Original Research Article

Assessment of knowledge of Occupational health hazards among formal and informal waste collectors in Rivers state

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ABSTRACT

Study was performed to assess the knowledge of occupational hazards and safety practices among formal and informal waste collectors in Rivers state, Nigeria. A qualitative and quantitative cross sectional design was employed for this study. The quantitative component was conducted among 314 formal and 314 informal waste collection workers respectively recruited by multistage sampling for the formal waste collectors and snowball sampling technique for the informal waste collectors. Purposive sampling was used to recruit participants for four focus group discussions in the qualitative component of this research. Data were collected using a self-designed pretested questionnaire, observational checklists, clinical, laboratory measurements and a study guide. Data analysis was done using the Statistical Package for Social Sciences (SPSS) version 21 to obtain demographics, mean scores, proportions etc. Result obtained showed that 98.1% of the formal waste collectors and 86% of the informal waste collectors were seen to possess a good knowledge of occupational health hazards. There were significant differences in responses to physical hazard exposures among formal and informal waste collection workers to; "presence of slippery surfaces in my workplace", U=38697, p=0.001, "exposure to high level of noise", U=33417, p=0.001, "exposure to offensive smell or odour", U=36284, p=0.001, and "exposure to abnormal environmental pressure", U=21879, p=0.001.Waste collectors in Rivers state are most susceptible to chemical and biological hazard exposures. The finding corroborates their poor respiratory health status. Recommendations emphasize on training and re-training of waste collection workers including risk communication, strengthening compliance to safety standards based on waste management policy guidelines for the protection of waste collection workers, establishing routine work schedules and health insurance packages for waste collection workers, encourage proper waste segregation at source and proper packaging of waste, improving cooperation among residents and stakeholders and providing welfare packages and incentives for the waste collectors.

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Keywords: Hazards, Waste Collectors, Exposures, formal and informal workers

1. INTRODUCTION

Waste can be described as the unusable by-products from activities of the human population that materially comprise similar substances found in the useable item. Wastes can also be described as products which are no longer useful to the user, manufacturer or creator of the product and needs to be gotten rid of, even if it comes with a cost when discarding it [1]. Waste generation has been known throughout the existence of humans. A notable history in the management of solid waste was recorded in 18th century in London and Southampton, where residual coal-ashes generated from houses and factories were collected by dust collectors and deposited in 'dust yards' for recycling fertilizers and to make bricks. The

need to develop a waste management system at the time was due to the deteriorating health conditions of the people as a result of the unsanitary living conditions from indiscriminate methods of waste disposal [4]. Since then most industrialized countries have developed an effective system of waste management.

Records show that in recent times, over two billion tonnes of solid waste is generated every year all over the world and it is projected that by 2050, waste generation globally will increase to approximately 3.4 billion tonnes annually [6]. Majority of the waste generated globally occurs in countries in Eastern Asia and the Pacific region (23%), while the smallest amount of waste (6%) is generated from Middle East and North African countries. An important observation to note however, is that the rate of waste generation is fastest in the regions of Sub-Saharan Africa, South Asia, and the Middle East/North Africa. This rapid rate of waste generation is projected to be more than triple, double and double the current rates in these regions respectively by 2050 [6]. The impact of functional waste management services provided by waste collection workers is not well recognized and is often overlooked, but can attract the attention of governments and other stakeholders when the waste management system fails. An inefficient waste management system in any country can have a far-reaching effect in limiting the achievement of the Sustainable Development Goals (SDGs).

Concept of Workplace Health Hazards

Hazards can be defined as the intrinsic probability for injury or harm to occur [11]. Hazards are therefore described as any material or condition with potentials to cause harm or injury to health. It is important to note that not all hazards are obvious and they may be unique to a particular work environment, hence the need to deliberately identify hazards and prevent them from causing harm or injury [9].

OSHA identifies five classes of hazards which include; safety, chemical, biological, physical and ergonomic hazards. Other organizations and authors have varied classifications in line with their understanding of hazards. [9] Classified hazards into six main classes, these include;

1. **Biological hazards**: These are hazards that results from association with infectious animals, plant or human materials, etc. while at work. They include infections with viruses, bacteria, insects, animals, etc., that can cause adverse health impacts on human. Biological hazards are becoming increasingly common in the workplace due to the occurrence of epidemics and pandemics in the workplace.
2. **Chemical Hazards**: Chemical hazards results from interaction with hazardous chemical substances which can be gaseous or liquid in nature and can cause injury to health. These hazards can result in adverse health and physical conditions, for example; respiratory tract irritations, ocular affectations, increased skin sensitivity and reactions, etc.

