

# Prevalence of Work-Related Musculoskeletal Disorders Among Cobblers in Faisalabad

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Qudsia Riaz<sup>1</sup>, Abeer Fatima<sup>1</sup>, Aleena Arshad<sup>1</sup>, Iqra Tahir<sup>1</sup>, Imran Ullah Khan<sup>2</sup>

## Correspondence

Iqra Tahir  
[iqra.tahir@mth.org.pk](mailto:iqra.tahir@mth.org.pk)

## Affiliations

- The University of Faisalabad, Faisalabad, Pakistan
- PhD Scholar, Al-Hamad Islamic University, Department of Physical Education and Sports Science, GCUF, Faisalabad, Pakistan

## Keywords

Work-Related Musculoskeletal Disorders, Cobblers, Occupational Health, Footwear Industry, Ergonomics, Prevalence, Nordic Musculoskeletal Questionnaire, Neck Pain, Shoulder Pain

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## ABSTRACT

**Background:** Work-related musculoskeletal disorders (WMSDs) are a significant occupational health issue affecting various industries, including footwear manufacturing. Cobblers, due to the nature of their work, are particularly vulnerable to WMSDs due to repetitive tasks and prolonged static postures.

**Objective:** The objective of this study was to determine the prevalence of WMSDs among cobblers in shoe manufacturing firms in Faisalabad, Pakistan.

**Methods:** This cross-sectional study was conducted over four months, involving 260 cobblers selected through purposive sampling. The Nordic Musculoskeletal Questionnaire (NMQ) was used to assess musculoskeletal symptoms in nine body regions over the past 12 months and 7 days. Data were analyzed using SPSS version 25, with descriptive statistics and chi-square tests for significance ( $p < 0.05$ ).

**Results:** The most commonly affected region was the neck, with 70 cobblers (26.9%) reporting symptoms in the past year and 40 (15.4%) in the past week. Shoulder pain was reported by 51 (19.6%) annually, and ankle/feet pain by 41 (15.8%). Significant associations were found between WMSDs and various body regions ( $p < 0.05$ ).

**Conclusion:** WMSDs are highly prevalent among cobblers, particularly in the neck and shoulders. Ergonomic interventions are recommended to reduce musculoskeletal strain.

## INTRODUCTION

Work-related musculoskeletal disorders (WMSDs) are a substantial concern across various professions due to their impact on occupational health and productivity. The World Health Organization (WHO) estimates that 50-70% of workers globally suffer from WMSDs, with these disorders contributing to significant morbidity and loss of work hours annually. Approximately 317 million people are affected by WMSDs worldwide, and 6,300 people die daily from work-related injuries, highlighting the profound impact of these disorders on the global workforce (1). Traditionally, WMSDs were associated with industries involving manual labor, such as manufacturing, construction, and factory work. However, recent evidence indicates that WMSDs are becoming more prevalent in a wide range of sectors, including healthcare, education, hospitality, and retail (2). Among workers in the footwear manufacturing industry, the risk of developing WMSDs is particularly high due to the repetitive, physically demanding nature of the job. Prolonged standing, awkward postures, and repetitive tasks contribute to the development of musculoskeletal symptoms in various body regions, including the neck, shoulders, and lower back (3).

Cobblers, who are responsible for shoe repair and manufacturing, are at heightened risk of WMSDs due to the nature of their work, which often requires prolonged sitting or standing, repetitive hand movements, and awkward postures. The global footwear industry, which combines

elements of craftsmanship, technology, and fashion, relies heavily on the labor of skilled artisans. However, these workers frequently face ergonomic hazards that can lead to musculoskeletal disorders. In particular, tasks such as cutting, stitching, and hammering in confined workspaces can exert excessive strain on the upper body, contributing to WMSDs (4). Previous studies have demonstrated that workers in the footwear industry, especially those involved in hand-sewn shoe production, are prone to musculoskeletal complaints, with a significant proportion reporting symptoms in the neck, shoulders, and upper limbs (5, 6). Although WMSDs among cobblers have received less attention compared to other occupational groups, the high prevalence of these disorders in this profession warrants closer examination.

