

Prevalence of Musculoskeletal Pain Amongst Sweepers of Pune Region

Vedanti Nilesh Walchale¹, Dr. Amruta Khilwani², Dr. Albin Jerome³

¹Physiotherapist, St. Andrew's College of Physiotherapy, Pune, India.

²Assistant Professor, St. Andrew's College of Physiotherapy, Pune, India.

³Principal, St. Andrew's College of Physiotherapy, Pune, India.

Corresponding Author: Vedanti Nilesh Walchale

DOI: <https://doi.org/10.52403/ijhsr.20240462>

ABSTRACT

Musculoskeletal pain related to work has been a major public health concern in recent years. Work related MSK pain is a common issue that affect many individuals and has been increasing day by day. Sweepers have an important role in our society as they keep our surroundings clean. In india very few studies had been carried out to assess prevalence of MSK pain amongst sweepers. Therefore, to identify the prevalence of MSK pain amongst sweepers, the present research has been undertaken. For this purpose, observational study was carried out on 187 sweepers including both female and male from hospitals, roads and footpaths of Pune region. Modified Nordic Musculoskeletal Pain Questionnaire was used to collect the MSK pain related information. The results showed that MSK pain amongst sweepers was high with majority of female sweepers complaining of body pain mostly in low back and shoulder region. It was observed that out of 187 participants, 166 (88.8%) samples found to have Musculoskeletal Pain in different body regions and 21 (11.2%) were not experiencing Musculoskeletal Pain. The high prevalence of MSK pain amongst sweepers was in lower back 50.27% and shoulder region 27.27% followed by 19.25% in ankles/feet, 12.30% in knees, 12% in neck, 10.70% in wrists/hands, 8.02% in upper back, 5.35% in elbows, 4.81% in hips/thighs. Results drawn from statistical inferences showed that there is significant relationship between MSK pain and years of work experiences in sweeping job. Thus it can be concluded that since sweepers experienced MSK pain, to address this some major and important guidelines, targeted interventions to improve the design of working tools including patient education and ergonomics has to be implemented to minimize their problems.

Keywords: Musculoskeletal pain, Prevalence of musculoskeletal pain, pain, sweepers, repetitive movement.

INTRODUCTION

Ache or discomfort in any of the body region such as Ankles, knees, hips, lower back, upper back, shoulders, elbows, neck, wrists etc is known as MSK pain.^[1] In maintaining hygiene of community and to keep our surrounding areas clean, sweepers play a very crucial role. Sweepers are

engaged in repetitive movements such as bending, pushing, pulling, and lifting for long durations due to which they are at high risk to develop MSK pain in different body regions.^[2,4]

Job of sweeping is a vigorous task that includes cleaning of assigned areas such as roads, footpaths, hospitals, etc using long

handled brooms.^[5] Standing for long hours, bending movement while collecting swept waste and sweeping movement, lifting containers to deposit waste is a strenuous physical tasks.^[6] Floor mopping using mop stick to clean the surface areas is a heavy job that involves repetitive movements of upper and lower extremities.^[7] Sweeping tasks involves movements of both hand as upper hand directs the mop and lower hand drives it.^[8] Changing of hand tools, repetitive movement and grip efforts to hold the mop while sweeping leads to increase the MSK pain in hand, wrists and fingers.^[9-11] Poor posture, repetitive movements and forceful exertions are all risk factors that develops MSK pain.^[12,13] Work related MSK pain amongst sweepers is because of broom sweeping and bending back for removing garbage on areas.^[14] MSK pain has been regarded as multifactorial causation. Repetitive handling and monotonous work can lead to MSK pain.^[15] The present study has been conducted to assess the prevalence of Musculoskeletal pain amongst sweepers of pune region.

MATERIALS & METHODS

In this study convenient sampling method was adopted. 187 Sweepers were selected between 21 to 40 years of age group including both male and female from pune region. In this study sweepers who had been sweeping for atleast one year and those who

had 4 hours/day minimum working hours of duty were included. Participants who were having any previous Musculoskeletal deformity, recent fracture, unhealed fracture, history of surgery and dislocations were excluded from this study.

