

RESPIRATORY MORBIDITY AMONG SOLID WASTE WORKERS OF SURAT CITY

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ABSTRACT

Objective

The objective of present work was to study the respiratory morbidity among the solid waste workers of Surat City.

Study Area

Surat city in India. Solid waste workers working at transfer station and sanitary land filling site were selected for study purpose.

Method

A cross- sectional study was designed. Total 57 workers working at final disposal site, and 123 workers working at different transfer station of city involving in day to day collection activity were selected for study purpose. Workers age, sex, social economic condition, habits and other relevant information for health survey were obtained separately. Respiratory morbidity data were collected using ATS- DLD standard questionnaires. Spirometry observation were made with spirometer Mastro Midline Version 2.1

Key words: Solid waste workers, Respiratory morbidity, Spirometry.

INTRODUCTION

To make the city clean, solid waste workers play an important role. In developing country, urban authority spent 50 % budget for solid waste management activity. 90 % of this amount is utilized for collection of waste and rest of 5-8 % is utilized for scientific disposal of waste. The situation is totally different in developed nation. In developed nation, due to strict regulation and its implementation collection efficiency is upto 90 %. They have developed scientific method for the disposal of waste. Thus developed nation have substantially reduced the occupation health hazards of waste collectors as they are not coming in contact of waste due to mechanised system. In developing nation Solid waste workers are engaged in activities like collection, transfer and transport, processing and disposal of waste. This activities exposes them to a variety of risk factor such as dust, bio-aerosols, volatile organic matter, diesel exhaust, temperature variable and mechanical stress while make them susceptible to variety of occupational diseases (Yogesh D Sabhe)

There are several studies which indicate the prevalence of high respiratory symptoms among solid waste workers. (Danish waste workers). In developing countries the workers are collecting the 90 % of waste manually and thus coming direct contact of waste daily. Generally, the workers are not using any protective devices like earplug, mask and gum-shoes. There is no dust control at work place. The health problem of these workers is more complex due to socio-economic factors like poverty, illiteracy rate, and poor housing condition. Various bad habits like smoking and alcohol drinking and poor diet make them vulnerable of develop certain occupational diseases. With this background cross-sectional study was designed, to study the prevalence of Respiratory morbidity among solid waste workers of Surat city.

STUDY POPULATION

Total 57 workers working at sanitary land filling site of city (Khajod) were selected. The workers at sanitary landfill site are engaged in only disposal of waste activity. 123 workers working at different transfer station of city who were engaged in day to day collection of waste were also selected. As the women workers were less in numbers only male workers had been included in the study. The workers were working for 8-10 hrs/day and 6-7 days in week. They were engaged in day to day collection, transfer and processing of waste. There was no arrangement for segregation of waste, which give rise to often odour nuisance at site. The workers were not using any protective devices. They were using cheap rubber sandals during working hours.

COLLECTION OF DATA

As, most of the workers were illiterate, the investigator fill the questionnaires on their behalf. Workers age, sex, social economic condition, habits and other relevant information for health survey were obtained separately. Socio economic and demographic characteristic of both the groups of workers are summarized in table no. 1

Table-1. Demographics and Socio economic characteristics of workers

Variables	Sanitary landfill workers(n= 57)	Door to door collectors (n=123)
Age in years		
<40	23 (40.4%)	85 (69.2 %)
>40	34 (59.6%)	38 (30.8 %)
Duration of job in years		
<8	17 (29.8 %)	97 (78.9)
>8	40 (70.2 %)	26 (21.1)

Education level		
Primary	29 (50.8 %)	27 (21.8)
H.S.C	19 (33.4 %)	65 (52.8)
Graduate	06 (10.6 %)	12 (9.8)
Unknown	03 (5.2 %)	19 (15.6)
Smoking Habits (n) (%)		
Never	24 (42.2 %)	19 (15.5)
Ex-smoker	13 (22.8 %)	25 (20.4)
Current smoker	20 (35.08 %)	79 (64.1)
Drinking Habits (%)		
Never	12 (21.1 %)	23 (18.7)
Occasionally	27 (47.4 %)	57 (46.3)
Every day	18 (31.5 %)	43 (35.0)

RESPIRATORY SYMPTOMS AND PULMONARY FUNCTION TEST

Respiratory symptoms data were collected using ATS- DLD standard questionnaires. Medical practitioner clinically examined the workers. Respiratory symptoms presented by a worker at least once in the last week and twice in the past three month were recorded. Respiratory symptoms were categorised as URS (Upper Respiratory Symptoms) and LRS (Lower Respiratory Symptoms). Symptoms like sinusitis, running or stuffy nose, common cold and fever were considered as URS symptoms and dry cough, cough with phlegm, wheezing and chest discomfort were considered as LRS symptoms.(Pope and Dockery,1999). The respiratory symptoms observed among the workers are represented in table no. 2.

