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Prevalence of Plantar Fasciitis and Non-Specific Chronic Low Back Pain and Its Association with Body Mass Index among Teachers of Private Schools in Peshawar

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KEYWORDS

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DECLARATIONS

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ABSTRACT

Background: Plantar fasciitis and non-specific chronic low back pain are common musculoskeletal disorders in professions involving prolonged standing, such as teaching. Teachers often experience prolonged standing. Poor ergonomics and elevated stress levels may contribute to the development of these conditions. **Objective:** To evaluate the prevalence of plantar fasciitis and non-specific chronic low back pain in private school teachers and assess the association of body mass index with these conditions. **Methodology:** A cross-sectional study was conducted among 383 private school teachers in Peshawar using a cluster sampling technique. Ethical approval was obtained from the departmental research committee of City University of Science and Information Technology, and informed consent was obtained from all participants. Teachers aged 25 to 40 years with at least six months of teaching experience were included, while administrative staff, pregnant females, and foot deformities or traumatic low back pain were excluded. The Windlass test was used to diagnose plantar fasciitis, and the numerical pain rating scale was used to assess pain severity. Body mass index was calculated and categorised according to WHO criteria. Data were analysed using SPSS version 27 with descriptive statistics and chi-square tests to evaluate the association of BMI with plantar fasciitis and non-specific chronic low back pain. **Results:** Among 383 participants, 73.9% were female and 26.1% male. The prevalence of chronic low back pain was 60.1%, while plantar fasciitis was 65.5%. Mild pain was the most reported severity for both conditions. Body mass index showed no statistically significant association with NSCLBP or plantar fasciitis. However, a significant linear trend (p=0.034) was observed for body mass index and chronic low back pain. **Conclusion:** A High prevalence of plantar fasciitis and chronic low back pain was observed among teachers. Although body mass index was not significantly associated, the linear trend highlights the need for ergonomic and weight management interventions. These findings highlight the importance of ergonomic interventions, regular screening, and weight management programs to prevent musculoskeletal disorders in teachers and improve their occupational health.

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INTRODUCTION

Plantar fasciitis is one of the most frequent causes of heel pain. The plantar fascia is a broad band of tissue that runs along the bottom of the foot from the heel to the toes. Inflammation of this tissue, typically at the heel attachment, is caused by repetitive stress, obesity, or poor footwear. Pain is commonly felt during the first steps after rest. Plantar fasciitis is more prevalent in women aged 45-64 and in individuals with higher body weight. It is also frequently seen in nurses working extended shifts on their feet, often in high heels.[1] High-impact activities, such as running, ballet, and aerobics, are common contributors to the development of plantar fasciitis, as are faulty foot mechanics like high or low arches and abnormal walking patterns.[2]

Risk factors include obesity, occupations requiring prolonged standing, and wearing improper footwear, such as high heels or shoes with inadequate arch support.[3] Its cause is not precisely known, although multiple factors are implicated, including tissue changes that accompany aging, obesity, and systemic diseases like arthritis. External factors standing for extended periods, poor footwear, or a lack of cushioning, can initiate or exacerbate the disorder.[4] The pain caused by PF has been related to changes in gait, deviation in stepping, and ultimately internal rotation of the tibia and femur and alteration of overall foot function.[5]

Research has established a high correlation of musculoskeletal disorders with elevated BMI, especially in people whose occupations are physically demanding or when they spend extended periods on their feet. Risk factors for foot pain, particularly in the heel area, include age, body weight, chronic diseases, and labor habits like standing for a long period, walking too much, or working on hard surfaces. With the increasing BMI, the risk of foot pain and limitations in function also increases, which is caused by both mechanical stresses on the body and metabolic consequences of being overweight.[6] Obesity has been thought to be a significant risk factor for low back pain (LBP) because it causes extra load on the spine.

Overweight increases mechanical stress in the lumbar vertebrae, and this can cause changes in the spine's structure over a while. Research has demonstrated that obese people with LBP tend to find relief for their symptoms after weight loss, especially those who have been rated as morbidly obese, with a body mass index (BMI) ≥40. Besides mechanical stress, obesity also affects chemical and inflammatory alterations that can have a detrimental impact on spinal wellbeing. The cumulative effect of excess weight can hasten wear and tear of spinal discs, joints, and ligaments and expose them to degeneration. Consequently, management of weight is often highlighted as a critical component of low back pain therapy in overweight and obese patients.[7]

LBP is pain in the lower ribs as well as the gluteal folds, and may radiate into the legs. Approximately 85% are non-specific, or to say it another way, there is no identifiable structural cause. Management depends on postural control, the capacity for stability when performing daily tasks. Postural control depends on synergistic input from the visual and vestibular systems, as well as from the somatosensory system, which informs the brain about body position in space.[8] The onset of LBP is often associated with the adoption of poor postures at work, heavy lifting, performing repetitive movements, trunk flexion, rotation, and hyperextension; pushing; pulling; carrying; and whole-body vibrations. In addition, certain factors can aggravate the LBP intensity, including age, gender, hypertension, smoking, ergonomics, lack of job satisfaction, being overweight or obese, lack of physical activity (PA), and depression.[9]

