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The Role of Medical Footwear in Preventing Occupational Low Back Pain Among Healthcare Professionals: Pilot Study

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Abstract: ***To evaluate the role of medical footwear in relation to low back pain (LBP) among healthcare professionals working in hospital settings. An observational pilot study was conducted using a self-administered questionnaire completed by a convenience sample of 35 medical staff members at medical centres in Dura. Data were analysed using SPSS, with statistical significance set at $p < 0.05$. The overall mean score for medical-shoe statements was 3.71, indicating a high score. The highest-rated item concerned wearing medical shoes during heavy work without experiencing LBP (mean = 4.12), while regular foot measurement to select appropriate shoes received the lowest score (mean = 1.21). Significant associations were reported in analyses involving age ($p = 0.044$), weight ($p = 0.033$), work conditions ($p = 0.031$), and work-related time measures (p values reported as 0.045 and 0.031). The small convenience sample and observational design limit generalisability and do not establish a causal effect of medical footwear on LBP. Some reported statistical tables contain inconsistencies that should be checked against the original SPSS output. Healthcare institutions may consider footwear education, appropriate shoe-fit assessment, rest breaks, task rotation, and broader ergonomic measures as part of occupational health programmes. Improved occupational health practices may support the well-being and functional capacity of healthcare professionals. This pilot study provides preliminary local data on perceived medical-footwear benefits and the relationship of footwear-related responses to demographic and occupational factors.***

Keywords: Healthcare Professionals; Low Back Pain; Medical Footwear; Occupational Health; Pilot Study.

1. Introduction

Low back pain (LBP) is one of the most prevalent musculoskeletal disorders affecting healthcare professionals worldwide, with implications for individual well-being, institutional productivity, and healthcare-system sustainability [1]. It is commonly described as pain, muscle tension, or stiffness located below the costal margin and above the inferior gluteal folds; chronic cases may persist for 12 weeks or longer [2]. Among medical staff who spend prolonged periods standing, walking, and performing physically demanding patient-care activities, LBP is an important occupational health concern.

Research has documented a substantial burden of work-related musculoskeletal disorders among healthcare workers. Reviews have reported high annual prevalence among operating-room personnel and nurses, with lower-back symptoms among the most frequently reported complaints [1], [3], [4]. Such disorders can contribute to absenteeism, reduced productivity, and early retirement, creating costs for healthcare services [5].

The causes of LBP among healthcare professionals are multifactorial. Physical workload, ergonomic conditions, psychosocial stressors, shift patterns, repetitive tasks, and patient handling have all been discussed as potential contributors [6], [7]. Age and cumulative occupational exposure may also be associated with vulnerability, while body mass index and body weight may increase mechanical demands on the lumbar region [8]–[10]. These factors should be considered when assessing prevention strategies.

Footwear is a potentially relevant but sometimes overlooked component of occupational musculoskeletal health. Medical shoes may affect comfort, stability, and the absorption of impact during prolonged standing and walking. Poorly fitting or insufficiently supportive footwear may alter walking patterns and contribute to discomfort in the lower limbs and back. Appropriate footwear, however, should be viewed as one element of a broader ergonomic approach rather than a stand-alone solution.

The physical demands of healthcare work include prolonged standing on hard floors, rapid directional changes, stair climbing, and assisting with patient transfers. These demands may interact with footwear characteristics and individual factors. Length of service may reflect cumulative exposure to occupational stressors, while shift duration, weekly work hours, and task variety may influence the load placed on the musculoskeletal system [11], [12].

Despite the importance of occupational footwear, limited research has specifically examined its relationship with LBP among healthcare professionals in the local setting. This pilot study therefore aimed to evaluate the perceived role of medical shoes in relation to LBP among healthcare professionals at medical centres in Dura. It also examined footwear-related responses alongside demographic characteristics, work conditions, and work duration.

2. Methodology

2.1 Study design and setting

A quantitative, observational pilot study was conducted using a self-administered questionnaire. The study took place at medical centres in Dura between February and June 2025. The research process included a review of relevant literature followed by primary data collection through a survey.

