

Occupational Health and Safety of Workers in Municipal Solid Waste Management System

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Abstract

The Municipal Solid Waste (MSW) comprises with household garbage rubbish, street sweepings, sanitation residues, etc. Municipal Solid Waste Management (MSWM) includes generation, storage, collection, transfer, transport and disposal of Municipal Solid Waste. In the processes of the MSWM, the waste disposal workers are playing a significant role. These employees are suffering from the infectious diseases such as allergic respiratory diseases, musculoskeletal disorders, the lower back, neck, knee pain etc. One of the major reasons for this situation is the inappropriate handling of the safety measures during the collection and disposal of waste by the workers. This leads more health related problems to the workers further affects social, economic condition of their families. Therefore, the general notion in the developing and underdeveloped countries is that the waste disposal workers are facing high risk in health and safety aspects in their occupational condition. Therefore, to study about the occupational related health and safety condition of the Municipal Solid Waste workers is need of the hour in the present scenario. In this aspect, this study focuses the occupational health and safety condition of the municipal solid waste workers in the Musiri Panchayat Union, Trichy district, Tamilnadu.

Methodology: It is an empirical study and the data was collected from the respondents in the waste collecting points and the dumping places. The data was collected through the self-structured interview scheduled and observation methods. The total number of the respondents is 60, both male and female workers. **Result:** The workers are facing health related problems. The workers are not following even the minimum level of safety measures during waste collection and other processes. The male workers are having the habits of drinking alcohol and smoking, eating tobacco and the female workers are felt satisfy and security in their working place.

Keywords: Municipal Solid Waste; Health; Safety; Occupation; Workers

Introduction

The Solid wastes are defined as discarded solids arising from human or animal life and activities. According to the United Kingdom's environmental agency the solid wastes are classified in two types: controlled and non-controlled waste. The controlled solid waste generated from house hold, commercial, industrial organization, construction and demolition sites. The non-controlled solid waste generated from agriculture, mines, quarries and degrading operation.

Every day there are new kinds of wastes are generated by the people and these wastes are spreading different types of diseases in the world. There are many reasons for this problem like, increasing number of the population, density of population in some particular places, urbanization, modern way of life styles, increasing level of purchasing power of the people, the frequent changing pattern of the commodities by the people etc. Therefore, the increasing amount of the waste is a major thread for the environment, social, economic and physical condition of the people and government as well. In this condition, the solid waste collection work is one of the crucial occupa-

tions in the modern society; also the Municipal Solid Waste Management (MSWM) is a most essential field in the contemporary world. It has encompassed planning, engineering, organization, administration, financial and legal aspects associated with generation, storage, collection, transfer and transport processing. The government and non-governmental organizations are taking various efforts in the process of solid waste disposal and management system. For example, the Government of India had been implemented various major programmes like Comprehensive Rural Sanitation Programme in 1999, the Total Sanitation Campaign (TSC) renamed as Nirmal Bharat Abhiyan (NBA) and recently the Swachh Bharat Abhiyan in 2014 [16]. There are numbers of people are involving in these programs voluntarily and also salaried. The major aim of these programs is to provide safe, clean and healthy living environment to the people. But at the same time there is a need to analyze how far the waste disposal workers are protecting themselves and caring their own health condition and government's welfare programs to the workers are major debatable and substantial concern. This is because, this group of people

are unavoidable at the same time uncared or voiceless people in social and administrative classification of Indian society. As mentioned, the solid waste collectors have low socio-economic status like poverty, lack of education and poor nutrition, poor housing, in addition, this group of workers are exposed directly and without adequate personal protection while handling in the municipal solid waste (MSW) which includes hazardous substances in the low-income countries [1]. When compared to the general population, the Solid waste workers have six times more relative risk of developing infectious diseases. In many of the third world countries, they have been done this work in manually and therefore they need physical strength to lift large size of waste containers. Commonly, they are suffering the health complaints like musculoskeletal disorders, the lower back pain, pain in knees, and neck [2,3].

