

## Original Research Article

# Occupational and social hazards among domestic solid waste collectors: a cross sectional study

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## ABSTRACT

**Background:** Domestic solid waste collectors play important role in maintain hygiene of a community, especially in developing countries. Yet not many efforts are done to identify their health needs. The main objective of this study is to identify the morbidity pattern and social problems of solid waste collectors in urban Maharashtra.

**Methods:** It was a cross sectional study. Study population consisted of domestic solid waste collectors who are registered under municipal corporation. Sampling was purposive. All the domestic solid waste collectors who came for specially arranged health check-up were included in the sample. Social and demographic information along with clinical history was collected using a structured questionnaire. General physical exam, eye checkup, skin examination and lab investigations were done in a specially organized camp, after obtaining prior consent of the participants. Data was analyzed using SPSS 19 software.

**Results:** More than 90% of 98 solid waste collectors, who participated in the study had frequent cough, fever and diarrhea. Over 85% had back or/and leg pain. More than half of the study population had dryness of skin and 47% of them complained of itching. 15 solid waste collectors were discriminated in marriages.

**Conclusions:** High prevalence of common frequent symptoms such as fever, cough and diarrhea can be controlled by conducting regular health checkups for this community. The need is to reach them rather than waiting for them to come to health facility. Sensitization of community towards importance of work done by the solid waste collectors is also required.

**Keywords:** Solid waste collectors, Morbidity pattern, Social problems

## INTRODUCTION

As the world hurtles toward its urban future, the amount of municipal solid waste, one of the most important by-products of an urban lifestyle, is growing even faster than the rate of urbanization. Poorly managed waste has an enormous impact on health, environment, and economy and hence this large amount of waste has to be properly managed.<sup>1</sup>

In a developing country, such as India, with limited resources, most of the cleaning process in urban localities remains manual. This manual handling of waste is largely done by socially poor and underprivileged individuals or group.<sup>2</sup> People involved in collection and management of solid waste are more prone to suffer from a variety of medical conditions including dermatological, respiratory, gastrointestinal and even ocular manifestations.<sup>3</sup> On humanitarian grounds it is the responsibility of the government and the society in general, to address their

health concerns, to curb their morbidities and to improve their wellbeing.

Hence this study is planned to assess the health status and identify the social and occupational risks associated with their health.

### Aim and objectives

The present study aims at assessing the occupational and social hazards among the domestic solid waste collectors in an urban and semi urban setup. Specific objectives of the study are to study the clinical profile of domestic solid waste collectors, to identify common morbidities among these waste collectors and to study the risk factors associated with the morbidities.

## METHODS

A cross sectional study was undertaken amongst the domestic solid waste collectors in an urban as well as a semi urban setup of Maharashtra in Aug 2018. The study population included waste collectors working in the setup who were registered under corporation or a non-profit organization. The study population was contacted through these organizations to attend a health camp organized for the study purpose. All those who attended the camp voluntarily were included in the study sample. The purpose and procedure of the study was explained in the local language for better understanding.

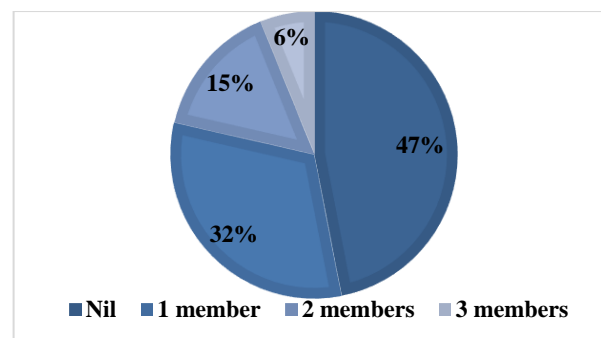
The data was collected using a structured questionnaire which consisted of demographic details, clinical history, dietary habits and social problems. General physical examination was done to take height, weight, blood pressure. Skin examination was done by dermatologist. Data was summarized using Microsoft excel program. Informed written consent from the participants and approval of the institutional ethical committee was obtained.

## RESULTS

Total 98 solid waste collectors voluntarily participated in the study of which 28 were males and 70 were females. Age of these participants ranged between 15 to 75 years with average age of  $38.8 \pm 13$  years. The low level of education was evident as almost half of them (48.9%) were illiterate. On the other hand, 21 were educated above secondary level also.

