

Study of Health Problems among Municipal Waste Collectors in Sohag City, Egypt

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Abstract: Introduction: Waste collectors play an important role in maintaining the health and hygiene in the communities. However, their job exposes them to various hazards while, little or no attention is paid to their health status. **Aim of the work:** This study was carried out to identify the occupational health hazards, and safety measures taken in collecting waste among 250 MSW collectors in the municipalities of Sohag City. **Materials and Methods:** A total of 250 waste collectors were subjected to an interview sheet including sociodemographic characteristics, occupational history, medical history of diseases or injuries in past three months, vaccination, and administrative rules of provided safety measures. **Results:** The physical complaints among MSW collectors during the past 3 months were that of injury (64%), followed by musculoskeletal disorders (58%), fatigue 40% then the respiratory disorders (32.4%), gastrointestinal disorders (24%), eye disorders (18%), and the least frequent skin disorders (16.8%). Most of MSW collectors not use PPE, none of them vaccinated, periodic checkup, trained before work. **Conclusion:** Waste collection is a hazardous job that exposes its workers to infections especially with the little, in any, protective measures they apply. Guidelines for safety measures and controlling infections should be emphasized and employed for those workers, while offering periodic medical examinations and supplying them with personal protective equipments.

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1. Introduction

Solid waste is movable solid items, arising from human activities, which discarded as useless or unwanted and that have no positive value. It constitutes a big environmental problem for the landscape, soil, atmosphere and groundwater. It is also the source of many health and hygienic problems. For centuries, people have been getting rid of it by organizing, collection, transport and dump system in Egypt⁽¹⁾.

Waste collection can be practice as either an occupation or essential mean of survival which exposed them to various high work hazards, as are the risks of various morbidities and factors like socio-economic status which is low and their working environment make them more vulnerable to hazardous exposure. Risk of morbidities increases with the intensity and duration of exposure to hazards, as well with the age of workers⁽²⁾.

Globally, solid waste collection is an important task and among the highest risk occupation. It is the removal of municipal solid waste with variety of biological, chemical, mechanical, physical and psychosocial hazards⁽³⁾.

Commonly observed health problems among SWC include respiratory systems, irritation of the skin, nose and eyes, gastro-intestinal problems, fatigue, headaches, psychological problems, allergies, chemical poisoning, tuberculosis, scabies, asthma, ophthalmic diseases, ulcer, stomach problems, musculoskeletal and dermal injuries⁽⁴⁾.

Egyptian waste collectors are therefore, dealing manually with mixed hazardous wastes with substantially increased occupational health impacts. Waste management practice in Egypt has been largely focused on the issues of collection and disposal with little or no attention paid to the health status of waste collectors⁽⁵⁾.

Aim of the work: This study was carried out to identify the occupational health hazards, and safety measures taken in collecting waste among 250 MSW collectors in the municipalities of sohag city.

2. Materials and Methods

Study Design

A cross-sectional study was conducted to identify the health problems among municipal waste collectors working at Sohag city, Egypt.

Study Setting and population

The study was conducted among 250 municipal waste collectors working at Sohag city, Egypt.

Research tools

Participants were interviewed (face to face) using pre-designed an interview sheet. The sheet was tested on a subset of 20 workers prior to starting to obtain information that might improve the work plan and facilitate the execution of the study. This pilot also enabled the adaptation of the sheet, the estimation of the time needed for interviewing the participants (15-20 min). The final data collection sheet was completed for each participant and covered sociodemographic characteristics (age, gender, residence, education, marital status, etc.), job description (nature of employment, duration of work, shift, etc.) complete medical history, work related complaints (injury, GID, MSD, respiratory disorders, eye disorders, skin disorders) and wearing of personal protective equipments: Disposable thick gloves, head covers, boots, masks goggle, or overalls). The sheet form included also questions about the practice of personal hygienic measures (hand wash and cloth change before leaving for home).