2.2 Population and sample

A convenience sample of 35 medical staff members was recruited from the target setting. Inclusion criteria were male or female medical staff with a professional qualification in a medical field and at least one year of clinical experience. Staff with less than one year of experience were excluded.

2.3 Data collection instrument

A structured questionnaire developed with reference to previous studies included three parts: demographic information; statements about medical shoes; and statements about daily activities related to pain. Responses were recorded on a five-point Likert scale ranging from strongly agree to strongly disagree.

2.4 Ethical considerations

Ethical approval was obtained from the Research and Ethics Committee. Participation was voluntary, confidentiality was assured, and written informed consent was obtained from all participants.

2.5 Data analysis

Data were analysed using the Statistical Package for the Social Sciences (SPSS). A p-value below 0.05 was considered statistically significant. The analyses described in the study included F-tests, regression analysis, and Spearman's rho correlation.

3. Results

3.1 Demographic characteristics

The sample included 35 medical staff members. The largest age group was 25–30 years (46%), followed by participants younger than 25 years (23%), those aged 30–35 years (20%), and those aged 35 years or older (11%). Nearly half of the sample had a normal BMI (49%); 34% were overweight, 11% were classified as obese, and 6% were underweight.

Table 1. Demographic characteristics of the sample.

Characteristic	Category	Frequency	Percent
Age	Less than 25 years	8	23%
Age	25–30 years	16	46%
Age	30–35 years	7	20%
Age	35 years and above	4	11%
BMI	Underweight (<18.5)	2	6%
BMI	Normal weight (18.5–24.9)	17	49%
BMI	Overweight (25–29.9)	12	34%
BMI	Obesity (30 or above)	4	11%

3.2 Work characteristics

For daily working hours, 53.8% were reported to work 6–8 hours and 26.1% more than 8 hours. In relation to days worked per week, 73.8% worked 3–5 days, 16.2% worked 5–7 days, and 10% worked fewer than 3 days.

Table 2. Distribution by hours worked per day.

Hours worked per day	Frequency	Valid percent	Cumulative percent
Less than 4 hours	2	6.3%	6.3%
4–6 hours	5	13.8%	20.1%
6–8 hours	19	53.8%	73.9%
Above 8 hours	9	26.1%	100.0%
Total	35	100.0%	100.0%

Table 3. Distribution by days worked per week.

Days worked per week	Frequency	Percent
Less than 3 days	4	10.0%
3–5 days	26	73.8%
5–7 days	5	16.2%
Total	35	100.0%

3.3 Medical-shoe statements

Mean scores from 1 to 2.5 were classified as low, 2.5 to 3.5 as intermediate, and 3.5 to 5.0 as high. The total mean for medical-shoe statements was 3.71 (high). The highest-rated statement was that medical shoes helped during heavy work without low back pain (mean = 4.1210). The statement about regularly measuring feet to select suitable shoes had the lowest mean (1.2126).

Table 4. Descriptive statistics for medical-shoe statements.

No.	Statement	SD	Mean	Score
1	Measuring my feet regularly helps me choose the right shoes	0.6400	1.2126	Low
2	Wearing medical shoes helps reduce foot pain	1.1277	3.9213	High
3	I can stand longer when I wear medical shoes	1.2357	2.8275	Intermediate
4	I can walk and do my tasks without low back pain when wearing medical shoes	0.7156	3.7250	High
5	I sleep well when I finish my job	0.9523	3.9752	High
6	I feel nervous when I do not wear medical shoes	0.9214	3.3541	Intermediate
7	Medical shoes help me during heavy work without low back pain	0.9258	4.1210	High
8	Shoes that are too small or fit poorly affect walking pattern	0.8124	3.3256	Intermediate
9	Medical shoes allow me to work a shift without low back pain	1.0472	3.7500	High
10	Cotton-blend socks allow me to wear my shoes more times	0.6558	4.0750	High
Total		0.9003	3.71305	High

3.4 Daily-activity statements

The total mean for daily-activity statements was 3.0242, classified as intermediate. The highest mean concerned pain preventing walking for more than half an hour (4.2269), followed by the view that increased pain is an indication to stop walking (3.7821).

