



Musculoskeletal Disorders among Rag Pickers at Lucknow City

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Abstract

Context: The Musculoskeletal Disorders (MSDs) among rag pickers are mostly non-fatal injuries such as injuries, pain or discomfort in the anatomical area, muscles, joints, tendons, ligaments, nerves and in bones. The nature of their occupation requires the rag pickers constant bending, which raised the risk of Musculoskeletal Disorders in many body parts. Musculoskeletal Disorders were significantly higher for the lower back, upper back, knees, shoulder, neck and ankles among the rag pickers. **Aim:** The purpose of this study was to investigate the prevalence of Musculoskeletal Disorders in different body parts among rag pickers. **Settings and Design:** This study was carried out on sixty rag pickers comprising of male and female. Multistage random sampling technique was adopted in the study. The data has been collected from the rag pickers engaged in rag picking at Lucknow city. **Materials and Methods:** A self-structured and standardized interview schedule including modified version of Body Discomfort Scale (BDS) devised by Kuorinka *et al.*, (1987) was used for the purpose of gathering information and measurement of pain in different body parts of the respondents. The study adopted survey research design and the respondents were interviewed personally. **Statistical Analysis Used:** The data was coded and analyzed using IBM SPSS 20.0 Version. The level of musculoskeletal pain in different body segments were analysed in the form of frequencies, mean, standard deviation and the significance was tested using ANOVA. **Results:** The study clearly revealed that rag pickers felt maximum pain in back, followed by knee pain, shoulder pain and hand pain. **Conclusions:** The study strongly recommends preventive and curative measures to minimize the burden of MSDs. A training program needs to be organized to detect the early signs and symptoms of MSDs so that rag pickers may adopt the curative measures.

Keywords: Body Discomfort, Ergonomics, Musculoskeletal Disorder, Rag Pickers

1. Introduction

Rag picker or scavenger or waste picker is a term for someone who picks out recyclable elements from mixed waste wherever it may be temporarily accessible. Rag pickers, also known as “garbage picker” live on the street, in slums and shanty areas and he/she makes a living from sorting and collecting the waste material, rags, and other similar material and then selling them to the local junkyards or garbage collection centers. They rarely have both social and occupational recognition in the country. The socio economic status of rag pickers is low and their working conditions are unfavorable. The work they do

is often called “3-D work”, that is, dirty, dangerous and demanding.

Musculoskeletal Disorders (MSDs) are injuries or pain that affect the human body’s movements or musculoskeletal system, including the joints, ligaments, muscles, nerves, tendons and structures that support limbs, neck and back¹.

Waste collection work is characterized by heavy weight lifting, which affects major joints². Rag pickers engaged in the waste collection are vulnerable to various occupational health hazards such as respiratory disorders, gastrointestinal diseases, skin diseases, eye infections and Musculoskeletal Disorders (MSDs). The Musculoskeletal Disorders among rag pickers are mostly non-fatal injuries

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such as injuries, pain or discomfort in the anatomical area, muscles, joints, tendons, ligaments, nerves, and in bones³.

Musculoskeletal conditions were the leading cause of disability in four of the six WHO regions in 2017 (ranked second in the East Mediterranean region and third in the African region). While the prevalence of musculoskeletal conditions increases with age, younger people are also affected, often during their peak income-earning years⁴.

The Global Burden of Disease (GBD) study provides evidence of the impact of musculoskeletal conditions, highlighting the significant disability burden associated with these conditions. In the 2017 GBD study, musculoskeletal conditions were the second highest contributor to global disability (accounting for 16% of all years lived with disability) and lower back pain remained the single leading cause of disability since it was first measured in 1990. While the prevalence of musculoskeletal conditions varies by age and diagnosis, between 20%–33% of people across the world live with painful musculoskeletal conditions⁴.

A recent report from the United States of America suggests that one in two adult Americans live with a musculoskeletal condition – the same number as those with cardiovascular or chronic respiratory diseases combined. Analysis of data from WHO's study on global ageing and adult health (SAGE) point at the high prevalence of arthritis in low and middle-income settings, particularly among those in lower socio-economic positions.

Many studies on rag pickers and their occupational health risks, such as respiratory illness, skin diseases, stomach problems and eye irritation, have been carried out. However, there have been fewer studies on the Musculoskeletal Disorders on rag pickers in India. The present study focuses on the prevalence of Musculoskeletal Disorders (MSDs) among rag pickers at Lucknow City. An attempt has been made to identify working conditions that increase the risk of MSDs among rag pickers.