Ethical consideration

The study was conducted after explaining the steps of the study and its objectives to the participants. Oral consent was obtained from all the participants in the study.

Data analysis

During this phase data coding, entry and analysis was accomplished with the aid of computer using Statistical Package for the Social Sciences (IBM SPSS) software package version 20. The results were represented in tabular and diagrammatic forms then interpreted. All statistical tests were considered significant at P-value of ≤ 0.05 .

3. Results

This study include 250 waste collectors worker all of them were male with mean age (40.52 ± 8.85), and the majority of them were rural residence, large family number, not use PPE none of them trained, checked up or vaccinated before or during employment.

Table 1 demonstrate that mean age of the studied population is 40.52 ± 8.85 years, whereas 38% of the studied populations are aged between (30-) years old.

The above table shows that 100% of the workers were males. And less than two-thirds (68%) of the studied populations were rural residence.

This table also show that 46% of the workers were illiterates, 26% of the subjects were able to read and write, and 14% of the workers had preparatory or secondary school. Those who was Single/ widow represent 16% and who were married represent 84%.

As regards family number 26% of the subject had 2-4 family members, 42 % had 4-6 family members, and 32% had family members > 6.

Finally this table reveals that about 35.6% of workers are smokers (cigarette and gauza) with 41.6 of them are mild smokers and 22.4 % heavy smokers, while ex-smokers were 2.4% and nonsmokers were 62%.

Smoking Index (SI) values were calculated as the number of cigarettes smoked per day multiplied by the number of years of smoking (mild 0-100, moderate 100-200, and heavy smoker >200) ⁽²¹⁾

Table (1): Sociodemographic features of studied groups.

Socio demographic features	(N = 250)	%
Age (Mean \pm SD)	40.52 \pm 8.85	
Age years		
20-	40	16
30-	95	38
40-	75	30
50-60	40	16
Gender		
Male	250	100
Female	0	0
Marital status		
Single	35	14
Married	210	84
Widow	5	2
Divorced	0	0
Residence		
Urban	80	32
Rural	170	68
Level of education		
Illiterate	115	46
Read&write	65	26
Preparatory	35	14
Secondary school	35	14
University	0	0
Family number		
2-4	65	26
5-6	105	42
More 6	80	32
Month income		
<500	55	22
\geq 500	195	78
Smoking		
Cigarette	49	19.6
Gauza	40	16
Ex-smoker	6	2.4
Non	155	62
Smoking index(cigarette and gauza)(N=89)		
Mild	37	41.6
Moderate	32	36
Heavy severe	20	22.4

Table 2 reveals that about 40% of workers are permanent job, while 60% of workers are temporary

job, concerning shifting system about 60% of them work at morning shift, and 24% afternoon shift, while the lowest at night shift 16%,

Concerning history of work duration, the above table and reveal that about 34% of them worked <10 years, 44% were 10-20 years, and 22% worked >20 years.

Regarding methods of collection of waste about 92% collect waste manually, and 8% both manually and equipment.

Finally, this table shows that 22% of workers had additional occupation.

Table (2): Job description of studied group.

Nature of employment:	N=(250)	%
Permanent	100	40
Temporary	150	60
work duration years:		
<10 years	85	34
10-20 years	110	44
> 20 years	55	22
Methods of collecting waste:		
Manually	230	92
Use of equipment	0	0
Both	20	8
Changing shift:		
Morning	150	60
Afternoon	60	24
Night	40	16
Additional occupation:		
No	195	78
Yes	55	22
Type of Additional occupation:		
Farming	25	10
Constructor	17	6.8
Loading and unloading	8	3.2
Baker	5	2

Table(3) shows that the majority of workers not use personal protective equipment's (94%), while more than half wash hand (64%) and change cloths (76%) before leaving for home.

Table (3): Distribution of studied groups regarding the personal hygiene.

