

Prevalence of Musculoskeletal Pain in Mall Workers

Miss. Ashwini Namdeo Rupnar¹, Dr. Gaurai Mangesh Gharote (PT)²

¹Intern, Department of Physiotherapy, Indutai Tilak College of Physiotherapy, Pune, India

²Associate Professor, Department of Physiotherapy, Indutai Tilak College of Physiotherapy, Pune, India

Abstract

Musculoskeletal pain is a major occupational health concern, particularly among workers exposed to prolonged standing, repetitive movements, and awkward postures. Mall workers represent a vulnerable occupational group due to the physical and psychosocial demands of retail work. The present study aimed to assess the prevalence, distribution, and intensity of musculoskeletal pain among mall workers and to explore its association with selected demographic and occupational factors. A cross-sectional survey was conducted among 100 mall workers employed in grocery and clothing shops. Data were collected using a demographic questionnaire, the Nordic Musculoskeletal Questionnaire, and the Visual Analog Scale. Descriptive statistics and Spearman's correlation analysis were used for data analysis. The findings revealed a high prevalence of musculoskeletal pain, particularly in the knees, lower back, and neck. Most pain episodes were short-term, although recurrent discomfort was noted in weight-bearing and posture-related regions. No significant correlations were observed between pain intensity and age, gender, body mass index, working hours, or years of experience. The results suggest that musculoskeletal pain among mall workers is primarily influenced by occupational and ergonomic factors rather than individual characteristics. Targeted ergonomic interventions and preventive exercise programs are recommended to reduce the burden of musculoskeletal disorders in this population.

Keywords: Musculoskeletal Pain, Mall Workers, Nordic Musculoskeletal Questionnaire, Visual Analog Scale, Occupational Health

Introduction

Musculoskeletal pain is one of the most common causes of disability worldwide and encompasses a wide range of conditions affecting muscles, joints, ligaments, tendons, and related structures¹. Work-related musculoskeletal disorders constitute a significant proportion of these conditions and are commonly associated with occupational activities involving repetitive movements, prolonged static postures, manual handling, and inadequate ergonomic support². Such disorders have substantial implications for individual health, productivity, and quality of life.

Employees working in retail environments, particularly in shopping malls, are frequently exposed to physical demands such as prolonged standing, continuous walking, repetitive upper limb movements, bending, and lifting³. Mall workers include sales personnel, cashiers, stock handlers, cleaners, and security staff, each of whom faces unique ergonomic challenges. These occupational demands, combined with long working hours and limited rest breaks, increase the risk of developing musculoskeletal pain⁴.

Previous studies conducted among retail and service sector workers have reported a high prevalence of musculoskeletal pain, with the lower back, neck, shoulders, and knees being the most commonly affected regions. For instance, a study in Ethiopia reported that 75% of cashiers experienced musculoskeletal symptoms, predominantly affecting the lower back, neck, and shoulder regions⁴. In South Africa, 67% of supermarket cashiers reported neck pain, and 66% reported lower back pain, significantly impacting daily activities and work performance⁵. In India, research among salespersons in Ahmedabad revealed a 58% prevalence of low back pain, with prolonged standing and repetitive lifting identified as significant contributors⁵. Similar findings have been reported in grocery stores and small retail establishments, where workers often perform repetitive tasks in constrained spaces, leading to high rates of musculoskeletal complaints⁶.

Tasks involving prolonged standing, repetitive hand movements, lifting, bending, reaching above shoulder height, or maintaining awkward postures increase the physical load on muscles and joints, leading to cumulative strain⁷. For example, cashiers performing repetitive scanning and bagging, stock handlers lifting boxes, or cleaning staff maintaining bent postures for prolonged periods are at increased risk for WMSDs. Poorly designed workstations, including non-adjustable counters, inadequate shelving height, and lack of supportive equipment, exacerbate these ergonomic challenges⁸. Individual factors such as age, gender, physical fitness, and lifestyle habits also play a pivotal role in determining susceptibility to MSP. Older employees may experience reduced musculoskeletal resilience, making them more prone to injury and chronic pain⁹. Women are often more susceptible to certain types of MSP due to anatomical and physiological differences, including lower muscle mass in some regions and hormonal influences affecting joint stability¹⁰. Lifestyle factors such as inadequate physical activity, poor nutrition, smoking, and alcohol consumption can further weaken musculoskeletal integrity, increasing vulnerability to pain and disorders. Additionally, body mass index (BMI) is a critical factor; higher BMI increases mechanical load on the spine, hips, knees, and feet, predisposing workers to pain in these areas¹¹.

