

Prevalence of Musculoskeletal Disorders among Building Sweepers

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ABSTRACT

Work related safety and health hazards are a major public health concern worldwide. According to the World Health Organization (WHO, 1995); 58% of the global population spends one-third of their time at work during adulthood. Therefore, the issue of work related safety has gathered increasing attention in the public health domain (Kabir A et al, 2015). Sweepers are vulnerable segment of our society and limited studies have been carried out in India to study their health issues. Therefore, the present research has been undertaken with the objective to identify the prevalence of musculoskeletal pain among residential building sweepers. For this purpose a cross-sectional descriptive study was carried out on 60 female sweepers from residential buildings of urban Mumbai city. A well structured questionnaire was used to study occupational activities of the females working as residential sweepers and modified Nordic Questionnaire was used to collect the MSD related information. The results showed that the musculoskeletal problem among residential sweepers was high; with majority of the female sweepers complaining of entire body pain. It was observed that 93.33%, 91.67%, 85% and 83.33% reported pain in arm, shoulder, hand/wrist and low back respectively. With respect to intensity of pain, 61.67%; 58.33% and 46.67% female sweepers complained of moderate pain in the shoulder, arm and hand respectively; and 31.67% complained of severe pain in the lower back and hand/wrist. Similarly, the frequency of pain on daily and weekly basis was more pronounced in lower back, hand/wrist, arm and shoulder. Statistical inferences drawn from the result showed that there was no correlation between MSD and intensity of pain among female sweepers; but there was a moderate, positive and significant correlation between MSD and age. A weak but positive significant correlation was found in MSD with years of experience and body weight among female sweepers. Thus, it can be concluded that since female sweepers experienced a number of musculoskeletal problems; some major ergonomic guidelines on safety and interventions to improve the design of working tools and conditions needs to be implemented at the earliest to minimize their problems.

Keywords: Musculoskeletal problems, sweepers, pain, safety

INTRODUCTION

Sweeping as a work job and employment, is specially thought and considered to be a menial one (Johncy 2014). Sweepers are the vulnerable segment of our community and suffering from different occupational health problems due to limited education, lack of knowledge on occupational health hazards. Musculoskeletal pain is a major worldwide

occupational health problem and can affect many different parts of the body including upper and lower back, neck, shoulders and extremities (arms, legs, feet and hands).

The issue of musculoskeletal problems in adult population is overwhelming. Low back pain is very common that almost half of the adult population suffered from low back pain

which last for more than 24 hours at times during the year (Tessa, 2010).

Almost all work requires the use of the arms and hands. Therefore, most Work Related Musculoskeletal Disorders (WMSD's) affect the hands, wrists, elbows, neck and shoulders. Work Related Musculoskeletal Disorders have become a major problem in many industrialized countries (Hagberg et al., 1995). There has been growing awareness among occupational health professionals worldwide of the large burden of illness associated with musculoskeletal disorders of the neck and upper limbs.

There is evidence for a positive association between highly repetitive work and shoulder MSD's which have been reviewed by several authors. Hagberg and Wegman (1987) attributed a majority of shoulder problems occurring in a variety of occupations to workplace exposure. Ohlsson et al. (1995) found a significantly higher proportion of shoulder MSD's in exposed populations with work characterized as involving repetitive arm and hand movements than in referent populations.

Sweeper has been dedicating their lives for cleaning of our community but the community has isolated them in terms of socio-economical and mental aspect from the main stream community. The present study is conducted to assess the occupational health problems among female residential building sweepers.

METHODOLOGY

The study conducted was descriptive in nature and convenient sampling method was adopted. 60 female residential building sweepers were selected between 18 – 60 years of age from western suburban residential building of urban Mumbai city between Borivali and Bandra and who had been sweeping for at least five years were included in the study.

Tools of Data Collection: A well – structured Questionnaire was developed to collect the necessary information followed by interview technique to elicit information

on female sweepers. The structured questionnaire was divided into following parts.

A. General Demographic Data:

Questions focused on the marital status, family size, age, socio – economic conditions, income and educational qualification of residential sweepers.