Personal hygiene	N = 250		%
Using personal protective equipment's	No	235	94%
	Yes	15	6%
Hand wash before leaving for home	No	96	36%
	Yes	160	64%
Change cloths before leaving for home	No	60	24%
	Yes	190	76%

Table (4): Health problems among studied groups.

Health problems	N = 250	%
Injury	160	64%
Musculoskeletal disorders(MSD)	145	58%
Respiratory disorders	81	32.4%
Gastrointestinal (GIT) disorders	60	24%
Eye disorders	45	18%
Skin disorders	42	16.8%
Fatigue	100	40%

This table reveals that the health problems among studied group were more than half of workers complain of injury (64%) and musculoskeletal disorders (58%), followed by about 40% subjective complain of fatigue, one third complain of respiratory disorders (32%), one quarter complain of Gastrointestinal(GIT)disorders (24%), meanwhile about (18%) complain of eye disorders, (16.8%)complain of skin disorders.

Table (5): The occurrence of musculoskeletal disorders in the past three months among the studied group regarding the age group.

Age group	MSD				total		P value
	Yes		No		N.	%	
	N.	%	N.	%			
20-	10	25.0	30	75.0	40	100.0	< 0.001
30-	55	57.9	40	42.1	95	100.0	
40-	50	66.7	25	33.3	75	100.0	
50-60	30	75.0	10	25.0	40	100.0	
Total	145	58.0	105	42.0	250	100.0	

This table reveals that the percentage of musculoskeletal disorders was high (75%) among age group (50-60) while the percentage of musculoskeletal disorders was low (25%) among age group (20-). The differences between all types of the age groups are statistically significant (P value <0.001).

Table (6): The occurrence of respiratory disorders in the past three months among the studied group regarding the age group.

Age group	Respiratory disorders				Total		P value
	Yes		No		N.	%	
	N.	%	N.	%			
20-	5	12.5	35	87.5	40	100.0	< 0.001
30-	25	26.3	70	73.7	95	100.0	
40-	30	40.0	45	60.0	75	100.0	
50-60	21	52.5	19	47.5	40	100.0	
Total	81	32.4	169	67.6	250	100.0	

This table demonstrates that the percentage of respiratory disorders was high (52.5%) among age group (50-60) while the percentage of respiratory disorders was low (12.5%) among age group (20-).

The differences between all types of the age groups are statistically significant (P value <0.001).

Table (7): The occurrence of injury in the past three months among the studied group regarding the use of personal protective equipments.

PPE	Injury				Total		P value
	Yes		No		N.	%	
	N.	%	N.	%			
Yes	2	13.3	13	86.7	15	100.0	< 0.001
No	158	67.2	77	32.8	235	100.0	
Total	160	64.0	90	36.0	250	100.0	

This table clarifies that the percentage of injuries was high (67.2%) among persons not using personal protective equipment while low percentage (13.3%) of injuries among persons Using personal protective equipment. The differences between them are statistically significant (P value <0.001).

Table (8): The occurrence of injury in the past three months among the studied group regarding the age group.

Age group	Injury				total		P value
	Yes		No		N.	%	
	N.	%	N.	%			
20-	40	100.0	0	0.0	40	100	< 0.001
30-	55	57.9	40	42.1	95	100	
40-	35	46.7	40	53.3	75	100	
50-60	30	75.0	10	25.0	40	100	
Total	160	64.0	90	36.0	250	100	

This table shows that the percentage of injuries was high (100%) among age group (20-) while the percentage of injury was low (46.7%) among age group (40-) the differences between all types of the age groups are statistically significant (P value <0.001).

4. Discussion

In Egypt, as well as in other developing countries, the traditional cultures still categorize street sweeping and waste collection as a filthy and stumpy occupation. Being ranked as such, those workers are usually having lower self-esteem; and the medical problems, which cannot be prevented by the little protective measures they take against their work-related hazardous exposures are further complicated or aggravated by various socioeconomic factors e.g., poverty, illiteracy or inadequate education, poor diet, and poor housing conditions.