In the Indian context, rapid urbanization and the expansion of shopping malls have led to a growing workforce engaged in retail activities¹². Pune, as one of the major metropolitan cities in India, has witnessed rapid growth in shopping malls and retail establishments over the past two decades. This urban expansion has led to a significant increase in the number of employees working in retail, including grocery and clothing shops¹³. These employees often face physically demanding tasks due to high customer volumes, seasonal fluctuations, and extended working hours, which increase the risk of musculoskeletal pain (MSP)¹⁴. Despite the growing number of mall workers in Pune, research focusing on the prevalence, severity, and contributing factors of MSP in this population remains limited, highlighting the need for targeted occupational health studies¹⁴. Grocery and clothing shop employees constitute a significant proportion of mall workers. Their tasks involve frequent lifting, bending, reaching, standing, walking, and repetitive hand movements, often performed in constrained and crowded environments. Grocery shop employees handle products that vary widely in size and weight, from small packaged items to large grocery sacks. Stocking, organizing shelves, and operating trolleys for transportation place considerable strain on the lower back, shoulders, knees, and wrists¹⁵. Understanding the prevalence and pattern of musculoskeletal pain in this occupational group is essential for designing effective preventive and rehabilitative strategies.

The need of the study is that the mall workers are routinely exposed to occupational risk factors that predispose them to musculoskeletal pain and injuries, which is why identifying the commonly affected body regions and understanding the intensity and contributing factors of pain are essential for planning

effective preventive and therapeutic exercise protocols. There is a lack of region-specific data addressing musculoskeletal pain among mall workers in Pune, highlighting the need for the present study. Hence, the present study was conducted to find out the prevalence of musculoskeletal pain in mall workers.

Methodology

The present study adopted a cross-sectional observational study design. The study population comprised mall workers employed in grocery and clothing shops. A total of 100 participants were included in the study, and convenience sampling was used to recruit eligible workers. Male and female workers aged between 25 and 35 years, with a minimum of five years of work experience and working for 8 to 12 hours per day, were included in the study. Workers with a history of recent musculoskeletal injury or with any underlying neurological conditions were excluded. Musculoskeletal pain and its severity were assessed using standardized outcome measures, namely the Nordic Musculoskeletal Questionnaire to identify the presence and distribution of musculoskeletal symptoms, and the Visual Analog Scale to quantify the intensity of pain.

Procedure

After obtaining informed consent, demographic data were collected from the participants. Pain intensity was assessed using the Visual Analog Scale, followed by administration of the Nordic Musculoskeletal Questionnaire to identify the presence and distribution of musculoskeletal pain across different body regions.

Data analysis and Results

Statistical analysis was performed using Jamovi version 2.6 and Microsoft Excel. Descriptive statistics, including mean, standard deviation, median, mode, and range, were used to summarize demographic and occupational variables. The prevalence of musculoskeletal pain across different body regions was calculated as percentages based on responses from the Nordic Musculoskeletal Questionnaire. As the data were non-normally distributed, Spearman's rank correlation coefficient was applied to examine the association between pain intensity (VAS scores) and age, working hours, years of experience, and body mass index. Differences in pain intensity between male and female participants were analyzed using the Mann-Whitney U test. A p-value of <0.05 was considered statistically significant.

