IJCRT.ORG ISSN : 2320-2882

INTERNATIONAL JOURNAL OF CREATIVE RESEARCH THOUGHTS (IJCRT)

An International Open Access, Peer-reviewed, Refereed Journal

"PREVALENCE OF WORK-RELATED MUSCULOSKELETAL DISORDERS AMONG SHOPKEEPERS IN NASHIK CITY"

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Abstract ***Background:*** *Work-related musculoskeletal disorders (WMSDs) are a major occupational health concern among shopkeepers due to prolonged working hours, repetitive tasks, and poor ergonomics, affecting their productivity and quality of life.****Methodology:*** *A cross-sectional study was conducted among 148 shopkeepers in Nashik city using purposive sampling over six months. Data were collected using the Nordic Musculoskeletal Questionnaire (NMQ) and Rapid Entire Body Assessment (REBA) scale. Statistical analysis was performed using SPSS version 26.0.****Results:*** *The highest prevalence of WMSDs was observed in the 30–39 age group (37.2%). Shoulder (19.59%) and upper back (17.57%) were the most affected regions. Most participants worked 11.6–13.2 hours daily. REBA analysis showed 43.24% at medium risk and 8.11% at high risk.****Conclusion:*** *WMSDs are highly prevalent among shopkeepers due to prolonged working hours and ergonomic risks. Targeted interventions such as ergonomic modifications, posture correction, and work-rest cycles are essential to reduce WMSDs and improve occupational health.*

Keywords: Work-related musculoskeletal disorders (WMSDs), Shopkeepers, Ergonomics, Nordic Musculoskeletal Questionnaire (NMQ), Rapid Entire Body Assessment (REBA), Occupational health, Prevalence, Nashik city

I. INTRODUCTION

Shopkeepers are the individuals who have to run a shop for their daily living. They experience various stresses at their workplace such as carrying heavy load, bending, performing overhead activities, remain in static postures for longer period of time.[1] In this profession there is no limitation of age group or gender. But it is often seen that males are more involved than females. Shopkeepers are exposed to various risk factors in the workplace and most of them follow a sedentary lifestyle therefore making them more prone to musculoskeletal discomfort.[2]

Musculoskeletal discomfort here is considered in terms of musculoskeletal pain. Musculoskeletal pain may occur due to prolonged static positions, carrying heavy loads, bending activities, etc.[3] It can also occur due to any trauma to the musculoskeletal structures such as bones, tendons, and ligaments. It also affects one's daily

life and can have a negative effect in terms of deteriorating quality of life and increasing dependency on others for their work.[4]

Musculoskeletal disorders (MSD) are a significant public health problem due to their high impact on disability, personal suffering, and absence from work, and their direct and indirect costs to the health care system. Musculoskeletal disorders (MSDs) comprise a major health problem for the general population, affecting their quality of life and also demanding increased health care and organization. Musculoskeletal disorders were mainly caused by ergonomic factors, individual factors, and psychosocial factors.[5]

However, the most prominent work-related musculoskeletal disorders originated from heavy workload coupled with ergonomic risks that leads to muscle stress and tension which causing an individual to experience pain.[6]

Work-related musculoskeletal disorders (WRMSDs) are impairments of body structures such as muscles, tendons, ligaments, joints, nerves and supporting blood vessels that result in aches, pains, numbness, or discomfort in the upper and lower limbs, or the area around the spine.[7]

These conditions could be caused or aggravated primarily as a result of the work itself and by the effects of the immediate environment in which the work is carried out.[8] These disorders cause extreme physical and mental suffering, as well as rendering the victims permanently disabled. They also impact businesses with rising medical and compensation costs, loss of skilled

labor, loss of time, reduced productivity, increased employee absenteeism, and significant costs associated with treatment and social responsibility claims.[9]

In low/middle-income countries WRMSDs are given less priority.[10] Occupational health is one of the efforts to keep the workforce physically, mentally, and socially healthy while working, whereas occupational diseases is a health problem that is physically and psychologically caused by work activity or condition that is related to the occupation. One of the factors that causes occupational disease is the ergonomic factor. The ergonomic factor is related to posture or inappropriate body movement while working.[11]