In the modern era, the generation of waste by the public and other industries is a significant aspect in the waste management system. The waste generation is determined by the size of population of a country, income level of the people, number of industries, status of the major occupation like tourism and the increasing number of cities. Currently, the level of global Municipal Solid Waste generation is approximately 1.3 billion tons per year, and it's expected to increase 2.2 billion tons approximately per year by 2025. In South Asia, approximately 70 million tons of waste is generated per year. According to the Central Pollution Control Board (CPCB) report in 2014-15, there were 51.4 million tons of solid waste generated in the country, in which 91 per cent was collected, and 27 per cent was treated and remaining 73 per cent disposed of at dumping sites. Also it has estimated that 15,342 tons of plastic waste generated in India, out of which, 9,205 tons were reported to be recycled and leaving 6,137 tons uncollected and littered.

Solid Waste Management System

Solid waste collection and disposal are major processes in the entire solid waste management system. The solid waste has been disposed and managed through the following methods; open burning, dumping into the sea, sanitary landfills, incineration, composting, plugging in fields, grinding and discharging into sewers, salvaging, fermentation and biological digestion. The collected waste is transported through the open truck, tractor-trailers, tipper trucks, and animal drawn carts in small town and villages. However, in some of the big cities the container carrier and dumping placers are used to transport the waste.

Municipal Solid Waste Generation in India

The traditional methods of municipal waste collection are practicing in many of the Indian cities still. The door to door collection is one among the best practices in Indian cities. The city corporations are provided permanent and temporary containers in plastic and cement pits to dump the waste in the streets. However, people are just throwing the waste in common places nearby locations such as streets corners and road side without separation. Therefore, the waste separation is major work for the Waste Collectors and they are having many injuries at this stage. Majority of them are not followed any safety methods like wearing gloves and boots, helmets, paints and full shirts. For the disposing of the waste they are using bullock carts, tractor, trailers tricycles etc. The power vehicles are also using for disposing waste in many cities but mostly they are not covered on the top, as a result the wastes are spill on the road site and creating unhygienic condition. Some of the major metro cities

are used the hydraulic power vehicle for transporting the waste [4-7]. While look into the waste disposal system in India, it has closely associated with some particular caste of the people. This work is not performing by all the community of people. It had been majorly performed by the lower caste people and majority of them are doing this job traditionally. Their social and economic condition is feeble and they are residing nearby the waste disposal yards, this could be convenient for their job but at the same time, it has created many health related problems to them. Therefore, the waste collectors are not only affected during their working place but also by their residential place [8,9].

Literature Review

There are number of studies have done in international and national level. These studies were described about the health related threads of the waste workers and the proper and improper methods of the municipal solid waste management system and its challenges. In that platform [1], pointed out in Taiwan the majority of the waste collectors had the health problems such as musculoskeletal injuries, lower back pain, wrist, and elbow. The study was done by [10], they described about the physical strength of the workers in the field. The study stated that the majority of the workers were faced the problem of musculoskeletal disorders. An another study by was mentioned the similar findings that the workers were frequently complained strain, cutting injury [11], laceration, twisting and soft tissue injury, injury by sharp object, cut by broken glass, or piercing object and straining of the body. Study stated that training is one of the major aspects in the waste collection activities but it was not happened for the workers [12]. Therefore it has created problems in the proper waste collection methods as well as the injury for the workers [13].