A total of 100 mall workers were assessed using the Nordic Musculoskeletal Questionnaire and the Visual Analog Scale. Descriptive statistics indicated that the participants had a mean age of 29.96 ± 2.9 years and were predominantly within the normal body mass index range (22.9 ± 1.64). The average working duration was 9.8 ± 1.49 hours per day, and the mean pain intensity score on the Visual Analog Scale was 4.54 ± 1.12 , indicating moderate musculoskeletal pain. Males constituted 59% of the sample, while females accounted for 41%, and the majority of participants were right-hand dominant (91%).

The Nordic Musculoskeletal Questionnaire revealed a high prevalence of musculoskeletal pain, with the knees (83%), lower back (77.7%), and neck (64.9%) being the most commonly affected regions over the past 12 months. Pain in the past seven days was most frequently reported in the neck and lower back (51.1% each), indicating ongoing or recurrent symptoms. Musculoskeletal pain leading to work restriction was most common in the knees (27.7%) and neck (21.3%). Doctor consultations were reported most frequently for neck (24.5%) and lower back pain (19.1%), reflecting the clinical relevance of these complaints.

Analysis of pain duration showed that the majority of musculoskeletal symptoms were short-term, lasting between 1 and 7 days, particularly for the neck (75.5%) and knees (83%). However, a subset of participants reported prolonged or daily pain, especially in the lower back and neck, suggesting early progression toward chronic musculoskeletal issues.

Table 1: The Nordic Musculoskeletal Questionnaire Findings

Body Region	Trouble in Past 12 Months (%)	Prevented Work in Past 12 Months (%)	Trouble in Past 7 Days (%)	Accident (%)	Doctor Visit (%)	Pain 1-7 Days (%)	Pain 8-30 Days (%)	Pain >30 Days (%)	Daily Pain (%)
Neck	64.9	21.3	51.1	2.1	24.5	75.5	8.5	1.1	13.8
Shoulders	36.2	14.9	25.5	4.3	7.4	59.6	4.3	2.1	0
Upper Back	37.2	13.8	18.0	0	0	0	0	0	0
Elbows	47.9	11.7	21.3	3.2	8.5	58.5	7.4	3.2	0
Wrists/Hands	16.0	0	6.4	0	0	16.0	0	0	0
Lower Back	77.7	20.2	51.1	0	19.1	56.3	12.8	3.2	5.3
Hips/Thighs	23.4	7.4	9.6	1.1	8.5	23.4	0	0	0
Knees	83.0	27.7	18.1	5.3	8.5	83.0	0	0	0
Ankles/Feet	25.5	11.7	22.3	6.4	10.6	25.5	0	0	0