Monotonous and sedentary work negatively impacts human health in many ways. However, the world is marching toward more service-related work that forces the working population to engage in tedious, repetitive, and sedentary work. Monotonous work takes a toll on both mental and physical health.[12] Evidence suggests that sedentary workers are more prone to musculoskeletal health complaints (MHC).[13] MHC includes lower back pain, upper back pain, neck pain, shoulder pain, arm pain, and leg pain are the leading causes of disability that affect 1.7 billion people worldwide. [14]

The impact of MHC is heterogeneous and ranges from economic loss to shorter longevity.[15] In addition, evidence suggests that older adults with musculoskeletal health conditions die sooner than those without.[16] MHC is also responsible for absenteeism, loss of productivity, early retirement, and contributing to years lived with disability.[17] Few studies also concluded that working in awkward postures or some combinations for long periods can also cause an increase in the risk of work-related musculoskeletal disorders.

Inappropriate working tasks can cause low back pain, shoulder pains, and others. Increased risk of attaining musculoskeletal disorder is due to bending or lifting from the back. Several simpler methods have been developed for systematically recording workplace exposure to be assessed by an observer and recorded on pro-forma sheets. REBA was developed to assess entire body posture for risk of WRMSDs. REBA has been developed to fill a perceived need for a practitioner's field tool, specifically designed to be sensitive to the type of unpredictable working postures found in health care and other service industries.[31]

AIMS & OBJECTIVES

Aim:

To identify the common work related musculoskeletal disorders among the shopkeepers in Nashik city.

Objective:

1) To find out the prevalence of work-related musculoskeletal disorders among the shopkeepers in Nashik city.

2) To evaluate the risk of work-related musculoskeletal disorders among the shopkeepers in Nashik city.

3) To evaluate the impact of working hours on work-related musculoskeletal disorders among the shopkeepers in Nashik city.

MATERIALS AND METHODOLOGY

This cross-sectional study will be conducted among shopkeepers working in various grocery shops, supermarkets, and convenience stores across Nashik city over a duration of six months, with a sample size of 148 participants selected through a purposive sampling technique. The study aims to determine the prevalence of work-related musculoskeletal disorders among shopkeepers and to analyze associated occupational risk factors.Both male and female shopkeepers aged between 20 and 60 years, working for more than 9 hours per day and having a minimum work experience of five years, will be included in the study. Shopkeepers with severe disabilities, those who have undergone recent surgery, sustained recent fractures, or are unable to understand or follow instructions will be excluded from the study.Materials required for the study will include pen and standardized outcome measure scales. The assessment will be carried out using the Rapid Entire Body Assessment (REBA), an ergonomic tool used to evaluate postural risks associated with job tasks, and the Nordic Musculoskeletal Questionnaire (NMQ), a validated questionnaire designed to assess the presence and distribution of musculoskeletal symptoms in different body regions. These outcome measures will help in identifying the prevalence and severity of musculoskeletal disorders and their association with occupational activities among shopkeepers.

PROCEDURE

OBTAINING APPROVAL FROM THE RESEARCH GUIDANCE AND ETHICAL COMMITTEE OF THE INSTITUTE

Each participant will be taken by the purposive sampling technique.

Participants will be selected based on both inclusion and exclusion criteria.

Information and instruction will be given to the participants about study in their local language.

They will be informed about the benefits, risks and confidentiality

Written consent will be taken in their local language. (Marathi)

Basic demographic data of selected participants will be taken.

Data Collection will be done using Nordic Musculoskeletal Questionnaire and REBA Scale.

Analysis of the collected data will be done.

Results and conclusion will be drawn.

DATA ANALYSIS

The collected data were entered into Microsoft Excel and analyzed using Statistical Package for the Social Sciences (SPSS) version 26.0. Descriptive statistics such as frequencies, percentages, means, and standard deviations were used to summarize demographic variables including age, gender, work experience, and daily working hours, as well as the distribution of musculoskeletal symptoms. The prevalence of work-related musculoskeletal disorders (WMSDs) was calculated based on responses from the Nordic Musculoskeletal Questionnaire (NMQ) for the past 12 months and past 7 days, including body-region–specific prevalence. Chi-square tests were used to examine associations between WMSDs and categorical variables like age group, gender, work experience, and working hours, while independent t-tests and one-way ANOVA were applied to compare mean differences between groups. A p-value of less than 0.05 was considered statistically significant, and the results were presented using tables and graphs.