B. Job Description:

This part of the questionnaire documented the job profile i.e. nature of job, type of work, total hours of work, number of hours worked per day etc.

C. Health Status:

Health profile was collected in this section of the questionnaire.

D. Musculoskeletal problems:

The musculoskeletal problems experienced by the sweepers were assessed in this section. This was done through validated tool i.e. Nordic Questionnaire Technique designed by Kuorinka I, Johnson B, Kilobom A, et al. (1987).

Statistical analysis:

Data was analyzed using descriptive statistical test like mean, percentage, standard deviation, frequency, range and T-test. For inferences to be drawn and to find out the correlation between variables Spearman's Rho test was applied.

Ethical considerations:

The study was conducted after obtaining the approval of the ethical committee of Seva Mandal Education Society. Prior to data collection, all participants were asked to give a verbal informed consent before starting the interview. The researcher explained the purpose of the study to all the participants with confirming confidentiality of their information that it will never be used for purposes other than scientific research.

RESULTS AND DISCUSSION

In this section an attempt has been made to single out the important findings of the study on female residential sweepers. The findings have been presented using

statistical methods and their theoretical implications. The data has been statistically

summarized as follows:

Table 1: Distribution of sample

Parameter	N	Age Groups (years)								Mean ± SD	Range
		21-30	%	31-40	%	41-50	%	>51	%		
Females	60	11	18.3	21	35	21	35	7	11.7	39.65 ± 8.875	24 - 60

The above table depicts that 60 female sweepers from western suburban residential buildings from urban Mumbai were selected for the study. The table shows the age wise sample distribution. Ages are categorized into different age groups i.e. 21 to 30 years, 31 to 40 years, 41 to 50 years, 51 and above. From the above table it is identified that maximum number of respondents i.e. 35 female sweepers fall under 31 to 40 and 41 to 50 years of age. It was observed from the table that the mean age of female sweepers was 39.65 years hence it is concluded that most of the respondents are adults and were carrying sweeping occupation for many years.

Similarly a study was done by Jayakrishnan Thayyil (2014) on municipal solid waste management workers where the mean age of the workers was 42.5 ± 7.2 years (24-65 years) with average experience of 4.8 ± 0.7 years.

Table 2: Demographic profile of the sweepers

Parameters	Females n= 60	Percentage %
1 Educational Qualification		
No education	30	50.00
Up to Primary	28	46.67
Matriculation or below	2	3.33
XII th Passed	0	0.00
Graduation and above	0	0.00
2 Marital Status		
Married	45	75.00
Unmarried	8	13.33
Widow	7	11.67
Divorcee	0	0.00
3 Personal Habits		
Smoking	17	28.33
Drinking	0	0.00
Gutka	20	33.33
Tobacco	22	36.67
Pan	4	6.67
No	6	10.00

As observed from the above table it was found that 50% female sweepers had received no education. Similarly in a study by Tushar & Aparajita (2010) on 112 workers engaged in the small-scale garment

industry found that Musculoskeletal morbidity was more common in illiterate workers as compared to those who were literate (75.08% vs. 68.60%). On the basis of marital status it was found that majority of sweepers i.e. 75% were married. With regards to personal habits it was found that female sweepers were addicted to tobacco (36.67%) and gutka (33.33%). Similar findings were reported in a study by Das et al (2013) on the women sweepers working under the Midnapore Municipality where 100% female sweepers were addicted to chewing gutka and tobacco.

Table 3: Household chores performed by female residential sweepers

Sr. No	Household chores	Females (n = 60)	
		Frequency	%
1.	Cooking	59	98.33
2.	Sweeping/ Moping	50	83.33
3.	Fetching water	8	13.33
4.	Washing Clothes	54	90.00
5.	Leaving children to school	2	3.33
6.	Marketing	37	61.67
7.	Walking	21	35.00
8.	No Activity	1	1.67

The above table indicates that majority of the female sweepers were doing most of the household chores i.e. 98.33%, 90% and 83.33% did cooking, washing clothes and sweeping/moping respectively. In addition to these activities 61.67% and 35% sweepers did marketing and washing respectively.