A Data collection sheet in which name, address, phone no., years of work experience and dominance of hand of all participants were noted. In job description, participant's total hours of work per week and per day were noted. Prevalence of MSK pain experienced by sweepers were assessed through validated Nordic Musculoskeletal Pain Questionnaire.

Statistical Analysis

Descriptive statistical tests like mean, percentage, standard deviation were used to analyze the data. All data was analyzed using the tool named "jupyter notebook" (version 7.1) and matplotlib was used to convert this numerical data into graphical form. Excel's (6.2.14 Excel 2019, Excel 2021) was used for storing the data. Data was represented in the form of tables, bar graphs and pie chart. Graphical presentation was used wherever necessary.

RESULT

The findings had been presented using statistical methods and their theoretical implications.

TABLE 1: Demographic Data and Work Experience

Statistic	Age (Years)	Experience (Years)	Working Hours/Week
Mean	33.37	5.65	44.12
Standard Deviation	5.34	3.59	6.14

From the above table, it was observed that the mean age of sweepers was 33.37 years, hence it is concluded that they were in sweeping occupation from many years with average work experience of 5.65 years.

TABLE 2: Distribution of Gender

Gender	Count	Percentage
Female	152	81.3%
Male	35	18.7%

From the above table it was observed that, out of total 187 participants 152 (81.3%) were female and 35 (18.7%) were male.

TABLE 3: Distribution of Samples Experiencing Pain

Pain Experience	Number of Individuals	Percentage (%)
Yes	166	88.77
No	21	11.23

From the above table it was observed that, out of 187 participants 166 (88.8%) samples found to have Musculoskeletal Pain in

different body regions and 21 (11.2%) were not experiencing Musculoskeletal Pain.

TABLE 4: The counts and percentages of females and males having pain and no pain

Gender	Pain (Count)	No Pain (Count)	Pain (%)	No Pain (%)
Female	138	14	90.79%	9.21%
Male	28	7	80.00%	20.00%

From the above table, it was observed that, out of 166 participants who were having MSK pain, 138 (90.79%) female sweepers had pain and 28 (20.00%) male sweepers had pain in different body regions.

TABLE 5: Distribution Of Patient's Pain According To Their Work Experience

Work Experience Range	Number of Individuals Reporting Pain	Percentage of Total
0-5 years	71	37.97%
6-10 years	76	40.64%
11-15 years	15	8.02%
16-20 years	3	1.60%
21-25 years	1	0.53%

From the above table it was observed that, out of Total 166 samples having Musculoskeletal Pain, maximum 40.64%(76) samples from work experience group 6-10 years were having Musculoskeletal Pain, 37.97%(71) samples from work experience group 0-5 years were

having MSK Pain, 8.02%(15) samples from group 11-15 years were having MSK Pain, 1.60%(3) samples had MSK pain from work experience group of 16-20 years and remaining 0.53%(1) sample from group 21-25 years was experiencing MSK Pain.

Table 6 Percentage of affected body part reported by the participants

Body part	Yes	No	Percentage of Yes (%)
Neck	24	163	12.83
Shoulders	51	136	27.27
Elbows	10	177	5.35
Wrists/Hands	20	167	10.70
Upper Back	15	172	8.02
Lower Back	94	93	50.27
Hips/Thighs	9	178	4.81
Knees	23	164	12.30
Ankles/Feet	36	151	19.25

From the above table it was observed that, in this study participants reported MSK pain and discomfort in different body regions using standard Nordic musculoskeletal pain questionnaire.

- Neck- Out of 187 participants, 24 of them had neck issues.
- Shoulders- Out of 187 participants, 51 of them had shoulder issues.
- Elbows- Out of 187 participants, 10 of them had elbow issues.
- Wrists/Hands- Out of 187 participants, 20 of them had wrist issues.
- Upper Back- Out of 187 participants, 15 of them had upper back issues.

- Lower Back- Out of 187 participants, 94 of them had lower back issues.
- Hips/Thighs- Out of 187 participants, 9 of them had hip issues.
- Knees- Out of 187 participants, 23 of them had knee issues.
- Ankles/Feet- Out of 187 participants, 36 of them had ankle issues.