RESULTS

AGE GROUPS OF THE PARTICIPANTS:

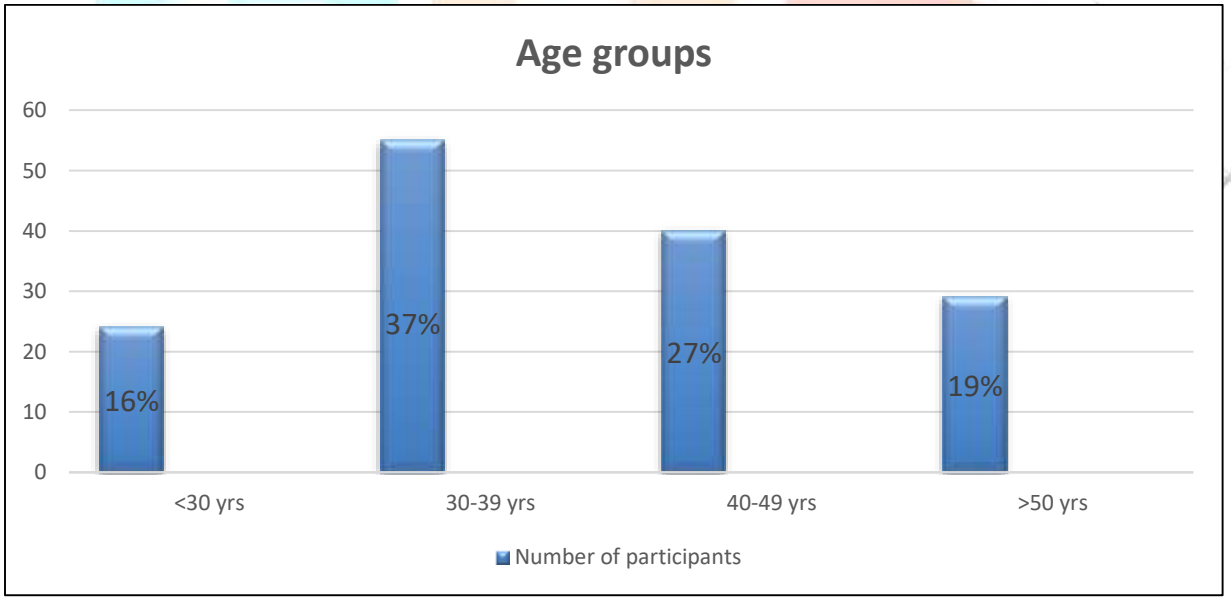

Figure 1: Age groups of the participants

Among participants under the age of 30, **16.2% (n=24)** reported experiencing WMSDs, indicating that even younger individuals are not immune to ergonomic risks, possibly due to physically demanding tasks or inadequate training in safe work practices. The highest prevalence was observed in the **30–39 age group**, where **37.2% (n=55)** of participants reported such disorders. This peak may reflect the cumulative effects of sustained physical activity over time, combined with the likelihood that individuals in this age bracket are often at the height of their professional workload. In the **40–49 age group**, the frequency slightly declined to **27% (n=40)**, which could suggest either improved coping mechanisms, greater experience in managing physical tasks, or a shift in job roles that are less physically intensive. Finally, participants aged **50 and above** accounted for **19.6% (n=29)** of WMSD cases. While this group showed the lowest frequency among those over 30, it still represents a significant portion, possibly influenced by age-related physiological changes and reduced resilience to repetitive strain.

