

Work-Related Musculoskeletal Disorders in Swachhata Doots of Panvel Mahanagar Palika: A Cross-Sectional Study

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Abstract

This study aims to assess the prevalence of Work-Related Musculoskeletal Disorders (WMSDs) and their associated risk factors among 200 street sweepers, known as Swachhata doots, working for Panvel Mahanagar Palika. The study employed demographic details, job details, and a self-reported Nordic Musculoskeletal Questionnaire (NMQ) to collect data, along with the Rapid Upper Body Assessment (RULA) to evaluate work posture. The results showed that 74% of the participants experienced musculoskeletal disorders, with lower back pain being the most prevalent (39%), followed by knees (21%) and shoulders (15%). The RULA assessment revealed that a significant percentage of participants were at medium to high risk of developing WMSDs due to postural problems. These findings indicate that the job of a Swachhata doot involves a major risk of developing WMSDs and calls for preventive measures to be implemented.

Keywords: Work Related Musculoskeletal Disorders, Nordic Musculoskeletal Questionnaire, Rapid Upper Limb Assessment

Introduction

Swachhata doots are street sweepers working under Panvel Mahanagar Palika. Swachhata doots perform jobs that are essential to our society because they maintain hygiene in our communities [1]. The job of a Swachhata doot is a vigorous task that involves cleaning assigned areas such as roads, footpaths, parks, markets, and open settlements. This process requires continuous physical activities of manually sweeping in the standing posture for long durations, bending while collecting the swept waste, and pushing or pulling the wheelbarrow [2].

Currently, more than 1000 Swachhata doots are working under Panvel Mahanagar Palika.

The responsibilities of Swachhata doots necessitate frequent utilization of joints such as their knees, shoulders, elbows, ankles, and necks, as well as their backs when they sweep, collect and dispose of waste [1]. The entire process of cleaning is divided among different groups of workers with each being assigned some specific tasks.

These workers who are involved in such repetitious physical tasks and awkward bending postures for long durations are at risk of developing Musculoskeletal disorders (MSDs). The term MSD denotes health problems of the musculoskeletal system, i.e. muscles, tendons, the skeleton, cartilage, the vascular system, ligaments, and nerves; ranging from mild discomforts to disabling injuries and permanent disability. Work-related musculoskeletal disorder (WMSD) is any musculoskeletal disorder that is aggravated by several factors, and where the work environment and the circumstances of its performance contribute significantly, but in varying magnitudes, to the causation of the disease [3]. WMSDs significantly impact the quality of life (QOL), cause reduced work time or absenteeism and increase work restrictions [4].

In Indian culture, street sweeping has been stigmatized to be a filthy and lowly occupation and the medical problems of these workers are affected by various socioeconomic factors such as poverty, lack of education, poor housing conditions, and poor diet [5].

The management of WMSDs usually relies on Outpatient Department (OPD) care. Unfortunately, the health insurance provided to these laborers by the municipal corporation does not offer an OPD cover (expenses of outpatient treatment which are incurred without hospitalization). Consequently, WMSDs become a liability for the Swachhata doots, making it imperative to recognize their incidence and potential risk factors.

Among street sweepers, most past studies have primarily focused on eye, skin, and respiratory occupational morbidities other than MSDs. The present study, in contrast, aims to assess the occupational exposure of sweeping to the development of MSDs and to identify the risk factors leading to the development of MSDs [2].

Aim and Objective

Aim - This study aims at determining the prevalence of work-related musculoskeletal disorders and the associated risk factors among Swachhata doots of Panvel Mahanagar Palika.

Objective -

1. To find the prevalence of work-related musculoskeletal disorders among street sweepers.
2. To identify the risk factors causing WMSDs.

Materials and Methods

- This cross-sectional survey study employed a purposive sampling method to examine the prevalence of MSD among street sweepers under Panvel Mahanagar Palika. The sample size was 200. The study utilized the pen-paper method.
- Ethical approval for the research was taken from the Institutional Ethics Committee.
- Necessary permits for field study were obtained from the Panvel Mahanagar Palika.
- The purpose and procedures of the study were clearly explained to all the participants.
- Inclusion criteria consisted of street sweepers between 20-59 years of age, working for at least one year under the Kharghar, Kalamboli, or Panvel ward, and with an understanding of Hindi/Marathi/English language. Exclusion criteria consisted of participants not willing to participate, having a previous history of injuries or surgery for MSD, and those with any psychological abnormalities.

