Original Research Article

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OCCUPATIONAL HAZARDS AND SAFETY PRACTICES OF REFUSE COLLECTORS IN OBIO/AKPOR LOCAL GOVERNMENT AREA OF RIVERS STATE

ABSTRACT

Background: Municipal solid waste management particularly in developing countries involve manual or semi-automated handling of the waste materials. This exposes the waste collectors to physical, biological and chemical hazards(1) that could easily lead to injuries and diseases where adequate safety precautions and practices are not put in place. Solid waste collection and disposal in Port Harcourt metropolis is undertaken by the Rivers State Waste Management Authority with the use of contractors that employ predominantly manual procedures in their work that exposes the staff to hazards. This study was undertaken to identify the occupational hazards and safety practices among refuse collectors in Obio/Akpor Local Government Area of Rivers State.

Methodology: A descriptive cross sectional study design was employed for this study using a sample of 310 refuse collectors who were selected by multi stage sampling procedure. An interviewer-administered questionnaire was used to collect data from the respondents. Additionally, a walk-through was conducted at 10 different sites of refuse collection. The data collected was analysed using Epi-info version 7.

Results: The findings from this study revealed that refuse collectors are exposed to physical, chemical & biological, psychosocial and ergonomics hazards in proportions of 72.08%, 94.9%, 39.32% and 48.65% respectively. It also revealed that 22.0% of the respondents had good knowledge of occupational hazards, 33.8% showed fair knowledge, while a majority of 44.0% had poor knowledge. On safety practices, 24.0% had good safety practices while a majority of 75.93% had bad safety practices. Knowledge was also seen to have a direct impact on safety practice, those who had better knowledge of hazards also showed good level of safety practices. P =0.000*. Some of the safety measures identified from the study included provision of clean water and soap, maintenance of equipments, job rotation and traffic control amongst others.

Conclusion: This study revealed that refuse collectors in Obio/Akpor Local Government Area are at risk of lots of occupational hazards which is a big problem because the workers lack any form of safety protection against these hazards. Majority of them do not have the basic knowledge of hazards and have not engaged in any safety training. It is necessary that adequate personal protective equipments are provided for them to reduce their exposure to these hazards and quality safety training also organized for them to improve their knowledge of the dangers they are exposed to and teach them ways to keep themselves protected.

Keywords: Occupational hazards, safety, knowledge, Refuse collectors, Rivers State Waste Management Authority, Obio/Akpor.

INTRODUCTION

A waste or refuse collector is anyone who is employed by a private or public organization for collection, removal and recycling wastes from residential, industrial, commercial or other collection site for further processing and eventual disposal[(2)]. Waste collectors are also know as garbage or trash collectors[(3)]. The responsibilities of waste collectors include emptying of refuse containers into a truck using either hydraulic lift or their physical strength and describing the criterion for appropriate disposal to customers[(3)].

The increase in municipal solid waste is a result of urbanization, and its handling and disposal has become of environmental and public health concern[(4)]. Growth in population and advancement of the society have brought increasing amounts of solid waste to urban areas[(5)]. Solid waste management combines a lot of activities including collection, sorting recyclable materials and on very few occasions, burning. Risks occur at every step in the process, from point of collection, during transportation and at disposal sites[(5)]. Solid waste collectors are exposed to dangers and accident risks related to the composition of the materials they handle, emissions from these materials, and the equipments been used[(1)]. These dangers can include many types of hazards such as chemical which results from exposure to chemical substances like solvents or gases, biological from contacts with products of living organisms or bacteria, psychosocial hazards resulting from stress and lastly, physical hazards which is the most common type of hazard and include slips and falls[(6)]. As a result of their exposure to multiple risk factors, they suffer high rates of occupational health problems[(7)].

There is an estimation by the International Labour Organization (ILO) that about 270 million occupational accidents occur each year resulting in around 2.3 million deaths[8]. The hazards associated with refuse collection is enormous[9]. This is because most of the workers involved have the task of manually shovelling refuse from the collection points into baskets before emptying into the trucks. Such process exposes them to lots of dangers resulting from composition of these wastes to sharps and even decaying matter with its harmful pathogens. The workers are often improperly kitted to suit the hazards they face daily[10].

