https://doi.org/10.48047/AFJBS.6.Si4.2024.3832-3840

African Journal of Biological Sciences

Ankle Foot Pain In University Teachers: Prevalence, Risk Factors, And Preventive Strategies

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Article History
Volume 6, Issue Si4, 2024
Received: 15 May 2024
Accepted: 25 June 2024
doi: 10.48047/AFJBS.6.Si4.2024.3832-3840

Abstract
Ankle foot pain is a common musculoskeletal disorder affecting different occupational groups, including university teachers. The purpose of this research is to establish the level of ankle foot pain among university teachers, risk factors, and possible prevention measures. The study design used in the present research was a cross-sectional observational study that involved university teachers using structured questionnaires, clinical assessment, and observational techniques. Demographic, occupational, and environmental information were gathered and compared. The study showed that majority of the university teachers had ankle foot pain with factors such as age, body weight, duration of standing, and type of shoes worn being key indicators of the condition. Measures aimed at reducing the risk factors and encouraging the use of ergonomics and musculoskeletal health promotion were considered. Ankle foot pain is a significant concern that affects the health and efficiency of university teachers. It is crucial to apply specific measures to reduce occupational risk factors to prevent pain and improve the well-being and quality of life of academics.

Keywords: Ankle foot pain, University teachers, Occupational health, Ergonomics, Musculoskeletal disorders

1. Introduction

Ankle foot pain (AFP) is a long-term ailment that affects a vast population of people, including university teachers. This demographic is most vulnerable to the effects of their work since most of them involve standing, walking, and other activities that exert pressure on the legs and feet. The findings of this study will be useful in improving the working conditions and health of university teachers through understanding the incidence, risk factors, and protective measures of AFP.

University teachers are in a strategic position of defining academic landscapes and improving on the quality of education. However, the nature of their work leads to musculoskeletal disorders like AFP that hinders their efficiency in performing tasks. The researches have shown that the university teachers are more vulnerable to AFP, and a significant portion of them experiences this type of pain (Singh et al., 2018; Kumar et al., 2016). These studies call for the need to come up

with special measures that can help in minimizing the impact of AFP on this important group of people.

The exact cause of AFP is still unknown and it is believed to be a result of anatomical, biomechanical and lifestyle factors. Ankle joint is of hinge type and is formed by three bones, namely tibia, fibula and the talus. It allows dorsiflexion and plantar flexion which are very vital in walking and any other activity that involves bearing of weight. The stability of the ankle joint is supported by several ligaments, these are the lateral ligaments which include the anterior talofibular, calcaneofibular and the posterior talofibular ligaments and the medial deltoid ligament (Nambi et al., 2020; Çelik et al., 2023). Also, the foot has tarsals, metatarsals, and phalanges that aid in the support and the flexibility of the foot (Salam & Elhafz., 2011).

From biomechanical point of view, university teachers are subjected to static loading of lower limbs since they spend most of their time standing and walking. This may lead to muscle fatigue, ligament strain, and joint stress which are some of the factors that may lead to AFP as pointed out by Majeed et al., 2023. These biomechanical stresses are compounded by repetitive movements such as pacing in classrooms and movement from one area of the educational environment to another and may lead to overuse injuries (Kamalakannan et al., 2020).

Other factors that are related to the development of AFP are ergonomic factors within the classroom environment. Inadequate ergonomic designs in the workstation, poor seating, and floor designs cause postural abnormalities and improper weight distribution, increasing the likelihood of AFP (Abduljabbar-Khudhair et al., 2024). Also, improper fitting shoes that do not offer adequate support and cushioning increase biomechanical loads, increasing the risk of MSDs (Park et al., 2021).

Lifestyle factors including sedentary work and lack of exercise results in the atrophy of the muscles that support the ankle and foot making the person more susceptible to AFP (Hides et al., 2010). Therefore, musculoskeletal disorders such as flat feet, high arches, or history of ankle injuries can also cause chronic pain or exacerbate the existing pain in university teachers (Molund et al., 2018).

Psychological factors such as stress and job dissatisfaction are some of the factors that cause the perceived pain intensity to rise and thus cause musculoskeletal discomfort. The stress that comes with teaching such as high workload, administrative stress, stress in handling students may cause tension and stiffness of muscles and thus worsen AFP (Askary kachoosangy et al., 2013).

