

Knowledge, Attitude and Safety Practices amongst Public and Private Solid Waste Handlers in a South Eastern State, Nigeria

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Abstract:

Background: In the task of collecting, treating and disposing of solid waste by waste handlers especially in developing countries where waste generation is increasing and commonly associated with indiscriminate unsafe disposal practices, waste handlers are exposed to a variety of work related hazards which may be deleterious to their health.

Objective: To assess the knowledge, attitude and safety practices amongst public and private sector solid waste handlers in Imo State, Nigeria.

Methods: The study was a Cross Sectional descriptive design that used the total population of 155 employed participants at the public and private waste management establishments in the State. Data was collected using pretested semi structured questionnaires. Descriptive analyses were done with frequencies and summary statistics. Chi square statistics were computed and p value set at < 0.05.

Results: A majority of respondents were aware of the hazardous nature of solid waste handling (75.5%). In spite of the fact that majority of the respondents were aware of personal protective equipment (PPE) (76.1%), only 66.7% of the overall that use PPE (87), used it always and less than half of the respondents had received pre-employment training (44.5%). On further analysis, it was revealed that, there were statistically significant differences between the public and private sector waste handlers with respect to awareness of the hazardous nature of solid waste handling ($p=0.000$), the awareness of the general consequences of the hazard exposure on health ($p=0.000$), the awareness of personal protective equipment ($p=0.000$) and the receipt of pre-employment training ($p=0.000$).

Conclusion: Public- Private Partnerships in waste handling should be the way forward in Nigeria in order to ensure better health protection and safety of waste handlers and the communities they serve.

Keywords: Knowledge, Attitude, Practice, solid waste handlers, Imo, Nigeria

I. Introduction

With an ever increasing growth in urban population and solid waste generation in developing countries, solid waste management is similarly plagued by the unhealthy and improper disposal of municipal solid waste and as such, should be undertaken in a manner that does not endanger in any way, the waste handlers, the public and the environment [1, 2].

According to a United Nations Report, it was noted that, while developing countries are improving access to clean drinking water they are falling behind on sanitation [3]. This has created unsanitary and hazardous conditions that have resulted in the pollution of the environment and the transmission of diseases that threaten public health and adversely affect the environment especially when waste is not appropriately collected and disposed [4].

As a consequence, the task of collecting, treating and disposing of such waste in an efficient, acceptable and safe manner coupled with the protection of those involved, poses a serious challenge to Governments charged with the responsibilities of solid waste management especially in an environment where health and protective measures have not been established, existing resource and budgetary constraints and ineffective regulatory responsibility, particularly relating to public health [5].

Furthermore, it was jointly reported by UNICEF and WHO; that as a consequence of bad sanitation, about 2.4 billion people will likely face the risk of needless disease and death by the year 2015 [6]. In an attempt to mitigate the menace of waste, every State in Nigeria has set up municipal Government institutions or agencies and due to poor management, fiscal irresponsibility or malfeasance, equipment failure or inadequate waste management budgets there has been collaboration in some cases with private companies to manage municipal solid waste which has led to the participation of both public and private sectors [7, 8].

All solid waste operators, both the government and privately employed, can be categorized as industry workers that are involved in waste handling and disposal; and who are at an increased health risk, especially for handlers that are careless, ignorant and do not adhere to health policies and safety rules. As a consequence, the poor handling of solid waste exposes them to potentially hazardous materials especially when exposure is on a regular and cumulative basis and more so, when a lot of them do not use appropriate protective gear; and work solely for economic survival without paying any attention to the health hazards associated with their workplace [9-11]. It has also been observed that the increasing rate of fatalities among workers can be attributed to their lack of awareness of the potential sources of occupational diseases which are numerous and also due to the poor level of compliance to occupational health regulations; hence, poor work practices [12, 13].

Furthermore, giving serious attention to the protection of waste handlers against personal injury and disease, through programmes that improve their fundamental understanding of the interactions between their work and health which is often overlooked at the workplace, will essentially ensure the maintenance of good health and well-being for all those at risk [14, 15].

In Nigeria, there is still paucity of information on health and safety measures with the associated poor use of personal protective equipment among workers [15]. Hence, assessing the knowledge, attitude and practice will highlight the areas of needed attention and improvement, which will involve the continuous monitoring of workers' health and safety, ensure that the correct handling and disposal procedures are followed strictly; and also, that essential occupational health and safety measures are adopted such as, appropriate education, training, personal hygiene and the use of personal protective equipment geared towards preventing exposure to hazardous materials or at least keeping exposure within safe limits.