Significant of the Study

The general notion of the developing and underdeveloped countries about the waste collection workers is that they are facing high risk in health and safety aspects in their occupational condition in the Municipal Solid Waste Management System (MSWMS). The major reason is inappropriate handling of the safety measures during the collection of waste by the workers because most of the processes of MSWM have done through manually. Therefore, the workers are suffering by the infectious diseases, allergic respiratory diseases, musculoskeletal disorders, the lower back, neck, knee pain etc [3, 13-14]. The workers are from socially and economically weaker sections and they are unable to get treatment for their health problems from the private multispecialty hospitals or even in middle level hospitals also. Their only scope is government hospitals for their health problems. This condition affects social and economic condition of the worker's families. Hence, to study about the occupation related health and safety condition of the MSWM workers is one of the significant research studies in the present scenario. In this aspect, this study focuses the actual condition of the occupational health and safety of the workers in Musiri Panchayat Union, Trichy district, Tamilnadu. It is an empirical study and the data was collected from the respondents in the waste collection points and the dumping places through the structured interview scheduled and observation methods. The main Objectives of the study are

- To find out the occupational based environmental condition of the municipal waste collection workers
- To examine the occupational related health condition of

the municipal waste collection workers

- To analyze the occupational health and safety of status of the workers in municipal solid waste management system.

Methodology

The research work has studied about the occupational related health condition of the municipal solid waste disposal workers in the Musiri municipality. The primary data was collected from 60 municipal waste collection workers, both male and female worker. The data was collected directly from the respondents in their working places. This would help to understand the actual working environmental condition of the workers [15,16]. The secondary data had been collected from the different sources like journal, reports, research studies and monographic etc.

Results and Discussion

Occupational Related Environmental Condition of the MSWM Workers: The working environment is one of the significant aspects for every occupation, but by nature itself the place of waste disposal is in un-cleaned condition. After collection of waste, the workers have to be worked long hours for separating, packing, decomposing, loading the wastes in the dumping yard. Therefore, the dumping yard must be maintained a minimum level of cleanliness [17]. During the data collection, it has observed that the workers are using tools for separating the organic and inorganic wastes, plastic waste and metal waste. However, for this process they did not use safety measures like wearing boots, gloves, mask, etc. In this dumping yard the workers are preparing organic manure through vermi compost technique. In the general observation of the dumping yard of this municipality, the workers are maintaining the dumping yard with clean. However, there is need for the workers to use the safety measures.

Health Condition of the MSWM Workers: In India majority of the cities, waste is disposed by manually. Therefore, there are high chances to affect health condition of the workers through the wastes. Many of the research studies are reported that the waste disposal worker's health is badly affected in the process of waste disposal. But the present study result is provided different perspectives. The majority of the respondents of the study said that there is no major health issue due to the disposal of the waste work. However, very negligible amount of the respondents have the problem of headache [18], fever and stomachache. The problem of knee pain is very common for the waste disposal workers, it has caused by age and nature of their work. However, it has observed that in this waste dumping yard majority of the workers are young age. This might be a reason for the healthy condition of the workers [19].

The Status of Health and Safety of the MSWM Workers: The respondents of the study are going to the government hospitals for their minor and major health problems. This is because; their economic condition is not applicable to access the private hospitals. Most of the respondents are medicating through home remedies for their minor health problems. Interestingly the women workers are not having any major health issues; also they are able to work equally with the male workers. The health issues such as TB, Diabetic, Asthma, heart problem etc., are common for the to the waste disposal workers. However, the respondents of this study are not affected majorly by these diseases. These workers are vaccinated properly for their children and they are more concern about their children's health

care [20-24]. Almost all the male workers are having the habit of drinking alcohol. The 60 percent females and 75 percent of males are having the habit of eating tobacco. The smoking is another awful habit of the respondents more than 55 percent of the male respondents are having the habits of smoking. These workers are spending around 20 to 30 percent of their salary for these kinds of habits. These habits have increased by their friends and relatives particularly during the festival time. They are aware about the health related problems due to these kinds of practice, but they are justifying for this habits related to their nature of occupation. When we look at the personal security of the women workers in the working environment, they are feeling happy and safety to work in the dumping yard [25,26]. Their working hour is started in the early morning between 5 to 6.00 am, because of this they may not able concentrate much on food preparation and their children's education. The permanent workers are not satisfied with their salary; they said that the monthly salary is not enough for their regular expenses. And most of the time they are borrowing money from money lenders with high interest rate. The temporary workers are working under the Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA) scheme and their salary is very low for their working capacity [28-31]. They are not professional waste disposal workers but coolie workers converted into waste collecting workers. They are from both lower and most backward communities' and working the municipal dumping yard.