2. Materials and Methods

2.1. Selection of Subject

Sample was selected from Lucknow city to carry out this research. Respondents were selected using multistage random sampling technique. The entire Lucknow city is divided in five zones -east, west, north, south and central.

From these five zones, randomly two zones were selected. Aurangabaad and Subhani Khera from south and west zones, respectively were selected since the slums of rag pickers slums are majorly concentrated. Using random sampling technique thirty rag pickers were selected randomly from each area comprising to a total of sixty samples. The sample is found to have maximum male (84%) in comparison to 16% of female rag pickers and this may be due to the reason that mostly men are involved in ragpicking activity whereas women are managing at home.

2.2. Tools Used

The modified Nordic Questionnaire was applied to rag pickers for the assessment of musculoskeletal problems. Body Discomfort Scale by Kuorinka *et al.*, 1987⁵ was used for the measurement of pain in different body parts of the rag pickers.

2.3. Data Collection

The respondents were interviewed personally. Respondents from each location were subjected to an interview method for assessing along with observation that included several factors that are associated with their work and its impact on their physical health. The study adopted survey research design. The survey was conducted during July–August in 2019. Age and work experience was taken as independent variables and body discomfort was taken as dependent variable.

2.4. Statistical Analysis

The data were expressed as the mean and standard deviation to evaluate statistical significance for physical characteristics. Score ranged from four for strongly agree to one for strongly disagree. Gender, age, marital status, family size, works experience, working duration, monthly income were recorded as categorical variables.

The data was coded and analyzed using IBM SPSS 20.0 Version. The levels of musculoskeletal pain in different body segments were also calculated with the help of frequency percentage, mean, standard deviation and the significance was tested using ANOVA.

3. Results

3.1. Socio-demographic and Occupational Characteristics of the Rag Pickers

The socio demographic and occupational characteristics of the total sample of the rag pickers are explained in (Figure 1). As observed from the following figure, it can

be concluded that maximum number of rag pickers were men in comparison to women and a clear revelation that most of the rag pickers were from middle adulthood. Most of the rag pickers were married. It was found that most of the rag pickers have been doing this work since 5 years and they work for 7-9 hours per day. Maximum rag pickers earn Rs. 6000-8000/- per month.

