



HEALTH AND SAFETY RISKS AMONGST THE MUNICIPAL SOLID WASTE COLLECTORS IN PORT HARCOURT METROPOLIS OF THE NIGER DELTA REGION OF NIGERIA

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ABSTRACT

Refuse collectors are those that pick up garbage for deposit at transfer stations or recyclable materials for deposit at existing recycling sites. This task is executed through the use of a truck on assigned routes. In developed countries automated trucks are used using hydraulic lift to pick up and dump trash containers. In developing countries such as Nigeria, the reverse is the case. Refuse collectors in this study area manually lift and dump containers into the operational trucks. Refuse collection is laden with health hazards. They are exposed to foul odours, dust, ants, flies and they get dirty easily even when they wear protective clothing if any (Appendix1B). Other hazards include chemical burns, injuries from disposable needles, broken glasses, falling objects from overloaded containers and the diseases that accompany solid waste. It is a very common sight to see refuse collectors on truck filled to overflowing with solid wastes sitting unsupported on top of the refuse while the truck is moving. The aim of this paper was to explore the work practices, injuries, illnesses, working conditions and other hazards faced by Port Harcourt municipal solid waste collectors in the course of discharging their duties. The sample for the study constituted of two hundred and seventy nine (279) solid waste collectors selected through convenient sampling technique. Their supervisors also formed part of the sample population. Data for the study was collected through structured questionnaire on Port Harcourt Metropolis solid waste (MSW) workers and oral interview with the aid of trained research assistants. Responses were analyzed using descriptive statistics of frequency counts, percentages and tables. Results revealed that out of the total respondents of two hundred and seventy – nine (279), 73(26.2 %) agreed that their protective equipments were of the right quality and suitable to the task, 31(11.1 %) were undecided while 175(62.5 %) disagreed. This implied that their protective equipments were not of the right quality and also not suitable to the tasks. Qualitative data revealed that not all the workers were given the protective equipments. Physical observation of the waste components revealed broken glasses and bottles, empty tins with serrated edges, broken plates, hypodermic needles and other sharp objects amidst several other forms of wastes. Two hundred and thirteen respondents representing 76.3 % of the total population agreed that they had sustained injuries from sharp objects in the course of packing refuse with bare hands. Only 57(20.4 %) disagreed while 9(3.2 %) were undecided. The study therefore concluded that Solid waste collectors in Port Harcourt municipality experienced different types of preventable

hazards inherent in their jobs due to their work practice. The hazards they experienced ranged from injuries of all kinds, musculoskeletal and hearing disorders to respiratory and gastro intestinal tract infections. It was therefore recommended that the workers should be provided with the right protective equipments suitable to the tasks and also monitored to ensure their usage at work. Amongst other recommendations was also the need for periodic health surveillance to detect early signs of disease and also monitor their work ability.

Key words: health, safety risks, solid waste collectors, Port Harcourt Metropolis, Niger Delta Region, Nigeria.

INTRODUCTION

Solid waste collectors are also referred to as garbage collectors or trash collectors. These all refer to those that use trucks to collect garbage to the final point of disposal or recycling on various routes as assigned. The duties of solid waste collectors include emptying of refuse bins into the truck using hydraulic lift or their physical strength and describing the standards for proper disposal to customers (California occupational Guide, 2002).

Solid waste collection is a global event as refuse generation can not be separated from man. Collection methods range from bags made of either plastic or paper, bins, drums, two wheeled or four wheeled containers (Poulsen and Breum, 1995). The job of solid waste collection involves frequent lifting, carrying, pushing or pulling of heavy objects. Frings-Dresen, Kemper, Stassen, et al (1995) Kuijer, Frings-Dresen, De Looze, et al (2000) posited that a closed refuse truck with an automatic lifting device to empty two-wheeled containers or four wheeled containers are used in the Netherlands. The only exceptional cases are those parts of Netherlands within the city areas where households have no space to place a container are bags collected (Kemper, Van Aalat, Lee water et al, 1990).

The solid waste collectors tag containers to indicate overflowing containers or rejection of unsuitable wastes to members of the public. The vehicles used in collecting refuse in ideal situations are in various shapes and sizes to suit the volume of rubbish to be collected at a particular instance. The choice of vehicles is also informed by the different types of roads and streets involved in refuse collection. Most of the streets might be narrow and fully parked with vehicles. This demands daily checking of the vehicles before leaving the depot to make sure they are in good working condition. The pressure to drive the trucks with minor faults will always be there but this should be resisted. This is crucial because someone's life may definitely be at stake (California occupational Guide, 2002).