Approximately 60% of people suffer from chronic low back pain. A number of factors affect the risk of getting this condition, such as age, work, and gender. It is reported to be more frequent in women and to be most common in people in mid-life. Individuals with physically demanding work, e.g., jobs that entail heavy lifting, and people with inactive work patterns are at greater risk. Obesity is also a major contributing factor in the incidence of chronic low back pain. Not only does it cause physical pain, but it also interferes with social relations and productivity in the workplace. Indeed, chronic low back pain is identified as one of the major causes of work-associated absenteeism in most industrialized nations.[10]

The tendency of teachers to have a high rate of musculoskeletal disorders is, to a great extent, due to the physical nature of the job. Activities that cause strain to the upper limb and trunk, for example, the constant writing on a blackboard for several hours, result in pain in the neck, shoulder, and lower back. About 15% of teachers indicate

that such musculoskeletal disorders hinder their capacity to carry out their professional duties, and the prevalence of such complaints is significantly higher during the 12 months. Prolonged standing during class also adversely affects teachers' overall well-being. Tasks with repetitive use of hands, such as writing and computer use, are associated with a more frequent incidence of shoulder and lower back pain. The lower extremities are also vulnerable, as they support the weight of the body during the day. A teacher's BMI is also found to be related to physical distress and even sleep problems. Pain could develop when BMI levels deviate from the average norm. Back pain is also determined by factors such as sociodemographic, age, gender, and lifestyle, which are among the determinants in developing musculoskeletal conditions.[11]

Low back pain is a highly prevalent complaint and is reportedly associated with decreased activities of daily living (ADLs) and quality of life (QOL). In addition, a specific diagnosis of low back pain cannot be obtained in approximately 80% patients with LBP, indicating that these patients are often diagnosed with nonspecific low back pain. This type of back pain is known as nonspecific low back pain and is defined as chronic when it persists for more than 12 weeks.[12,13] The relationship of LBP, BMI, and stress amongst house officers in different clinical rotations was studied. The sample consisted of 170 physical therapy interns of both sexes. LBP was measured through the Oswestry disability index, and stress levels through the Perceived Stress Scale. Findings revealed that 5.9% were underweight, 35.3% were of normal BMI, 38.8% overweight, and 20% obese.

The study concluded that there was no such significant relationship between LBP and BMI or stress levels, but LBP was significantly related to various clinical placements.[14] It investigated the prevalence of plantar fasciitis amongst nurses in a Tertiary Care Centre situated in a rural region. A total of 100 healthy nurses (70 females and 30 males), aged between 20 and 50 years, were selected using simple random sampling. The Windlass test was applied in both non-weight-bearing and weight-bearing positions. The results indicated that 21% of the participants had a positive test for plantar fasciitis, of which 17% were female nurses and 4% were male nurses.[15] It performed a cross-sectional survey evaluating the prevalence of plantar fasciitis among traffic police officers. The research involved 88 officers, males and females, between the ages of 40 and 60 years. Diagnosis was performed with the use of the Windlass test, and the Foot Functional Index was used to assess the effect on daily functioning. The research identified a 25% prevalence of plantar fasciitis, predominantly caused by prolonged standing necessitated by the nature of work.

This study is meant to cover several gaps presented in previous research. Firstly, while plantar fasciitis and lower back pain are mostly discussed, little attention is given to teachers, especially those working in private schools in Peshawar. By focusing on this particular population, the study seeks to establish how these conditions affect the health of teachers. Second, although plantar fasciitis is usually explored independently of back pain, this research delves into their relation, providing a wider scope of how they might be connected. It also explores the probable relationship between BMI and the prevalence of these conditions in teachers, something that has not been much studied in this population.[16]

METHODOLOGY

A cross-sectional study was conducted among 383 private school teachers in Peshawar using a cluster sampling technique. Ethical approval was obtained from the departmental research committee of City University of Science and Information Technology, and informed consent was obtained from all participants. Teachers aged 25-40 years with at least six months of teaching experience were included, while administrative staff, pregnant females, and those with foot deformities or traumatic low back pain were excluded. The Windlass test was used to diagnose plantar fasciitis, and the Numerical Pain Rating Scale (NPRS) was used to assess pain severity. BMI was calculated and categorised according to WHO criteria.

Data were analyzed using SPSS version 27 with descriptive statistics presented as frequencies and percentages. The chi-square test was applied to evaluate the association of BMI with plantar fasciitis and non-specific chronic low back pain. The p-value ≤0.05 was considered statistically significant.