3. **Physical Hazards**: Physical hazards are environmental factors that can harm an employee without necessarily touching them. They Include Slippery floors, objects in walkways, unsafe or machinery, noise, poor lighting, fire radiation, magnetic fields, extreme pressure etc. Physical hazards can affect those who work in extreme weather conditions or in harmful environments. Workers that are exposed to continuous loud noise, radiation, sun rays and ultraviolet rays could be at risk.
4. **Safety Hazards**: These occur when the work environment and conditions are not safe. They are created by workers themselves or workplace housing design, equipment design etc. e.g. exposed electrical wires may electrocute personnel in contact with it, working at heights without appropriate safety equipment may cause falls from height, faulty ladders, scaffolds, and roofs are safety hazards and have the potential to cause harm.
5. **Ergonomic Hazards**: Ergonomic hazards occur due to the impact of work type, body positions and working conditions and other physical factors on the body and can result in musculoskeletal injuries and other health problems. For example, poor posture, a poor workstation setup in an office, poor posture, manual handling and repetitive movements are ergonomic hazards.
6. **Psychosocial Hazards**: Psychosocial hazards as the name implies are occupational hazards that affect one's social life or psychological health. Psychosocial hazards impact employee's mental health or wellbeing psychosocial hazards in the workplace include occupational burnout and occupational stress, which can lead to burnout. For example, stress, sexual harassment, victimization etc.

1.2 AIM

The aim of this research is to assess the knowledge of occupational hazards and safety precautions among formal and informal waste collectors in Rivers state, Nigeria.

1.3 OBJECTIVE

I. Assess and compare the level of knowledge of occupational hazards and safety precautions among formal and informal waste collectors in Rivers State.

1.4 RESEARCH QUESTION

I. What is the level of knowledge and practice of safety precautions among formal and informal waste collectors in Rivers State?

1.4 HYPOTHESIS

H0 = There is no significant difference in the knowledge of safety precautions among formal and informal waste handlers.

H1 = There is a significant difference in the knowledge of safety precautions among formal and informal waste handlers.

1.5 STATEMENT OF PROBLEM

In developing countries, waste collectors have higher risk of having infections and chronic diseases, acute poisoning and body injuries compared to the general residents [12]. Owing to population growth, industrialization and urbanization, the amount of waste generated in Africa is on the increase. In recent times, approximately 0.09 to 3.0 kg of solid waste is generated per person daily in Sub-Saharan Africa and management of this waste is a serious challenge in most African countries, with a reported 30% to 50% prevalence of occupational injuries among waste collectors [3, 7].

Several authors have assessed the type of hazards which the waste collectors are exposed to, while others researchers have conducted studies on the effect of poor waste management on the environment. There is a dearth of information about the association between exposure to the hazards and risks and health problems experienced by the waste collection workers. Additionally, only few studies have been conducted to compare the hazard exposures, risks and health status between formal and informal waste collection workers in Rivers State. Study therefore seeks to assess the Occupational health and safety practices among formal and informal waste collectors in Rivers state, Nigeria

1.6 SIGNIFICANCE OF RESEARCH

The results of this investigation will aid in the prevention of future cases of occupational injuries, accidents, illnesses, and fatalities among those employed in waste collection in the study area, Rivers State. The study's findings will also shed light on the dangers of improper waste disposal and the need of following all applicable safety protocols on the job. The findings of this study can be used by institutions, organizations, and communities where people are engaged in waste handling to prevent and reduce the negative effects of poor waste handing on their health status and to aid relevant authorities in implementing and maintaining high standards of safety culture and practices with respect to waste management. The results offer policymakers, waste management organizations, and other institutions real evidence on the health and safety of waste collectors, which should inform their work. This research provides academics with valuable empirical literature and useful background information for future studies.

2. MATERIAL AND METHODS / METHODOLOGY

2.1 STUDY AREA

Study was performed in Rivers state, South-South Nigeria. The state was established in 1967 and is bounded by the Atlantic Ocean to the south, Imo, Abia, and Anambra to the north, Akwa Ibom state to the east, Bayelsa and Delta states to the west. There are a wide variety of indigenous peoples living there, including the Ikwerre, Ibani, Opobo, Eleme, Okrika, Kalabari, Etche, Ogba, Ogoni, and Engenni [10].