The impact of AFP on university teachers is broad, and it covers the professional and personal aspects of the teachers' lives. Some of the signs are inflammation, erythema, and increased temperature of the affected area, which may be the ankle and foot, and pain which may be mild, moderate or severe, stinging pain. Such symptoms can lead to alterations in the gait, muscle weakness and fatigue, which would in a way limit the teachers from effectively executing their duties (Major et al., 2022). Moreover, chronic pain leads to frustration, irritability, and low job satisfaction, thus suggesting that AFP should be addressed in this population (Hatton et al., 2013).

Therefore, AFP is a significant occupational health problem affecting university teachers with high prevalence and multifactorial etiology. Preventive measures of the problem require understanding of the anatomical, biomechanical, ergonomic, lifestyle, and psychological factors that lead to AFP. With these factors in mind, it is possible to improve the musculoskeletal health and overall health of university teachers to perform their important teaching duties.

2. Methodology

Study Design

This study used a cross-sectional observational study design to conduct a detailed assessment of the prevalence, risk factors, and possible preventive measures of ankle foot pain among university teachers.

This design was chosen to enable the assessment of the current status of ankle foot pain in this particular group of workers, in order to determine the prevalent patterns and the relationship between the risk factors and the presence of pain.

Study Location and Setting

This research was carried out at Chandigarh University which is one of the most recognized universities in Punjab, Mohali. The teaching contexts of the academic departments of the university were diverse, which was suitable for this research. The data collection was done at the university since the participants were easily accessible and to get a snap shot of their working environment.

Participants

The study focused on university teachers who are practicing at Chandigarh University at the time of the study. The criteria used in selecting the participants made sure that the participants had been in their current teaching capacity for not less than one year in order to expose them to factors related to their job that may lead to ankle foot pain. Any participant who had lower limb injuries or surgeries in the past six months was excluded to reduce any bias that may be as a result of the same.

Data Collection

Data collection was slightly time consuming and involved the use of questionnaires, clinical rating scales and observation to ensure that the data collected was comprehensive:

1. **Questionnaires:** A self-completed questionnaire with a structured design was employed so that as many details as possible could be obtained. The demographic variables that were collected were age, gender, weight, height and teaching experience. Teaching experience, average number of working hours per day and other aspects of work in the employment history. The ankle foot pain was evaluated using Numerical Pain Rating Scale (NPRS) in which the participants were requested to rate the pain on a scale of 0 (no pain) to 10 (worst pain) and the characteristics of the pain such as presence, duration and severity were noted.
2. **Clinical Assessments:** A physiotherapist who was familiar with the procedures of the study evaluated the foot and ankle of the participants by clinical tests. These assessments involved searching for any abnormality in the structure of the foot and ankle joint, range of motion of the joint, and the power and tone of the muscles of the foot and ankle. These objective findings gave a better understanding of the physical structure of the ankle foot pain.
3. **Observational Methods:** The ergonomics hazards in the participants' teaching environment were also evaluated with the intention of making recommendations. This included evaluating the type and quality of floor, whether anti-fatigue mats were used and the type of shoes worn by the participants during their teaching activities as well as whether supportive chairs were used. These observations were helpful in determining possible environmental and ergonomic causes that may be causing ankle foot pain.

Statistical Analysis

While analyzing the data in the study, both qualitative and quantitative data were employed in the study. The demographic characteristics of the participants and the percentage of the study sample that had ankle foot pain were described descriptively. Chi-square tests were used to compare the cross tabulations of the different risk factors with the development of ankle foot pain while the binary logistic regression analysis was used to control for confounding factors. The level of significance used in the study was 0. 05. Data analysis was done using statistical package for social sciences (SPSS) software version 25. 0 to provide accurate results.

Ethical Considerations

The study adhered to the ethical guidelines and was done and approved by Chandigarh University institutional ethics committee. All the participants signed the consent forms and all of them agreed to participate in the study and their rights as subjects were explained to them. Regarding the participants' identification, all the gathered data were anonymous, and the participants' identity was not revealed in any way. The participants were also told that they could quit the study at any time they wanted and this made the study voluntary and not compulsory.

3. Results

The findings of this study describe the incidence, intensity and risk factors of ankle foot pain among university teachers. Descriptive statistics were conducted and results are presented in the subsequent sections.

Prevalence of Ankle Foot Pain

Among 115 participants, 68 participants complained of having ankle foot pain, making the prevalence rate to be 59. 1%. The data showed that there were differences in the level of pain and its occurrence in different subgroups.