Suggestions

- Training is one of the important aspects for the workers in safe disposal of waste. Therefore, the municipal corporations should take immediate action for providing proper training through experts
- Provide workers friendly safety tools to the workers because the existing tools used by the workers are not suitable in the process of waste disposal [3].
- Transporting the waste is major risk factor for the workers, therefore the administration need to provide proper advanced technological vehicles to the workers
- The vehicles which are used for disposal of waste have to be periodically serviced by the municipalities
- The municipalities should be provided risk and health allowance to all the workers irrespective of permanent and temporary workers [27].
- Provide proper water facilities in the dumping yards to clean their tools as well as bathing purpose of the workers
- Provide special health care of women workers and special leave have to be provided for them.
- Periodical medical checkup should be provided to the waste disposal workers
- The government needs to provide special educational scholarship programme for the worker's children
- The amount of disposing waste is increasing day by day. Therefore, government has to provide sufficient carrier facilities with advanced level technology to the workers [3].

Conclusion

The general interest of every employee is that to have good environment in their working place. This will be applied to the municipal solid waste disposal workers also. Though their nature of work is in hazardous place, they need to have minimum level of safety, security and clean working environment. There

should be need of holistic efforts by the different stakeholders such as government, municipal administration, environmentalist, public and waste disposal workers. Everyone should have response for the clean and safety working environment in the disposal of municipal solid waste management system. Thereafter, one can say that the municipal solid waste management system is the occupational hazardous free waste management system.