II. Methodology

2.1 Study Area

The survey was conducted in Imo State located in the South Eastern part of Nigeria, within longitude 5° 29' 06" N and latitude 7° 02' 06" E occupying an area between the lower river Niger and the upper and middle Imo River. The State occupies an area of 5289.49 square kilometres with a population density of about 707.9 per square kilometre and had a total population of 3.93 million (2.03 million males and 1.9 million females) by 2006 census, with an expected population in 2013 of 4.95 million based on an annual growth rate of 3.2% between 2006 and 2013 [16, 17].

2.2 Study Population

The study population comprised all waste handlers in the Government waste management agency (Imo ENTRACO) and all the waste handlers in the only private waste management company in Imo State (Waste management and Environmental Solutions Ltd).

2.3 Study Design

The study was a cross sectional descriptive design that used the total population of 155 participants at the time of the study, employed by Imo ENTRACO (110 participants) and Waste management and Environmental Solutions Ltd (45 participants).

2.4 Data Collection and Analysis

A pretested semi structured questionnaire was used and this was interviewer administered. Data was collected from all the 155 participants that responded to the questionnaires. The questionnaire comprised 4 sections, Section one; Sociodemographic characteristics, Section two; Knowledge of occupational hazard, Section three; Attitudes towards safety practices and Section four; Safety practices towards waste handling. Medical students were recruited for the distribution and collection of the questionnaires. The returned questionnaires were checked for errors, cleaned and validated manually, and analysed using SPSS v22. Descriptive statistics (frequency tables and summary indices) were generated. Chi Square was used to test association between categorical variables with the p value set at 0.05 significant level.

2.5 Ethical Considerations

Appropriate entry permission was sought to conduct the survey and verbal consents were given by the respondents. Ethical approval was obtained from the Ethics Committee of Imo State University Teaching Hospital Orlu.

III. Results

One hundred and fifty five questionnaires were administered and all were completed and returned.

3.1. Sociodemographic Characteristics

More than half of the respondents (60.0%) were between the ages of 19 and 39 years with the majority of them, male (77.4%), Igbo (64.5%), married (77.4%), of the Christian faith (57.4%) with most of the respondents, having either a primary or secondary level of education (83.2%) but close to half of them on the job of waste handling for up to 10 years (49.7%)(Table 1).

Table 1: Sociodemographic Characteristics

Variable	Category	Frequency (%) n= 155
Age	19-29	55(35.5)
	30-39	38(24.5)
	40-49	40(25.8)
	50 and above	22(14.2)
Gender	Male	120(77.4)
	Female	35(22.6)
Educational level	Primary	52(33.5)
	Secondary	77(49.7)
	Tertiary	26(16.8)
Ethnicity	Igbo	100(64.5)
	Hausa	24(15.5)
	Others	31(20.0)
Religion	Catholic	63(40.6)
	Orthodox	26(16.8)
	Islam	7(4.5)
	Others	59(38.1)
Marital Status	Married	120(77.4)
	Single	20(12.9)
	Others	15(9.7)
Length of service (yrs)	1-10	77(49.7)
	11-20	43(27.7)
	21-30	23(14.8)
	>30	12(7.7)

3.2 Knowledge, Attitude, and Practice of respondents

Majority of the respondents were aware of the hazardous nature of solid waste handling (75.5%) and the general consequences of exposure on health (73.5%). While about three quarters of the respondents (75.5%) were able to identify a particular hazard according to its classification, not more than half of the respondents were able to identify the specific consequences for any particular class of hazard; but nevertheless, a majority of respondents were aware of personal protective equipment (PPE) (76.1%), were of the opinion that PPE prevents occupational injuries and diseases (70.9%) and also felt the necessity to always protect self when working (75.5%). Also, most of the respondents (96.8%) felt that Government was not doing enough towards workers' protection and health. Despite the fact that less than half of the respondents (44.5%) received pre- employment training, more than half had used PPE (56.1%) and of those that have used PPE, only 66.7% always use PPE(Table 2).

Table 2: Knowledge, Attitude, and Practice of Respondents

Variable	Category	Public waste handlers (%) (n=110)	Private waste handlers (%) (n=45)	Total (%)
KNOWLEDGE				
Aware of the hazardous nature of Waste handling (n=155)	Yes	72(65.5)	45(100)	117(75.5)
	No	38(34.5)	0(0)	38(24.5)
*Particular hazard According to its classification (n=155)	Physical	72(65.5)	45(100)	117(75.5)
	Chemical	81(73.6)	45(100)	126(81.3)
	Biological	64(58.2)	45(100)	109(70.3)
	Ergonomic	26(23.6)	45(100)	71(45.8)
	Psychosocial	10(9.1)	45(100)	55(35.5)