In recent years there are changes in the methods of solid waste collection which involves the use of complex equipment. There is need to thoroughly put the operators of these equipment through the operations to avoid complications. The equipment should also be maintained and monitored regularly. There is a relationship between the method of collecting solid waste and the resultant hazards. In most cases the refuse are manually handled. In some cases refuse sacks are used but difficult to judge the weight of each sack.

It is suggested that not more than two sacks should be picked up at any one time but this is not practicable from observations (California occupational Guide, 2002).

Solid waste collection is often taken for granted in modern societies. Members of the public exhibit non-chalant attitude towards the way they put out their refuse (Kuijer and Frings-Dresen, 2004). Their expectation most times is, they put out the rubbish any how and within one day it is gone without bothering about how it is collected. The attitude is often that the council tax they pay takes care of that.

Refuse collection is a hazard laden job. Such hazards include injuries from sharp objects such as broken glasses, serrated edges of tin cans, knives protruding as bags are lifted or swung and hypodermic needles. These needles might be carrying other people's blood possibly contaminated with a number of viruses (Kuijer and Frings-Dresen, 2004).

Solid waste collectors are exposed to increasing risk of respiratory and gastrointestinal tract diseases. These are attributed to the microbial agents they are exposed to in the course of discharging their duties (Wouters, Hihorst, Kleppe, et al 2002, Heldal, Halstensen, Thorn,etal 2003, Ivens, Ebbehoj, Poulsen, etal 1997, Ivens, Breum, Ebbehoj etal 1999).

Violence from members of the public is another form of hazard. This might be as a reaction to the refuse trucks blocking the roads. The violence could be demonstrated in various ways from verbal abuse to spitting and even physical violence in most cases. They are also subjected to hazard of hearing and musculoskeletal disorders which has to do with back, shoulder and arm injuries. Incorrect manual handling, size of the bin and the distance they have to move the bins predispose to the injuries (Wouters, Hihorst, Kleppe, et al 2002, Heldal, Halstensen, Thorn,etal 2003) Ivens, Ebbehoj, Poulsen, etal 1997, Ivens, Breum, Ebbehoj etal 1999).

The nature of duties involved in refuse collection requires the use of protective equipment. They work in busy roads and also carry heavy loads. The protective equipment they require range from "toetector" footwear, nose masks, high visibility clothing capable of being seen by car drivers from a reasonable distance, gloves, the right wear suitable for rain, heat or cold and reinforced trousers to minimize against punctured wounds from sharp objects. The protective equipment should be suitable to the tasks. Where possible the personal protective equipment should be tried out before general use (California Occupational Guide, 2002).

Risk assessments should be carried out to identify the hazards that are involved and also look towards eliminating or reducing the risk to a level as low as possible. This calls for the involvement of the operatives and safety representatives (Kuijer and Frings-Dresen, 2004).

The focus of this paper is to explore the work practices, injuries, illnesses, that Municipal solid waste collectors in this study area are exposed to in the course of discharging their duties followed by appropriate recommendations.

MATERIALS AND METHODS

Study Area

Rivers State is one of the thirty-six states of Nigeria with Port Harcourt as the capital. Port Harcourt is the nerve centre of famous Nigerian oil industries with ninety industrial concerns. This attracts influx of immigrants. Two thirds of Rivers State is in the Niger Delta geographical terrain (<http://www.ngex.com/nigeria/places/states/rivers.htm>). Port Harcourt covers an area of 1,077 km, square and has a population of 5,689,087 (2005, estimate).

Study Design

The study was a survey of the municipal solid waste collectors. The population of the study constituted of all solid waste collectors in Port Harcourt metropolis. Convenient sampling technique was used in selecting the sample for the study. The sample constituted of solid waste collectors and their supervisors. Due permission was obtained from the supervisors to involve the workers in the study. Each respondent also participated voluntarily. Anonymity was assured to enhance the confidence to volunteer necessary information. Two hundred and seventy nine refuse collectors participated in the study.

Data for the study was collected through structured questionnaire on municipal solid waste (MSW) workers and oral interview with the aid of trained research assistants. Physical observations of the components of the solid wastes were also carried out on every site visited. Questionnaires were completed with responses from the respondents by the trained assistants who read the questions in simplified language to the respondents. This was to enhance accuracy. At the end of each day, entries were validated by the trained research supervisor. The refuse collectors were always met on duty in their various sites through out the period of data collection. The period of data collection was during the dry season and it spanned through a period of four weeks.