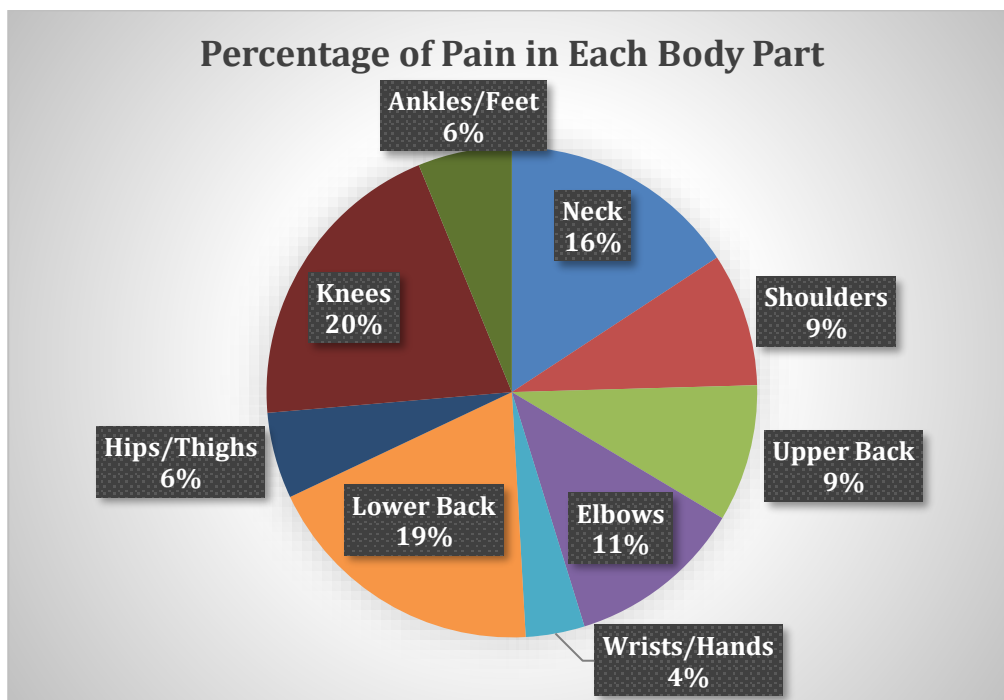


Figure 1: Percentage of Pain reported in Joints

Comparison of pain intensity between genders using the Mann–Whitney U test demonstrated no statistically significant difference in VAS scores, indicating similar pain perception among male and female workers. Spearman’s correlation analysis revealed no significant associations between pain intensity and age, working hours, years of experience, or body mass index.

Table 2: Comparison of VAS scores for males and females

	Statistic	p-value	Effect size
Mann-Whitney U Test	-1.3862	0.1657	0.14

These findings suggest that musculoskeletal pain among mall workers is not strongly influenced by individual demographic factors but is more likely associated with occupational and ergonomic demands.

Discussion

The present study demonstrated a high prevalence of musculoskeletal pain among mall workers, with the knees, lower back, and neck being the most commonly affected regions. The findings demonstrated a high overall prevalence of musculoskeletal pain among mall employees, with the knees (83%), lower back (77.7%), and neck (64.9%) being the most affected regions. These results imply that these areas are vulnerable to work-related strain, and this aligns with the anatomical regions most commonly subjected to biomechanical load during prolonged occupational activity. The majority of complaints were short-term or intermittent, which may be an indication of an emerging trend toward chronic musculoskeletal strain. Correlation analyses between VAS scores and demographic or occupational variables, including age, gender, body mass index (BMI), working hours, and years of experience, did not show statistically significant associations, which suggests that musculoskeletal pain in this population is predominantly influenced by occupational and ergonomic factors rather than intrinsic individual virtues. The high prevalence of musculoskeletal complaints observed in this study matches with previous research conducted among retail and service sector workers, which supports the occupational nature of these disorders¹⁶.

The prominence of knee and lower back pain may be attributed to prolonged standing, extensive walking on hard surfaces, repetitive bending, and frequent lifting, all of which are common occupational demands in malls. Several studies among retail cashiers, security personnel, and sales assistants have reported similar findings, where sustained static postures and repetitive micro-movements were key contributors to pain in the lower extremities and lumbar region¹⁷.

The observed high prevalence of neck pain in the present cohort is also similar to the findings from research among sales and administrative staff, where awkward postures, forward head inclination, and insufficient ergonomic support were causing cervical discomfort¹⁸. These findings highlight the fact that although mall work may not be traditionally considered physically intensive labor, they are exposed to substantial biomechanical stress that can cause musculoskeletal discomfort and functional limitations. Moderate prevalence rates of shoulder and elbow pain were also noted, with 36.2% and 47.9% of participants reporting discomfort in these regions, respectively. Such complaints are likely associated to repetitive upper limb movements like lifting merchandise, handling shopping bags, stocking shelves, and operating point-of-sale systems. Similar studies on supermarket employees and store attendants have similarly reported that repetitive reaching, lifting, and overhead tasks contribute to shoulder impingement, lateral epicondylitis, and upper limb fatigue¹⁹.

On the contrary, wrist and hand pain was less commonly reported (16%), which may be due to differences in occupational roles. While some tasks, such as cashier work or merchandise handling, involve extensive manual activity, others, like administrative support or security duties, may cause less strain on the distal upper limbs. This implies the importance of task-specific ergonomic assessment when addressing musculoskeletal complaints in mall environments.

