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Prevalence of Plantar Fasciitis among Culinary Professionals and its Relation with Occupational Standing Time – A Cross-Sectional Study

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ABSTRACT

Plantar fasciitis (PF) is a musculoskeletal disorder characterized by heel pain, commonly associated with prolonged occupational standing. Culinary professionals typically work in environments that require long periods of standing, yet this population has not been specifically examined in existing research.To determine the prevalence of plantar fasciitis among culinary professionals and its relation with occupational standing time.This cross-sectional analytical study assessed the prevalence of plantar fasciitis among 179 culinary professionals aged 20–60 years working in restaurants, bakeries, and catering services. A non-probability convenience sampling technique was used to include both males and females in study, and data were collected using a structured questionnaire along with the Windlass test to assess plantar fasciitis. Data were analyzed using SPSS version 26 with descriptive and inferential statistics following ethical approval and informed consentAmong 179 participants, 26.8% were diagnosed with plantar fasciitis. Executive chefs (37.4%) and station cooks (22.9%) formed the largest occupational groups. Most participants reported high occupational workload, with 55.9% working 7 days per week, 73.2% standing for 6–10 hours daily, and 24.6% standing for more than 10 hours, while 88.3% reported rest periods of up to 2 hours during work. Tile flooring was the most common workplace surface (48.0%), followed by concrete (28.5%) and marble (21.8%). A statistically significant association was found between plantar fasciitis and occupational standing time ($p = 0.03$), with a higher prevalence observed among individuals standing for more than 10 hours per day. Plantar fasciitis is common among culinary professionals and is considered to be mainly related to standing, long working hours, and hard flooring surfaces. Preventive strategies in the workplace and modifications of the working load might decrease the occupational risk factor.

Keywords: *Culinary, Foot Diseases, Heel Pain, Occupational Health, Plantar Fasciitis, Standing*

INTRODUCTION:

Plantar fasciitis is one of the most common causes of heel pain and is recognized as a degenerative musculoskeletal disorder affecting the plantar fascia [1]. The plantar fascia, also known as the plantar aponeurosis, is a thick fibrous band extending from the medial calcaneal tuberosity to the metatarsal heads, playing a key role in maintaining the medial longitudinal arch and absorbing forces during weight-bearing activities [2].

It consists of three broad bands of a dense, fibrous connective tissue that acts as a windlass, supports the medial arch, and absorbs up to twice the body weight during stance [3]. The medial longitudinal arch acts as a primary shock absorber and is essential for normal gait, its dysfunction is associated with conditions such as plantar fasciitis, hallux valgus, and tarsal tunnel syndrome [4]. Plantar fasciitis, also referred to as painful heel syndrome, heel spur, runner's heel, sub-calcaneal pain, calcaneodynia, or calcaneal periostitis, occurs due to inflammation of the plantar fascia, leading to heel pain and discomfort. It is a degenerative condition characterized by thickening and tenderness of the plantar fascia, particularly at its attachment to the calcaneal bone [5]. Pain often described as sharp, stabbing, or burning, especially during the first steps after rest, which may decrease with movement but reoccur with prolonged activity [6]. The condition results from repetitive microtrauma, leading to micro tears. These micro tears trigger a healing response from the body, which can exacerbate inflammation and lead to further discomfort [7].

Epidemiological studies suggest that approximately 10% of the United State population is expected to experience plantar fasciitis during their lifetime, with global prevalence ranging from 3.6% to 7% [7, 8]. In Pakistan, The prevalence has been reported to be around 13.4%, as determined using the Windlass test, particularly among individuals exposed to prolonged occupational standing during extended working hours [9]. Higher prevalence has been observed in runners and individuals with increased body mass index, while females are affected more frequently than males [10, 11].

Several risk factors increase the likelihood of developing plantar fasciitis, including obesity, prolonged standing or walking, participation in high-impact sports, and biomechanical abnormalities such as flat feet or excessively high arches [12]. This condition can significantly restrict a person's physical activity, leading to both physical and psychological health challenges. Additionally, it may impose a substantial financial burden due to medical treatment costs, reduced work productivity, and potential loss of income [13]. It may also lead to alterations in gait, stepping, and internal rotation of the tibia and femur, affecting overall foot function [14].