Limited research exists on the prevalence of WMSDs specifically among cobblers in Pakistan. Most studies on WMSDs focus on workers in large-scale manufacturing settings or other industrial sectors, while the unique risks faced by cobblers remain underexplored (7, 8). However, the available literature suggests that individuals working in the shoe-making industry are exposed to various occupational hazards that increase their risk of developing WMSDs. These hazards include repetitive tasks, sustained awkward postures, and mechanical strain associated with the manual handling of materials (9). A systematic review conducted by Xu et al. (10) identified work-related stressors such as excessive pressure and repetitive motion as significant risk factors for the development of WMSDs in

factory workers. Similarly, studies by Tegenu and colleagues have reported a high prevalence of musculoskeletal complaints, particularly in the upper limbs, among workers in the shoe industry (11). Jahangiri's study (2019) found that up to 70% of workers reported musculoskeletal ailments, with a particular focus on the upper limbs (12). These findings align with research by Muller et al. (2017), who observed a high incidence of WMSDs among footwear industry workers, with the spine, neck, and upper extremities being the most affected body regions (13). In this study, we aim to investigate the prevalence of WMSDs among cobblers working in shoe manufacturing firms in Faisalabad. By utilizing the Nordic Musculoskeletal Questionnaire (NMQ), we seek to identify the body regions most commonly affected by musculoskeletal symptoms and the factors contributing to WMSDs in this population. This research will provide valuable insights into the occupational health risks faced by cobblers and inform potential interventions aimed at reducing the burden of WMSDs in this profession. Understanding the prevalence and risk factors associated with WMSDs among cobblers is essential for developing preventive strategies that can improve the overall health and well-being of workers in the footwear industry.

## MATERIAL AND METHODS

This cross-sectional study was conducted over a period of four months in various shoe manufacturing firms in Faisalabad, Pakistan, after receiving approval from the institutional review board. A purposive sampling technique was employed to select a total of 260 cobblers who met the inclusion criteria. The inclusion criteria required participants to be of either gender, aged between 20 and 50 years, and to have been employed in the shoe manufacturing industry for at least six months. Individuals with recent fractures, systemic illnesses, trauma, polyarthritis, rheumatoid arthritis, or any other arthritic conditions, as well as psychiatric illnesses, were excluded from the study. Additionally, shoe manufacturing employees with a history of work-related or vehicular accidents, those with physical deformities, and pregnant women were excluded from participation.

Prior to data collection, written informed consent was obtained from all participants after thoroughly explaining the study objectives. Ethical considerations were adhered to in line with the Declaration of Helsinki, ensuring participants' confidentiality and voluntary participation. The data collection tool employed in this study was the standardized Nordic Musculoskeletal Questionnaire (NMQ),

which has excellent reliability, demonstrated by a Cronbach's alpha value of 0.945. The NMQ was used to gather information about the participants' demographic details, workplace characteristics, and psychosocial data, as well as musculoskeletal symptoms they experienced in nine different body regions over the past year, including the head/neck, shoulders, elbows, wrists/hands, upper back, lower back, hips, knees, and ankles/feet.

Data collection took place on-site at the various shoe manufacturing firms, and the questionnaires were distributed among the cobblers. Participants were asked to fill out the NMQ, listing any musculoskeletal symptoms they experienced in the previous 12 months, as well as symptoms in the past seven days. The collected data were subsequently entered into SPSS version 25 for statistical analysis. Descriptive statistics were generated to describe the frequency distribution of musculoskeletal disorders among the participants, including the prevalence of musculoskeletal symptoms across different body regions. The frequency of musculoskeletal symptoms was analyzed in terms of both 12-month and 7-day prevalence. The data were presented using frequency tables, percentages, and cumulative percentages to describe the distribution of musculoskeletal complaints among the cobblers.

In conclusion, this study adhered to rigorous ethical standards, ensured the use of reliable and validated data collection tools, and applied appropriate statistical methods to assess the prevalence of work-related musculoskeletal disorders among cobblers in the shoe manufacturing industry in Faisalabad. The findings of this study will contribute to a better understanding of the occupational health risks faced by cobblers and may inform the development of preventive strategies aimed at reducing the burden of musculoskeletal disorders in this workforce.

## RESULTS

The data analysis was performed using SPSS version 25. Descriptive statistics, including frequency distributions, means, standard deviations, and quartiles, were calculated to summarize the participants' demographic information and the prevalence of work-related musculoskeletal disorders (WMSDs). Additionally, chi-square tests were applied to examine the associations between demographic characteristics and WMSD prevalence, with p-values considered significant at  $<0.05$ .