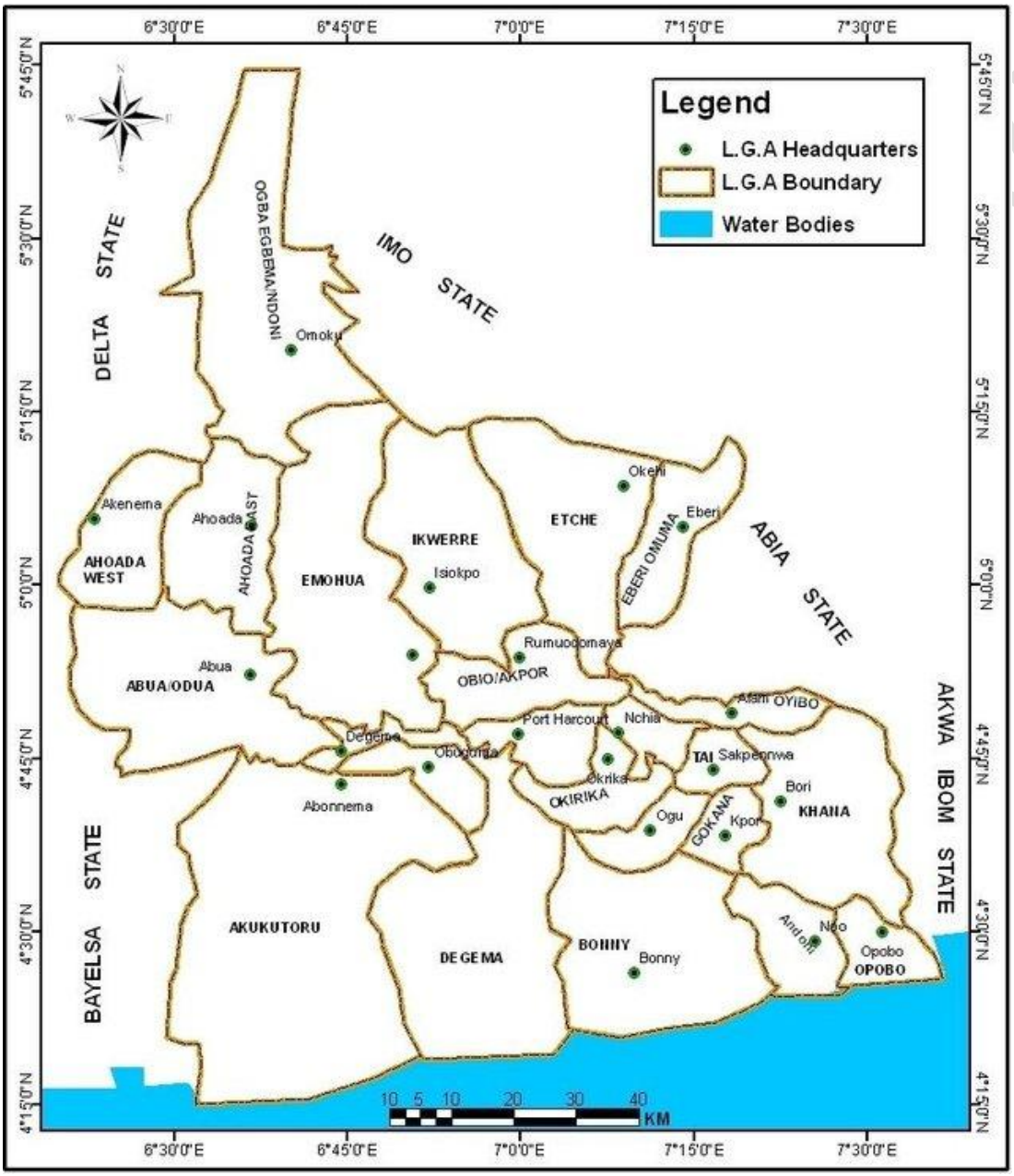

Figure 1: Map of Rivers State of Nigeria. Source

More than forty percent of Nigeria's crude oil is produced in the State, and the State is well renowned for its large crude oil and natural gas reserves [10]. The territory is home to two large oil refineries, two large ports, airports, and a number of industrial estates.