Table 5. Descriptive statistics for daily-activity statements.

No.	Statement	SD	Mean	Score
1	Physical activities make my pain worse	0.5871	3.1005	Intermediate
2	Pain does not prevent me from walking any distance	0.4125	1.1125	Low
3	Pain prevents me from walking for more than half an hour	1.2357	4.2269	High
4	I can stand as long as I want without extra pain	0.6400	3.2126	Intermediate
5	Pain prevents me from standing for more than 30 minutes	1.1277	2.7105	Intermediate
6	An increase in pain indicates that I should stop walking	0.9821	3.7821	High
Total		0.9003	3.024183	Intermediate

3.5 Hypothesis testing

Age: The study reported a statistically significant relationship between medical-shoe use and LBP in relation to age ($p = 0.0443$). The reported F-test table is reproduced below as supplied; the degrees of freedom and sums of squares should be verified against the original output.

Table 6. Reported F-test analysis for age.

Source	Sum of squares	df	Mean square	F	Sig.
Between groups	17.957	2	8.979		
Within groups	335.543	35	9.069	30.890	0.0443
Total	353.500	37			

Work conditions: Regression analysis was reported to show a significant relationship ($p = 0.0315$). The original table contains values that do not align clearly across the sums of squares, degrees of freedom, and mean squares; values are retained as reported for verification.

Table 7. Reported regression analysis for work conditions.

Model	Sum of squares	df	Mean square	F	Sig.
Regression	29.326	2	421.012		
Residual	314.123	36	7.2650	30.452	0.0315
Total	333.426	38			

Length of service/work duration: Spearman's rho analysis was reported to identify significant associations for hours worked per day ($p = 0.04452$, rounded in the text to 0.045) and days worked per week ($p = 0.03113$, rounded to 0.031). The supplied table appears misaligned, and the correlation coefficients should be checked against the original SPSS output.

Table 8. Reported Spearman's rho results for work duration.

Reported measure	Correlation coefficient	Significance (2-tailed)	N
Hours worked per day	0.817	0.04452	35
Days worked per week	0.0315	0.03113	35

Weight: Regression analysis was reported to indicate a significant relationship between weight and LBP in the context of medical-shoe use ($p = 0.0331$). As the supplied table contains apparent inconsistencies in its degrees of freedom and mean-square values, the original analysis output should be consulted before publication.

Table 9. Reported regression analysis for weight.

Model	Sum of squares	df	Mean square	F	Sig.
Regression	34.225	3	219.2215		
Residual	226.223	5	28.2001	0.0472	0.0331
Total	260.448	8			

4. Discussion

The findings indicate that participants generally rated medical footwear positively, with an overall mean score of 3.71. The highest-rated item concerned wearing medical shoes during heavy work without experiencing LBP, suggesting that participants perceived footwear as relevant to comfort during demanding clinical tasks. This is consistent with literature identifying footwear as one potentially modifiable aspect of occupational musculoskeletal health [13], [14]. However, self-reported perceptions do not establish that medical shoes directly prevent or reduce LBP.

The study reported significant associations involving age ($p = 0.0443$), weight ($p = 0.0331$), work conditions ($p = 0.0315$), and work-duration measures ($p = 0.04452$ and $p = 0.03113$). These findings are broadly consistent with the view that occupational LBP is multifactorial and may be associated with physical workload, individual characteristics, and cumulative exposure [6], [9], [11]. Given the pilot sample and inconsistencies in some statistical tables, these associations should be interpreted cautiously and not as evidence of causation.

Nearly half of the participants were aged 25–30 years, while 34% were overweight and 11% were classified as obese. These characteristics may be relevant when considering occupational health, but the study does not provide enough information to determine whether age or body weight modifies the effect of footwear. Larger studies with clearly specified models and appropriate adjustment for confounding variables are needed.