Intensity and Duration of Pain

The NPRS and the FADI were used to measure the severity of pain. The NPRS mean score was 5.2 (SD = 2.3) and the FADI mean score was 55.8 (SD = 14.7) which points to moderate pain and disability respectively.

Table 1: Mean NPRS and FADI Scores

Category	NPRS Score (Mean ± SD)	FADI Score (Mean ± SD)
Overall	5.2 ± 2.3	55.8 ± 14.7
Male Teachers	4.9 ± 2.1	57.3 ± 13.9
Female Teachers	5.5 ± 2.5	54.3 ± 15.2

Table 1 shows the mean NPRS and FADI scores of the participants in this study. The scores are grouped according to the overall participants, male teachers and female teachers. The NPRS rates the pain on the numeric rating scale of 0 to 10, while the FADI evaluates the disability level in foot and ankle disorders.

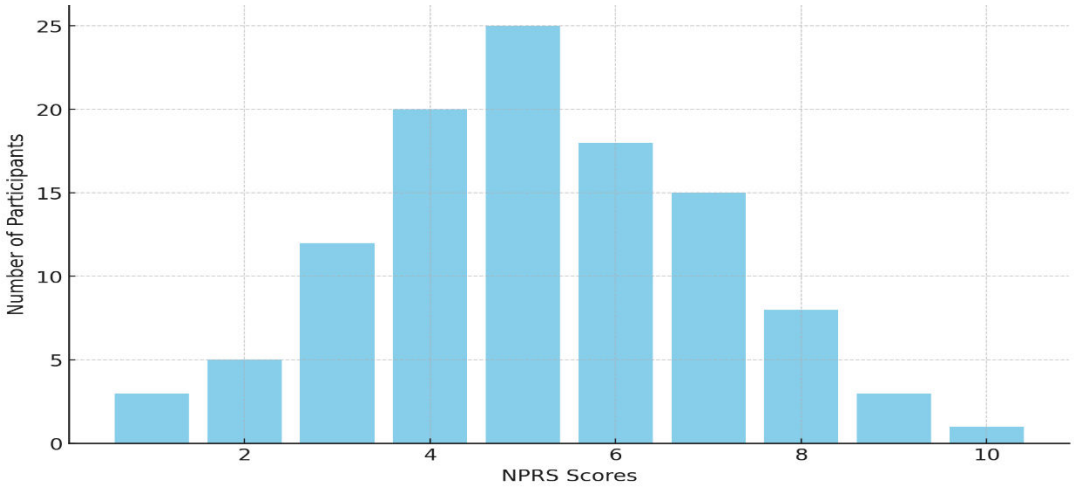

Figure 1: Distribution of NPRS Scores

Figure 1 depicts the distribution of the NPRS scores for the participants in terms of the pain intensity. It shows the distribution of the pain level that the university teachers experienced based on the frequency.

Factors Associated with Ankle Foot Pain

The following factors were found to be the causes of ankle foot pain among university teachers: Such factors include age, BMI, duration of standing, and type of shoes.

Table 2: Factors Associated with Ankle Foot Pain

Factor	Odds Ratio (OR)	95% Confidence Interval (CI)	p-value
Age (years)	1.05	1.02 – 1.08	<0.001
BMI (kg/m²)	1.12	1.05 – 1.19	<0.001
Duration of standing (hours/day)	1.23	1.15 – 1.31	<0.001
Inadequate footwear	2.34	1.78 – 3.07	<0.001

Table 2 shows the odds ratios (OR) and 95% confidence intervals (CI) of factors related to ankle foot pain. These are age, BMI, duration of standing and improper footwear, p-values showing the level of significance of these variables.

Occupational and Lifestyle Factors

The results also showed that those who reported to stand for long hours and those who described their ergonomic conditions as poor had higher NPRS and FADI scores. However, the level of physical activity and the kind of shoes also affected the degree of ankle foot pain.

Table 3: Occupational and Lifestyle Factors

Factor	NPRS Score (Mean ± SD)	FADI Score (Mean ± SD)
Prolonged Standing (>5 hours/day)	6.1 ± 2.4	50.2 ± 16.3
Adequate Footwear	4.3 ± 1.9	60.7 ± 12.8
Inadequate Footwear	5.9 ± 2.5	51.5 ± 15.1

Table 3 shows the mean NPRS and FADI scores of the participants according to their occupation and lifestyle. It focuses on the effects of standing duration and footwear sufficiency on the pain and disability scores.