This showed that, participants were having most of the pain in lower back (50.27%) and shoulder (27.27%) region, followed by ankles/feet (19.25%), neck (12.83%), knees (12.30%), wrists/hands (10.70%), upper back (8.02%), elbows (5.35%) and hips/thighs (4.81%).

TABLE 7: Percentage of participants reported limitation in normal activities

No. of participants reported prevention in activity (out of 187)	Yes	No	Yes (%)	No (%)
SINCE LAST 12 MONTHS	164	23	87.7 %	12.3
ANY TROUBLE IN THE LAST 7 DAYS	94	93	50.3%	49.7

From the above table it was observed that, participants reported prevention in performing normal activity during the working hours due to the pain and discomfort arise because of work related musculoskeletal pain. Out of 187 participants, 164 (87.7%) reported being prevented in normal activity from past 12 months and 94 participants (50.3%) reported being prevented in normal activity from last 7 days.

DISCUSSION

In this study prevalence of Musculoskeletal pain amongst sweepers had been assessed using Nordic Musculoskeletal pain Questionnaire. The majority of participants were female.

The result Showed that the rate of pain was 50.27% in lower back, 27.27% in shoulders followed by 19.25% in ankles/feet, 12.30% in knees, 12% in neck, 10.70% in wrists/hands, 8.02% in upper back, 5.35% in elbows, 4.81% in hips/thighs. The highest prevalence was in lower back and shoulder region followed by ankles/feet, knees, neck, wrists/hands, upper back, elbows and hips/thighs.

The study found that sweepers had MSK pain due to repetitive activities of bending, pushing, pulling, lifting for long durations and repetitive movements of broom sweeping and bending back to remove garbage from the surface areas.^[2-4] Coordination, strength and endurance in various muscle groups are much needed for sweepers to effectively clean surface areas.^[16,17] Anatomical structures such as bones, joints, ligaments, cartilage, muscles and multiple body areas get affected in musculoskeletal conditions. Day-to-day activities, occupational efficacy, and social life has been hindered because of musculoskeletal pain.^[18] As sweepers were not engaged in lifting heavy loads on head or carry them for long durations, as a result

of which they do not put much pressure on cervical vertebrae.^[19]

Musculoskeletal discomfort/pain related to working factors includes working experience, sweeping distance, length of broom, weight of broom and dustpan. This study showed that the participants were affected due to their working hours that was almost upto 8 to 10 hrs each day. Continuous work pressure had been a important factor to cause musculoskeletal pain and loss of efficiency. Poor working conditions had implicated as a causative factor for MSK pain. Musculoskeletal pain in shoulder region was developed due to work related repetitive movements and strenuous activities. As the sweepers puts a high demand on lower back muscles while bending and collecting waste at the time of sweeping (Cholewicki et al., 1991; Gotshalk, 1984), fatigue-induced changes in posture can further increase spinal loads and the risk of lower back pain (Dolan & Adams, 1998).

CONCLUSION

The important risk factor in this study was repetitive movements for long durations, bending incorrectly and poor posture that resulted to develop MSK pain. This study concluded that sweepers had high prevalence of Musculoskeletal pain. In the given study many body regions were affected but the highest prevalence was found in lower back and shoulder region followed by ankles/feet, knees, neck, wrists/hands, upper back, elbows and hips/thighs respectively. Addressing this, sweepers require an enhanced physician training, interventions and ergonomics. Ergonomics such as use of long handled broom to avoid bending is must. Job related guidelines for sweepers are very important to get them proper knowledge and awareness of risk factors.

Declaration by Authors

Ethical Approval: Approved

Acknowledgement: First of all, I would like to thank the Almighty 'God for his grace, wisdom, guidance and protection during this project. I am extremely grateful to my parents for their love, prayers, care and sacrifice for educating and preparing me for my future.

It is my pleasure to express gratitude to DR. ALBIN JEROME (PT) Principal of St. Andrews College Of Physiotherapy, Pune for granting me permission to carry out this project.

I acknowledge the constant support, valuable inputs and tireless effort of my guide Dr. Amruta Khilwani (PT) who has reviewed my project. I am thankful to my statistician Mr. Keshav Andre, for helping me with the statistical analysis.

I am indebted to my subject for allowing me to assess them for my study as they co-operated and helped me to make data collection possible.

