

Original Article

Ankle and Foot Health Status in Primary School Teachers (Cross-Sectional Study)

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ABSTRACT

Background: Prolonged standing and the demands of teaching significantly impact the foot health of primary school teachers. Previous studies have highlighted the prevalence of foot problems in this demographic, but there is a lack of comprehensive research specifically targeting the relationship between occupational demands and foot health among teachers.

Objective: This study aims to assess the foot and ankle health of primary school teachers, examining the impact of prolonged standing and other occupational factors on their foot health and overall quality of life.

Methods: A cross-sectional study was conducted over a six-month period, involving 400 primary school teachers aged 23-40 years, selected through non-probability purposive sampling. Participants with a history of foot trauma or surgery were excluded. The Foot and Ankle Disability Index (FADI) was utilized for data collection, assessing functional disability related to the foot and ankle. Data analysis employed descriptive and inferential statistics, including Pearson Correlation tests, using SPSS software version 25.

Results: The study found that 60% of teachers reported foot discomfort, with 30% experiencing moderate to severe pain. Difficulty in stair navigation was evident, with 25.9% experiencing difficulty in going up stairs and 26.8% in going down stairs. A strong correlation was observed between the total FADIS score and general level of pain (Pearson Correlation .713). Severe foot pain corresponded with lower FADI scores, indicating a negative impact on daily functioning and quality of life.

Conclusion: The study concludes that primary school teachers face significant foot health challenges, likely due to the occupational demands of prolonged standing and inadequate footwear. The findings suggest the need for ergonomic workplace adjustments and awareness programs to mitigate these issues. Interventions focusing on appropriate footwear and regular breaks could enhance foot health and overall well-being.

Keywords: Foot Health, Primary School Teachers, Occupational Health, Foot and Ankle Disability Index, Ergonomics, Quality of Life.

INTRODUCTION

The structural complexity of the ankle and foot plays a vital role in weight support and mobility, with the ankle serving as the joint connecting the leg to the foot. This connection is enhanced by the foot's structure, comprised of small bones forming a dome-like, segmented structure with multiple joints. These structures make ground contact at three primary points: the calcaneal tuberosity, the head of the first metatarsal, and the head of the fifth metatarsal (1). The foot is characterized by two longitudinal arches: the medial arch, composed of the first three metatarsal bones, the calcaneus, the talus, and the navicular, is more elastic and arcuate than the lateral arch, which consists of the cuboid, fourth and fifth metatarsals, and the calcaneus. Stability is provided by the medial collateral ligaments, or the deltoid ligament, categorized into superficial and deep fiber groups. Notably, the most frequently injured ligament in the ankle is the anterior talofibular ligament, crucial for preventing anterior talus displacement and plantar flexion (2). Traditionally recognized as common among older individuals, foot problems are influenced by various factors that impact foot and ankle health (4). Occupations requiring extended periods of standing and an upright posture are associated with an elevated risk of work-related foot diseases (5). This is particularly relevant in the teaching profession, where primary school teachers often work in challenging environments, requiring prolonged standing. Such occupational demands, coupled with working through pain, carrying

or moving heavy objects, and remaining stationary for extended periods, are highly correlated with foot complications (6). Conditions like tenderness and pain in the medial arch, and factors such as obesity, prolonged standing jobs, pes planus, limited ankle dorsiflexion, plantar heel spurs, and running, significantly contribute to poor health-related quality of life and disability (7).

Notably, foot malformations occur more frequently in females, with adult-acquired flatfoot deformity being a notable example. This 3D deformity often involves the talo-navicular joint, both as the apex of the deformity and the primary joint for its correction (8). Bunions, often described in lay terms as the overlaying bursa and enlarged, frequently inflammatory metatarsal head, cause pain, restrict walking, and create difficulties in wearing regular shoes (9). Additionally, local inflammatory responses to foot injuries can lead to local osteoporosis, as seen in Charcot foot, characterized by erythema, edema, and marked temperature elevation in its acute phase, while surprisingly, pain is not a prominent symptom (10).