Presently, the waste disposal system is managed by the Rivers State Waste Management Agency (RIWAMA), a parastatal of the Ministry of Environment charged with the responsibility of enhancing environmental cleanliness of the State to achieve positive and substantial change in living conditions of the inhabitants as well as reducing diseases or health problems. Study area was chosen due to the huge waste generated by the state and due to a number of waste collectors spread across the nooks and crannies of the state.

2.2 Research Design

A concurrent nested mixed-method design was employed for this research. This includes a comparative cross-sectional study for the quantitative component of the study. The comparative cross-sectional component was used to identify similarities and differences in work characteristics between formal and informal waste collectors. The qualitative component of this research employed a phenomenological study design which explained the experiences of the waste collection workers about their health and hazard exposures associated with their occupation through focus group discussions [2].

2.2.1 Sampling Method

A combination of multistage sampling technique and snowball sampling method were used for this study to select participants in the formal waste management organization in Rivers State and informal waste collectors. Sampling was done using these two LGAs which largely make up Port Harcourt Metropolis for reasons that RIWAMA operates mainly in Port Harcourt and Obio-Apkor LGAs,.;

Stage 1: Selection of Zones by simple random sampling

Stage 2: Selection of Waste Collection contractors by simple random sampling

Stage 3: Selection of Waste Collection workers by simple random sampling

Sample size was determined using comparison of two proportions according to the relation below;

Sample size = $\frac{2(Z_\alpha+Z_\beta)^2\ P\ (1-P)}{(p_1-p_2)^2}$

Where Zα is the Standard normal deviate corresponding to the required significant level of 5% =1.96 (2-tailed test), Zβ is the 80% statistical power, which is the standard normal deviate corresponding to β=0.84.

P is the Pooled Prevalence = Arithmetic average of two proportions= $\frac{p_1-p_2}{2}$

p1 = proportion of informal waste collectors estimated to have a respiratory symptom (cough)

p2 = proportion of formal waste collectors estimated to have a respiratory symptom (cough)

2.3 knowledge of occupational hazards and safety precautions among waste collectors

When it comes to the understanding and actual implementation of safety measures, researchers have shown that waste collectors have certain knowledge and practice gaps when it comes to managing solid waste. This has provided the impetus for the study that is being done to realize and appreciate the expertise and safety methods that are used by municipal garbage collectors.

[5] conducted a research to evaluate the knowledge, attitudes, and practices of solid waste collectors in the Lideta Sub-city of Addis Ababa, Ethiopia about the prevention of occupational health hazards. The purpose of the research was to evaluate the knowledge, attitudes, and behaviors of solid waste collectors in the sub-city of Lideta, which is located in Ethiopia, with the end goal of avoiding and regulating the incidence of health risks in the workplace there. A research with a cross-sectional design was carried out using a sample population of forty-six hundred individuals who collected solid garbage. The study produced a number of important results, including a response rate of 94.8%, with female respondents accounting for 69.7% of the total. The participants ranged in age from 17 to 65 years old, with the mean age of the participants being 35 years old. More over half of the people who took part in the survey, or 60.8%, have enough information about the protection of occupational health hazards that are related with the profession of solid waste management. Just 37.2% of the participants maintained safe procedures for the avoidance of occupational health risks, although the majority of participants (75.9%) had a favorable attitude. Participants who were not content with their jobs had a likelihood that was 2.8 times higher (adjusted odds ratio = 2.8, 95% confidence interval [CI]: 1.84 - 4.26) of not maintaining safe occupational health practices when compared to employees who were satisfied with their jobs. Workers had a reasonable level of knowledge and attitudes towards the avoidance of occupational health risks, but the magnitude of having safe occupational health practices was extremely low. The researchers came to the conclusion that basic occupational health services should be made available to garbage collectors and should be put into practice. Also, the researchers suggested that personal protective equipment should be made available to these employees. In addition, the researchers proposed providing supporting monitoring to the people who handled the garbage in order to guarantee that the personal protection equipment was utilized correctly and regularly.