GENDER OF THE PARTICIPANTS:

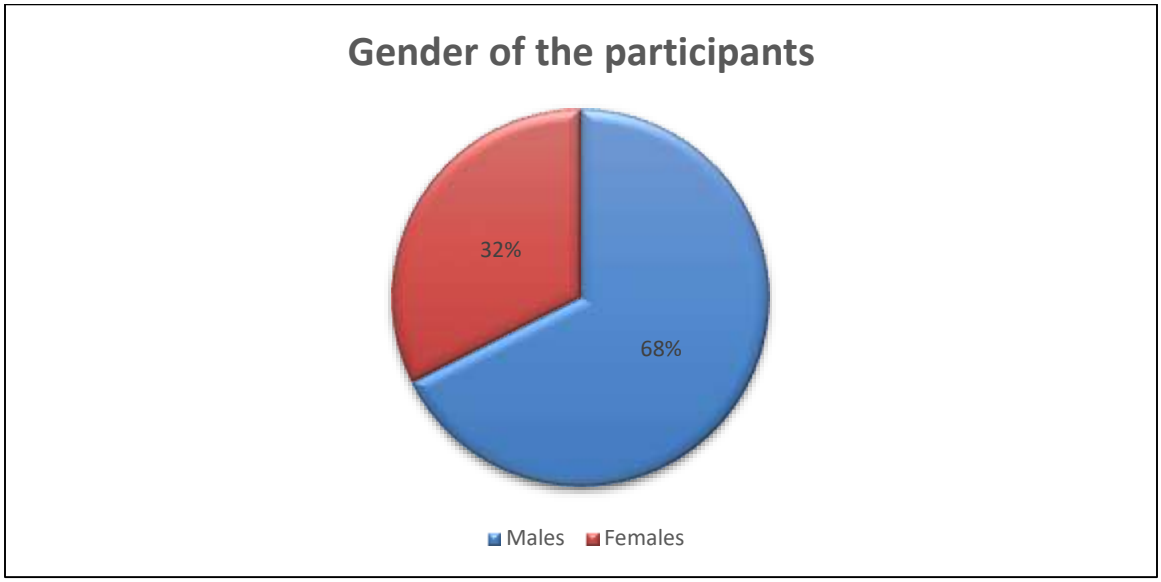

Figure 2: Gender of the participants

The demographic breakdown of the participants reveals a notable gender disparity. Out of the total sample, **100 individuals were male**, representing a significant **68%** of the entire group. This indicates that more than two-thirds of the participants were men, suggesting either a male-dominated environment or a sampling bias toward male respondents. In contrast, **48 participants were female**, accounting for the remaining **32%**

WORKING HOURS OF THE PARTICIPANTS:

Figure 3: Working hours of the participants

The bar chart presents a clear distribution of working hours across five defined intervals. The majority of shopkeepers fall within the (11.6, 13.2] hour range, with approximately **33 individuals**, indicating this is the most common working duration. The second most populated interval is [10, 11.6] hours, comprising around **15 shopkeepers**, suggesting a significant portion works slightly shorter hours. A noticeable drop is observed in the (13.2, 14.8] and (14.8, 16.4] intervals, with **10** and **13 shopkeepers** respectively, reflecting a moderate number of individuals working longer shifts. The least represented group is in the (16.4, 18] hour range, with only **2 shopkeepers**, highlighting that extended working hours are rare among this population. Overall, the data suggests that most shopkeepers tend to work between **11.6 to 13.2 hours daily**, with fewer opting for significantly shorter or longer durations. This distribution may reflect operational norms, labor capacity, or economic factors influencing daily work routines.

AFFECTED BODY PART:

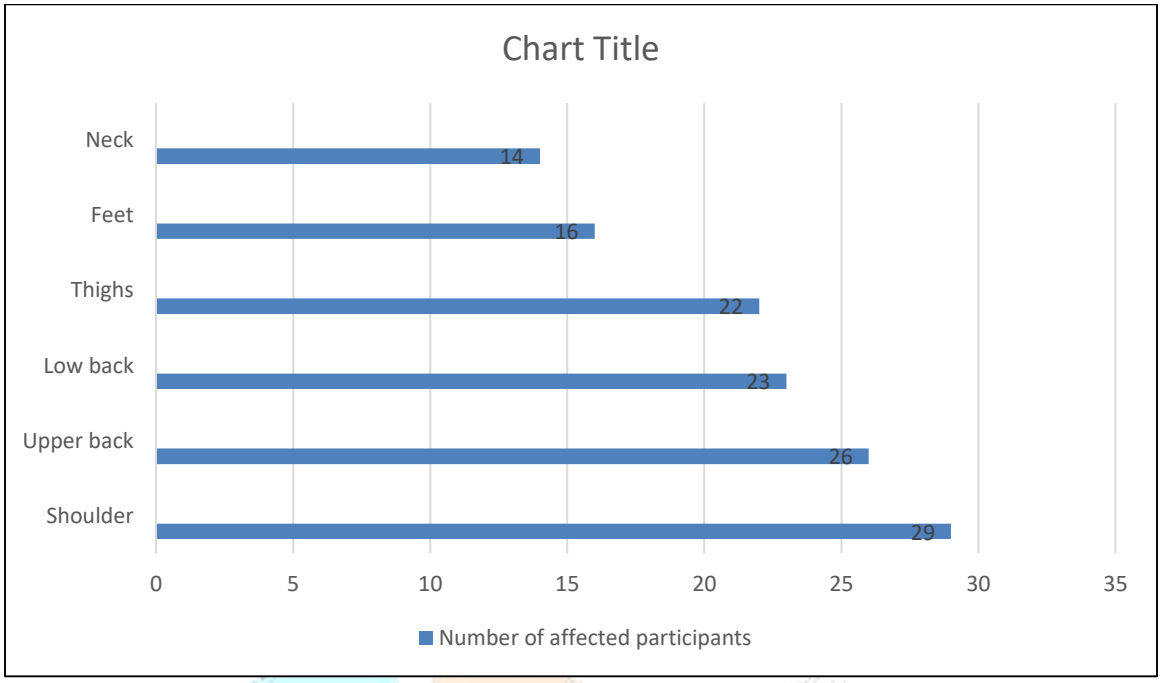

Figure 4: Affected body part

The data reveals the distribution of physical discomfort reported by participants across various body regions. The shoulder emerged as the most commonly affected area, with **29 individuals (19.59%)** indicating pain or strain, suggesting it may be a frequent site of musculoskeletal stress. Following closely, the upper back was reported by **26 participants (17.57%)**, and the lower back by **23 (15.54%)**, highlighting the prevalence of back-related issues. Discomfort in the thighs was noted by **22 participants (14.86%)**, while **16 individuals (10.81%)** experienced problems in their feet, possibly linked to prolonged standing or walking. Lastly, neck pain was reported by **14 participants (9.46%)**, rounding out the list.

REBA SCORE DISTRIBUTION:

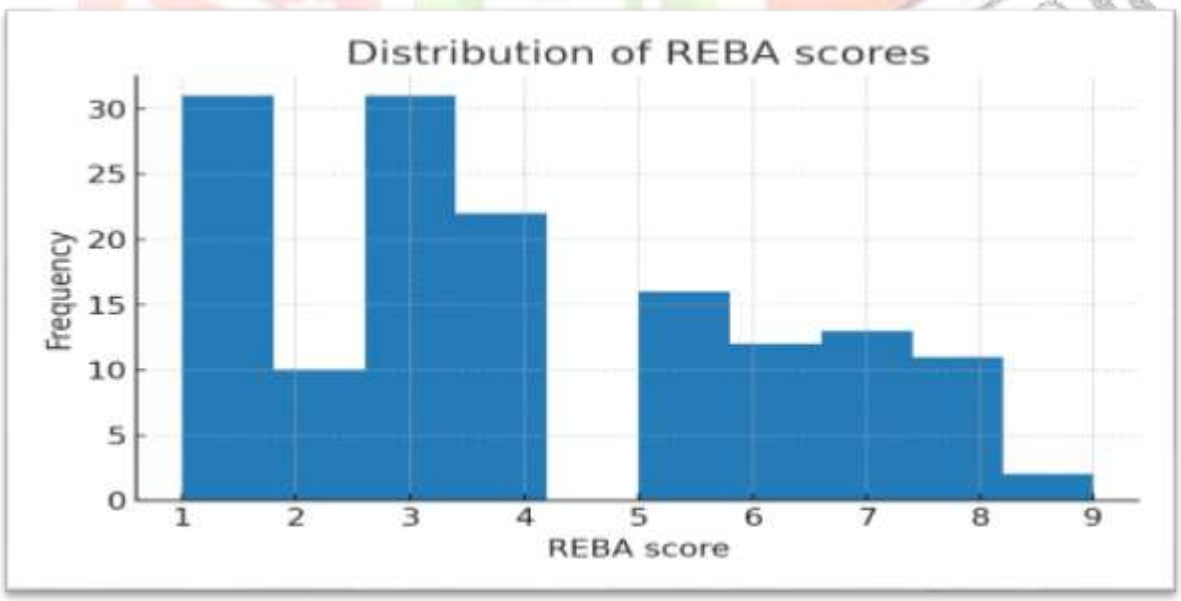

Figure 5: REBA score distribution

The graph shows that **scores of 1, 2, and 3** are the most frequently observed, each appearing approximately **31 to 32 times**, indicating that a majority of participants were working in postures associated with low ergonomic risk. As the scores increase, the frequency gradually decreases, with **score 4** appearing around **23 times** and **score 5** about **15 times**, suggesting moderate risk levels. Higher scores—**6 through 9**—are less common, with

frequencies ranging from **10 down to 6**, reflecting fewer instances of high-risk postures. Overall, the distribution suggests that while most individuals were engaged in relatively safe postures, a smaller portion may require ergonomic adjustments to reduce potential strain or injury.

REBA RISK CATEGORIES:

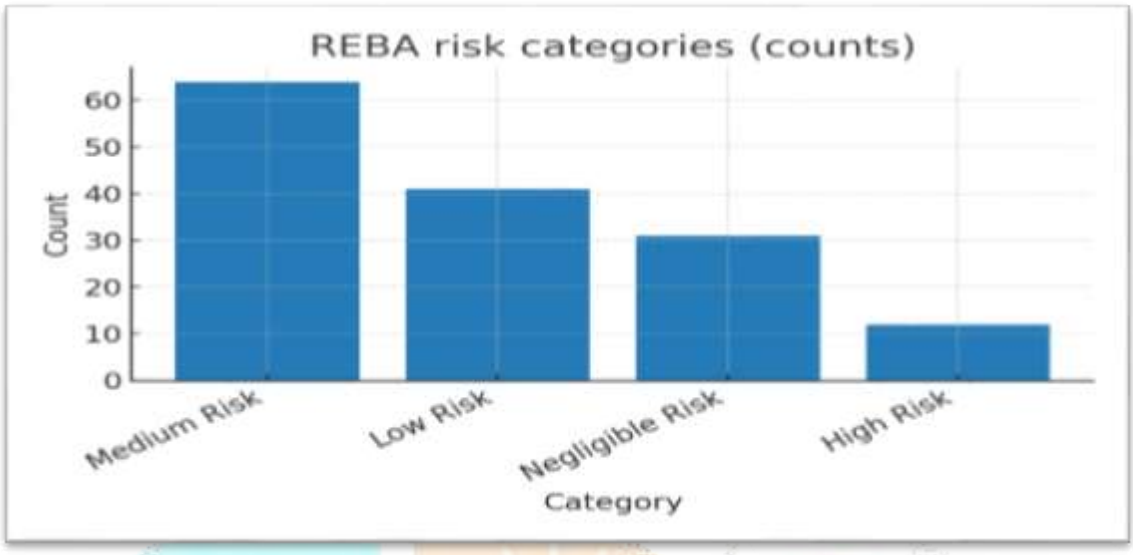

Figure 6: REBA risk categories

The REBA (Rapid Entire Body Assessment) interpretation data provides a breakdown of ergonomic risk levels observed in a given set of workplace tasks or postures. Among the four categories, **Medium Risk** emerges as the most prevalent, accounting for **64 instances**, which represents **43.24%** of the total. This suggests that nearly half of the evaluated activities pose a moderate level of concern and may require further analysis or intervention to prevent potential musculoskeletal disorders. **Low Risk** follows with **41 cases** or **27.70%**, indicating a substantial portion of tasks that are relatively safe but could still benefit from periodic review or minor ergonomic adjustments. The **Negligible Risk** category includes **31 instances**, making up **20.95%** of the total. However, even negligible risks should not be entirely overlooked, especially in dynamic or evolving work environments. Finally, **High Risk** is the least represented category, with **12 occurrences** or **8.11%**, yet it holds significant importance. Tasks falling into this group are likely to pose serious ergonomic hazards and demand immediate corrective measures to safeguard worker health and safety.