Concerning the personal hygiene and safety protection most workers not use personal protective equipment, and only 6% use as follow (uniform 6%, gloves 2%, and gum boot 1.6%). This findings were in accordance with the findings of Milhem ⁽⁶⁾, and in

agreement with Eweis et al ⁽⁵⁾ who found none of waste collectors wear ppe.

Regarding the prevalence of injury about 64% of MSW collectors experienced one or more injuries in the past 3months, and the most frequent was cut wound (24%), followed by punctured wound (16%), contusion (14%), strain (6%), and finally fracture (1.2%). These findings in agreement with Das (2009) who stated the most frequent injury was cut wound 42.3%, followed by contusion 6.4%, puncture wound 4.3%, then fracture 2.56% and strain 2.13%. also in agreement with Bourdouxhe et al ⁽⁷⁾ and Robazzi et al ⁽⁸⁾.

Regarding musculoskeletal disorders the anatomical distribution showed that the most frequently affected body regions were back pain (24%), followed by shoulder pain (12%), knee pain (8%), elbow pain (7.2%), neck pain and wrist-hand pain (6%), and finally hip pain (2%). this result in agreement with Klein et al ⁽⁹⁾, Yang et al ⁽¹⁰⁾, and Mehraded et al ⁽¹¹⁾.

Regarding the respiratory disorders the present study revealed that frequency of respiratory symptoms among workers in past 3 months were productive Cough (16%), followed by sneezing(4.4%), itching nose(4.4), and sore throat (4.4%), dry cough(4%) and running nose (4%), chest tightness(2%), allergic rhinitis(2%), wheeze(2%), and chronic bronchitis (2%), and finally bronchial asthma (1.6%). This result agrees with Milhem ⁽⁶⁾, Abou-Elwafa et al ⁽¹²⁾, Ira ⁽¹³⁾, and Issever et al ⁽¹⁴⁾.

Concerning gastrointestinal disorders the present study revealed one quarter complain of diarrhea followed by nausea/vomiting and dysentery. This results in agreement with El-Wahab et al ⁽¹⁵⁾, Milhem ⁽⁶⁾ and Thorn ⁽¹⁶⁾.

Regarding eye disorders the present study found about 18% of workers complain of eye disorders most frequently burning of eyes followed by redness and foreign body impaction This finding in agreement with Eweis et al ⁽⁵⁾ and, Rojers et al ⁽¹⁷⁾.

Concerning the skin disorders among MSW collectors were (10%) dermatitis or eczema, Allergic rash (6%) and paronychia (6%). this in agreement with Das ⁽¹⁸⁾ study which revealed that about 30% of collectors complain of dermatitis followed by allergic rash. this results agree with Diggikar ⁽¹⁹⁾, Abou-Elwafa et al ⁽¹²⁾, and Eweis et al ⁽⁵⁾.

Regarding occurrence of fatigue the present study revealed about 40% of MSW collectors complain of fatigue during or at the end of work this was higher than study conducted by El wahab et al ⁽¹⁵⁾ which reported 27.5% of workers suffered from fatigue.

Conclusion and Recommendation

We conclude that this working group of waste collectors should be treated as a vulnerable group that needs a special care. This care can be summarized as providing them pre placement and in-service orientations about their tasks and health education about the health hazards they are being exposed to while emphasizing the preventive measures to improve their knowledge, attitudes and practices.

Immunization against tetanus, typhoid and HBV infections should be provided by their institutes and checked by local occupational health authorities. Guidelines for safety measures and controlling infections should be emphasized and employed for those workers, while offering periodic medical examinations and supplying them with personal protective equipment.