A research was carried out by [8] in Kathmandu Metropolitan City to investigate the level of awareness among municipal solid waste handlers about occupational health hazards and safety procedures. The purpose of this research was to determine the level of knowledge that trash handlers have on occupational health and safety procedures, as well as the

relationship between that knowledge and the use of personal protective equipment. The study also included an evaluation of the state of occupational health issues and injuries as well as variables related with the incidence of these health problems among those who worked in the waste handling industry in the metropolitan area of Kathmandu. The research was conducted using a cross-sectional methodology, and a total of 355 people who collected solid garbage were chosen to participate in the study. For the purpose of data collection, a semi-structured questionnaire and an observation checklist were used. When the data were gathered, they were input into the analytic program SPSS version 20, and a chi-square test was carried out to assess whether or not there was a connection between the dependent variable and the variables chosen for independence. 51.5 percent of the total respondents (355) surveyed had good knowledge about occupational health hazards; 16.1 percent of the respondents had good knowledge about how to prevent work-related health risks; 29% of the respondents had good knowledge about personal protective equipment; and 31.5% of the respondents had good knowledge about how to use personal protective equipment. In addition, 45.8% of the people who took part in the research had effective methods for using their personal safety equipment (PPE).

During the course of their careers, more than half of the respondents (63.7% of the total) said that they have struggled with various occupational health issues. The evidence of occupational health injuries was found to be modest, with just 25.4% of the respondents reporting experiencing any symptoms. In addition, variables that had a significant influence on occupational health problems included knowledge on occupational health hazard ($p = 0.016$), work experience ($p = 0.021$), and health checkup ($p = 0.042$). Variables that had a significant influence on occupational health injuries included monthly income ($p = 0.036$), knowledge to prevent from health risk ($p = 0.001$), gender ($p = 0.02$), and knowledge of occupational health hazard ($p = 0.011$), work experience (p = In light of the findings of this research, it was suggested that occupational health and safety procedures be strengthened. It is necessary to direct awareness initiatives toward increasing understanding of occupational health risks and safety practices in order to promote the usage of personal protective equipment (PPE).

3. RESULTS AND DISCUSSION

3.1 Socio-Demographic Data

Table 1 shows the socio-demographic characteristics of the respondents. Among the organized waste collectors, their mean age was 35 years and about 43 (13.7%) out of 314 respondents were aged between 21 and 30 years, while 171 (54.5%) were aged between 31 and 40 years and 100 (31.8%) respondents were aged 41 years and above. A total of 39 (12.4%) females and 275 (87.6%) males made up the sex composition of the organized waste collection workers.

Concerning the marital status of the organized waste collectors, there were 126 (40.1%) singles, 160 (51.0%) married and 5 (1.6%) widowed and 23 (7.3%) are divorced. Other demographics are presented in details in table 1 below

Table 1: Sociodemographic characteristics of study participants

Variables	Organized (n=314)	Informal (n=314)
	Frequency (%)	Frequency (%)
Age (Years)		
20 & below	0 (0.0)	3 (1.0)
21 – 30	43 (13.7)	56 (17.8)
31- 40	171 (54.5)	62 (51.6)
41 & above	100 (31.8)	93 (29.6)
Sex		
Female	39 (12.4)	1 (22.6)
Male	275 (87.6)	243 (77.4)
Marital Status		
Widowed	5 (1.6)	6 (1.9)
Divorced	23 (7.3)	51 (16.2)
Single	126 (40.1)	136 (43.3)
Married	160 (51.0)	121 (38.5)
Religion		
Christian	314 (100.0)	314 (100.0)

Table 1 continued

Educational Level		
None	6 (1.9)	8 (2.5)
Primary	25 (8.0)	126 (40.1)

Secondary	179 (57.0)	152 (48.4)
Tertiary	104 (33.1)	28 (8.9)
Family Size		
3 & below	185 (58.9)	208 (66.2)
4-6	121 (38.5)	106 (33.8)
7 & above	8 (2.6)	0 (0.0)
Place of Residence		
Rural	109 (34.7)	157 (50.0)
Urban	205 (65.3)	157 (50.0)
Presence of chronic disease		
Yes	136 (43.3)	32(10.2)
No	178 (56.7)	282 (89.8)

3.1.1 Occupational Status of Respondents

Table 2 shows the occupational status of respondents. Among the formal waste collectors, 39 (12.4%) were engaged in the waste collection job as part-time, while 275 (87.6%) were engaged in the waste collection job as a permanent or full-time employment. Eighty-six (27.4%) organized waste collectors have additional source of income, while 228 (72.6%) do not have. Also, 56 (17.8%) respondents have an average monthly income of N30, 000 and below, 125 (39.8%) earns between N31, 000 and N50, 000 monthly, while 106 (33.8%) and 27 (8.6%) earns between N51, 000 and N70, 000, and N71, 000 and above respectively.