DISCUSSION

The findings of this study on work-related musculoskeletal disorders (WMSDs) among shopkeepers in Nashik City reveal patterns both consistent with and distinct from prior research conducted in similar occupational settings. For instance, Ohara and Kulkarni (2025) reported a high prevalence of WMSDs among rural shopkeepers in Maharashtra, with the lower back and knees being the most affected regions. In contrast, this study identifies the shoulder (19.59%) and upper back (17.57%) as the most commonly affected areas, suggesting that urban shopkeepers in Nashik may engage in tasks involving frequent reaching, lifting, or overhead movements—activities less prevalent in rural setups.[32]

Similarly, Gupta et al. (2021) found that chronic osteoarthritic pain was widespread among Indian shopkeepers, particularly in the lower back (57.33%) and knees (30%). This study, however, presents a more diversified distribution of discomfort across body regions, including thighs (14.86%) and feet (10.81%), which may reflect prolonged standing and walking typical of urban retail environments. These differences underscore the importance of contextualizing ergonomic risks within specific occupational and geographic settings.[20]

Moreover, a meta-analysis by Mishra et al. (2025) highlighted that WMSDs are prevalent across various Indian occupational sectors, with ergonomic risk levels often correlating with task repetitiveness and physical workload. This study's REBA-based assessment aligns with this, showing that 43.24% of tasks fall under medium risk, reinforcing the need for targeted ergonomic interventions even in seemingly low-risk environments.[33]

The age-wise distribution of WMSDs in this study reveals a peak prevalence in the 30–39 age group (37.2%), which may be attributed to the cumulative physical strain experienced during peak career years. Younger participants (<30 years) also reported notable discomfort (16.2%), likely due to inadequate training in safe work practices or sudden exposure to physically demanding tasks. The decline in WMSDs among older age groups (40–49: 27%; ≥50: 19.6%) could reflect adaptive coping strategies, role transitions to less physically intensive duties, or underreporting due to normalization of chronic pain.

The gender disparity—68% male vs. 32% female—may reflect the male-dominated nature of retail operations in Nashik or sampling bias. This imbalance could influence the types of tasks performed and the associated ergonomic risks, as men may be more involved in physically demanding roles such as stock handling or prolonged standing.

Working hours data further contextualizes the ergonomic burden. Most shopkeepers work between 11.6 to 13.2 hours daily, a duration that significantly exceeds standard occupational thresholds and likely contributes to musculoskeletal strain. The correlation between extended working hours and discomfort in weight-bearing regions (feet, thighs) supports this hypothesis.

This study stands out for its focus on a developing urban center like Nashik, where rapid commercial expansion has not been matched by ergonomic awareness or infrastructure. Unlike previous studies that targeted rural populations or older age groups, your research includes younger and mid-career individuals, offering a more comprehensive view of WMSD onset and progression across the working lifespan. This demographic inclusivity enhances the relevance of your findings for urban occupational health planning. Furthermore, Nashik's unique blend of traditional retail practices and emerging commercial norms creates a hybrid work environment that has not been extensively studied. This research fills this gap by providing empirical data on ergonomic risks in such transitional economies.

This study provides a foundational dataset for developing targeted physiotherapy and occupational health interventions in urban retail settings. By identifying specific age groups and body regions most affected, healthcare providers can tailor treatment plans—such as strengthening exercises for the shoulder girdle or postural re-education for back pain. Moreover, these findings can inform municipal labor policies and workplace safety regulations in Nashik and similar cities. Integrating ergonomic standards into local business could significantly reduce WMSD incidence. In the long term, this research supports the creation of a city-wide ergonomic surveillance system, enabling early detection and intervention for musculoskeletal risks among retail workers. This proactive approach could enhance worker productivity, reduce healthcare costs, and improve quality of life.