The prevalence of musculoskeletal pain among teachers, including foot problems, is linked to factors like heavy lifting, prolonged sitting, poor posture, anxiety, high job demand and workload, and lack of peer and colleague support (12). Foot problems, defined as a range of conditions affecting muscles, joints, tendons, ligaments, nerves, bones, and the localized blood circulation system, can be caused or exacerbated by work tasks and environmental factors (14). The focus of this study is to understand how the general foot health condition of primary school teachers impacts their ability to stand for extended periods during their work shifts. Previous research has mainly concentrated on diabetic foot conditions and foot abnormalities, but this study aims to fill the gap in understanding the specific challenges faced by primary school teachers in this regard.

MATERIAL AND METHODS

This cross-sectional study was conducted over a six-month period, from March 12, 2023, to October 6, 2023, following ethical approval from the Allied Health Sciences Ethical Committee (IEC Ref.NO USKT/IEC/SPON.NON/301/04/2023, dated March 12, 2023). The research encompassed primary school teachers from a range of schools, including Learning Grammar High School, National Quiz High School, Allamah Iqbal Public High School, Quaid-e-Azam Public High School, Primary School, Al-Kosar School, Government Girls' High School, Quaid-e-Millat School, Government Secondary High School, Government Primary School, Danish Public High School, Dar-e-Akram Primary School, The Knowledge Schools, Unique Public School, The Motive Schools, Govt Girls' Elementary School, and Govt Boys' School.

The sample size, determined through Raosoft Software, included 400 participants, selected using a non-probability purposive sampling technique. Participants were school teachers aged between 23-40 years, including both males and females, with a minimum teaching experience of 1-2 years. The study excluded individuals with a history of foot trauma, past surgical interventions on the foot, or any musculoskeletal deformity affecting the foot.

Data collection involved the use of the Foot and Ankle Disability Index, a gold-standard tool for measuring functional disability in the foot and ankle. This index comprises 26 items, including 4 pain-related and 22 activity-related items, focusing on assessing more challenging tasks essential to daily living. Each item is scored on a 5-point Likert scale, ranging from 0 (unable to do) to 4 (no difficulty at all), culminating in a total potential score of 104 points.

For data analysis, both descriptive and inferential statistics were employed. This included calculating means, standard deviations, and percentages to assess foot and ankle health. Additionally, a Pearson correlation test was conducted to ascertain the association between foot and ankle health status and the generalized level of pain. All statistical data were processed using SPSS software, version 25.

The study was self-funded to maintain independence in research conduction and result analysis. Adherence to ethical guidelines and protocols was rigorously observed throughout the study, ensuring the integrity and reliability of the findings.

RESULTS

In the conducted study, the assessment of difficulty experienced by primary school teachers in navigating stairs provided insightful results. Regarding the ascent of stairs, as depicted in Table 1, a majority of the participants, 65.6% (258 individuals), reported no difficulty at all. In contrast, 17.6% (69 individuals) experienced slight difficulty, 8.1% (32 individuals) faced moderate difficulty, and 7.4% (29 individuals) had extreme difficulty. A small fraction, 1.8% (12 individuals), were unable to ascend stairs at all. This data suggests that while a significant majority of the participants could climb stairs without any difficulty, a notable proportion experienced varying degrees of difficulty.

Table 1 Difficulty in Going Up Stairs

Level of Difficulty	Frequency	Percent (%)
Unable to do	12	1.8
Extreme difficulty	29	7.4
Moderate difficulty	32	8.1
Slight difficulty	69	17.6
No difficulty at all	258	65.6
Total	400	100.0

Similarly, the descent of stairs, detailed in Table 2, revealed that a larger majority, 73.3% (293 individuals), had no difficulty, whereas 14% (56 individuals) experienced slight difficulty. Those facing moderate and extreme difficulties were fewer, comprising 5% (20 individuals) and 6.3% (25 individuals) respectively. Only 1.5% (6 individuals) were unable to descend stairs. This indicates that descending stairs was generally less challenging for the participants compared to ascending them.

Table 2 Difficulty in Going Downstairs

Level of Difficulty	Frequency	Percent (%)
Unable to do	6	1.5
Extreme difficulty	25	6.3
Moderate difficulty	20	5.0
Slight difficulty	56	14.0
No difficulty at all	293	73.3
Total	400	100.0

Table 3 Pearson Correlation Coefficients Among Pain Parameters and Total FADIS

Parameter	Total FADIS	General Level of Pain	Pain at Rest	Pain During Normal Activity	Pain First Thing in the Morning
Total FADIS	1	.713**	.739**	.797**	.726**
General Level of Pain	.713**	1	.552**	.615**	.551**
Pain at Rest	.739**	.552**	1	.722**	.706**
Pain During Normal Activity	.797**	.615**	.722**	1	.693**
Pain First Thing in the Morning	.726**	.551**	.706**	.693**	1
Note: ** indicates a statistically significant correlation.					