Analysis of pain duration revealed that most complaints were short-term, lasting between 1–7 days, particularly for the neck (75.5%) and knees (83%). At the same time, the presence of daily or prolonged discomfort, especially in the lower back (5.3%) and neck (13.8%), signals early signs of developing musculoskeletal strain. Chronic pain in these areas may arise from cumulative exposure to micro-trauma, sustained poor postures, or repetitive low-intensity tasks over extended periods. Previous occupational studies have demonstrated that prolonged standing, repetitive low-amplitude movements, and static postures contribute to muscular fatigue and, if not treated, may lead to chronic pain syndromes²⁰.

The present study also checked the influence of gender on musculoskeletal pain. No significant differences were observed between male and female participants in terms of VAS scores, suggesting comparable pain perception and reporting across genders amongst mall workers. This finding contrasts with some epidemiological studies that report higher pain prevalence among women, often attributed to physiological differences, hormonal influences, or increased pain sensitivity²¹.

In the context of mall workers, however, similar exposure to occupational demands, uniform work schedules, and shared ergonomic risks may have mitigated gender-based differences in pain experience. Correlation analyses between VAS scores and demographic or occupational variables, including age, BMI, working hours, and years of experience, revealed weak, non-significant relationships. The negligible correlation between age and pain intensity ($r = -0.04$) suggests that musculoskeletal complaints were not age-dependent in this relatively young workforce. Similarly, BMI was not strongly associated with pain severity ($r = -0.019$), indicating that body composition was not a primary driver of musculoskeletal discomfort in this sample. These findings are consistent with previous research in the service industry, which stresses on the fact that work-related biomechanical exposures, rather than individual physical characteristics, are the primary causes of musculoskeletal pain²².

Neither longer working hours nor greater work experience correlated with higher pain intensity, which contrasts with studies in manufacturing and hospitality sectors, where pain severity often increased with cumulative work exposure²³. This problem can be to adaptive mechanisms among long-term employees, inter-individual differences in pain coping strategies, or the relatively narrow range of reported working hours (8–12 hours/day) in the present study, which may have limited statistical power to detect any influence.

Prolonged standing, static postures, repetitive movements, continuous customer interaction, and often inadequate rest breaks contribute to cumulative biomechanical load, particularly affecting the lower extremities and spine. Previous literature shows that among cashiers, retail clerks, and other service workers with even low-intensity, non-industrial physical tasks, when done over prolonged period of time without any ergonomic corrections can potentially cause²⁴.

The study highlights that pain can be caused due to cumulative occupational demands arising from prolonged standing, repetitive movements, static postures, and continuous customer interaction without sufficient rest breaks, contribute to significant biomechanical load, particularly in the knees, lower back, and neck. These findings are consistent with prior literature showing that even low-intensity, non-industrial tasks, when sustained over long periods without ergonomic corrections, can result in

musculoskeletal pain and functional limitations²⁵. The patterns observed in this study underscore the necessity of early identification and targeted interventions for high-risk regions to maintain functional capacity and prevent progression to chronic pain.

The present study did not directly assess workplace stressors, while existing literature indicates that job strain, high customer interaction, and limited autonomy can increase the chances of developing chronic pain over a long period. Finally, given the reports of short-term nature of pain in this population, there can be scope of early intervention that not only reduces current symptoms but reduces the risk of developing MSDs and improve work performance.

Limitations and Future Scope

The study was limited by its cross-sectional design, relatively small sample size, and reliance on self-reported data, which may have introduced recall or reporting bias. Additionally, the findings are limited to a single geographic location and specific shop types within malls, restricting generalizability. Future research should involve larger, multi-center prospective studies to establish causal relationships between occupational exposure and musculoskeletal pain. Further studies should also incorporate psychosocial factors, objective ergonomic assessments, and shop-specific analyses to better understand the determinants of chronic musculoskeletal pain among diverse groups of mall workers.

Conclusion

There is high prevalence of musculoskeletal pain among mall workers, especially in the knees, lower back, and neck. The demographic and occupational factors showed no significant correlation with pain, but the findings are suggestive of the impact of workplace ergonomics and repetitive strain.

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