Of the total participants, 37 lived in a joint family and 61 lived in a nuclear family.

Number of family members ranged from single person to family of 12 with median family size of 5 members. It was noted that 11% families had more than seven people living together. It was also noted that 53% of families had more than one family members working in the same occupation (Figure 1).



**Figure 1: Number of family members in same occupation.**

It was observed that majority (75.5%) of them worked for more than 6 hours. Average working time was 5.3 hours. While 34% of the solid waste workers were in this occupation for less than 5 years, comparable group (39%) were in this occupation for more than 10 years.

Most of them (85.7%) had mixed diet. It was observed that as the solid waste collector start their work very early in the morning, they tend to depend on street food for their breakfast. Frequency of intake of fast food is given in Table 1.

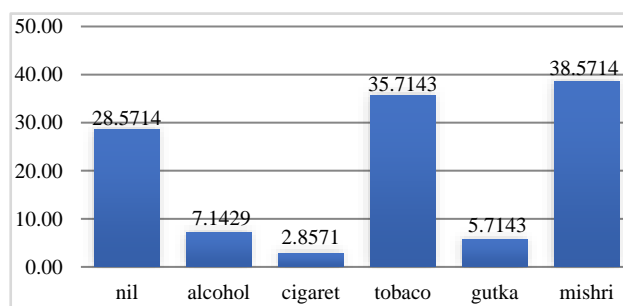
**Table 1: Intake of street food.**

Frequency	N	%
0	18	18.36
1-2	38	38.77
Alternate day	20	20.4
Everyday	22	22.45
Total	98	100.00

It was observed that 22.45% people had street food every day while less than 20% never had it. The most common item was Vada pav, which was eaten for breakfast or lunch.

Analysis of food frequency questionnaire for intake of food showed that the study population had average calorie deficit of  $621.6 \pm 176.7$  kcal and protein deficit of  $12.2 \pm 3.1$ .

Data collected with respect to addiction revealed that tobacco and mishri were most prevalent addiction (Figure 2).



**Figure 2: Prevalence of addiction.**

Two third of the population was having some kind of addiction sometimes more than one addiction such as alcohol and tobacco was noted.

Laboratory investigations showed that average haemoglobin of females was  $11.33 \pm 1.9$  and for males it was  $14.66 \pm 1.6$  which is within the normal range for Indian females and males which is 12.1-15.1 and 13.8-17.2 respectively. Average BMI was  $24.18 \pm 6.3$  in females and  $22.43 \pm 4.3$  in males. The difference was not statistically significant.

### Prevalence of health problems

Detailed health checkup was done to find prevalence and type of health problems commonly observed in this population. It included measuring height and weight to calculate BMI, checkup of eyesight, pallor and dental hygiene. Average BMI was  $24 \pm 6$ . Pallor was seen in 43 (61.4%) of the study population. Vision was checked for 98 people and was found to be affected in 24 i.e., 24.49% people.

### Frequency of cuts and wounds

As the population is at high risk of getting cuts and wounds while handling sharps, question was particularly asked regarding frequency and severity of cuts and wounds (Table 2).

**Table 2: Frequency of cuts and wounds.**

Frequency	N	%
Rarely	18	18.37
Sometime	12	12.24
Frequently	40	40.81
Very frequently	28	28.57

However only 30 out of 98 (30.61%) solid waste collectors had taken tetanus injection.

Morbidities present in solid waste collectors is summarized in Table 3.