LIMITATIONS

The study presents several limitations that should be acknowledged to contextualize its findings. First, the sample size, while sufficient for preliminary analysis, may limit the generalizability of the results to the broader population of shopkeepers in Nashik or similar urban settings. A larger and more diverse sample could enhance statistical power and allow for more robust subgroup comparisons. Second, the gender distribution within the sample reveals an imbalance, with male participants comprising 68% and females only 32%. Although this may reflect the actual workforce composition, it introduces potential bias in interpreting gender-specific ergonomic risks and may underrepresent the experiences of female shopkeepers. Another limitation pertains to the range of reported working hours. While the study categorizes work durations into defined intervals, the deviation in individual schedules and the lack of standardization in daily routines may affect the accuracy of ergonomic risk assessments. Variability in shift patterns, rest breaks, and task intensity are not fully captured, which could influence the interpretation of musculoskeletal strain. Additionally, the study does not assess psychosocial stressors such as job satisfaction, mental fatigue, or workplace pressure, which are known to interact with physical risk factors and contribute to the development or exacerbation of WMSDs. The absence of this dimension restricts the holistic understanding of occupational health among shopkeepers and highlights the need for future research incorporating both physical and psychological variables.

SUGGESTIONS

The findings of this study highlight several key directions for future research to better understand and address work-related musculoskeletal disorders (WMSDs) among shopkeepers in developing urban areas. Expanding the sample size across multiple cities would improve the generalizability of results and enable meaningful regional comparisons. Addressing gender imbalance by ensuring equal representation can lead to more accurate gender-based ergonomic insights. Future studies should also examine variations in work schedules, shift patterns, and task intensity to better capture ergonomic exposure. Including psychosocial factors such as job stress, mental fatigue, and emotional well-being would provide a more holistic view of occupational health risks, as these often interact with physical stressors to influence WMSD development. Longitudinal research tracking symptom progression and evaluating ergonomic interventions like adjustable workstations, task rotation, supportive footwear, cushioned flooring, and REBA-based assessments can help shape effective prevention strategies and inform policy. Overall, a multidimensional and inclusive approach is essential for improving occupational health in retail environments.

SUMMARY

The study revealed that WMSDs peak among shopkeepers aged 30–39, with a gradual decline in older age groups. Male participants dominated the sample, but both genders reported significant discomfort, highlighting the need for gender-sensitive interventions. Long working hours were common, contributing to physical strain, especially in the shoulders, back, and thighs. REBA assessments showed that most shopkeepers faced low to medium ergonomic risks, though a notable portion encountered high-risk postures requiring urgent ergonomic improvements.

CONCLUSION

This study offers a comprehensive evaluation of Work-Related Musculoskeletal Disorders (WMSDs) among shopkeepers, emphasizing the complex interplay of ergonomic risks in informal retail environments. Through demographic profiling, ergonomic assessments, and prevalence data, it becomes evident that WMSDs affect individuals across all age groups, genders, and work patterns, driven by factors such as physical demands, posture, and extended work duration. The highest prevalence was observed among those aged 30–39, likely due to cumulative strain and peak workload intensity, while younger participants also reported discomfort, and older

individuals showed a decline possibly due to adaptive strategies or role changes. Despite a male-dominated sample, both genders experienced significant discomfort, highlighting the need for inclusive interventions. Most shopkeepers worked between 11.6 to 13.2 hours daily, often without ergonomic support or structured breaks, contributing to fatigue, particularly in the shoulders, upper back, and thighs. REBA assessments revealed that although many worked in low-risk postures, 43.24% faced medium risk and 8.11% high risk, indicating the need for targeted ergonomic improvements. These findings underscore the importance of posture training, task rotation, anti-fatigue flooring, and scheduled rest periods. Integrating such measures into occupational health strategies can reduce WMSD prevalence, enhance productivity, and improve the well-being of workers in the informal retail sector.

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