Table-2 Prevalence of Respiratory Symptoms.

Variables	Sanitary landfill workers(n= 57)	Door to door collectors (n=123)
URS (Upper Respiratory Symptoms)		
Sinusitis	09 (15.8)	37 (30.0)
Running of stuffy nose	11 (19.3)	43 (35.0)
Sore throat	17 (29.8)	59 (50.0)
Common cold	23 (40.3)	67 (54.5)
LRS (Lower Respiratory Symptoms)		
Dry cough	39 (68.4)	102 (83.0)
Cough with phlegm	23 (40.3)	93 (75.6)
Wheezing	29 (50.8)	78 (63.4)
Chest discomfort	22 (38.5)	59 (48.0)

A lung function test was performed according to American Thoracic Society guidelines (ATS-1995). PFT test were performed and recorded by spirometer by Maestro midline version 2.1. The measurements were performed during morning hours. The forced vital capacity (FVC), FEV₁ and maximum flow rate at 50% and the last 25% of the vital capacity reading measured. Lung function testing was performed according to the recommendation of the American Thoracic Society. Table no. 3 represents the spirometric observation of solid waste workers.

Table-3 Spirometric lung function data

Function	Value (mean ±SD)	Sanitary land fill workers (n=57)	Door to door waste collection workers (n= 123)
FVC	Observed	2.80 ± 0.82	2.27 ± 0.97
	Predicted (%)	89.68 ± 11.5	79.4 ± 18.9

FEV1	Observed	1.83 ± 1.23	1.27 ± 1.03
	Predicted (%)	93.4 ± 14.9	85.6 ± 16.7
PEF	Observed	5.23 ± 2.00	4.31 ± 1.79
	Predicted (%)	82.9 ± 16.8	74.6 ± 15.4

RESULTS

The door to door waste collecting workers has a high prevalence of URS and LRS. They have significant lower spirometric values than the sanitary land fill workers. Lung function decrement appeared to be occupation related since 79 % of workers engaged in waste collection for more than 8 years. There is decrement of lung function value almost 28 %, in the group where workers having length of service more than 8 years. The data showed that occupational exposure in door to door waste workers is associated with an excess of respiratory symptoms with a noticeable decrease in pulmonary function. The door to door waste collectors was found to be associated with increase prevalence of URS (odds ratio = 2.33 95 % CI = 0.90-4.12) and LRS (odds ratio = 4.59 95 % CI= 2.57-6.13) than sanitary land filling workers.

DISCUSSIONS

Manual handling of unsegregated solid waste as done by the workers may be exposed to large quantities of pathogens present in solid waste. This leads them to respiratory and other health problem. Prevalence of respiratory symptoms were found higher with longer duration of service in sanitary land fill workers and door to door waste collecting workers.

The workers involved in solid waste management activity are illiterate and poor people. Working environment is same in all developing nation. Present work can throw some light on respiratory

morbidity of solid waste workers in general. In view of this strict implementation of segregation of waste and change in current practise of open dumping of solid waste at sanitary land fill site should be considered in the country on priority basis.

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REFERENCES

1. Chun-Yuh Yang,et al.(2000), Adverse Health Effects among Household waste collectors in Taiwam. Environmental Research Section A 85, 195-199. <http://www.idealibrary.com>. Collectors, Occup. Environ, Med, 54, 861-867.
2. Daniela Porta et al.(2009). Systematic review of epidemiological studies on health effects associated with management of solid waste. Environmental health,8:60
3. Iven, U.I., et al. (1998), Injuries among domestic waste collectors. Am. J.Ind. Med.33, 182-189.
4. Ivens, U.I. et al. (1997), Season, equipment, and Job function related to gastrointestinal problems in waste
5. Manas Ranjan Ray et al. (2004), Respiratory and general health impairments of ragpickers in India: a study in Delhi. Int. Arch. Occup. Environ Health 77:595-598.
6. Nielsen,O.R. et al. (1995), Traffic-related air pollution: Exposure and health effects in Copenhagen street cleaners and cemetery

- workers. Arch. Environ. Health 50,207-213.
7. Patil AD et al. (2001) Health- care waste management in India. J Environ Manage 63: 211-220.
 8. Pope CA III et al. (1999), Epidemiology of particle effects. In: Holgate ST, Samet JM, Koren HS, Maynard RL (eds) Air pollution and health. Academic, San Diego, pp 673-705
 9. Sigsgaard, T. et al. (1997), Respiratory disorders and atopy in Danish refuse workers. Am. J. Respir. Crit. Care Med.149, 1407-1412.
 10. Yogesh D sabde. (2008). A study of morbidity pattern in street sweepers: A cross sectional study. Indian J Community Med 33: 224-228.