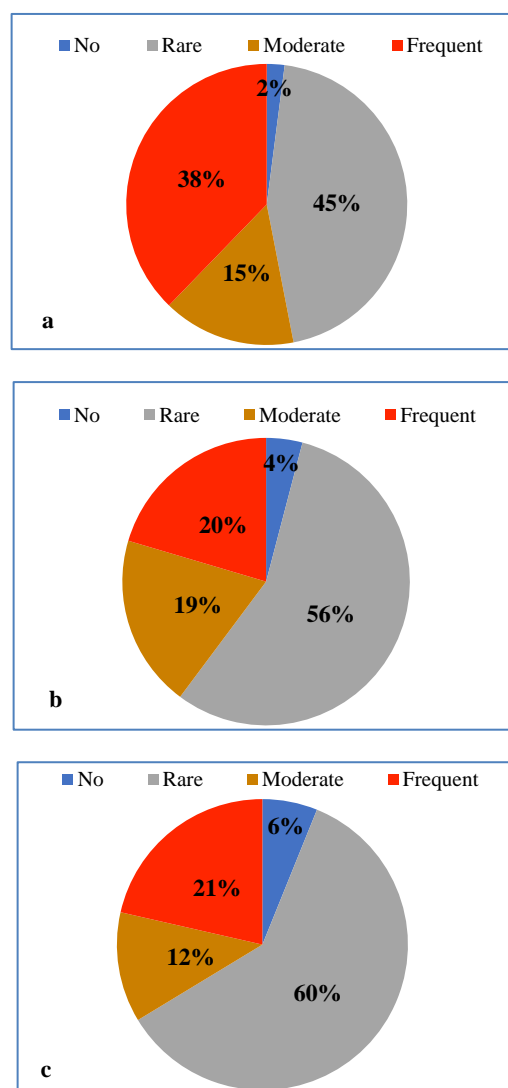
Most prevalent symptom was fever followed by cough. The most prevalent musculoskeletal problem was back problem followed by leg problems. As fever, cough and diarrhea were highly prevalent, their frequency was further categorized with respect to their frequency as no, rare, moderate and frequent (Figure 3).

Though these diseases were rare in maximum population, fever was frequent in 38% solid waste collectors, 20% had frequent cough and 21% frequent diarrhoea.

Severe back problems were reported by 11 of the solid waste collectors.

**Table 3: Morbidity pattern of solid waste collectors.**

Morbidities	N	%
Back problem	87	88.78
Leg problems	84	85.71
Vision	24	24.49
Pallor	58	59.18
Icterus	6	6.12
cyanosis	0	0.00
Lymphadenopathy	11	11.22
Itching	42	42.86
Dryness	53	54.08
Hyperpigmentation	11	11.22
Hypopigmentation	7	7.14
Redness	28	28.57
Respiratory illness	45	45.92
Fever	96	97.96
Cough	94	95.92
Diarrhea	92	93.88



**Figure 3: Frequency of (a) fever, (b) cough and (c) diarrhoea.**

Though the population has high risk of tetanus, 68 people were not immunized with tetanus toxoid injection. Nearly all of them (96/98) never had deworming done, while only 2 had taken medication for deworming.

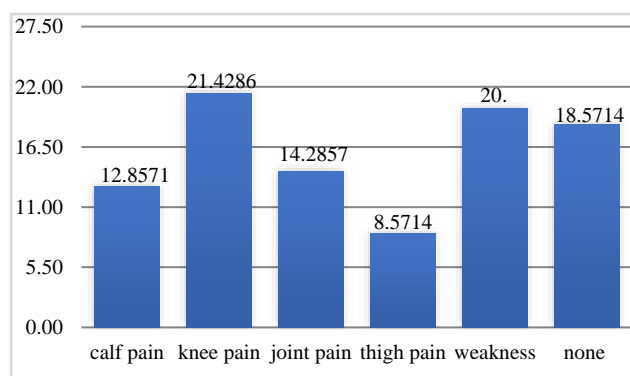
Exposure to hazardous material pose risk of skin problems in this population. Skin problems detected are shown in Table 4.

**Table 4: Distribution of skin problems.**

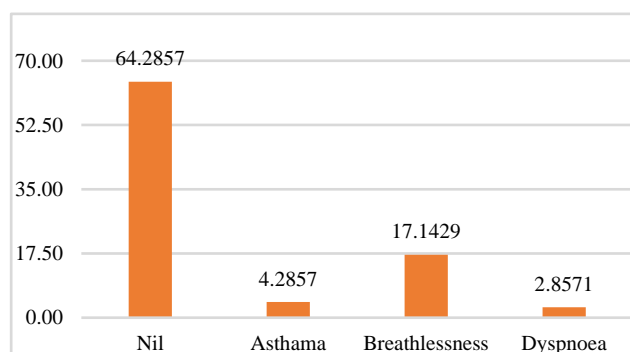
Problem	N	%
<b>Hyperpigmentation</b>	11	11.22
<b>Dryness</b>	53	54.08
<b>Itching</b>	42	42.86
<b>Hypopigmentation</b>	7	7.14

Xerosis (dryness) was the most common problem among the population. On examination the most skin problems were tinea, melasma and scabies accounting for 7%, 5% and 5% respectively in the study population.

As their work involve walking for long distance every day and bending frequently to collect the waste from different locations, special attention was paid to pain in leg and calf muscle (Figure 4).