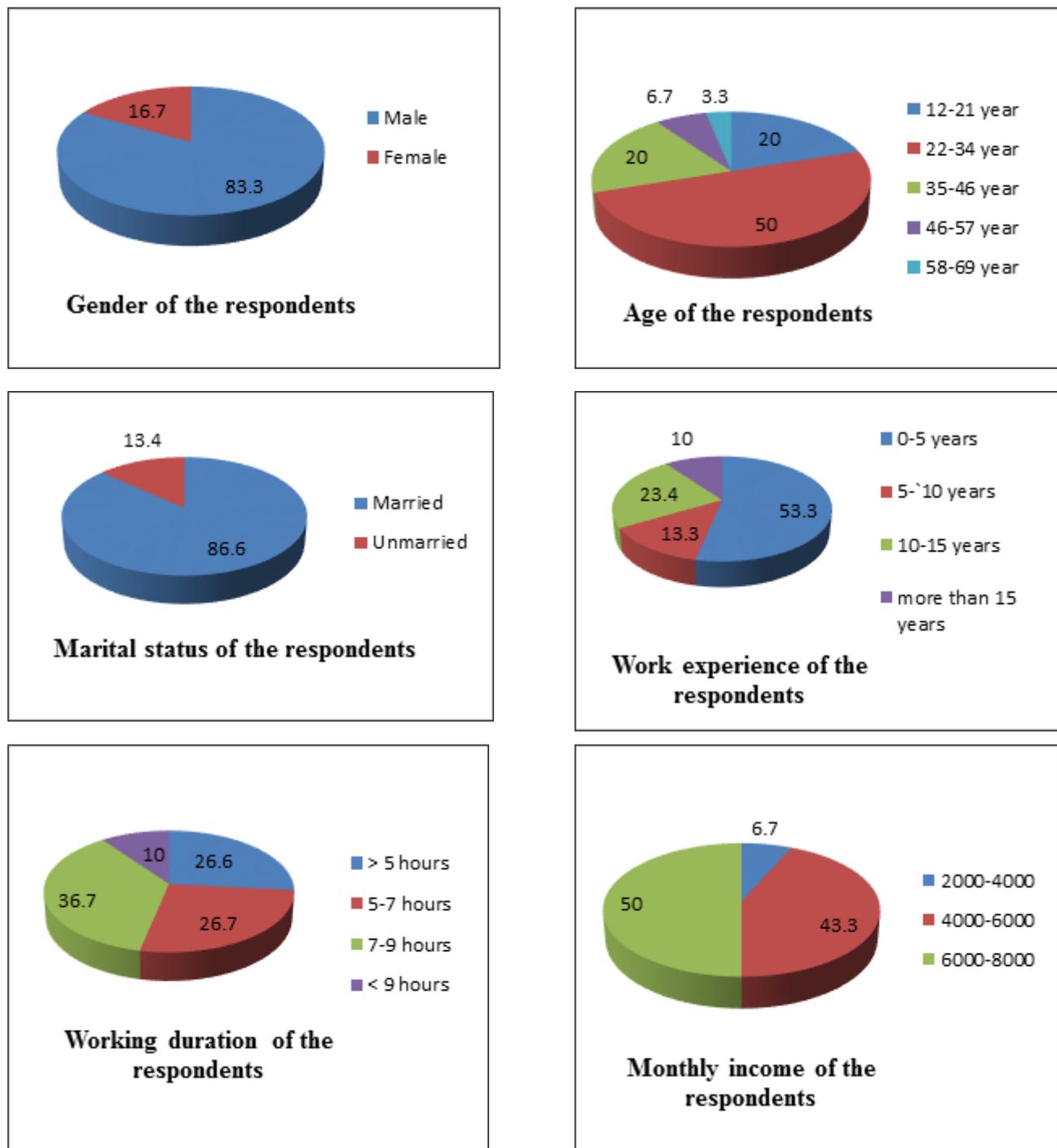


Figure 1. Sociodemographic and occupational characteristics of the rag pickers.

3.2. Body Discomfort Due to Work Experience

The data depicted in (Table 1), clearly indicates that maximum body discomfort was felt by the respondents whose work experience was more than 15 years. Pain in the spinal cord and backache during working was also found to be maximum in workers with more than 15 years of work experience. Equal intensity of pain in hands and legs was expressed among workers with more than 15 years of experience. In contrary, pain in knee was expressed by workers with 5-10 years of experience. Significant difference was evident across the workers with varied work experience in pain and strained shoulder and it was found that almost equal intensity of discomfort was expressed in the workers with 10-15 years and more than 15 years of work experience. The same pattern of discomfort is evident in being uncomfortable while lifting heavy loads and body pains while sleeping. A clear evidence of body discomfort among workers with more years of work is depicted through the data. It is also clear that with increase of work experience, the workers had more discomfort and this may be due to the reason that, continuous pain without any treatment may have led to chronic pain and discomfort in almost all areas.

3.3. Body Discomfort Due to Age

Responses of work related discomfort or pain in different body parts according to age have been presented in (Table 2). It is evident from the data that maximum body discomfort was felt by the respondents whose age was 58-69 years. Pain in the spinal cord and backache was also found to be maximum whose age is 58-69. Equal intensity of pain in hands in age group of 47-57 and 58-69 was expressed by the workers. Pain and cramps in legs was found to be maximum in the age group of 35-46 and 58-69. Maximum pain in knee was expressed by workers in the age group of 58-69. Significant difference was evident across the workers with varied age group in pain and strained shoulder and it was found that equal intensity of discomfort was expressed in the workers in the age group of 22-34, 35-46 and 58-69 years, respectively. The same pattern of discomfort is evident in being uncomfortable while lifting heavy loads and body pain while sleeping. A clear evidence of body discomfort among older people is depicted through the data. It is also clear that the older people expressed more discomfort and this may be due to the reason that, the bones of older people are weak and there is more body pain in lifting the body repeatedly. This may be leading to chronic pain and discomfort in all areas.

Table1. Variation in body discomfort according to work experience

Items	Work Experience				F	P
	M.±S.D.	M.± S.D.	M.± S.D.	M.± S.D.		
	0-5 years	5-10 years	10-15 years	More than15 years		
Suffer from body discomfort during occupation	2.93±0.258	3.00±0.000	3.29±0.488	3.33±0.577	2.293	0.103
Suffer from pain in the spinal cord during occupation	2.81±0.535	3.00±0.000	3.29±0.469	3.33±0.516	4.193	0.010*
Feel backache while working in bending position for long hours	3.09±0.390	3.00±0.000	3.21±0.426	3.33±0.516	1.163	0.332
Feel pain in hands while working	2.67±0.488	2.50±0.577	2.57±0.535	2.67±0.577	0.141	0.935
Feel pain and cramp in legs while working	2.31±0.471	2.25±0.463	2.57±0.756	2.67±0.516	1.376	0.260
Feel pain in knee while working	2.23±0.568	2.38±0.916	2.29±0.469	2.33±1.033	0.118	0.949
Pain and strained in shoulder while working	2.67±0.617	2.50±0.577	3.43±0.535	3.33±0.577	3.802	0.023*
Feel uncomfortable while lifting heavy loads	2.47±0.743	2.25±0.500	2.71±0.756	2.67±1.155	0.379	0.769
Feel uncomfortable while sleeping due to body pain	2.07±0.704	2.25±0.500	2.29±0.951	2.67±0.577	0.593	0.626