The first part of the questionnaire was designed to elicit socio-demographic information while the second part was to elicit information on their work practices, injuries, illnesses, and other hazards they encountered on the job. The completed questionnaires were sorted, collated and analyzed using tables, frequency counts and simple percentages.

Both qualitative and quantitative data were integrated into the analysis. The qualitative data analysis involved the transcription of the information gotten from oral interview. The results of the qualitative data were used in the explanation of some of the findings of the study.

RESULTS

Respondents were all males and their age ranged between 15 – 45 years and above. Fourteen (5.0%) respondents were between the age range of 15 – 20 years. Sixty five

(23,3%) respondents were between 20 – 25 years of age. One hundred and seventeen (41,9%) respondents were between 25 – 35 years. Sixty-nine (24,7%) respondents were between 35-45years of age while only fourteen (5,0%) respondents were up to 45 years and above (Table 1).

Table 1.: Age of respondents.

Age	No. of respondents	Percentage %
15 – 20 Yrs	14	5,0
20 – 25 Yrs	65	23,3
25 – 35 Yrs	17	49,1
35 – 45 Yrs	69	24,7
45 – Above	14	5,0
Total	279	100

Table 2.: Educational qualifications of respondents.

Educational qualifications	No. of respondents	Percentage (%)
Primary	51	18,3
Secondary	121	43,4
Tertiary	72	25,8
No Formal	35	12,5
Total	279	100

The educational background of the respondents is represented in table 2. One hundred and twenty one (43,3%) of the total respondents secondary school certificate. Seventy two (25,8%) respondents had tertiary school certificates while thirty-five (12,5%) had never gone to school (Table 2). One hundred and thirty (130) respondents representing 46,6% were married while 149 (53,4%) were not married (Table 3).

Table 3.: Marital status.

Marital status	No. of respondents	Percentage (%)
Married	130	46,6
Unmarried	149	53,4
Total	279	100

One hundred and ninety-one (191) respondents representing 32,6% agreed that refuse were manually lifted with their physical strength into the trucks. Twenty (20) respondents representing 7.2% were undecided while 66 (23,7%) of the total respondents disagreed to the item. Thirty-five (35) respondents representing 12,5% of the total sample disagreed that overflowing refuse containers were tagged indicating rejection of more wastes to the

members of the public. Only nine (9) respondents representing 3,2% of the total sample were undecided while 235 (84,2%) respondents disagreed to the item (Table 4).

Table 4.: Respondents responses on work practices.

Items 1 – 4	Responses expressed in percentage (%)			
Work Practices	A	U	D	Total
Refuse are emptied into the truck with hydraulic lifts	49	30	200	279
Refuse are emptied manually with physical strength	191	22	66	279
Standards of proper disposal are described to customers	48	16	215	279
Overflowing containers are tagged to indicate rejection of more wastes to members of the public.	35	9	235	279

*A....Agreed U.....Undecided D...Disagree

On the provision of “toetector” foot wears to the solid waste collectors, 102(36,6%) respondents agreed, 36(12,9%) were undecided while 141(50,3%) of the total respondents disagreed that they were provided. On the provision of enough high visibility clothing to go round all the workers, 99(35,5%) respondents agreed, 61(21,7%) were undecided and 119(42,7%) disagreed. On whether the protective equipments were of good quality, 73(26,2%) respondents agreed, 31(11,1%) were undecided while 175(62,7%) respondents disagreed. On whether the respondents were always making use of the protective materials, 83(29,7%) respondents agreed, 49(17,6%) were undecided and 147(52,7%) disagreed (Table 5).

Table 5.: Respondents responses on Personal Protective Equipment.

Items 5 – 12	Responses expressed in percentage (%)			
Personal Protective Equipment	A	U	D	Total
“Toetector” foot wears are provided for all the workers.	102 36,6%	36 12,9%	141 50,5%	279 100%
High visibility clothing were also provided enough to go round all workers.	99 35,5%	61 21,9%	119 42,7%	279 100%
Hand gloves are provided enough to go round all workers.	129 46,2%	10 3,6%	140 50,2%	279 100%
The right wears suitable for rain, heat or cold are provided.	13 4,7%	53 19,0%	213 76,3%	279 100%
Reinforced trousers are used to minimize against punctured wounds.	29 10,4%	43 15,4%	207 74,2%	279 100%
Our protective equipments were of good quality and thus suitable to the task.	73 26,2%	31 11,1%	175 62,7%	279 100%
The personal protective equipments are always tried out before general use.	9 3,2%	59 21,1%	211 75,6%	279 100%
Workers always make use of their protective materials at work.	83 29,7%	49 17,6%	147 52,7%	279 100%