The age of participants ranged from 20 to 38 years, with a mean age of 25.6 years and a standard deviation of 4.96 years. The interquartile range (IQR) was from 22 to 28 years. The age distribution is presented in Table 1 below:

**Table 1: Frequency Distribution of Age of Participants (N=260)**

| Age | Mean | SD   | 25th Percentile | 50th Percentile (Median) | 75th Percentile | p-value |
|-----|------|------|-----------------|--------------------------|-----------------|---------|
|     | 25.6 | 4.96 | 22              | 26                       | 28              | 0.876   |

Most participants were between 22 and 28 years old, with 26 participants aged 22 (10%) and 28 participants aged 26 (10.8%). The p-value for age distribution was 0.876,

indicating no statistically significant association between age and WMSD prevalence. The sample consisted predominantly of male participants, as shown in Table 2:

**Table 2: Frequency Distribution of Gender of Participants (N=260)**

| Gender | Frequency | Percent (%) | p-value |
|--------|-----------|-------------|---------|
| Female | 26        | 10.0        | 0.582   |
| Male   | 234       | 90.0        |         |
| Total  | 260       | 100.0       |         |

Of the 260 participants, 234 (90%) were male, and 26 (10%) were female. The gender distribution was not significantly associated with the prevalence of WMSDs ( $p=0.582$ ).  
Prevalence of Work-Related Musculoskeletal Disorders

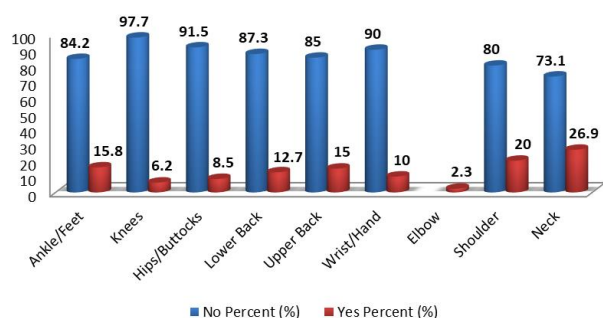
The prevalence of WMSDs was assessed based on the Nordic Musculoskeletal Questionnaire responses. The results are presented in Table 3, including both annual and weekly prevalence rates across various body regions:

**Table 3: Frequency Distribution of Annual and 1-Week Prevalence of Work-Related Musculoskeletal Disorders (N=260)**

| Body Area     | 12-Month Prevalence | 7-Day Prevalence | p-value (12-Month) |
|---------------|---------------------|------------------|--------------------|
| Neck          | 70 (26.9%)          | 40 (15.4%)       | 0.003              |
| Shoulder      | 51 (19.6%)          | 37 (14.2%)       | 0.042              |
| Elbow         | 17 (6.5%)           | 10 (3.8%)        | 0.089              |
| Wrist/Hand    | 26 (10%)            | 18 (6.9%)        | 0.077              |
| Upper Back    | 39 (15%)            | 15 (5.8%)        | 0.023              |
| Lower Back    | 33 (12.7%)          | 23 (8.8%)        | 0.034              |
| Hips/Buttocks | 22 (8.5%)           | 8 (3.1%)         | 0.098              |
| Knees         | 16 (6.2%)           | 10 (3.8%)        | 0.105              |
| Ankle/Feet    | 41 (15.8%)          | 25 (9.6%)        | 0.021              |

The neck region had the highest 12-month prevalence of musculoskeletal symptoms, affecting 26.9% of participants, followed by the shoulder (19.6%) and ankle/feet (15.8%). Weekly prevalence rates showed a similar trend, with the neck, shoulder, and ankle/feet being the most frequently reported areas of discomfort. Statistically significant associations were found between the prevalence of musculoskeletal symptoms and body regions such as the neck ( $p=0.003$ ), shoulder ( $p=0.042$ ), upper back ( $p=0.023$ ), lower back ( $p=0.034$ ), and ankle/feet ( $p=0.021$ ).

The impact of WMSDs on participants' ability to perform activities of daily living (ADLs) was assessed, and the results are presented in Figure 1. The most commonly affected area was the neck, with 70 participants (26.9%) reporting that their WMSD symptoms prevented them from performing normal daily activities over the past 12 months.

