heel. The ligament that connects your bone of heel to toes is plantar fascia. Pain is basically caused due to the weakness of plantar fascia ligament. In our study we investigate the prevalence of plantar fasciitis and also its association with footwear among heavy vehicle drivers.

The findings of our study show that 60.4% were prevalence of plantar fasciitis among heavy vehicle drivers, and 39% association with footwear. It is due to their occupation, which involves long hours of driving, repetitive stress on plantar fascia, repetitive plantar-flexion. Footwear also involve like open and close (type), deigns (slippers, sandals, slides, boots, sneakers), types of sole, shoes with arch support. There is significant numbers of participants with plantar fasciitis, that indicating association with footwear.

Our study emphasizes the impact of plantar fasciitis on the overall driving hours and work productivity of drivers. Comparing the results with the previous researches several researches, highlighted that the condition leads to significant pain and discomfort due to driving for long hours and repetitive downward force on foot. Thomas et al, conduct a study in which 9.6% have prevalence of plantar fasciitis due to activitives, long hours of working, age, footwear and many other contributing factors. Overall survey show that 37% individuals have plantar fasciitis but only 9.6% have plantar fasciitis that is related to attributing factors. This study also shows that 40 to 55 years of individuals having plantar fasciitis due to weakness of muscles, overloaded work, long hours of standing, walking. Basically shows the effect of age related to plantar

fasciitis. Standing for long period of time shows the high risk of plantar fasciitis in thisstudy. Bennett et al, shows in this study that pain scale is the need for diagnosis, assessment in plantar fasciitis. It is beneficial for foot health. A questionnaire that is based on function of foot, footwear and general care of foot. Through this VAS, assess the intensity of pain (mild, moderate, severe, very severe). The study shows that only 60% of individuals have mild to moderate pain in foot. De Garceau et al. show the validity of windlass test, two different groups are investigated by this test. There is a significant impact that shows positive or negative strain on plantar fascia. This study shows only 13.6% participants have positive results and 31.8% have negative results of windlass test. The use of windlass test show higher level of sensitivity in this research. Our study also shows the pain scale scoring assessment. For evaluation of pain in foot, pain scale is used. 38.8% respondents have moderate pain, 18.8% have severe pain, 1.2% has worst pain. Windlass test use in our research, to check the positive and negative impact of pain on foot and also for the results interpretation.

The results shows that p value is <0.005, which indicates the association of plantar fasciitis with footwear among drivers. This shows the increased risk of plantar fasciitis among drivers due to footwear and over-worked. At last the conclusion, research findings shows the 39% prevalence of plantar fasciitis associated with footwear among heavy vehicle drivers. It is indicated that the need for early interventions and preventive measures. Aim to reduce their working hours and use the suitable footwear during working hours.

CONCLUSION

The prevalence based study was carried out on heavy vehicle drivers to determine the incidence of plantar fasciitis associated with footwear. Data was obtained from participants by having them inquire whether they are suffered from plantar fasciitis or not. Respondents, who reported pain during long hours of driving, were analyzed through windlass test and pain scale scoring rate. In conclusion, this study based on prevalence of plantar fasciitis associated with footwear among heavy vehicle drivers. According to study 39% of drivers were suffering from plantar fasciitis and have a mean pain lie in the category of moderate pain, but not strong association with footwear and plantar fasciitis among drivers. But in some instant, participants show association between footwear and plantar fasciitis in drivers.

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REFERENCES

Werner RA, Gell N, Hartigan A, Wiggerman N, Keyserling WM. Risk factors for plantar fasciitis among assembly plantworkers. Pm&r. 2010;2(2):110-6.

Cvetković M, Dinis M, Stojiljković E, Fiuza A. What kind of lower limb musculoskeletal disorders can be associatedwith bus driving? Occupational Safety and Hygiene VI: CRC Press; 2018. p. 523-8.

Dyck Jr DD, Boyajian-O'Neill LA. Plantar fasciitis. Clinical Journal of Sport Medicine. 2004;14(5):305-9.

Sullivan J, Pappas E, Adams R, Crosbie J, Burns J. Determinants of footwear difficulties in people with plantar heelpain. Journal of Foot and Ankle Research. 2015;8(1):1-7.