*A....Agreed U.....Undecided D...Disagree

One hundred and seventy one (171) workers representing 61,3% of the total sample population agreed that the solid waste collectors had suffered from musculoskeletal injuries on the job. However, 53 (19,0) respondents were undecided while 55(19,7%) disagreed. On the sustenance of injuries form sharp objects in the course of parking refuse with bare hands, 213(76,3%) respondents agreed, only 9 (3,2%) were undecided while 57(20,4%) disagreed. On suffering from respiratory tract infections, 222(79,6%) respondents agreed, 13(4,7%) were undecided while 44(15,8%) respondents disagreed (Table 6).

Table 6.: Respondents responses on injuries/illnesses.

Items 13 – 18 Injuries/illnesses	Responses expressed in percentage (%)			
	A	U	D	Total
Workers have suffered from musculoskeletal injuries on this job.	171 61,3%	53 19,0%	55 19,7%	279 100%
There are victims of hearing disorders due to continuous exposure to high noise levels on the highways.	190 68,1%	22 7,9%	67 24,0%	279 100%
I have sustained injury from sharp objects in the course of packing refuse with bare hands.	213 76,3%	9 3,2%	57 20,4%	279 100%
I have never been injured or fallen sick since I started this job.	12 4,3%	28 10,0%	239 85,7%	279 100%
Workers have suffered from respiratory tract infections at different times.	222 79,6%	13 4,7%	44 15,8%	279 100%
Workers have suffered from gastrointestinal tract infections at different times.	212 76%	20 7,2%	47 16,8%	279 100%

*A....Agreed U.....Undecided D...Disagree

DISCUSSION

The study revealed a group of workers who were still in their productive years and thus requires reasonable protection against the associated hazards inherent in solid waste so that their future will not be marred. However, the trend (more youths and few elders) might not be unconnected with the young population of Rivers State (Akpogomeh and Atemie, 2002).

A greater proportion of the respondents had primary and secondary education. Few of the respondents had no formal education. Most of those who had tertiary education might not have wanted to identify with this type of job as it is considered “a dirty job”(See Appendix 1B). This might not be unconnected with the fact that members of the public looked down on solid waste collectors as revealed by the study. However, most of the workers admitted to doing it as a last resort in the absence of a better alternative.

Most of the respondents were married thus reiterating the need to put in place a system that will minimize the hazards inherent in solid waste collection. This is necessary to enhance the health of the workers to cater for their families and also serve the public.

The solid waste collectors in the study area were not emptying refuse with hydraulic lifts but manually with their bare hands most times (See Appendix 11B). This predisposed them

to injuries from various dangerous components of the solid waste such as sharp objects, broken plates and bottles, empty tins and even hypodermic needles. This affirmed the relationship between the method of solid waste collection and the resultant hazard. Collection of solid waste with bare hands is contrary to California occupational Guide, of 2002.

Streets were littered and drains also blocked with refuse giving rise to floods and incessant malarial attacks on residents of the city from mosquitoes. All these happened because standards of proper disposal of refuse at the collection sites were not prescribed to customers (members of the public) by the solid waste collectors thus resulting to improper disposal of refuse. Overflowing containers were not also tagged to indicate rejection of more wastes to members of the public (See Appendix 11A). Members of the public exhibited non-chalant attitude towards the way they dumped their refuse. This corroborates the submission of (Kuijer and Frings-Dresen, 2004). The negative attitude could be attributed to an erroneous belief that the council tax they pay should take care of that irrespective of how they do it (Kuijer and Frings-Dresen, 2004). The researchers always found the solid waste collectors sit on top of over filled moving trucks without any support thus endangering their lives (See Appendix 11A).

Foot wears were not the “toetector,” type that is the superior brand. Workers were therefore vulnerable to punctured wounds which could be complicated by tetanus. Visibility clothing given was not the high visibility type and some of the workers had none (See Appendix 1A&B). The workers at work could not be sighted from afar thus could possibly be knocked down by oncoming vehicles. The hand gloves were not enough to go round. This explains why most of the workers were met working with bare hands (See Appendix 1VB). Working without quality hand gloves exposed them to injuries from broken glasses, bottles, serrated edges of tin and other sharp components hidden in the solid waste. Interview with most of the respondents also revealed that there were some groups of solid waste collectors referred to as the temporary staff who were not given the protective materials at all (See Appendix 11B). These groups of workers were not paid as much but exposed to more health hazards. Working under this type of condition could probably be attributed to no other reason than poverty and lack of a better alternative.