Among the informal waste collectors, one hundred and twenty-eight (40.8%) engaged in the waste collection job as part-time employment status, while 186 (59.2%) had permanent employment status. One hundred and forty-six (46.5%) have additional source of income, while 168 (53.5%) do not have. Additionally, 69 (22.0%) of the informal waste collection workers earns an average monthly income of N30, 000 and below, 140 (44.6%) earn between N31, 000 and N50, 000, while 80 (25.5%) and 25 (8.0%) earn between N51, 000 and N70, 000, and N71, 000 and above respectively.

Table 2: Occupational Status of respondents

Variables	Formal (n=314) Frequency (%)	Informal (n=314) Frequency (%)
Employment Status		
Part-Time	39 (12.4)	128 (40.8)
Permanent	275 (87.6)	186 (59.2)
Additional Source of Income		
No	228 (72.6)	168 (53.5)
Yes	86 (27.4)	146 (46.5)
Average income		
30000 & Below	56 (17.8)	69 (22.0)
31000 – 50000	125 (39.8)	140 (44.5)
51000 – 70000	106 (33.8)	80 (25.5)

71000. & Above	27 (8.6)	25 (8.0)

3.1.2 Level of Knowledge and Practice of Safety Precautions

Research Question: What is the level of knowledge and practice of safety precautions among formal and informal waste collectors in Rivers State?

Table 2 revealed that among the respondents, a higher percentage of organized waste collectors 160 (51.0%) know about occupational hazards compared to the informal waste collectors 109 (34.7%), a higher percentage of the informal waste collectors had no knowledge about occupational hazards187 (59.6%) compared to the organized waste collectors 112 (35.7%) and a higher percentage of the organized waste collectors were unsure about their knowledge of occupational hazards 42 (13.4%) compared to the informal waste collectors 18 (5.7%). The difference in knowledge about occupational hazards of waste collection job was statistically significant. P=0.001.

Majority of the organized waste collection workers had an idea about the occupational hazards they are exposed to 206 (65.6%) compared to the informal waste collection workers 93 (29.6%) and the difference was statistically significant with p=0.001.

A higher percentage of the organized waste collection workers had received a training or sensitization about occupational hazard exposure and prevention 182 (58%) compared to the informal waste collection workers 75 (23.9%), and the difference in proportion was statistically significant, p=0.001.

None of the respondents believed that employees would always be safe if they strictly adhered to occupational safety norms and regulations. All informal garbage collection employees and 311 of the 318 respondents (99%) were unsure whether or not strict adherence to safety laws in the workplace would safeguard them from harm. It was determined that there was no statistically significant difference between the groups (p=0.083).

Two hundred and three (64.6%) organized waste collectors opted that stigmatization is a type of workplace hazard compared to 175 (55.7%) informal waste collectors. The difference in proportion was statistically significant, p=0.022.

A higher percentage of the organized waste collection workers 209 (66.6%) opted that excess exposure to sunlight is a type of workplace hazard compared to the informal waste collection workers 155 (49.4%), and the difference in proportion was statistically significant, p=0.001.

A higher percentage of the organized waste collection workers 199 (63.4%) stated that not wearing mask can cause damage to respiratory organs, compared to the informal workers 189 (0.674). the difference in proportion was not statistically significant.

Concerning hand washing for prevention of diseases, a higher percentage of the organized waste collection workers, 210 (66.9%) opted that washing hands after work and working with clean clothes can prevent dermal diseases respectively, and the difference in proportion was statistically significant, p=0.001.

The total knowledge score shows that a higher percentage of the organized waste collection workers had good knowledge about occupational hazard 308 (98.1%) compared to the informal waste collectors 270 (86.0%) and this finding was statistically significant, p=0.001.

Table 3: Knowledge and Practice of Safety Precautions among Formal and Informal Waste Collectors in Rivers State.