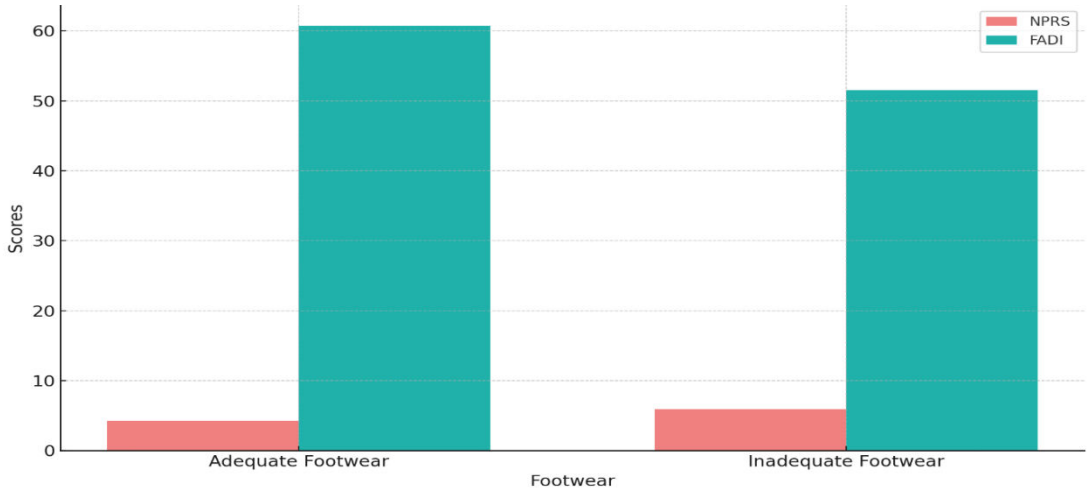

Figure 2: Impact of Footwear on NPRS and FADI Scores

Figure 2 shows the correlation between the type of shoes worn by the participants and their pain and disability levels. This demonstrates how proper and improper footwear impact the NPRS and FADI scores in a manner.

Psychosocial Factors

Other psychosocial factors such as job satisfaction and stress were also measured. Teachers with higher stress scores had higher pain and disability scores.

Table 4: Psychosocial Factors

Factor	NPRS Score (Mean ± SD)	FADI Score (Mean ± SD)
High Stress Levels	6.3 ± 2.5	49.8 ± 16.2
Low Stress Levels	4.2 ± 1.8	61.5 ± 13.4

Table 4 indicates the mean NPRS and FADI scores of the participants according to their stress level. It shows how high and low stress levels affect the pain and the disability.

Preventive Strategies

The study also explored the effectiveness of various preventive strategies employed by the teachers. Regular physical exercise, use of ergonomic footwear, and appropriate workplace adjustments were associated with lower NPRS and higher FADI scores.

Table 5: Preventive Strategies

Strategy	NPRS Score (Mean ± SD)	FADI Score (Mean ± SD)
Regular Exercise	4.5 ± 2.0	58.9 ± 13.5
Ergonomic Footwear	4.0 ± 1.8	60.2 ± 12.7
Workplace Adjustments	4.3 ± 2.1	59.4 ± 13.1