It was alarming evidence from the above table that majority of the female sweepers complained of entire body pain along with 93.33% , 91.67%, 85% and 83.33% reporting pain in arm, shoulder, hand/wrist and low back respectively.

Similar findings were reported in a study by Das et al (2013) on the women sweepers working under the Midnapore

Municipality 82.69% female sweepers experienced muscle pain with back pain.

Table 4: Occurrence, Frequency and Intensity of pain among female residential sweepers

Body Parts	Occurrence of Pain		Frequency of Pain			Intensity of Pain			
	No Pain	Pain	Daily	Weekly	Monthly	Mild Pain	Moderate Pain	Severe Pain	Very Severe Pain
Eye	57 (95.00)	3 (5.00)	3 (5.00)	0 (0)	0 (0)	2 (3.33)	1 (1.67)	0 (0)	0 (0)
Neck	39 (65.00)	21 (35.00)	3 (5.00)	15 (25.00)	3 (5.00)	6 (10.00)	12 (20.00)	3 (5.00)	0 (0)
Shoulder	5 (8.33)	55 (91.67)	17 (28.33)	36 (60.00)	2 (3.33)	6 (10.00)	37 (61.67)	12 (20.00)	0 (0)
Upper Back	30 (50.00)	30 (50.00)	12 (20.00)	18 (30.00)	0 (0)	3 (5.00)	17 (28.33)	10 (16.67)	0 (0)
Elbows	56 (93.33)	4 (6.67)	1 (1.67)	3 (5.00)	0 (0)	3 (5.00)	1 (1.67)	0 (0)	0 (0)
Lower Back	10 (16.67)	50 (83.33)	24 (40.00)	26 (43.33)	0 (0)	1 (1.67)	30 (50.00)	19 (31.67)	0 (0)
Arm	4 (6.67)	56 (93.33)	26 (43.33)	29 (48.33)	1 (1.67)	3 (5.00)	35 (58.33)	18 (30.00)	0 (0)
Hand/ Wrist	9 (15.00)	51 (85.00)	26 (43.33)	24 (40.00)	1 (1.67)	4 (6.67)	28 (46.67)	19 (31.67)	0 (0)
Thighs	51 (85.00)	9 (15.00)	1 (1.67)	7 (11.67)	1 (1.67)	3 (5.00)	4 (6.67)	2 (3.33)	0 (0)
Knees	40 (66.67)	20 (33.33)	6 (10.00)	12 (20.00)	2 (3.33)	2 (3.33)	14 (23.33)	4 (6.67)	0 (0)
Calf of legs	25 (41.67)	35 (58.33)	6 (10.00)	29 (48.33)	0 (0)	6 (10.00)	24 (40.00)	5 (8.33)	0 (0)
Feet/ Ankle	46 (76.67)	14 (23.33)	5 (8.33)	9 (15.00)	0 (0)	4 (6.67)	7 (11.67)	3 (5.00)	0 (0)

*The figures in bracket indicate percentage

In a study by Alireza et al (2007), on musculoskeletal problems among workers of an Iranian communication company, the results of Nordic musculoskeletal questionnaire revealed that the highest rates of WMSDs prevalence were found in shoulders (73%).

The above table also shows the occurrence of pain experienced by the residential sweepers on daily, weekly and monthly basis. The results of the daily occurrence of pain among female sweepers show that 43.33% suffered from hand, arm/wrist, 40% lower back, 28.33% shoulder and 20% upper back pain. Further the female sweepers weekly suffer from various pains such as shoulder (60%), arm and calf (48.33%), lower back (43.33%), upper back (30%) and neck (25%) respectively. Very few female sweepers reported of negligible pain on a monthly basis i.e .neck (5%) and shoulder and knees (3.33%).

Similar findings were reported by Pandit(2013) on 50 workers in handloom units where highest number of women weavers reported of having pain in neck, low back, leg, shoulder and ankle pain &

frequent pain in low back, shoulder, neck, knees and legs respectively.