Workload was substantial for some participants: 53.8% reportedly worked 6–8 hours per day and 26.1% more than eight hours. Prolonged standing, patient handling, and repetitive work are plausible contributors to musculoskeletal symptoms [3], [7], [12]. The reported association with work conditions supports considering rest breaks, task rotation, ergonomic patient-handling procedures, and work-schedule review as part of a comprehensive prevention strategy.

The low mean for regular foot measurement (1.21) may indicate that this practice was uncommon or that respondents disagreed with the statement, depending on the questionnaire's coding direction. Because the exact coding and item polarity are not fully specified, this result should not be interpreted without checking the questionnaire and scoring procedure. Nevertheless, occupational health education can address proper shoe fit and footwear selection.

The daily-activity score was intermediate overall (3.02), while participants reported that pain could restrict walking duration. These results suggest that pain-related functional limitations may coexist with positive perceptions of medical footwear. Footwear should

therefore be considered alongside other interventions, rather than as a replacement for ergonomic assessment, physical conditioning, and clinical evaluation when needed.

Several limitations should be acknowledged. The sample was small and selected by convenience from medical centres in one locality, limiting generalisability. The observational, questionnaire-based design does not establish temporality or causation, and outcomes appear to rely on self-report. In addition, the reported statistical tables contain internal inconsistencies and require verification against the original dataset and SPSS output. Future studies should recruit larger samples, use validated measures of LBP and footwear characteristics, define exposure and outcome variables clearly, and report complete test statistics and confidence intervals.

5. Conclusion

This observational pilot study found a high overall mean score for medical-shoe statements (3.71), indicating that participants perceived medical footwear as relevant to their work comfort. The study reported statistically significant associations involving age, weight, work conditions, and work-duration measures; however, it did not establish a direct causal effect of footwear on low back pain. The findings support considering appropriate footwear within broader occupational health strategies that also address ergonomics, patient handling, rest breaks, work organisation, and education on shoe fit. Because the sample was small and some statistical tables appear inconsistent, the results should be treated as preliminary and verified before drawing firm conclusions.

References

[1] M. Clari, G. Garzaro, V. Dimonte, and F. Donato, “Prevalence of musculoskeletal disorders among perioperative nurses: A systematic review and meta-analysis,” BMC Musculoskeletal Disorders, vol. 22, no. 1, pp. 1–12, 2021.

[2] J. B. Taylor, A. P. Goode, S. Z. George, and C. E. Cook, “Incidence and risk factors for first-time incident low back pain: A systematic review and meta-analysis,” The Spine Journal, vol. 21, no. 5, pp. 718–730, 2021.

[3] Y. Du, W. Wang, and L. Zhang, “Prevalence of work-related musculoskeletal disorders among nurses: A meta-analysis,” Iranian Journal of Public Health, vol. 52, no. 3, pp. 463–475, 2023.

[4] H. Heidari, M. Moezzi, and M. Gholami, “Work-related musculoskeletal disorder prevalence by body area among nurses in Europe: Systematic review and meta-analysis,” Journal of Functional Morphology and Kinesiology, vol. 10, no. 1, pp. 15–28, 2025.

[5] P. M. Sari and W. T. Utama, “Low back pain in healthcare workers in the operating room: A literature review,” Medical Profession Journal of Lampung, vol. 16, no. 2, pp. 44–48, 2025.

[6] S. Kalkan and A. Yildiz, “The impact of work-related musculoskeletal pains on routine tasks among operating room nurses: A multicenter cross-sectional study,” Pain Management Nursing, vol. 25, no. 2, pp. 112–119, 2024.

[7] European Agency for Safety and Health at Work, “Prevention strategies for MSDs in the healthcare sector,” OSHwiki, 2024.

[8] E. Gunes and S. Ayaz-Alkaya, “The effect of health education on prevention of low back pain for health caregivers and cleaning workers,” International Journal of Nursing Practice, vol. 28, no. 2, Art. no. e12973, 2021.