- A written consent form was obtained.
- The demographic data collected from the participants included name, age, gender, the highest level of education, language is spoken, and body mass index (BMI). Job characteristics were also collected, including assigned working area, number of years in the occupation, income, working hours per day, start and end time of the shift, days off per month, main tasks, work intensity, and safety equipment.
- Two scales were employed in the study-
 1. Self-reported NMQ to screen the MSK symptoms in nine regions of the body over the last 12 months and the past week.
 2. RULA to evaluate work posture and to identify the risk factor. The following postures were evaluated: the most difficult postures and work tasks, the posture sustained for the longest periods, and the posture where the highest force loads occur. Images of these tasks were taken and the grand score was calculated.

Data Analysis and Results

The cross-sectional study included 200 street sweepers between the ages of 20-59 years, with a minimum of 1 year of work experience. The workers typically work for 8 hours a day with 1 hour break, and receive 4 leaves a month. Most of them had an education of 10th and below. Most participants were male indicating a male predominance in this occupation.

Table 1: Descriptive Statistics

Age (n=200)	Mean	37.51
	Standard Deviation	±9.06
BMI (n=200)	Mean	23.35
	Standard Deviation	±4.14
Gender Distribution (n=200)	Males	90.50%
	Females	9.50%
Level of Education (n=200)	None	7.50%
	SSC and Below	74%
	Above HSC	18.50%
Work Experience in Years (n=200)	1-10	66%
	10-20	23.50%
	20-30	10.50%

Table 1 shows the descriptive statistics of the data including age, BMI, gender distribution, level of education, and experience of the participants.

Figure 1: Pain during the Last 12 Months

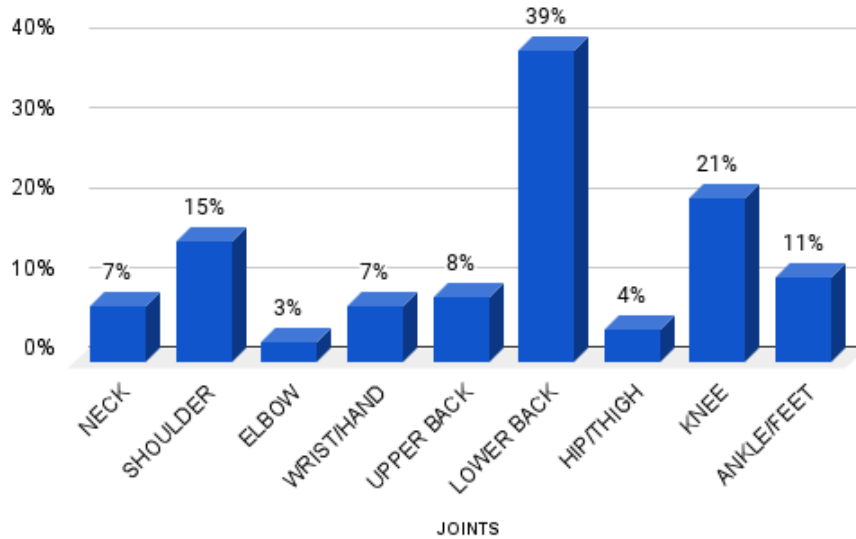


Figure 1 shows the prevalence of reported pain during the last 12 months which was highest in the lower back (39%), followed by knees (21%) and shoulders (15%).

Figure 2: Prevented from doing their Normal Work

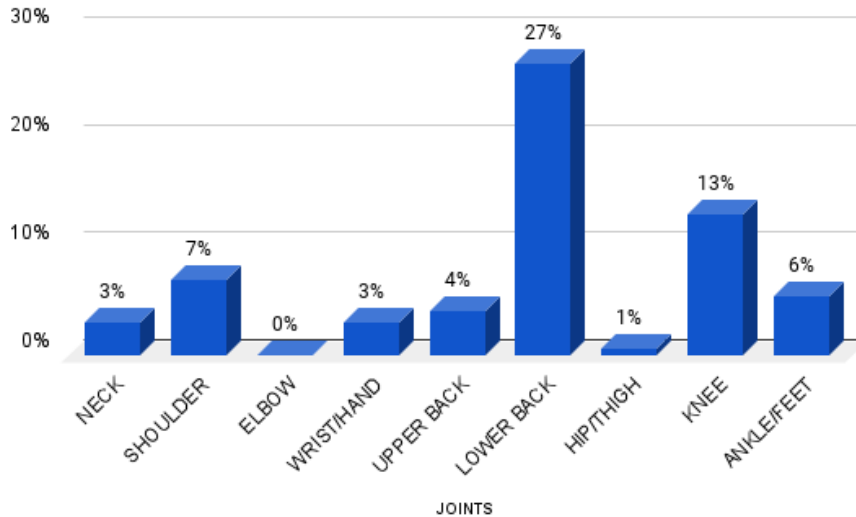


Figure 2 shows that 27% of participants were prevented from doing their normal work due to discomfort in the low back followed by 13% of the participants affected due to discomfort in the knees during the past 12 months.