A commonly used diagnostic method is the Windlass test, in which the toes are passively extended upward while the ankle remains stable; this maneuver often reproduces the characteristic heel pain, helping to confirm the presence of plantar fasciitis [15]. Plantar fasciitis can be managed through physiotherapy interventions such as stretching of the calf, hamstring, and Achilles tendon, strengthening of intrinsic foot muscles, myofascial release, and manual therapy to reduce pain and improve function. Conservative management also includes orthotics, NSAIDs, weight reduction, and corticosteroid injections for inflammation control [16, 17]. Despite increasing evidence on plantar fasciitis in occupations involving prolonged standing, culinary professionals remain underexplored, despite similar occupational demands. The present study aims to determine the prevalence of plantar fasciitis among culinary professionals and examine its association with occupational standing patterns to support workplace modifications and improve functional outcomes in this high risk group.

Significance: This research is significant because it focuses on culinary professionals who are routinely exposed to prolonged occupational standing, which may contribute to the development of plantar fasciitis. By determining how common the condition is in this work environment, the study can guide practical workplace adjustments such as supportive footwear use, alternating standing postures, and incorporating short rest breaks. These findings may help reduce discomfort, prevent chronic symptoms, and improve overall work efficiency.

Research Question: Is to determine the prevalence of the prevalence of plantar fasciitis among culinary professionals and its relation with occupational standing time?

METHODOLOGY:

Study Design: This study was an analytical cross-sectional study design.

Sample Technique: A non-probability convenience sampling technique was employed to recruit eligible participants.

Data Analysis: The data were analyzed by using descriptive statistics and presented in a frequencies and percentages, using pie chart or a bar graph. Data were entered in and analyzed by SPSS version 26.

RESULTS AND FINDINGS

Out of a total of 179 respondents, 48 individuals were identified as having plantar fasciitis, giving a prevalence of 26.8% in the studied population. In contrast, 131 respondents (73.2%) did not report plantar fasciitis. This distribution indicates that approximately one-quarter oftheparticipants were affected by plantar fasciitis, suggesting that the condition is relatively common within the study group. From an epidemiological perspective, a prevalence rate of nearly 27% reflects a meaningful burden of plantar fasciitis, warranting further analysis of associated demographic and occupational variables. This finding supports the need for preventive strategies, early screening, and ergonomic interventions aimed at reducing foot-related musculoskeletal disorders in similar populations.

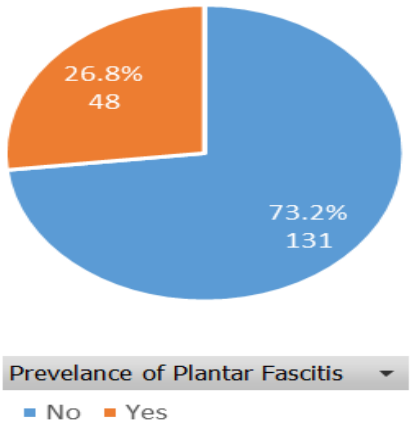

Fig 1: Prevalence of plantar fasciitis

Plantar fasciitis prevalence appears to increase with age among culinary professionals. The youngest group (20–29 years) had the lowest prevalence (12; 16.7%), while the highest prevalence was observed in the 50–59 years group (3; 42.9%). The 30–39 years (25; 33.8%) and 40–49 years (8; 30.8%) groups show moderate prevalence, suggesting that cumulative occupational exposure and aging may contribute to higher plantar fasciitis risk. These trends indicate that age is an important factor to consider in occupational health interventions for culinary staff.