Table 4 also indicates the intensity of pain experienced by the female sweepers. It is evident from the above table that 61.67%; 58.33% and 46.67% female sweepers complained of moderate pain in the shoulder, arm and hand respectively and 31.67% complained of severe pain in the lower back and hand/wrist. Such high intensities of pain can be due to repetitive job which requires heavy physical effort needed in carrying out the occupational activities such as lifting, carrying, pulling and pushing the bins which leads to muscular strain. The other reasons being; marriage and child bearing at an early age and complete involvement in household chores.

Inferential Statistics: The inferences were drawn using statistics to find out the correlations using spearman rho's test between various variables under the study. Variables under study

Dependent Variable: MSD

Independent Variable: Intensity of pain, age, years of experience, weight.

Table 5: Association between intensity of pain and MSD

Gender			MSD	Over all Intensity of Pain
Female	MSD	Correlation Coefficient	1	0.19
		Sig. (2-tailed)	.	0.146
		N	60	60
	Over all Intensity of Pain	Correlation Coefficient	0.19	1
		Sig. (2-tailed)	0.146	.
		N	60	60

*Correlation is significant at the 0.05 level (2 – tailed)

The above table shows the association between MSD and intensity of pain. As per the Spearman’s rho correlations there was no correlation between the two variables among female residential building sweepers.

Table 6: Correlation between age and MSD

Gender			Age group	MSD
Female	Age Group	Correlation Coefficient	1	.409**
		Sig. (2-tailed)	.	0.001
		N	60	60
	MSD	Correlation Coefficient	.409**	1
		Sig. (2-tailed)	0.001	.
		N	60	60

*Correlation is significant at the 0.05 level (2 – tailed)

The above table shows the correlation/association between age and musculoskeletal problems. As per the Spearman’s rho correlations there was a moderate, positive and significant correlation among female residential sweepers.

Table 7: Correlation between years of experience and MSD

Gender			Experience (years)	MSD
Female	Experience (years)	Correlation Coefficient	1	.331**
		Sig. (2-tailed)	.	0.01
		N	60	60
	MSD	Correlation Coefficient	.331**	1
		Sig. (2-tailed)	0.01	.
		N	60	60

*Correlation is significant at the 0.05 level (2 – tailed)

The above table shows correlation between years of experience and musculoskeletal problems. As per the Spearman’s rho correlations female residential sweepers showed weak, positive significant correlation. Higher experience goes with higher MSD’s.

Table 8: Correlation between weight and MSD

Gender			Weight (kgs)	MSD
Female	Weight (kgs)	Correlation Coefficient	1	.260*
		Sig. (2-tailed)	.	0.045
		N	60	60
	MSD	Correlation Coefficient	.260*	1
		Sig. (2-tailed)	0.045	.
		N	60	60

*Correlation is significant at the 0.05 level (2 – tailed)

The above table shows correlation between weight and musculoskeletal problems. As per the Spearman’s rho correlations there was a weak, positive significant correlation between the variables among female residential sweepers.

CONCLUSION

The sweeping job by nature itself demands standing posture including bending, twisting and stooping, abduction and adduction of shoulders and arms. The most important risk factor in the present study was the repetitive and awkward posture that resulted to the development of MSD’s. In addition, these communities of

workers are engaged in this type of repetitive job over the years; coming from low socioeconomic strata and are addicted to gutka, tobacco and smoking which affects the health adversely. It was therefore evident that the sweeping job should be designed using ergonomic principles i.e. reduce the repetitive motions by interspacing activities; avoid static posture by sequencing the job activities; use proper size brooms with long handles to avoid bending; reduce forceful exertions and maintain upright posture as far as possible with minimum twisting at waist and bending and twisting. Job-specific guideline for residential sweepers regarding maximum limits of lifting and carrying and pulling pushing of the load is very important. Frequent and regular medical check - up by the housing societies for these vulnerable group of people is very essential as these sweepers will not go on their own due to financial constraints and remain with the sufferings, thus leading unhealthy life.

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