RESULTS

A total of 383 teachers participated in the study, of

whom 73.9% were female and 26.1% were male. Most participants (94%) reported teaching for 5 hours daily, and the prevalence of NSCLBP was 60.1%. Table 1 shows that plantar fasciitis was present in 65.5% of participants. In terms of BMI, 1.6% of participants were underweight, 45.4% had a normal BMI, 43.9% were overweight, and 9.1% were obese. For NSCLBP, 45.2% of affected participants reported mild pain, 10.7% moderate pain, and 4.2% severe pain. For plantar fasciitis, 50.1% experienced mild pain, 12.8% moderate pain, and 2.6% severe pain (Table 1). Chi-square testing revealed no significant association between BMI and NSCLBP (p=0.135) or between BMI and plantar fasciitis (p=0.486). However, a significant linear trend was found between BMI and NSCLBP (p=0.034) as shown in Table 2.

DISCUSSION

This study found a high prevalence of plantar fasciitis (65.5%) and NSCLBP (60.1%) among private school teachers in Peshawar. These findings are consistent with previous studies that reported a high burden of musculoskeletal disorders in teachers due to prolonged standing and occupational strain.[6,16] Although BMI was not significantly associated with plantar fasciitis or NSCLBP in the chi-square analysis, a significant linear trend was observed for NSCLBP, indicating that increased BMI may contribute to the development of low back pain. These results are in line with the findings that reported a strong association between BMI and low back pain in overweight individuals.[7]

The high prevalence of plantar fasciitis observed in this study may also be related to the long hours of standing reported by participants. Previous studies have identified prolonged standing, poor ergonomics, and inadequate footwear as contributing factors.[4] Similarly, the frequent occurrence of NSCLBP among teachers emphasizes the need for targeted interventions, including ergonomic workplace modifications and health education programs focusing on posture correction and weight management found that medical students with higher BMI and increased screen time experienced more low back pain.[17] Although the population differs, the mechanism is similar: prolonged sitting or standing, static posture, and extra load on the spine contribute to musculoskeletal stress.

A combined condition was explored by researchers who found that patients with plantar fasciitis were more likely to report low back pain, indicating a link between foot function and lumbar posture.[18] This dual association supports our approach of studying both conditions together in one population studied patients visiting a physical therapy center, and found that plantar fasciitis was prolonged walking or standing, as well as reinforces the idea that occupational demands and

Table 1: Plantar fasciitis frequencies and BMI Categories

Variables		Frequency	Percentage
Plantar Fasciitis	Positive	251	65.5
	Negative	132	34.5
BMI	Underweight	6	1.6
	Normal weight	174	45.4
	Overweight	168	43.9
	Obese	35	9.1
NPRS for LBP	No pain	153	39.9
	Mild pain	173	45.2
	Moderate pain	41	10.7
	Severe pain	16	4.2
NPRS for plantar fasciitis	No pain	132	34.5
	Mild pain	192	50.1
	Moderate pain	49	12.8
	Severe pain	10	2.6
	Total	383	100

Table 2: Chi-square test for association of BMI with low back pain and plantar fasciitis

Condition	Association	p-value
BMI vs NSCLBP	Not significant	0.135
BMI vs Plantar Fasciitis	Not significant	0.486
BMI vs NSCLBP (linear trend)	Significant	0.034

body weight plays a vital role in the development of plantar fasciitis.

In another study, a 73.6% prevalence of plantar fasciitis was found among physical therapists.[2] Although their population differed, the similarity lies in the prolonged upright posture and physical strain involved in both professions. This supports the notion that static postures, such as standing during lectures, can lead to foot strain and pain. The findings of this study further support the importance of early screening and preventive strategies for musculoskeletal disorders in teachers. Such measures may reduce the burden of these conditions and improve overall occupational health and productivity in this population.

CONCLUSION

This study revealed a high prevalence of plantar fasciitis and non-specific chronic low back pain among private school teachers in Peshawar. Although BMI was not significantly associated with either condition, a significant linear trend was observed between BMI and NSCLBP. These findings highlight the importance of ergonomic interventions, regular screening, and weight management programs to prevent musculoskeletal disorders in teachers and improve their occupational health. Schools should implement ergonomic interventions, such as proper furniture and anti-fatigue mats, to reduce musculoskeletal strain in teachers.

Regular screening programs for early detection of plantar fasciitis and NSCLBP should be introduced for teachers. Health education programs should be developed to promote posture correction and physical activity. Weight management programs should be encouraged among teachers with a high BMI to minimise the risk of musculoskeletal disorders. Further studies should be conducted on larger populations and in different educational settings to strengthen the generalizability of these findings.

DECLARATIONS

Consent to participate: Written consent had been obtained from patients. All methods were performed following the relevant guidelines and regulations.
Availability of Data and Materials: Data will be made available upon request. The corresponding author will submit all dataset files.
Competing interests: None
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