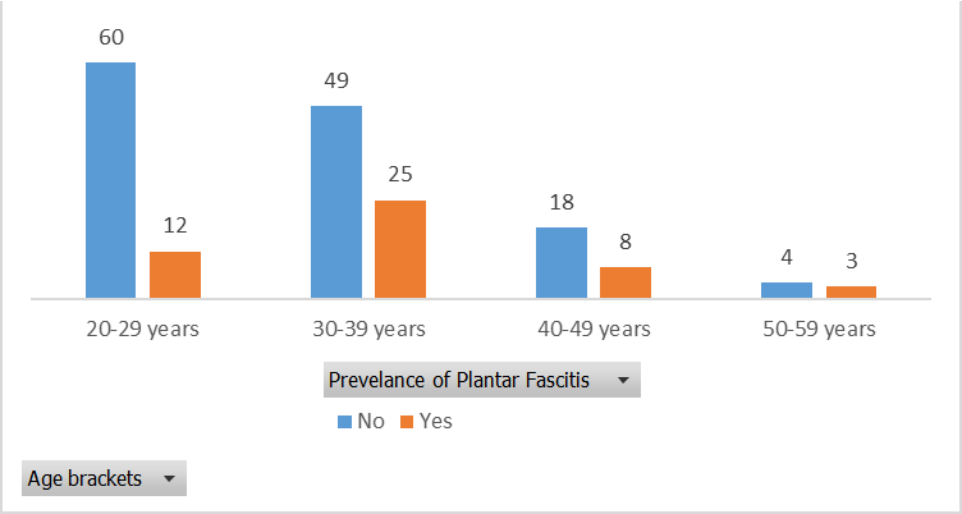

Fig 2: Age-wise status of respondents: Showing break-up of population with respect to age of respondents:

Plantar fasciitis was more prevalent among female culinary professionals (25; 39.1%) compared to their male counterparts (23; 20.0%). Despite males forming a larger proportion of the workforce, females exhibited a higher relative risk, which may be due to physiological differences, footwear, or specific occupational tasks. This suggests that gender-specific preventive measures, such as supportive footwear and rest strategies, may be particularly important for female staff in reducing plantar fasciitis risk.

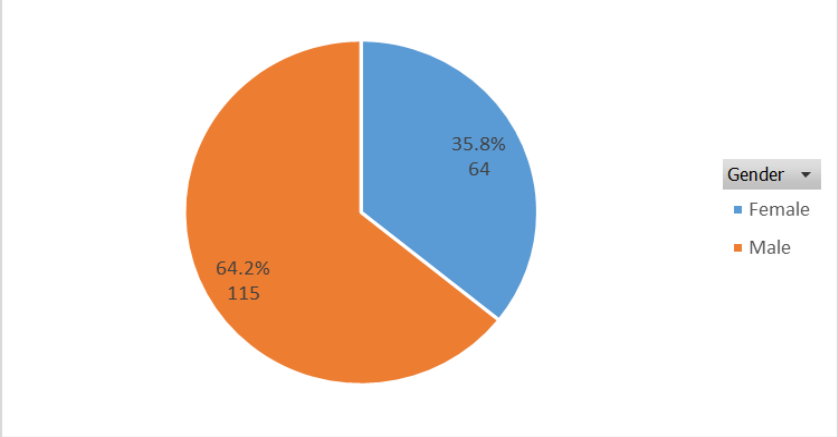

Fig 3: Gender-wise population: Showing break-up of population with respect to gender brackets of respondents:

Plantar fasciitis prevalence varied across job roles. Executive Chefs (25; 37.3%) and Bakers (7; 33.3%) showed the highest prevalence, likely reflecting prolonged standing and intense kitchen activity. Station Cooks had moderate prevalence (9; 22.0%), while Kitchen Assistants (3; 11.1%) and Deputy Chefs (2; 11.1%) had lower rates, possibly due to differences in workload or task rotation. Managers, despite minimal standing time, had 2 cases (40.0%), though the sample size was small (n=5). These results suggest that occupational role and associated physical demands are key determinants of plantar fasciitis risk among culinary professionals.

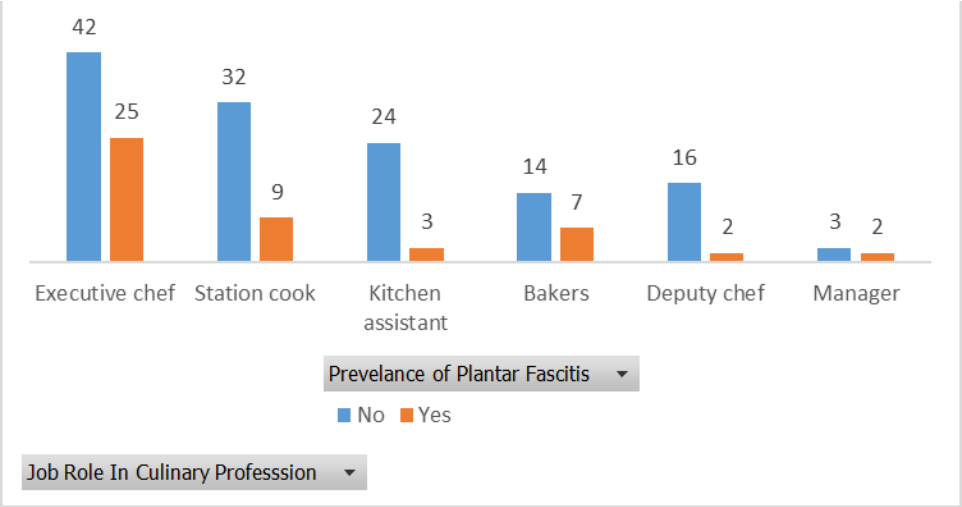

Fig 4: Job role-wise population: Showing break-up of population with respect to Job role of respondents:

Plantar fasciitis prevalence increased with longer standing hours. Those standing more than 10 hours per day had the highest prevalence (18; 40.9%), compared to 6–10 hours (30; 22.9%) and up to 5 hours (0; 0%). This indicates a clear relationship between prolonged standing and plantar fascia strain among culinary professionals. The data underscore the importance of interventions such as supportive footwear, anti-fatigue mats, and scheduled rest breaks to mitigate foot-related occupational risks.

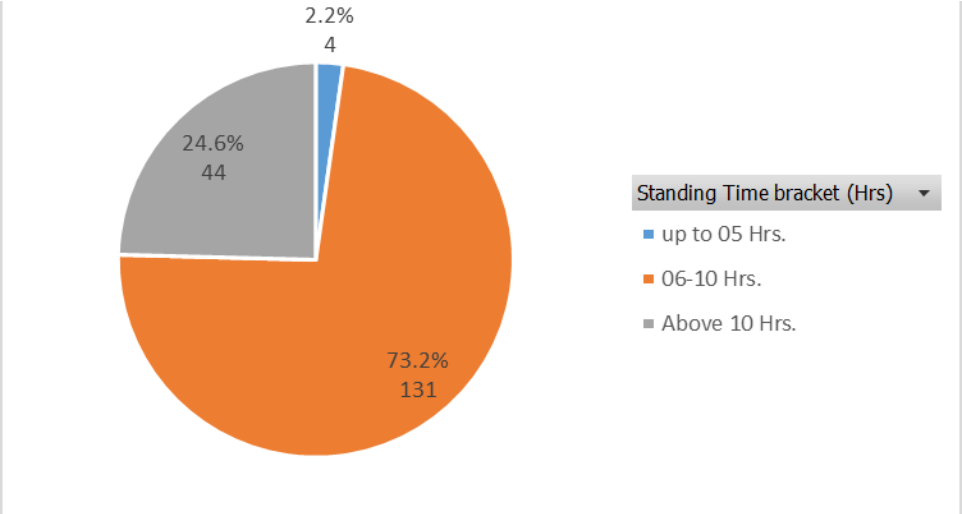

Fig 5: Standing Time population: Showing break-up of population with respect to Standing Time brackets of respondents:

Plantar fasciitis prevalence varied by floor type. The highest prevalence was observed on concrete floors (21; 41.2%), suggesting that harder, less shock-absorbing surfaces may increase foot strain. Tile (18; 20.9%) and marble (9; 23.1%) showed moderate prevalence, while wood floors had no reported cases,

although the sample was very small (n=3). This highlights the importance of floor material in occupational foot health, as prolonged standing on hard surfaces may exacerbate plantar fascia stress among culinary professionals.

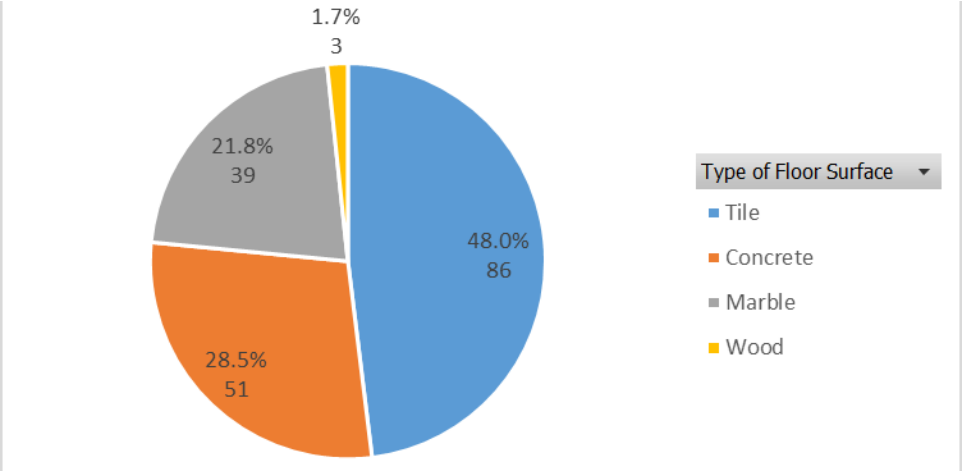

Fig 6: Type of Floor Surface-wise population

Table 1: Chi-Square Tests:

Test Element	Chi-Square	p-value	Result
Age * Prevalence of PF	6.74	0.08	Accept Null Hypothesis (Insignificant Association)
Gender * Prevalence of PF	7.61	0.01	Reject Null Hypothesis (significant association)
BMI * Prevalence of PF	4.90	0.09	Accept Null Hypothesis (Insignificant Association)
Job Role * Prevalence of PF	10.81	0.06	Accept Null Hypothesis (Insignificant Association)
Job exp.* Prevalence of PF	1.47	0.48	Accept Null Hypothesis (Insignificant Association)
Working Days / Week * Prevalence of PF	16.96	0.00	Reject Null Hypothesis (significant association)
Standing Time * Prevalence of PF	6.94	0.03	Reject Null Hypothesis (significant association)

Rest Time * Prevalence of PF	1.54	0.21	Accept Null Hypothesis (Insignificant Association)
Type of Floor Surface * Prevalence of PF	8.25	0.04	Reject Null Hypothesis (significant association)

SUMMARY OF KEY FINDINGS

1. The prevalence of plantar fasciitis among culinary professionals was 26.8%, indicating that approximately one-quarter of the participants were affected.
2. The condition was more prevalent in older age groups, with the highest rate observed in the 50–59 years category (42.9%) and the lowest in the 20–29 years group (16.7%).
3. Female participants showed a higher prevalence of plantar fasciitis compared to males, indicating a gender-related difference in risk.
4. Higher BMI categories (normal to overweight range) were more commonly associated with plantar fasciitis cases.
5. Executive Chefs and Bakers showed comparatively higher prevalence, reflecting greater occupational physical demands.
6. Participants with longer working hours and extended standing time (especially >6–10 hours daily) demonstrated increased occurrence of plantar fasciitis.
7. Most affected individuals reported working on hard floor surfaces such as tile and concrete, indicating an environmental risk factor.
8. Working more days per week (6–7 days) was significantly associated with higher prevalence of plantar fasciitis.
9. Chi-square analysis showed significant associations between plantar fasciitis and gender, working days, standing time, and floor type ($p < 0.05$).
10. No significant association was found between plantar fasciitis and age, BMI, job role, experience, or rest duration.
11. Overall findings indicate that plantar fasciitis among culinary professionals is multifactorial, mainly influenced by occupational workload, prolonged standing, and working surface conditions.

DISCUSSION

The present study aimed to evaluate the prevalence of plantar fasciitis (PF) among culinary professionals and its association with demographic and occupational factors. Overall, the findings align closely with prior research indicating that PF is strongly associated with occupations requiring prolonged standing and repetitive foot strain.

Prevalence and Occupational Load: Consistent with studies among street vendors, pharmacists, nurses, beauticians, construction workers, security guards, salesgirls, and traffic wardens [9, 18, 19, 20, 6, 21] all these present study found that culinary professionals engaged in extensive daily standing experienced high PF prevalence. Extended standing hours (>6 hours daily in 73.2% of participants) and long workweeks (7 days/week in 55.9%) were significantly associated with PF ($\chi^2 = 6.94$ and 16.96, respectively). These results reinforce the notion that mechanical overload and repetitive weight-bearing are central risk factors for plantar fascia strain.

Gender and Age Effects: Females exhibited higher PF prevalence, in agreement with prior occupational studies indicating that anatomical and biomechanical differences may predispose women to PF [19, 20] While the workforce in this study was predominantly young to middle-aged (81.5% aged 20 39), PF prevalence increased modestly with age, reflecting cumulative exposure effects consistent with literature findings in both occupational and general populations.

BMI and Anthropometric Factors: Contrary to some studies highlighting overweight and obesity as risk factors [22], BMI did not show a significant association with PF in this sample. This divergence may be explained by the largely normal-to-overweight distribution (78.2%) and high activity level of culinary professionals, which may mitigate weight-related risk.