References

- Sabde YD, Zodpey SP. A study of morbidity pattern in street sweepers: a cross-Sectional Study. *Indian Journal of Community Medicine*. 2008;33(4). <https://www.ncbi.nlm.nih.gov/pmc/articles/PMC2763693/>
- Yang CH, Chang WT et al. Adverse health effects among household waste collectors in Taiwan, *Environment Research Section*. 2001;85:195-199.
- Jaiswal A. Occupational Health and Safety in the Construction Industry in Developing Countries” *Innovative Management Practices for Global Competitiveness*, Glowplus Publishers, Chennai. Edited Book by Dr Lavanya Latha. 2015:257-262.
- Bhide AD & Shekdar AV. Solid Waste Management in Indian Urban Centers. *International Solid Waste Association Times (ISWA)*. 1998;1:26-28.
- Reddy S, Galab S. An Integrated Economic and Environmental Assessment of Solid Waste Management in India – the Case of Hyderabad, India. 1998.
- Malviya R, Chaudhary R, Buddhi D. Study on solid waste assessment and management – Indore city. *Indian Journal of Environmental Protection*. 2002;22(8):841-846.
- Central Pollution Control Board (CPCB). *Management of Municipal Solid Waste*. Ministry of Environment and Forests, New Delhi, India. 2004.
- Jaiswal, A. Ethnographic Profile of the Textile workers of Uttar Pradesh: Religion wise *The Anthropologists, International Journal of Contemporary and Applied Studies of Man*. 2012;14(2):231-237
- Jaiswal A. A Case Control Study among Carpet Thread Factory Workers in Uttar Pradesh, India: Occupational Injury and its Deteriorating Factors” *Global Journal of Human Social Science, History and Anthropology*. 2013;12(10):23-30.
- IJzelenbergW, Molenaar D, Burdorf A. Different risk factors for musculoskeletal complaints and musculoskeletal sickness absence. *Scand J Work Environ Health*. 2004;30:56-6.
- Kuijjer PPF, Dresen MHWF. *World at work: Refuse Collectors*. Occupational Environment. 2004;61:282-286.
- Merson MH, Black RE, et, al. *International Public Health: Diseases, Programs, Systems and Policies*. Gaithersburg, Maryland, Aspen Publishers. 2001.
- Jaiswal A. Respiratory Efficiency as Affected by Exposure to Textile Dust- Health Status Evaluation of Textile Workers of District Varanasi of Uttar Pradesh. *Genes, Environment and Health* Jaiswal, A. (2007). *Anthropological perspective*, 2007;12:135-161.
- Jaiswal, A. A study of the Occupational Health function among female Textile Workers *International Journal of Sociology and Anthropology (IJSA)*. 2011;3(3):109-114.
- Jaiswal, A, Kapoor AK, Satwanti Kapoor. Health conditions of a Textiles Workers and their association with breathing condition” *The Asian Man, An International Journal*. 2011;5(1):28-33.
- Jaiswal A. A Review of Professional and Industrial Workers Health Research in India *Voice of Intellectual Man, An International Journal*. 2014;4(1):81-96. (Online: ISSN: 2319-4308 and ISSN: 2231-6914).
- Annual Report 2014 – 2015 Central Pollution Control Board Ministry of Environment, Forest & Climate Change.<http://cpcb.nic.in/openpdf.php?id=UmVwb3J0RmlsZXMvMzQ1XzE0OTgyMDk5NTFfbWVkaWFWaG90bzI1OTk4LnBkZg>.
- Das SS. Occupational Health Problems Among Door To Door Solid Waste Handlers in Surat City, Gujarat, PG Dissertation Submitted to Achutha Menon Centre for Health Sciences Studies, Sree Chitra Tirunal Institute for Medical Sciences and Technology, Thiruvananthapuram, Kerela. 2009.
- http://dSPACE.sctimst.ac.in/jspui/bitstream/123456789/2139/1/MPH_5761.pdf
- Jayakrishnan T, Jeeja MC, Bhaskar R. Occupational health problems of municipal solid waste management workers in India. *International Journal of Environmental Health Engineering*. 2013;2:42.
- Joshi R and Sirajuddin, A. Status and Challenges of Municipal Solid Waste Management in India: A Review, *Cogent Environmental Science*. 2016. <https://www.cogentia.com/article/10.1080/23311843.2016.1139434>.
- Neeraj K, Baredar PP. Opportunity and Challenges of Municipal Waste Disposal in India, *International Journal for Innovative Research in Science & Technology*. 2016;3:2.
- Methods of Solid Waste Disposal and Management.
- <https://theconstructor.org/environmental-engg/methods-of-solid-waste-disposal/4721/>.
- Mohammed S, Latif PA. Possible Health Danger associated with Garbage/Refuse Collectors, *IOSR Journal of Environmental Science, Toxicology and Food Technology*. 2014;8(9)9:22-30. www.iosrjournals.org.
- Sharholly M, Ahmad K, Mahmood G, et. al. Municipal Solid Waste Management in Indian cities–A review, *Waste Management*. 2008;28:459-467, <https://www.sciencedirect.com/science/article/pii/S0956053X07000645>.
- Siddiqui FZ, Khan E. Sustainable Development through Integrated Municipal Solid Waste Management (MSWM) Approach – A Case Study of Aligarh District. In: *Proceedings of National Conference of Advanced in Mechanical Engineering (AIME2006)*, Jamia Millia Islamia, New Delhi, India. 2006;1168–1117.
- Urban development series – Knowledge Papers, What a Waste: A Global Review of Solid Waste Management, <http://siteresources.worldbank.org/INTURBANDEVELOPMENT/Resources/336387-1334852610766/Chap3.pdf>.
- <https://blog.oup.com/2017/03/social-work-month-importance/>.
- <https://www.thecompleteuniversityguide.co.uk/courses/social-work/reasons-to-study-social-work/>.
- <https://www.socialworkers.org/About/Ethics/Code-of-Ethics/Code-of-Ethics-English>.