MATERIALS AND METHOD

Study Area

This study was conducted in Obio/Akpor Local Government Area in Rivers State, which is one of the centres of economic activities in the state. With its head quarters in Rumuodomya, it covers an area of 260km square with a population of approximately 649,600 persons from city population estimates(2016), spread across its 17 wards and communities[11]. Obio/Akpor is a lowland region with mean elevation below 30 metres above sea level. Its geology comprises basically of alluvial sedimentary basin and basement complex. It is mainly inhabited by civil servants and traders. Ikwerre is the indigenous language of the people, but English is widely spoken as a result of the commercial nature of the area. Farming is the major occupation of the people although majority of the farming land has been lost due to urban development[12].

Study Design and Population

This study employed a descriptive cross-sectional design, with a study population comprising of 960 male refuse collectors who are employed by 80 contractors working for the Rivers State Waste Management Authority. Each contractor has two refuse collecting trucks, each of which is manned by a gang of 6 staff: a driver, a conductor and 4 evacuators, all of which are actively involved in the waste collection process.

Sample Size Determination

Sample size was obtained using the descriptive studies sample size formular with the following assumptions; proportion of 76% obtained from a study[11]. Using 5%

margin error at 95% confidence interval; after considering 10% non response rate, he sample size used was 310.

Sampling Method

A multi staged sampling technique was employed for this study.

Stage 1: This involved the identification of the 80 refuse contractors who were assigned by the Rivers State Waste Management Authority to collect refuse in Obio/Akpor Local Government Area.

Stage 2: This stage involved the collection of the list of the 12 staff of each of the 80 contractors from the Rivers State Waste Management Authority

Stage 3: In this stage, simple random sampling method of balloting was used to select 4 refuse collectors from each of the 80 contractors using the list obtained from the Rivers State Waste Management Authority as a sampling frame. The selected refuse collectors totalling 320, i.e 4 from each contractor were subsequently administered with the questionnaire after obtaining informed consent from them.

Study Instruments

A semi structured, interviewer–administered questionnaire was used to collect information from respondents. The questionnaire was divided into five sections: Section A probed the socio demographic data of the respondents. Section B elicited data on the occupational history of the respondents. Section C was used to identify hazards associated with refuse collection services in Obio/Akpor. Section D attempted to access the level of knowledge of occupational hazards among refuse collectors in Obio/Akpor, comprising of 15 occupational hazard knowledge questions, assessed on a 15 point scale, (≤ 5 Poor Knowledge; 6-10 Fair Knowledge; 11-15 =. Good Knowledge). While Section E accessed the safety practices against occupational hazards among refuse collectors and consisted of 10 safety practice questions assessed on a 10 point scale, (≤ 5 Poor Practice and 6-10 Good Practice).

A checklist adapted from Solid Waste Association of North America (2011), was also used for a walk through survey to access the safety measures put in place against occupational hazards.

A total of 10 collection sites were visited, the safety measures listed on the check list were accessed on a 10 point scale. Any safety measure with checks in 8-10 sites was

termed excellent, checks in 5-7 sites was termed good, checks in 3-4 sites was termed moderate while ≤ 5 was termed poor.

Data Management

Data collected were extracted from the questionnaires and entered into micro-soft excel, cleaned and analysed using Epi info version 7. Frequencies and percentages were produced in tables, and a chi square test was employed to determine the association between independent variables such as age and educational status with knowledge of occupational hazards and safety practices.

Ethical Considerations

Before undertaking this study, ethical clearance was obtained from the Research and Ethics Committee of the University of Port Harcourt. Permission to undertake this study was acquired from the authorities of the Rivers State Waste Management Authority where the participants were recruited for the study. Confidentiality was assured as names of respondents were not included in the questionnaire. No harm to the subjects was ensured in the entire recruitment.