Last but not least I extend my gratitude to my colleagues and friends for their support and for creating a friendly working atmosphere that made it possible for me to complete my project successfully.

Source of Funding: None

Conflict of Interest: The authors declare no conflict of interest.

REFERENCES

1. Mehrdad R, Majlessi-Nasr M, Aminian O et al. Musculoskeletal disorders among municipal solid waste workers. *Acta Med Iran*, 2008
2. Keyserling WM, Workplace risk factors and occupational musculoskeletal disorders, part 1: a review of biomechanical and psychophysical research on risk factors associated with low-back pain.
3. Hoozemans MJM, Kuijer PPFM, Kingma I et al. Mechanical loading of the low back and shoulders during pushing and pulling activities.
4. IJzelenberg W, Molenaar D, Burdorf A, Different risk factors for musculoskeletal complaints and musculoskeletal sickness absence.
5. Salve PS, Chokhandre P, Assessing the exposure of street sweeping and potential risk factors for developing musculoskeletal disorders and related disabilities: A cross-sectional study. *BMJ Open*, 2016
6. Salve P, Bansod D, Street Sweeping Occupation and Potential Risk Factors for Developing Musculoskeletal Disorders and Related Disabilities: A Study in Mumbai, India. *Demographic Dimensions of Sustainable Development*, 2017
7. Kumar R., Kumar S, Musculoskeletal risk factors in cleaning occupation—a literature review *Int J Ind Ergon*, 2008
8. Dianat, Nedaei M, Nezami M.A, the effects of tool handle shape on hand performance, usability and discomfort using masons' trowels *Int J Ind Ergon*, 2015
9. Dianat I., Rahimi S, M. Nedaei, M.A. Jafarabadi, A. E, Oskouei Effects of tool handle dimension and workpiece orientation and size on wrist ulnar/radial torque strength, usability and discomfort in a wrench task *Appl Ergon*, 2017
10. Khan M.R., Singh N.K., Shinde D, An ergonomic study: bicycle repairer in rural India *Research into design for a connected world*, Singapore Springer, 2019
11. Lin J.H, Radwin R.G, Fronczak F.J, Richard T.G. Forces associated with pneumatic power screwdriver operation: statics and dynamics *Ergonomics*, 2003
12. European Agency for Safety and Health at Work. *FACTS 71 Introduction to work-related musculoskeletal disorders*, 2007
13. NIOSH. *Ergonomic Guidelines for Manual Material Handling* was prepared for publication by the Cal/OSHA Consultation Service, Research and Education Unit, Division of Occupational Safety and Health, California Department of Industrial Relations. DHHS (NIOSH), 2007.
14. Pintakham K, Effectiveness of the Multidimensional Ergonomic Intervention (MEI) Model to Reduce Musculoskeletal Discomfort among Street Sweepers (doctor of philosophy's thesis). College of Public Health Sciences, Chulalongkorn University; Bangkok, Thailand, 2014
15. Robson L, et al, A Systematic Review of the Effectiveness of Training & Education for the Protection of Workers; Toronto: Institute for Work & Health. Cincinnati: National Institute for Occupational Safety and Health, 2010

16. Krause N, Scherzer T, Rugulies R, Physical workload, work intensification, and prevalence of pain in low wage workers: results from a participatory research project with hotel room cleaners in Las Vegas. *Am J Ind Med*,2005
17. Bello A, Quinn MM, Perry MJ, Milton DK, Characterization of occupational exposures to cleaning products used for common cleaning tasks--a pilot study of hospital cleaners. *Environ. Health*,2009
18. World Health Organization. Protecting Workers' Health Series No. 5, Preventing Musculoskeletal Disorders in the Workplace. Geneva, Switzerland, 2003
19. Robson L, et al, A Systematic Review of the Effectiveness of Training & Education for the Protection of Workers; Toronto: Institute for Work & Health. Cincinnati: National Institute for Occupational Safety and Health, 2010

How to cite this article: Vedanti Nilesh Walchale, Amruta Khilwani, Albin Jerome. Prevalence of musculoskeletal pain amongst sweepers of Pune Region. *Int J Health Sci Res.* 2024; 14(4):500-505. DOI: <https://doi.org/10.52403/ijhsr.20240462>