[9] I. Cavdar, A. Karaman, Y. Ozhanli, and A. Ozbas, “Low back pain in operating room nurses and its associated factors,” Pakistan Journal of Medical Sciences, vol. 36, no. 6, pp. 1291–1296, 2020.

[10] I. Alnaami et al., “Prevalence and factors associated with low back pain among health care workers in southwestern Saudi Arabia,” BMC Musculoskeletal Disorders, vol. 20, no. 1, Art. no. 56, 2019.

[11] O. Hämmig, “Work-related stress, physical workload, and musculoskeletal disorders in healthcare professionals,” Journal of Occupational Medicine and Toxicology, vol. 15, no. 1, pp. 1–11, 2020.

[12] E. Fallon and K. O’Sullivan, “Low back pain prevalence and associated factors among radiographers in Ireland: A cohort study,” Radiography, vol. 29, no. 2, pp. 312–318, 2023.

[13] L. A. Corrêa and T. A. F. Mathias, “Low back pain prevalence and associated factors among nursing personnel in primary health care,” Revista Brasileira de Enfermagem, vol. 74, no. 2, Art. no. e20200123, 2021.

[14] H. Douhal and R. Shudifat, “Nurses’ knowledge and practice of appropriate techniques of body mechanics and non-specific back pain,” Cureus, vol. 15, no. 10, Art. no. e56478, 2023.

[15] E. J. Kim, Y. H. Lee, and J. H. Park, “Effects of footwear characteristics on musculoskeletal symptoms in hospital nurses: A cross-sectional study,” Journal of Korean Academy of Nursing, vol. 52, no. 4, pp. 412–423, 2022.

[16] D. R. Smith and P. A. Leggat, “Musculoskeletal disorders among rural Australian nursing students,” Journal of Occupational Health, vol. 63, no. 1, Art. no. e12245, 2021.

[17] C. M. Williams, S. Penkala, P. Smith, T. Haines, and K. A. Bowles, “The relationship between footwear characteristics and musculoskeletal symptoms in Australian nurses,” Journal of Foot and Ankle Research, vol. 15, no. 1, pp. 23–35, 2022.

[18] Y. Chen, S. Zhang, and J. Wang, “Prolonged standing and low back pain in healthcare workers: A prospective cohort study,” International Journal of Environmental Research and Public Health, vol. 20, no. 5, pp. 4123–4135, 2023.

[19] L. L. Andersen, E. Villadsen, and T. Clausen, “Cumulative occupational exposures and low back pain among healthcare workers: A 5-year follow-up study,” Scandinavian Journal of Work, Environment and Health, vol. 50, no. 3, pp. 178–187, 2024.

[20] O. E. Johnson, E. Emmanuel, and U. A. Okafor, “Footwear practices and musculoskeletal pain among nurses in tertiary hospitals,” Journal of Preventive Medicine and Hygiene, vol. 62, no. 2, pp. E512–E520, 2021.

[21] S. Park, J. Lee, and H. Kim, “Association between body mass index and low back pain in healthcare workers: A systematic review and dose-response meta-

analysis," Obesity Reviews, vol. 25, no. 1, Art. no. e13678, 2024.
[22] K. Ngan, S. Drebit, S. Siow, S. Yu, D. Keen, and H. Alamgir, "Risks and causes of musculoskeletal injuries among health care workers," Occupational Medicine, vol. 70, no. 5, pp. 347–353, 2020.
[23] S. P. Anderson and J. Oakman, "Allied health professionals and work-related musculoskeletal disorders: A systematic review," Safety and Health at Work, vol. 13, no. 3, pp. 259–267, 2022.
[24] A. Richardson, B. McNoe, S. Derrett, and H. Harcombe, "Prevalence of work-related musculoskeletal disorders among New Zealand healthcare workers," Journal of Primary Health Care, vol. 15, no. 2, pp. 124–132, 2023.