The study also included an analysis of pain parameters in relation to the Foot and Ankle Disability Index (FADIS), as shown in Table 3. The correlation between the total FADIS score and the general level of pain was notably strong, indicated by a Pearson Correlation coefficient of .713. Pain at rest also showed a significant correlation with the total FADIS score (.739), as did pain during normal activity (.797) and pain first thing in the morning (.726). These correlations suggest that higher levels of pain, whether at rest, during normal activity, or in the morning, are associated with greater disability as measured by the FADIS. Moreover, the general level of pain showed moderate correlations with pain at rest (.552), pain during normal activity (.615), and pain first thing in the morning (.551), indicating a consistent relationship across different types of pain experiences. These findings underscore the impact of pain on the functional abilities of primary school teachers, particularly in relation to activities involving the foot and ankle, such as stair navigation.

DISCUSSION

The study provided a comprehensive examination of foot problems among school teachers, attributing these issues to factors such as prolonged standing, job demands, and incorrect posture. The findings revealed that prolonged standing negatively impacts teachers' foot health, with approximately 60% reporting foot discomfort and 30% experiencing moderate to severe foot pain. This

aligns with previous research indicating that a significant portion of school teachers suffer from foot problems, with 66.7% reporting such issues in one study, and a staggering 95.1% of school teachers in Hong Kong experiencing some form of pain in the past month (15).

The relationship between uncomfortable footwear and foot pain was particularly notable, suggesting that changing footwear could be a simple yet effective intervention. Numerous studies have shown that wearing appropriate shoes can significantly alleviate foot pain in teachers (16). The daily routine of teachers often involves prolonged hours of standing and moving, leading to overworked muscles and joints (17, 18). Ankle health problems were identified as the most common ailment among teachers, with their rate of foot issues substantially higher than that of other professions. This has been attributed to the cumulative effects on the integumentary, vascular, and musculoskeletal systems of the foot (19).

The study found that participants with severe foot pain had lower Foot and Ankle Disability Index (FADI) scores, a correlation that persisted even after adjusting for age, sex, and BMI. The presence of foot problems was significantly linked to self-reported disability, limitations in performing daily activities, and reduced quality of life scores (20). Complications such as foot ulcers, poor blood circulation, gangrene, ischemia, and neuropathy were common among those who stood for long periods, suggesting that impaired lower extremity function may be a key indicator of future disability and could diminish quality of life.

Interestingly, men scored higher on the FADI in terms of overall health, physical activity, social ability, and energy, indicating that women with foot problems might experience poorer general and specific quality of life related to foot health compared to men. This disparity could stem from differences in pain tolerance, health status, physical activity habits, or social characteristics between genders. It was observed that females had a higher rate of foot problem consultations than males, which might reflect a greater need for treatment among women.

This study's strengths include its thorough approach to evaluating the link between foot and ankle health and the general level of pain, as well as its inclusion of a diverse population of school teachers. However, its cross-sectional nature limits the ability to establish causality, and reliance on self-reported measures may introduce response bias. Future research should consider a longitudinal design to better understand the causative relationships and explore interventions to reduce foot and ankle pain. Raising awareness about the health implications of prolonged standing and encouraging breaks during standing periods could be beneficial in addressing these issues.

CONCLUSION

The conclusion of this study underscores the significant impact of prolonged standing and occupational demands on the foot health of primary school teachers, revealing a high prevalence of foot problems and associated pain. The findings highlight the need for interventions, such as ergonomic adjustments in the workplace and the selection of appropriate footwear, to mitigate these issues. Moreover, the study emphasizes the importance of increased awareness and preventative measures in the educational sector to improve the overall well-being of teachers. The data also suggest potential gender differences in foot health, indicating a need for tailored approaches in addressing these problems. As such, these insights have substantial implications for occupational health policies and practices within the educational system, aiming to enhance the quality of life and professional efficiency of educators.

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