Figure 3: Pain during the Last 7 Days

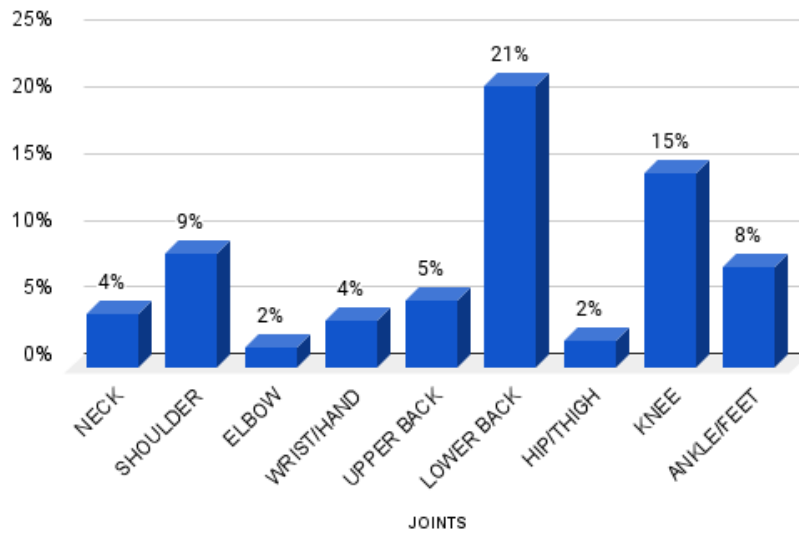


Figure 3 shows the prevalence of pain during the last 7 days. The highest prevalence is observed in the lower back (21%) followed by knees (15%) and shoulders (9%).

Figure 4: RULA Analysis (Level of MSD Risk)

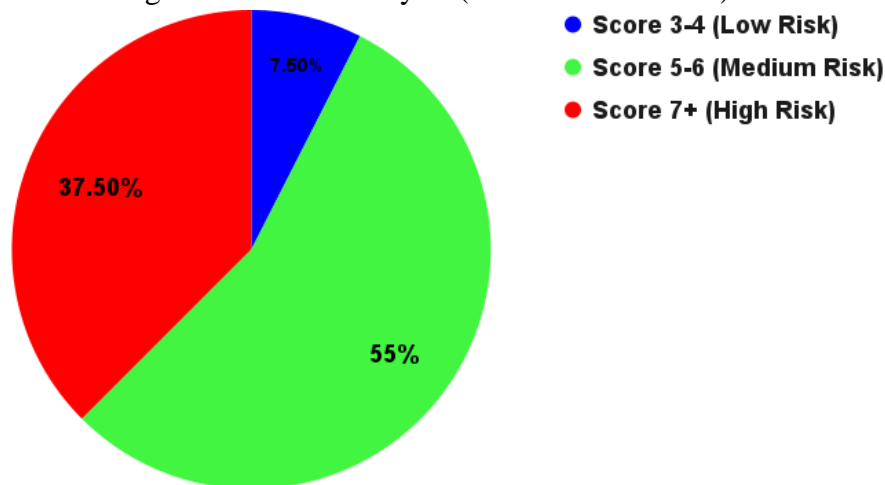


Figure 4 shows that the maximum number of participants falls under the medium-risk category (55%), followed by the high-risk category (37.5%) and low-risk category (7.50%).

Discussion

The Swachhata doots were surveyed and assessed using the Nordic Musculoskeletal Questionnaire (NMQ) and Rapid Upper Limb Assessment (RULA).

The job of a Swachhata doot involves demanding physical labor, which entails repetitive use of their joints when carrying out activities such as sweeping, collecting, and disposing of waste. Out of 200, 148(74%) participants suffered from musculoskeletal disorders in at least one of the joints of their body. Results of NMQ indicated that the prevalence of reported pain was higher in the lower back followed by knees and

shoulders. Statistical body part scores of the lower back, knees, and shoulders reflect the high loading of these body regions. The RULA assessment showed that most Swachhata Doots had a poor working posture, falling into either the medium-risk or high-risk category, indicating a high ergonomic risk.

A similar study was carried out among MSW workers in Chennai in 2015, in which a higher prevalence of symptoms in knees, shoulders, and lower back was found [7]. Another study on MSW workers in Iran reflected the highest prevalence of musculoskeletal symptoms in the low back followed by knees, shoulders, upper back, and neck [8]. These findings are consistent with the present study offering evidence that there is a high prevalence of MSDs among the 'Swachhata doots'.