**Figure 4: Distribution of leg and calf pain.**



**Figure 5: Distribution of respiratory problems.**

It was observed that knee problem was most prevalent in the study group. Less than 20% reported that they do not have any problem.

Exposure to dust is a known occupational hazard for solid waste collectors. Hence prevalence of respiratory problem was specifically noted for the study group (Figure 5).

It was observed that chest problems were less prevalent in the study population. However, 17% reported to have breathlessness.

Dental examination revealed that 74 subjects out of 98 had bad oral hygiene.

Further analysis was done to compare BMI and haemoglobin with respect to other parameters such as gender, duration of job and frequency of street food, type and size of family.

It was observed that average haemoglobin of females was  $11.33 \pm 1.9$  and for males it was  $14.66 \pm 1.6$  which is within the normal range for Indian females and males which is 12.1-15.1 and 13.8-17.2 respectively. Average BMI was  $24.18 \pm 6.3$  in females and  $22.43 \pm 4.3$  in males. The difference was not statistically significant.

Social problems pose a major burden on the health of a family. It was noted that 15 solid waste collectors were discriminated in marriages and 18 faced discrimination in school.

## DISCUSSION

In developing countries, the waste generated is seldom stored in closed containers and is dumped on the ground directly. This results in direct contact of solid waste with solid waste collectors while shoveling by hand or picking or segregation.<sup>4</sup>

Waste collectors around the world are at risk for work-related disorders and injuries. Among the most frequent diseases there are allergic and other diseases of the respiratory system, as well as musculo-skeletal, gastrointestinal and infectious diseases.

Poulsen et al reported that exposure to organic dust while manual sorting of the waste is the cause of organic dust toxic syndrome which includes cough, fever, chest tightness along with many other symptoms and severe occupational pulmonary diseases.<sup>5</sup> Thorn et al also reported that certain dusts from household waste may cause airway inflammation as well as general symptoms.<sup>6</sup>

Study done in waste collectors of Delhi reported that respiratory symptoms and lung function decrement were recorded in 94% and 52% of the collectors.<sup>7</sup> Landfill workers had significantly higher prevalence of both upper and lower respiratory symptoms and spirometry revealed impairment of lung function in 62% in a study by Ray et al.<sup>7</sup> As compared to these studies prevalence of respiratory illness was 45% in the present study. The difference may be due to the difference in the area and Delhi is reported to have high pollution.

Prevalence of important skin problems such as tinea, melasma and scabies accounting for 7%, 5% and 5% respectively according to our study is comparable with that of a dermatological study done in Manipal, where prevalence is 18.3%, 6.1% and 6.1% respectively.<sup>8</sup> Skin lesions were found in 40% of solid waste collectors in our study. It is comparable to a study done in Kerala where it was reported to be 36.4%.<sup>2</sup> Among our study population 40% have raised levels of eosinophils suggestive of allergies to various allergen. It is closely comparable to a study done in Chandigarh where 35.3-48.9% workers suffered from allergy.<sup>9</sup>

High prevalence of fever, cough and diarrhea as observed in the current study is in accordance with other studies done in India as well as other parts of world where the system is prevalent.

According to our study, injuries are fairly common during work as nearly 70% of solid waste collectors suffer from at least some kind of cuts and injuries frequently which is closely comparable to 73.2% incidence of the same reported by a study done in Kerala, India to be caused because of highly limited supply of protective gears.<sup>2</sup> It is also comparable to 60.4% of waste collectors of Dharan Municipality. Prevalence of dental caries was more (76%) in the present population as compared to those in Dharan Municipality 52% suffered from dental caries.<sup>10</sup>

## CONCLUSION

The most prevalent health problem faced by the solid waste collectors is musculoskeletal. Decreased immunity maybe due to the poor-quality diet as suggested by calorie and protein deficit and high frequency of street food intake. This leaves the scope of identifying the risk factors for the prevalent clinical and social morbidities of this population.

Frequent health check-ups and proper counselling regarding health care is essential for this population. Dissemination of information regarding potential hazards of occupation and ill effects of improper dietary intake may help in reducing the burden of preventable diseases.

In addition, it is extremely necessary to create awareness among the society regarding the importance of their vital role and hence there should not be any discrimination in their participation in social events.

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*Conflict of interest: None declared*

*Ethical approval: The study was approved by the Institutional Ethics Committee*

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