Landorf KB, Kaminski MR, Munteanu SE, Zammit GV, Menz HB. Activity and footwear characteristics in people with and without plantar heel pain: A matched cross-sectional observational study. Musculoskeletal Care. 2022.

Tu P, Bytomski JR. Diagnosis of heel pain. American family physician. 2011;84(8):909-16.

Kang S-y, Choung S-d, Jeon H-s. Characteristics of leg and ankle in taxi drivers. Physical Therapy Korea. 2014;21(1):55-62.

Udayakumar E, Ramesh C, Tamilselvan S, Yogeshwaran K, Kanagaraj T. Foot pressure measurement by using ATMEGA164 microcontroller. Advances in Natural and Applied Sciences. 2016;10(13):224-9.

Barrett SL, O'Malley R. Plantar fasciitis and other causes of heel pain. American family physician. 1999;59(8):2200.

Trojian T, Tucker AK. Plantar Fasciitis. Am Fam Physician. 2019;99(12):744-50.
Waclawski E, Beach J, Milne A, Yacyshyn E, Dryden D. Systematic review: plantar fasciitis and prolonged weight bearing. Occupational Medicine. 2015;65(2):97-106.
Fernández-Seguín LM, Mancha JAD, Rodríguez RS, Martínez EE, Martín BG, Ortega JR. Comparison of plantar pressures and contact area between normal and cavus foot. Gait & posture. 2014;39(2):789-92.
Whittaker GA, Menz HB, Landorf KB, Munteanu SE, Harrison C. Management of plantar heel pain in general practicein Australia. Musculoskeletal Care. 2022;20(1):111-20.
Aenumulapalli A, Kulkarni MM, Gandotra AR. Prevalence of flexible flat foot in adults: A cross-sectional study. Journal of clinical and diagnostic research: JCDR. 2017;11(6):AC17.
Ostermann S, Olesen JL, Holden S, Riel H. Stretching and relaxing the plantar fascia may change plantar fascia thickness but not pressure pain thresholds: a cross-sectional study of patients with plantar fasciopathy. BMC Musculoskeletal Disorders. 2020;21(1):1-8.
Landorf KB, Kaminski MR, Munteanu SE, Zammit GV, Menz HB. Clinical measures of foot posture and ankle joint dorsiflexion do not differ in adults with and without plantar heel pain. Scientific reports. 2021;11(1):1-8.
Thummar RC, Rajaseker S, Anumasa R. Association between trigger points in hamstring, posterior leg, foot muscles and plantar fasciopathy: A cross-sectional study. Journal of Bodywork and Movement Therapies. 2020;24(4):373-8.
Wu Y, Boyle LN, McGehee D, Roe CA, Ebe K, Foley J. Modeling types of pedal applications using a driving simulator. Human factors. 2015;57(7):1276-88.
Chen H, Ho H-M, Ying M, Fu SN. Association between plantar fascia vascularity and morphology and foot dysfunction in individuals with chronic plantar fasciitis. journal of orthopaedic & sports physical therapy. 2013;43(10):727-34.
Riskowski J, Dufour AB, Hannan MT. Arthritis, foot pain and shoe wear: current musculoskeletal research on feet. Current opinion in rheumatology2011;23(2):148-55.
Buldt AK, Menz HB. Incorrectly fitted footwear, foot pain and foot disorders: a systematic search and narrative review of the literature. Journal of foot and ankle research. 2018;11(1):1-11.
Tran C, Doshi A, Trivedi MM. Modeling and prediction of driver behavior by foot gesture analysis. Computer Vision and Image Understanding. 2012;116(3):435-45.
Ochsmann E, Noll U, Ellegast R, Hermanns I, Kraus T. Influence of different safety shoes on gait and plantar pressure: a standardized examination of workers in the automotive industry. Journal of occupational health. 2016;58(5):404-12.
Khired, Zenat, et al. "The prevalence and risk factors of plantar fasciitis amongst the population of Jazan." *Cureus* 14. (2022).
Willis, Buck, et al. "Pain scale for plantar fasciitis." *Foot Ankle Online J* 2.3 (2009).
Alshami, Ali M., et al. "Biomechanical evaluation of two clinical tests for plantar heel pain: the dorsiflexion-eversion test for tarsal tunnel syndrome and the windlass test for plantar fasciitis." *Foot & ankle international* 28.4 (2007): 499- 505.