**Figure 1: Distribution of Impact of Annual Prevalence of WMSDs on ADLs of Participants**

The most prevalent WMSD symptom was neck pain, followed by discomfort in the shoulder, ankle/feet, and upper back. Significant associations were found between the prevalence of WMSDs and body regions such as the neck, shoulder, upper back, lower back, and ankle/feet. The results indicate that WMSDs are highly prevalent among

cobblers in Faisalabad, with a considerable impact on their ability to carry out daily activities. These findings underscore the need for targeted interventions to reduce the incidence of WMSDs in this workforce.

## DISCUSSION

The findings of this study highlight the significant prevalence of work-related musculoskeletal disorders (WMSDs) among cobblers in Faisalabad, particularly in the neck, shoulders, and lower back. The results align with previous research, such as Muller's study, which also reported high rates of musculoskeletal complaints among workers in the footwear industry, with neck pain being one of the most common complaints (12). This study revealed that 26.9% of cobblers experienced neck pain over the past year, a finding that is consistent with the literature. However, in contrast to Muller's findings, which reported a higher prevalence of knee and spine pain (12), this study found relatively lower rates of knee and lower back pain, suggesting some variability in musculoskeletal symptoms across different working populations.

The high prevalence of neck pain among cobblers in this study can be attributed to prolonged periods of maintaining static postures and repetitive tasks that place strain on the upper body. Similar findings were observed by Pandey et al., who identified shoulder and upper limb pain as significant issues among cobblers (14). In the current study, shoulder pain affected 19.6% of participants, which, while lower than the prevalence reported by Pandey et al., still underscores the vulnerability of cobblers to upper body musculoskeletal disorders. These findings emphasize the need for ergonomic interventions tailored to the specific demands of cobblers' work, such as the use of adjustable workstations or frequent breaks to reduce muscle fatigue.

A notable strength of this study is its focus on an understudied population—cobblers working in the footwear manufacturing industry in Faisalabad. The use of a well-established tool, the Nordic Musculoskeletal Questionnaire (NMQ), with its high reliability (Cronbach's alpha 0.945), ensured that the data collected on musculoskeletal symptoms were robust and consistent. Additionally, the study's sample size of 260 participants provides a reasonably large dataset to explore the prevalence of WMSDs in this occupational group. The cross-sectional design allowed for the identification of common musculoskeletal complaints within the workforce at a specific point in time, offering valuable insights for future workplace interventions.

However, several limitations should be acknowledged. First, the cross-sectional nature of the study limits the ability to establish causality between work tasks and the onset of musculoskeletal symptoms. The study only captured the prevalence of WMSDs at a single time point, without considering long-term trends or fluctuations in symptom severity. Additionally, the reliance on self-reported data from the NMQ introduces the possibility of reporting bias, as participants may underreport or exaggerate their symptoms. Another limitation is the exclusion of workers with pre-existing musculoskeletal conditions or systemic illnesses, which may have resulted in an underestimation of the true burden of WMSDs among cobblers. Furthermore, the study did not consider psychosocial factors, such as stress or job satisfaction, which have been shown to influence the development of musculoskeletal disorders (9). These factors should be explored in future research to provide a more comprehensive understanding of WMSDs among cobblers.

The findings of this study have several implications for workplace health and safety in the footwear manufacturing industry. Based on the high prevalence of WMSDs, particularly in the neck, shoulders, and upper back, it is recommended that employers introduce ergonomic interventions aimed at reducing musculoskeletal strain. These may include providing adjustable workstations, encouraging regular breaks, and promoting body posture awareness among workers. Moreover, training programs focusing on the importance of physical activity and stretching exercises could help mitigate the risk of WMSDs. Future studies should employ longitudinal designs to assess the long-term effects of ergonomic interventions on musculoskeletal health in this population.

## CONCLUSION

In conclusion, this study has demonstrated a high prevalence of WMSDs among cobblers in Faisalabad, with neck and shoulder pain being the most frequently reported symptoms. While the study provides important insights into the occupational health risks faced by this workforce, further research is needed to explore the underlying causes of these disorders and to evaluate the effectiveness of preventive strategies. The inclusion of psychosocial factors and a more diverse sample would help build a more

comprehensive picture of WMSDs in the footwear manufacturing industry.

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