Aware of the consequences of hazard exposure on health (n=155)	Yes	69(62.7)	45(100)	114(73.5)
	No	41(37.3)	0(0)	41(26.5)
*Consequences of a particular hazard According to its classification (n=155)	Physical	49(44.5)	6(13.3)	55(35.5)
	Chemical	62(56.4)	4(8.9)	66(42.6)
	Biological	41(37.3)	6(13.3)	47(30.3)
	Ergonomic	60(54.5)	3(6.7)	63(40.7)
	Psychosocial	75(68.2)	1(2.2)	76(49.0)
Aware of personal protective equipment (n=155)	Yes	73(66.4)	45(100)	118(76.1)
	No	37(33.6)	0(0)	37(23.9)
ATTITUDE				
Do you believe that PPE prevents occupational injury and disease (n=155)	Yes	65(59.1)	45(100)	110(70.9)
	No	8(7.3)	0(0)	8(5.2)
	No opinion	37(33.6)	0(0)	37(23.9)
Do you feel the necessity to always protect yourself while working (n=155)	Yes	85(77.3)	45(100)	130(75.5)
	No	25(22.7)	0(0)	25(81.3)
Do you feel that Government is doing enough towards workers protection and health (n=155)	Yes	2(1.8)	3(6.7)	5(3.2)
	No	108(98.2)	42(93.3)	150(96.8)
PRACTICE				
Received pre-employment training (n=155)	Yes	24(21.8)	45(100)	69(44.5)
	No	86(78.2)	0(0)	86(55.5)
Use of personal protective equipment (n=155)	Yes	42(38.2)	45(100)	87(56.1)
	No	68(61.8)	0(0)	68(43.9)
Frequency of use of personal protective equipment (n=87)	Always	13(30.9)	45(100)	58(66.7)
	Occasionally	22(52.4)	0(0)	22(25.3)
	Rarely	7(16.7)	0(0)	7(8.0)

*Multiple Response

3.3 Association between Knowledge, Attitude, Practice and the Employment Sector.

The awareness of the hazardous nature of solid waste handling ($\chi^2= 20.59$, $p=0.000$), the awareness of the general consequences of the hazard exposure on health ($\chi^2= 22.8$, $p=0.000$), and the awareness of personal protective equipment ($\chi^2= 19.88$, $p=0.000$) among the respondents, were significantly different between the public and private sectoremployees of the waste management service entities.

Also, the opinion that PPE prevents occupational injury and disease ($\chi^2= 25.94$, $p=0.000$) and the necessity to always protect self while working ($\chi^2= 12.19$, $p=0.000$) among the respondents were significantly different between public and private sector employees of the waste management service entities.

Furthermore, the receipt of pre-employment training ($\chi^2= 79.03$, $p=0.000$), ever used PPE ($\chi^2= 49.56$, $p=0.000$) and always using PPE ($\chi^2= 58.78$, $p=0.000$) among the respondents were significantly different between public and private sectoremployees. On the contrary, there was no statistically significant difference between the public and private sector employees of the waste management service entities with respect to whether they feel that Government is doing enough to protect their health in the work place (Table 3).

Table 3: Association between Knowledge, Attitude, Practice and Employment Sector

	Government Employed(%)	Private Employed (%)	Total (%)	X ²	df	p value
KNOWLEDGE						
Aware of the hazardous nature of Waste handling				20.59	1	0.000*
Yes	72(65.5)	45(100)	117(75.5)			
No	38(34.5)	0(0)	38(24.5)			
Total	110(100)	45(100)	155(100)			
Aware of the consequences of hazard exposure on health				22.80	1	0.000*
Yes	69(62.7)	45(100)	114(73.5)			
No	41(37.3)	0(0)	41(26.5)			
Total	110(100)	45(100)	155(100)			
Aware of personal protective equipment				19.88	1	0.000*
Yes	73(66.4)	45(100)	118(76.1)			
No	37(33.6)	0(0)	37(23.9)			
Total	110(100)	45(100)	155(100)			
ATTITUDE						
Do you believe that PPE prevents occupational injury and disease				25.94	2	0.000*
Yes	65(59.1)	45(100)	110(70.9)			
No	8(7.3)	0(0)	8(5.2)			
No opinion	37(33.6)	0(0)	37(23.9)			
Total	110(100)	45(100)	155(100)			
Do you feel the necessity to always protect yourself while working				12.19	1	0.000*
Yes	85(77.3)	45(100)	130(83.9)			
No	25(22.7)	0(0)	25(16.1)			
Total	110(100)	45(100)	155(100)			
Do you feel that Government is doing enough towards workers protection and health				2.14 ^a	1	0.143
Yes	2(1.8)	3(6.7)	5(3.2)			
No	108(98.2)	42(93.3)	150(96.8)			
Total	110(100)	45(100)	155(100)			
PRACTICE						
Received pre-employment training				79.03	1	0.000*
Yes	24(21.8)	45(100)	69(44.5)			
No	86(78.2)	0(0)	86(55.5)			
Total	110(100)	45(100)	155(100)			
Use of personal protective equipment				49.56	1	0.000*
Yes	42(38.2)	45(100)	87(56.1)			
No	68(61.8)	0(0)	68(43.9)			
Total	110(100)	45(100)	155(100)			
Frequency of use of personal protective equipment				58.78	2	0.000*
Always	13(30.9)	45(100)	58(66.7)			
Occasionally	22(52.4)	0(0)	22(25.3)			
Rarely	7(16.7)	0(0)	7(8.0)			
Total	42(100)	45(100)	87(100)			