(M=Mean, S.D. = Standard Deviation), *Significant, p<0.05

Table2. Variation in body discomfort according to age

Items	Age					F	P
	M±S.D.	M±S.D.	M±S.D.	M. ±S.D.	M±S.D.		
	12-21	22-34	35-46	47-57	58-69		
Suffer from body discomfort during occupation	3.00±0.000	3.00±0.378	3.17±0.408	3.00±0.000	4.00±.	2.178	0.102
Suffer from pain in the spinal cord during occupation	3.00±0.000	3.00±0.371	2.83±0.937	3.00±0.000	4.00±0.000	2.348	0.066
Feel backache while working in bending position for long hours	3.00±0.000	3.03±0.320	3.42±0.515	3.00±0.000	4.00±0.000	7.128	0.000*
Feel pain in hands while working	2.60±0.548	2.53±0.516	2.67±0.516	3.00±0.000	3.00±.	0.537	0.710
Feel pain and cramp in legs while working	2.33±0.492	2.13±0.346	3.00±0.603	2.50±0.577	3.00±0.00	8.975	0.000*
Feel pain in knee while working	2.36±0.809	2.21±0.491	2.25±0.622	2.00±0.816	3.50±0.707	2.334	0.067
Strained in shoulder while working	2.60±0.548	3.00±0.756	3.00±0.632	2.50±0.707	3.00±.	0.508	0.731
Feel uncomfortable while lifting heavy loads	2.00±0.707	2.60±0.737	3.00±0.632	2.00±0.000	2.00±.	1.883	0.146
Feel uncomfortable while sleeping due to body pain	2.00±0.707	2.07±0.594	2.33±1.033	3.00±0.000	3.00±.	1.219	0.329

(M=Mean, S.D. = Standard Deviation), *Significant, $p < 0.05$

4. Discussion

The study sample comprise of migrant rag pickers from Assam state (Northeastern India) because there are always floods that's the reason they have to come here for work. They work under the contractors because they give them land for living. Rag pickers collect the rags from houses, apartments, shops and roads and sell it to the contractor on cheap price and contractor gives them money on monthly basis.

If we observe the socio-demographic profile of the rag pickers, majority (83%) were males. Studies in Brazil⁶ and Delhi⁷ have shown that more than 50% of the rag pickers are males; the findings are similar to our study. Majority of the study population belonged to middle aged (22-34 years). Similar findings were also mentioned in a report submitted on rag pickers of Kathmandu⁸. A study from Paletos in Brazil reported that majority of the rag pickers (58%) belonged to the age group 18-39 years⁶. The present study reported that majority (86.6%) of the rag pickers were married.

Majority (53.3%) of the rag pickers were working as rag pickers since 0-5 years and most (36.7%) of them

reported to work for 7-9 hours daily in the current study. Menon *et al.*,⁹ found that 73% of rag pickers worked for period of 5-8 hours daily and 21% for more than 8 hours in Thiruvananthapuram district. Shrestha *et al.*,⁸ also found that majority of these rag pickers were working 7 hours per day. From the study the average monthly income of 50% rag pickers is found to be getting an income of Rs. 6000-8000 INR.

The results of the present study showed that maximum body discomfort was felt by respondents whose work experience was more than 15 years. High prevalence of MSDs among rag pickers, particularly backache ($\mu = 3.33$), pain and strained in shoulder ($\mu = 3.43$) and spinal cord ($\mu = 3.33$). Singh *et al.*,¹⁰ found that high prevalence of MSDs among waste pickers, particularly in the lower back (54%), knee (48%), upper back (40%) and shoulder (32%). Pain in hands and legs cramp while working ($\mu = 2.67$) was reported among workers with more than 15 years of experience. Pain in knee was expressed by orkers with 5-10 years of experience ($\mu = 2.38$). Uncomfortable feeling while lifting heavy loads ($\mu = 2.71$) was expressed by the workers whose work

experience is 10-15 years and body pain while sleeping ($\mu = 2.67$) expressed by the workers whose work experience is more than 15 years.