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References

- Zurbrugg C (2003): Urban solid waste management in low-income countries of Asia How to cope with the garbage crisis. Presented for: Scientific Committee on Problems of the Environment (SCOPE), Urban Solid Waste Management Review Session, Durban, South Africa, November 2003.
- Frings-Deresen MHW (2005): Protecting waste collectors all around the world. *Occup Environ Med*; 62:820-821.
- Dorevitch, S. and Marder, D. (2006): Occupational hazards of municipal solid waste workers. University of Illinois, Chicago, US A. PMID: 11107229.
- Sarkar P (2003): "Solid Waste Management in Delhi – A social vulnerability study" In: Martin JB, Suresh MV, Kumaran TV. eds., *Proceeding of the Third International Conference on Environment and Health*, Chennai, India; 451-464.
- Ewis AA, Rahma MA, Mohamed ES, Hifnawy TM and Arafa AE (2013): Occupational health related morbidities among street sweepers and waste collectors at Beni –suef, Egypt. *Egyptian Journal of Occupational Medicine*; 37 (1): 79-94.
- Milhem, A. (2004): Investigation of occupational health and safety hazards among domestic waste collectors in Bethlehem and Hebron Districts. MSc thesis, Environmental Science, Faculty of Graduate Studies, at An-Najah National University, Nablus, Palestine.
- Bourdouxhe M., Cloutier E., and Guertin S (1993): Accident hazards associated with domestic waste collection IRSSTR0-77.
- Robazzi M.L.C.C., Moriya T.M., Favero M., Lavrador M.A.S. and Luis M.A.V: (1997), Garbage collectors: occupational accidents and coefficients of frequency and severity per accident, *Ann Agric Environ Med*, 4(1), 91-6.
- Klein, B.P., Roger, C.J. and Lee, M.S. (1984): Assessment of workers' compensation claims for back strains/sprains. *Journal of Occupational Medicine* 26, 443-448.
- Yang CY, Chang WT, Chuang HY, Tsai SS, Wu TN, and Sung FC (2001): Adverse health effects among household waste collectors in Taiwan. *Environ Res*; 85:195-9.
- Mehrdad R, Majlessi-Nasr M, Aminian O, Sharifian SA, and Malekhamadi F (2008): Musculoskeletal disorders among municipal solid waste workers. *Acta Medica Iranica*; 46:233-238.
- Abou-Elwafa HS, El-Bestar SF, El-Gilany AH, and Awad Eel-S (2012). Musculoskeletal disorders among municipal solid waste collectors in Mansoura, Egypt: A cross-sectional study. *BMJ Open*;2: pii: e001338.
- Ira F (2004): Review of Health Impacts from Microbiological Hazards in Health Care Wastes. Department of Blood Safety and Clinical Technology & Department of Protection of Human Environment; World Health Organization, Geneva.
- Işsever H, Özdilli K, and Özyildirim BA (2007): Respiratory Problems in Tannery Workers in Istanbul. *Indoor Built Environ*; 16: 177-183.
- El-Wahab EWA, Eassa SM, Loffi SE, El Masry SA, and Shatat HZ (2014): Adverse Health Problems among Municipality Workers in Alexandria (Egypt): *Int J prev Med*;5:545-56.
- Thorn J (2001): Seasonal variation in exposure to microbial cell wall components among household waste collectors. *Ann Occup Hyg*; 45:153-154.
- Rojers J, Englehardt J, and An H (2002): Solid waste collection, health and safety risk: survey of Municipal solid waste collectors. *J Solid Waste Technol Mang*; 28:154- 160.
- Das(2009): Occupational health problems among door to door solid waste handlers in Surat city, Gujarat. Achutha Menon Centre for Health Sciences Studies Sree Chitra Tirunal Institute for Medical Sciences and Technology Thiruvananthapuram, Kerala.
- Diggikar, U. A. (2004): Health status of street sweepers with reference to lung function tests [Dissertation]. Pune University.
- Awad H E, Seif N Y, and Ahmed H I (2013): Occupational Hazards and Preventive Measures among Waste Collection Workers.
- Sanjay P. Zodpey and Suresh N. (2006): Ughade. Tobacco Smoking and Risk of Age-related Cataract in Men.. *Regional Health Forum ;WHO South-East Asia Region*; Vol. 3: 336-46.