RESULTS

Table 4.1: Distribution of age, marital status, level of education and religion of respondents

Variables	Frequency (n=295)	Percent (%)
Age(years)		
16-20	32	10.84
21-25	64	21.9
26-30	120	40.68
31-35	55	18.64
≥ 36	24	8.14
Marital status		
Single	234	79.32
Married	60	20.34
Widowed	1	0.34
Religion		
Christian	270	91.53
Islam	23	7.80.
Traditionalist	2	0.67
Level of Education		
No formal	45	15.25
Primary	40	13.56
Secondary	186	63.05
tertiary	24	8.14

Table 4.1 represents the age, marital status, level of education and religion of respondents. Majority of the respondents accounting for 40% were within the age bracket of 26-30, followed by the age bracket of 21-25 with 21.9%. 31-35 and 16-25 having percentages of 18.14% and 10.84% respectively followed by those above 36 which had the lowest percentage of 8.14%. Among the respondents, singles accounted for 79.32%, while those married were 20.34%. only 1 person was reported to be widowed. On religion, a large proportion of the respondents were Christians, accounting for 91.53% .Followed by islam with 7.80% including 2 traditionalist. Secondary education gained the highest percentage of 63.05%, primary education 13.56% and 15.25% was recorded for workers who had never completed any formal education. Respondents who had attained the tertiary education accounted for 8.14%,

Table 4.2: Distribution of years of experience, history of job related illness, safety and occupational hazard training and duration of training

Variables	Frequency (n=295)	Percent (%)
Experience		
6months - 1year	140	47.46
≥ 1year	155	52.54
History of job related illness		
Been ill	182	61.69
Never been ill	113	38.31
Trained in Safety		
Trained	26	8.81
Untrained	269	91.19
Duration of training		
Once	26	100

Table 4.2 represents the experience, history of job related illness, occupational/safety trainings and duration of trainings of respondents. Analysis showed that 47.46% had worked from the period of 6 months - 1 year while 52.54% had work experience of over 1 year. On history of job related illness, 61.69% reported to have been ill while 38.31% reported to have never been ill. 8.81% of respondents had been trained on safety while a majority of 91.19 reported to have never been trained. On duration of training, the 8.81% of respondents that reported to have been trained all admitted to have been trained only once.

Table 4.3: Physical hazards respondents are exposed to

Variables	Frequency (n=295)	Percent (%)
Noise		
Yes	251	85.08
No	44	14.92
Vibrations		
Yes	219	74.24
No	76	25.76
Sharps		
Yes	295	100
No	0	0
Harsh weather		
Yes	212	71.86
No	83	28.14
Radiation		
Yes	16	5.42
No	279	94.58
Vehicular traffic		
Yes	283	95.93
No	12	4.07

Table 4.3 is a breakdown of the responses of respondents concerning their exposure to different kinds of physical hazards. From the table, it shows that 85.08%, 74.24%, 100%, 71.86%, 5.42% and 95.93% of the respondents agreed to been exposed to noise, vibration, sharps, harsh weather, radiation and vehicular traffic respectively against 14.92%, 25.76%, 0%, 28.14%, 94.58% and 4.07% which didn't agree to been exposed to these hazards.

Table 4.4: Chemical and Biological hazards respondents are exposed to

Variables	Frequency (n=295)	Percent (%)
Exposure to inhalable substances		
Yes	278	94.24
No	17	5.76
Exposure to absorb-able substances		
Yes	255	86.44
No	40	13.56
Exposure to rodents/creeping insects/reptiles		
Yes	290	98.31
No	5	1.69
Choking smell		
Yes	291	98.64
No	4	1.36
Exposure to skin Irritants		
Yes	287	97.29
No	8	2.71

On exposure to chemical and biological hazards, 94.24%, 86.44%, 98.31%, 98.64% and 97.29% of respondents also agreed to been exposed to inhale-able substances, absorb-able substances, creeping rodents and reptiles, choking smell and skin irritants respectively against a very few in percentages of 5.76%, 13.56%, 1.69%, 1.36% and 2.71% who did not think they were exposed to these hazards.