Clothing suitable to each weather condition was not given to the workers (Appendix 1A&B, 11A&B, 111B, 1VA&B). The coverall given to them easily wears off and most of them were seen working in their muftis. Their protective equipment could not serve the intended purpose because they were not of good quality and most workers were not using them at work always. It was rare to find workers in their complete outfit at work contrary to the ideal situation. Incidentally working with suitable protective equipments is the only condition that can reduce the hazards of the job to a minimum. The practice of using substandard equipment and not also using the ones provided at all times were contrary to the 2002 California occupational guide.

Solid waste collectors in Port Harcourt municipality suffered from musculoskeletal injuries because of the large volume of wastes they have to pack manually contrary to the use of hydraulic lifts (California occupational guide, 2002). Port Harcourt municipality is a highly

congested place and thus hearing disorders experienced by the solid waste collectors because of continuous exposure to high levels of noise on the highways cannot be a surprise (See Appendix 11A, 11B & 1VA). This corroborates the submission of Kuijer and Frings-Dresen, (2004) that solid waste collectors have increased risk for musculoskeletal and hearing disorders due to high physical work load and high noise levels. Sustainance of injuries from sharp objects is expected since they use their bare hands most times without gloves to pack the waste. It would have been a big surprise if solid waste collectors in this study area were not falling sick nor suffer from respiratory tract infections because they were not always using protective equipments at work such as nose mask thus liable to inhale microbial agents (See Appendix 1A&B, 11A&B, 1VA&B). Ear muffs were not used thus highly vulnerable to hearing disorders. It is very common to find solid waste collectors packing waste which could last for hours without a nose mask in the face of unbearable odour (even to a passerby in a vehicle) oozing out from the heaps of the decomposed refuse (See Appendix 11A). Gastrointestinal tract infections could be attributed to using of bare hands to pack refuse which might not be adequately washed thereafter before eating. All these hazards are in line with the assertion of Kuijer and Frings-Dresen, (2004) that solid waste collectors are prone to developing respiratory and gastrointestinal complaints due to exposure to microbial agents in the organic dust.

CONCLUSION AND RECOMMENDATIONS

Solid waste collectors in Port Harcourt municipality experience different types of preventable hazards inherent in their jobs due to their work practice. The hazards they experience range from injuries of all kinds, musculoskeletal and hearing disorders, respiratory and gastro intestinal tract infections. Findings of the study revealed that they were given protective equipment to work with but not the superior quality and not all the workers were given. Those given were not using it always to work. The workers were not monitored to ensure they used their protective equipment. The members of the public were not also educated on how to properly dispose their refuse. This improper method of refuse disposal further increased health hazards associated with it to residents of this city. Roads were littered with refuse giving rise to poor aesthetic view; drains were blocked with refuse giving rise to floods and incessant malarial attacks from mosquito bites. The air was polluted by unpacked decomposed refuse giving rise to respiratory tract infections.

Findings of the study necessitated such recommendations as the provision of trucks with hydraulic lifts for packing of the refuse to ease the job for the workers and also reduce the incidence of musculoskeletal pains. Quality protective materials appropriate to the task should be provided. They should be educated on the importance of using them and also monitored with penalty attached to ensure compliance. Members of the public should be educated on the proper way of disposing refuse and reasons for proper disposal. Safety representatives should be engaged to ensure that all the safety measures are observed in the course of discharging these duties. Refuse collectors should compulsorily undergo periodic health surveillance since specific occupational demands are still present in their jobs. The health surveillance will help in detecting early signs of disease and also monitor their ability to work.

Until the above preventive measures are adopted and implemented the solid waste collectors will continue to be at risk of the various health hazards associated with the job.

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APPENDIX 1.:



A.: Solid waste collectors in their provided outfit at work. No masks to cover their nose from inhaling the polluted air.



B.: A solid waste collector in his worn out coverall at work.

APPENDIX 11.:



A.: Workers on active service in muftis and no nose masks. Overfilled truck, no ear muffs, no high visibility clothing.



B.: The research assistant with the waste collectors at work with none of the protective equipment.

APPENDIX 111.:



A.: Research assistants with solid waste collectors on top of overfilled truck in readiness to move.



B.: Research assistants with solid waste collectors filling their trucks manually with no nose masks.