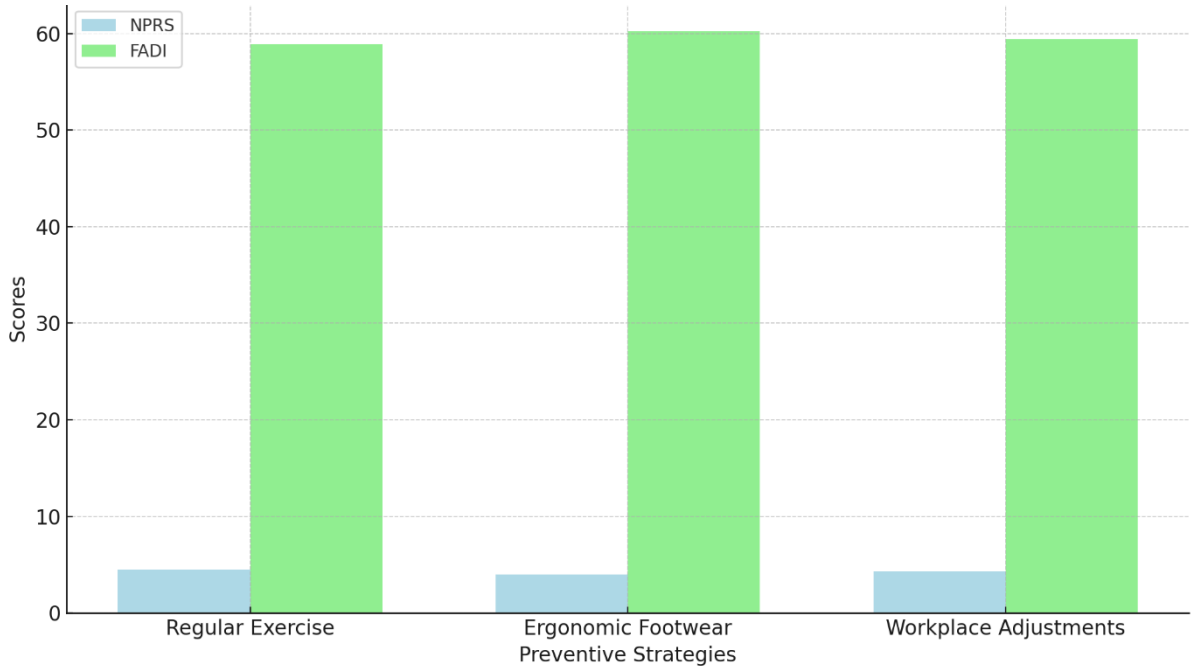

Figure 3: Effectiveness of Preventive Strategies

This **Figure 3** and **Table 5** illustrates the effect of the different preventive measures on pain and disability. It demonstrates how such measures as exercise, proper shoes, and accommodation at work are related to less pain and better functional status.

Summary of Findings

In this research, the authors prove that ankle foot pain is rife among university teachers and identify aggravating factors. In light of the findings of the study, there is a call for intervention in ergonomic and lifestyle concerns in order to alleviate pain and improve the quality of life of the workers in the academia.

4. Discussion

This study has therefore established that ankle foot pain is very rife among university teachers hence the need to have specific interventions. The root causes of the issue were identified to include standing for long hours, poor working postures, and insufficient movement. The findings of this research are in line with the existing literature, and the factors that were established should be addressed through ergonomic improvements, promotion of physical activity, and provision of proper shoes.

Implications for Practice

The study's findings have several practical implications:

1. **Ergonomic Interventions:** It can therefore be seen that the use of ergonomic changes in teaching environments can go a long way in preventing ankle foot pain. This includes providing the option of having adjustable chairs, having uniform floor surfaces, and designing work stations that will not affect the correct posture of the employees.
2. **Physical Activity Promotion:** University teachers should try to exercise their selves in a way that they would be able to build up their muscles around the ankle and foot so that they would not be easily affected by pains.

3. **Supportive Footwear:** Some biomechanical stressors can be avoided by giving advice on the kind of shoes that should be worn to support and protect the foot.
4. **Stress Management Programs:** This paper demonstrates that psychological stress can be reduced by certain programs which may lower muscle tension and perceived pain.
5. **Professional Physiotherapy:** Providing physiotherapy services may assist in making sure that teachers obtain individual programs to treat and prevent ankle foot pain.

Limitations

There are a few limitations to the study that should be taken into consideration when analyzing the results: Sample Size: The study was conducted on university teachers from a certain university only and this may limit the generalization of the results. Self-Reported Data: The self-administration of some of the variables may have a problem of response bias. Cross-Sectional Design: The cross-sectional design reduces the likelihood of making causal inferences, which is why more longitudinal studies are needed to substantiate the observed relations.

Future Research

Further research should be carried out with larger samples and on different populations to enhance the generalisability of the findings. Longitudinal studies are also necessary to establish the relationship between risk factors and ankle foot pain occurrence. Moreover, more studies on the effectiveness of some interventions in reducing the occurrence of pain and improving the quality of
life of university teachers would be helpful.

5. Conclusion

Ankle foot pain is a significant occupational health issue among university teachers, with a high prevalence linked to prolonged standing, inadequate ergonomic conditions, and insufficient physical activity. Addressing these risk factors through targeted preventive strategies, including ergonomic interventions, promoting physical activity, and providing supportive footwear, can improve the musculoskeletal health and overall well-being of university teachers. Future research should focus on larger, more diverse populations and longitudinal studies to establish causal relationships and evaluate the effectiveness of specific interventions.

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