Table 4.5: Ergonomics and Psychosocial hazards respondents are exposed to

Variable	Frequency (295)	Percent (%)
Lifting heavy objects		
Yes	228	77.29
No	67	22.71
Prolonged raising of arm		
Yes	70	23.73
No	225	76.27
Overly bending the lower back		
Yes	243	82.37
No	71	24.07
Eye Strain		
Yes	52	17.63
No	243	82.37
Threats or violent public attacks		
Yes	65	22.03
No	230	77.97
Bullying from other employees		
Yes	38	12.88
No	257	87.12
Work Overload		
Yes	245	83.05
No	50	16.97

On ergonomics, 77.29% agreed to lifting heavy objects as against 22.71% who disagreed. Also, 23.73% agreed that the work requires prolonged raising of the arm while a good percentage of 76.27% disagreed. 82.37% and 17.63% admitted to overly bending of the back and eye strain respectively as frequent encounters while working, as against a percentage of 24.07% and 82.37% respectively, who disagreed. Psychosocial hazards also had an exposure rate of 39.32% from responses to questions on threat from public, bullying within the work place and work overload, which had percentages of 22.03%, 12.88% and 83.05% respectively in agreement to these factors and percentages of 77.97%, 87.12 and 16.97% respectively in disarrangement.

Table 4:6 Exposure to hazards among respondents

Variable	Frequency (295)	Percent (%)
Physical Hazards	212	72.08
Chemical & Biological hazards	280	94.9
Psychosocial Hazards	116	39.32
Ergonomics	148	48.65

Table 4.6 is a summary table, which shows the percentages of the different types of hazards respondents are exposed to. chemical and biological hazards has the highest percentage of exposure at 94.9%, followed by physical hazards with 72.08%. Psychosocial hazards and ergonomics had the smallest percentages of 39.32% and 35.68% respectively. This shows that the respondents are more likely to be exposed to chemical, biological and physical hazards on a typical work day and less likely to be exposed to psychosocial hazards and bad ergonomics.

DISCUSSION

The study identified four major types of hazards with exposure levels at different rates, these included: physical hazards at 72.08%, chemical and biological hazards at 94.9%, psychosocial hazards at 39.32% and ergonomics at 48.46%. The exposure rate of physical hazard was similar to that found in a study which revealed 72% physical hazard exposure rate among waste workers in China[13] and also close to the study done in Zimbabwe and in Ethiopia which recorded rates of 65% and 63% respectively[10,14]. It is slightly lower than the findings of carvalho in brazil[15] and Ohajinwa[16] which recorded exposure rates of 82.4% and 82% respectively. However, there was a sharp disparity with the findings of Ravindra in India[17] and Ziaei in Iran[18] which recorded rates of 44.4% and 39% respectively, this could be as a result of the fact that the wastes were sorted and bagged before disposal thereby reducing the exposure of waste collectors to the contents. Chemical and biological hazards which had exposure rate of 94.9% is higher compared to the findings in a study done by Hifinawy & Arafa in Egypt[19] which recorded a rate of 80% and that of Darboe & Tsai in The Gambia[20] which was 85%. It was in huge disparity with that of

Chikombe S which recorded a rate of just 6.82%[10] and also that of Ravindra which was 48.9%[17], this could be attributed to the narrow scope of their study, which focused on health implications of these hazards. psychosocial hazards with exposure rate of 39.32% is almost similar to that of Ziaei in Iran which was 36.5%[18] but significantly higher than that of Chikombe S which was 4.55%[10], attributable to the scope of the study which focused more on physical health conditions. Ergonomics with a rate of 48.65% is higher than that of chikombe S which revealed rates of 22.73%[10].

CONCLUSION

This study showed that a lot still needs to be done to guarantee the safety of refuse collectors especially from hazards that they encounter while carrying out their duties. It revealed that these group of people are exposed to so much dangers that have potentials to cause serious health effects and even death in the worst case scenario.

It is necessary that adequate personal protective equipments are provided for them to reduce their exposure to these hazards and quality safety training also organized for them to improve their knowledge of the dangers they are exposed to and teach them ways to keep themselves protected.

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