Maximum body discomfort, pain in spinal cord and backache ($\mu = 4.00$), was felt by the respondents whose age was 58-69. Equal intensity of pain in hands ($\mu = 3.00$) in age group of 47-57 and 58-69 was expressed by the workers. Pain and cramp in legs was found to be maximum ($\mu = 3.00$) in the age group of 35-46 and 58-69. Maximum pain in knee was expressed by workers in the age group of 58-69. Significant difference was evident across the workers with varied age group in pain and strained in shoulder and it was found that equal intensity of discomfort was expressed in the workers in the age group of 22-34, 35-46 and 58-69 years ($\mu = 3.00$), respectively. Uncomfortable feeling while lifting heavy loads ($\mu = 3.00$) was expressed by the workers whose age group is 35-46 years and body pain while sleeping ($\mu = 3.00$) expressed by the workers whose age group is 47-57 years.

Reddy *et al.*,¹¹ found that high percentage of musculoskeletal complaints (90.8%) were detected among Municipal Solid Waste (MSW) collectors and the knee (84.5%) was the most frequently affected body region. High prevalence of MSDs among waste collectors was reported also in studies of Brazil¹², Denmark¹³, Taiwan¹⁴, USA¹⁵ and The Netherlands¹⁶. The independent risk factors for musculoskeletal symptoms among MSW collectors were the duration of employment; lifting, pulling; pushing/carrying loads >20/kg and walking for long periods of time. The differences in the distribution of musculoskeletal complaints in between different types of MSW collectors were statistically not significant but shown higher in the rag pickers group.

Another study showed that a high percentage of musculoskeletal complaints (60.8%) were detected among MSW collectors and the low back was the most frequently affected body region. The independent risk factors for musculoskeletal symptoms among MSW collectors were the duration of employment; decision latitude; lifting, pulling; pushing/carrying loads >20kg and walking for long periods of time. The most frequently affected body regions among MSW collectors were low back (22.5%); then shoulders (15.8%); neck (7.5%); knee (6.7%) and hips/thighs and elbows (5.8% each)¹⁷.

Salve *et al.*, (2016)³ have done their work under the title "Assessing Musculoskeletal Disorder among Municipal Waste Loaders of Mumbai, India". It was evident

from the results that significantly higher symptoms of Musculoskeletal Disorders were found in hip/thigh (22%), followed by lower back (19%), shoulder (18%) and upper back (15%), when compared with the control group.

Reddy and Yasobant (2015)¹¹ have done their work under the title "Musculoskeletal Disorders among Solid Waste staff in India: A Cross Sectional Risk Assessment". The result showed that 70% of the participants had been suffering with musculoskeletal pain during the last twelve months, whereas 91.8% had pain throughout the last seven days. Knees, shoulders and lower back were found to be highly affected (84.5%, 74.5% and 50.9%, respectively). Female illiterate employees with lower socioeconomic status were found to have higher odds for Musculoskeletal Disorders. Similarly, higher body mass index having no physical activity will increase the possibility of odds having Musculoskeletal Disorders.

In Egypt, rag pickers suffer from Musculoskeletal Disorders because of the large volume of waste they have to pack manually. Ergonomic risk factors might be a contributing factor. The illiterate rag pickers may be unaware of the proper safety techniques during waste collection. In Nigeria, 171 workers representing 61.3% of the sampled waste collectors were forced to be troubled from musculoskeletal injuries while working. In Iran, the prevalence of musculoskeletal symptoms, among municipal solid waste workers in Tehran, in low back, knees, shoulders, upper back and neck were 45%, 29%, 24%, 23%, and 22%, respectively¹¹.

5. Conclusion

In India, the social stigma of rag pickers remains a problematic issue. Rag pickers are the most highly exposed occupational groups with respect of MSDs because they have to work hard and be in several awkward postures in order to complete task, due to the work posture for long duration, which hampers the correct posture and leads to severe pain. This may be because rag pickers are not protected by occupational health and safety measures. Moreover, rag pickers are not covered by labour legislation and hence, are not entitled to any benefits or job security. The un-favorable working conditions of rag pickers could be ameliorated through legislative measures as well as a proper workplace health promotion model intervention. In addition, a routine workplace health promotion model needs to be activated for the welfare of these under marginalized population. This study showed that rag

pickers felt maximum pain in spinal cord, backache and shoulder. Knee pain and hand pain were also found in the rag pickers. The study strongly recommends preventive and curative measures to minimize the burden of MSDs. A training program needs to be organized to detect the early signs and symptoms of MSDs so that rag pickers may adopt the curative measures.

6. Limitations

Our study should be viewed with the following limitations in mind: Postural analysis could not be done because of non-cooperation of sample as they are very busy. The study was conducted limited sample. The study sample included few female respondents as comparison to male respondents.

7. References

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