*significant a- Likelihood ratios

IV. Discussion

This study assessed the knowledge, attitude and safety practices of solid waste handlers who were either Government or Private Employed in the solid waste management industry in Imo State. The age and sex distribution in the present study showed that the majority of the respondents were male and between the ages of 19 and 39 years, which appear to be similar with other studies of industry workers, as these jobs, especially those that are physically demanding and probably more hazardous, tend to be carried out by young men [18-20].

It was observed that most of the waste handlers had either a primary or secondary level of education and this was consistent with other studies of industry workers that reported similar levels of literacy [18-23]. This could possibly be due to the fact that the deteriorating economic situation and the high cost of education is contributing to this level of literacy being observed among such jobs.

In line with the fact that most of the waste handlers in the present study had some form of education, a majority of them were aware of the hazardous nature of their work and the general consequences of exposure on their health and were also able to classify a particular hazard, though, less than half of them were unable to identify the specific consequences for any of the particular classes of hazard. The level of awareness of the hazards and its general consequences observed could be explained partially by the work experience associated with the length of service, of which half of the respondents had been in service of waste handling for at least 11 years; and also probably due to the close work relationships and the exchange of information that occurs among themselves as they coordinate to seamlessly handle waste either at the point of collection or at the point of disposal. In support of work experience as an explanation of the level of awareness observed in the present study, Sabitu et al [18], reported that awareness was positively influenced by maturity and work experience.

Furthermore, the inability of more than half of the respondents in the present study to identify the specific consequences for any particular class of hazard could probably be attributed to lack of adequate training as more than half of the respondents had not received any pre-employment training. The level of awareness of the hazards associated with their jobs among the majority of the respondents were similarly observed in other Nigerian studies conducted among workers of different occupations faced with their peculiar hazards in Abia, Kaduna, Lagos and Edo States [5, 18, 21, 24]. On the contrary, studies conducted by Oranusi et al, in Nigeria among artisans and factory workers and Tam et al, in Hong Kong among construction workers reported low awareness among the workers of the hazards associated with their work [19, 25].

It was also observed in the present study, that even though, the majority were aware of personal protective equipment (PPE) and were of the opinion that PPE prevents occupational injuries and diseases and also felt the necessity to always protect themselves, only 66.7% of the overall that use PPE (56.1%), used it always. This poor use of PPE was similarly observed in other studies in Nigeria, Singapore and Tanzania [18-21, 24, 26, 27]. Oranusi et al [19] and Isah et al [24], attributed the low use of PPE to poor awareness and poor economic conditions respectively. Though in the present study where there was high awareness and willingness to use PPE, the low use could be attributed more, to poor economic conditions resulting in the unavailability of PPE.

The present study, further showed that all of the private sector waste handlers (100%) were generally aware of the hazards, consequences, had a positive attitude and regularly used PPE and these were significantly different from the public sector waste handlers, specifically with respect to awareness of the hazardous nature of their work, awareness of the general consequences of hazard exposure on their health, received pre-employment training, awareness of personal protective equipment, the opinion that PPE prevents occupational injury and disease, the necessity to always protect self while working and the regular use of PPE. These significant differences observed could be due to the bureaucratic barriers, political interferences and lack of profit motive that is usually associated with Public sector establishments in Nigeria and as a result there is a slow or reduced response to workers protection and safety, among a host of other issues. This was further highlighted in the present study where most of the respondents (97%) were of the opinion that Government was not doing enough towards workers protection and health. The private sector is generally profit and market oriented, driven by increased productivity and efficiency and as a consequence, workers protection and safety is important to the shareholders in order to ensure a healthy and productive workforce. So it is in the interest of private enterprise to initiate and implement programs and training that create awareness of occupational hazards and instil a culture of correct and consistent use of PPE in the workplace.

V. Conclusion

Public- Private Partnership models in waste handling should be encouraged in Nigeria as they benefit the communities and workers especially with respect to protection and safety. Private involvement saves and releases municipal resources to be available for other urban infrastructure and services. This partnership will be more sustainable by enabling public and private sector establishments to maximize their participation through joint objectives, implementation and evaluation, where public sector provides policy and control while the private sector provides training, PPE, safe and timely collection, transportation and safe disposal of solid waste.

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