Job Role and Occupational Factors: 43 Executive Chefs and Bakers demonstrated the highest PF rates, reflecting intense kitchen activity, prolonged standing, and heavy workload. The type of floor surface emerged as a significant factor ($\chi^2 = 8.25$, $p = 0.04$), with harder surfaces such as tile and concrete linked to higher PF prevalence. This observation aligns with prior research emphasizing the role of hard flooring and inadequate foot support in occupational PF [6, 7, 9]. Interestingly, job experience and rest duration were not significantly associated with PF, suggesting that short rest periods or symptom-driven breaks may be insufficient to counteract mechanical stress.

Multifactorial Etiology: Weak-to-moderate correlations between PF prevalence and variables such as age, gender, BMI, standing time, and working days indicate a multifactorial etiology. These findings echo prior research [23, 24] highlighting the interplay between mechanical load, foot biomechanics, and environmental factors in the development of PF. The importance of ergonomic interventions, supportive footwear, workload management, and preventive physiotherapy is reinforced by both the present study and the broader literature [25]

LIMITATIONS OF THE STUDY

The present study has several limitations that should be considered when interpreting the findings. First, the analytical cross-sectional design restricts the ability to establish causal or temporal relationships between occupational factors and the occurrence of plantar fasciitis, allowing only the identification of associations. Second, the use of a non-probability convenience sampling technique may introduce selection bias, as participants were recruited based on availability and willingness, thereby limiting the generalizability of the results to all culinary professionals in Karachi or other regions. Additionally, data collection was confined to selected restaurants, bakeries, and catering services, which may not fully represent diverse 46 working environments, particularly informal food sectors. Occupational exposure variables such as standing hours and rest duration relied partly on self-reporting, increasing the risk of recall bias. Diagnosis of plantar fasciitis was based on clinical assessment without imaging confirmation, which may affect diagnostic accuracy. Furthermore, excluding individuals with systemic diseases or foot deformities may underestimate real-world prevalence. Lastly, the six month data collection period may not capture seasonal variations in workload or symptom severity.

FUTURE INVESTIGATE INQUIRY

Future studies should adopt a longitudinal or cohort study design to establish temporal and causal relationships between occupational factors and the development of plantar fasciitis. Probability-based sampling techniques, such as stratified or random sampling, are recommended to minimize selection bias and enhance the generalizability of results across diverse culinary workplaces. Expanding the study setting to include informal food sectors, small eateries, and multiple cities beyond Karachi would improve external validity. Objective measurement tools, such as wearable devices to record standing duration and rest intervals, should be used to reduce recall bias. Incorporating diagnostic imaging, particularly ultrasound, alongside clinical tests would enhance diagnostic accuracy. Rather than excluding individuals with comorbidities or foot deformities, future research should consider adjusting for these variables statistically to better reflect real-world conditions. Additionally, extending the data collection period across different seasons would allow assessment of workload variations and symptom fluctuations. These methodological improvements would provide more robust evidence to inform occupational health policies and preventive strategies.

CONCLUSION

This study investigated the prevalence of plantar fasciitis (PF) among 179 culinary professionals in Karachi, focusing on its association with demographic and occupational factors. Plantar fasciitis, a degenerative musculoskeletal disorder affecting the plantar fascia, is a major cause of heel pain, characterized by degenerative thickening, tenderness at the calcaneal insertion, and sharp pain during initial weight-bearing after rest. The plantar fascia supports the medial longitudinal arch, absorbs shock, and distributes forces during stance, with dysfunction contributing to PF and other lower-limb disorders. Globally, PF affects 3.6–7% of the population, with nearly 10% experiencing it during their lifetime, while Pakistan reports a prevalence of approximately 13.4%, particularly among workers exposed to prolonged standing, with women affected almost twice as often as men. In this study, participants were predominantly male, aged 20–39 years, with BMI between 20–30 kg/m², working 6–7 days per week, standing 6–10 hours daily, with limited rest and hard floor surfaces. Chi-square analysis identified gender, standing duration, working days, and floor type as significant risk factors. Limitations included cross-sectional design, convenience sampling, self-reported occupational variables, and absence of imaging. Recommendations include longitudinal studies, probability based sampling, objective exposure measurement, and incorporation of imaging to strengthen causal inference and generalizability, informing occupational health interventions in Karachi.

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