The results of this study suggest that the Swachhata Doots are at a high risk of developing WMSDs due to the nature of their job. Sweepers frequently assume a bent-forward and/or twisted back position, which results in a significant static postural load that increases the lumbar shear forces [9, 10]. Prolonged standing causes cumulative disc compression. These factors may cause lower back discomfort [10]. The cause of shoulder pain may be related to the upper limbs working maximum duration to perform activities of sweeping. These repetitive arm movements require high dynamic and static force output. Additionally, collecting and disposing of heavy and/or bulky items in trash bins can pose a significant physical risk factor [10]. Prolonged standing also places significant compression forces on the knee joints, leading to pain and fatigue.

Awkward postures and repetitive motions further increase the likelihood of developing WMSDs by increasing the exertion required by the smaller muscles and preventing the larger and stronger muscles from working efficiently [10].

The Pandalur Mahanagar Palika runs free dispensaries and provides free medications to the workers, but no ergonomic measures are taken. Therefore, it is important to implement ergonomic interventions to reduce the risk of WMSDs among Swachhata Doots. Ergonomic measures can improve the working conditions of the workers and ensure their health and safety while working.

Conclusion

The findings of my study revealed that 'Swachhata doots' have a high incidence of Work-Related Musculoskeletal Disorders (WMSDs) due to poor posture, particularly in the lower back, knees, and shoulders. Preventive measures must be taken to reduce the occurrence of musculoskeletal disorders in this profession.

Clinical Importance

- The findings of this study can serve as a basis for designing and implementing appropriate ergonomic interventions, such as job rotation, training in proper posture, the use of ergonomic equipment, and scheduling of rest breaks to reduce the risk of WMSDs among Swachhata Doots.
- This can be done through Training Programs/Workshops and Education Manuals.
- Further studies with larger sample sizes can be undertaken to identify the factors responsible for an increased prevalence of WMSDs.

Limitations of the Study

- NMQ is a self-administrated form and therefore desirability bias may be present.
- The study's cross-sectional design only included a specific portion of the population, which may limit the generalizability of the study findings to a broader population.
- While the study conducted RULA analysis of the most challenging posture sustained for longer durations, the work roles of the workers were not clearly defined.

Acknowledgment

Grateful acknowledgments to the Almighty God for blessings and to all individuals who contributed to the completion of this research, including Dr. Shweta Phadke, my guide Dr. Jyoti Parle, my family, the Department of Community Physiotherapy, Panvel Mahanagar Palika staff, participants, colleagues, and all those who offered their support.

References

1. Jugmin P., Junsee L., Myung-Sun L., "Occupational Health Injuries by Job Characteristics and Working Environment among Street Cleaners in South Korea", International Journal of Environmental Research and Public Health, 2020.
2. Pradeep S. S., Praveen ., "Assessing the exposure of street sweeping and potential risk factors for developing musculoskeletal disorders and related disabilities: a cross-sectional study", BMJ Open, 2016.
3. "Work-related Musculoskeletal Disorders Questionnaire (WMSD)", Retrieved from [clinicaltrials.gov. https://clinicaltrials.gov/ct2/show/NCT04192604](https://clinicaltrials.gov/ct2/show/NCT04192604), 2019.
4. Deepak A., Chandra I., Keerthi R., "Work related musculoskeletal disorders among hospital nurses in rural Maharashtra, India: a multi centre survey", International Journal of Research in Medical Sciences, 2013.
5. Yogesh D. S., Sanjay p. Z., "A Study of Morbidity Pattern in Street Sweepers: A Cross-sectional Study", Indian J Community Med, 2008.
6. Haimanot M., Tsiwaye G., Abayneh A., Awtachew B., "Prevalence and Associated Factors of Musculoskeletal Disorders among Cleaners Working at Mekelle University, Ethiopia", J Pain Res, 2020.
7. Endreddy M. R., Sandul Y., "Musculoskeletal disorders among municipal solid waste workers in India: A cross-sectional risk assessment", J Family Med Prim Care, 2015.
8. Mehrdad R., Majlessi-Nasr M., Aminian O., et al. "Musculoskeletal Disorders among Municipal Solid Waste Workers", Acta Med Iran.
9. Kerr MS, Frank JW, Shannon HS, et al. "Biomechanical and psychosocial risk factors for low back pain at work", Am J Public Health, 2001.
10. Zock J. P., "World at work: Cleaners", Occupational and Environmental Medicine, 2005.
11. Pintakham K, Siriwong W. "Effectiveness of the multidimensional ergonomic intervention model to reduce musculoskeletal discomfort among street sweepers in Chiang Rai Province, Thailand", Risk Management Health Policy, 2016.
12. Waqar Naqvi, "Physiotherapy in Community Health and Rehabilitation", Jaypee Brothers Medical Publishers, 2011, pages 365-368.



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