Variables	Formal Frequency (%)	Informal Frequency (%)	$\chi 2$	p-value
Do you know about occupational hazards?				
Not Sure	42 (13.4)	18 (5.7)		
No	112 (35.7)	187 (59.6)	38.082	0.001*
Yes	160 (51.0)	109 (34.7)		
Do you have any idea of the hazards you might be exposed to?				
Not Sure	3 (1.0)	54 (17.2)		
No	105 (33.4)	167 (53.2)	102.470	0.001*
Yes	206 (65.6)	93 (29.6)		
Have you had any training or sensitization on the occupational hazards you might be exposed to and how to prevent them?				
Not Sure	7 (2.2)	11 (3.5)		
No	125 (39.8)	228 (72.6)	75.491	0.001*
Yes	182 (58.0)	75 (23.9)		
Workers are always protected from occupational accidents and diseases if they strictly comply with the laws and regulations governing occupational safety.				
Not Sure	311 (99.0)	314 (100.0)		
No	3 (1.0)	0 (0.0)	3.014	0.083
Yes	0 (0.0)	0 (0.0)		

Table 3 continued

Stigmatization is a type of workplace hazard				
False	111 (35.4)	139 (44.3)		
True	203 (64.6)	175 (55.7)	5.210	0.022*
Excess exposure to sunlight is a type of workplace hazard				
False	105 (33.4)	159 (50.6)		
True	209 (66.6)	155 (49.4)	19.056	0.001*

Not wearing mask can cause damage to respiratory organs				
False	115 (36.6)	125 (39.8)		
True	199 (63.4)	189 (60.2)	0.674	0.414
Washing hands after work can prevent diarrheal Diseases				
False	104 (33.1)	182 (58.0)		
True	210 (66.9)	132 (42.0)	39.062	0.001*
Working with clean clothes can prevent dermal diseases				
False	104 (33.1)	180 (57.3)		
True	210 (66.9)	134 (42.7)	37.129	0.001*
Total Knowledge Score				
Poor Knowledge	6 (1.9)	44 (14.0)		
Good Knowledge	308 (98.1)	270 (86.0)	31.378	0.001*

3.1.2.1 Hypothesis: There is no difference in the knowledge of safety precautions among formal and informal waste collectors

Table 4 shows that at p = 0.05, the calculate chi-square value of 403.102 with degree of freedom 19 was less than the critical chi-square value of 30.144. So, the null hypothesis is wrong, and the alternative hypothesis, which says that formal and informal waste collectors in Rivers State know different things about safety precautions, is true.

Table 3: Chi-Square Tests for Knowledge of Safety precautions

	Knowledge of safety precautions
Chi-Square	403.102a
Df	19
Asymp. Sig.	.000

a. 0 cells (0.0%) have expected frequencies less than 5. The minimum expected cell frequency is 15.7.

Findings revealed the level of knowledge and practice of safety precautions among formal and informal waste handlers in Rivers State. Only a few formal waste collectors and a little over ten percent of the informal waste collectors were seen to possess a poor knowledge of the occupational hazards in Rivers State. The poor knowledge and practice of safety precautions among formal and informal waste collectors in Rivers State would most likely expose the handlers to avoidable health problems. Though more than half of both formal and informal waste collectors had good knowledge

about the occupational hazards and safety measures required for their job type. This finding is in consonance with the findings of [5, 8]. More formal waste collectors possessed good knowledge of the occupational hazards associated with waste collection in Rivers State compared to the informal waste collectors. This finding is further backed with the chi-square value that shows a rejection of the hypothesis that there is no difference in the knowledge of safety precaution among formal and informal waste handlers in Rivers State. Therefore, the knowledge about occupational hazard among waste collectors in Rivers State is higher among formal waste collectors than the informal waste collectors in Rivers State, and this could be as a result of the lack of optimum training for the informal workers as against their formal counterparts

4. Conclusion

Major findings showed that the knowledge about occupational hazard among waste collectors in Rivers State is higher among formal waste collectors than the informal waste collectors in Rivers State, and this could be as a result of the lack of optimum training for the informal workers as against their formal counterparts

The waste collectors were exposed to all the five (5) types of hazards and risks inherent in the waste management sector and therefore training and re-training of waste collection workers was recommended. Although, a greater percentage of the formal and informal waste collectors had a good knowledge on the hazards and risks inherent in their job, periodic training and retraining programs, including risk communication should be done by responsible waste management agencies for the formal waste collectors and by the government for the informal waste collectors, to improve the knowledge level of waste collectors in the state.

Consent

A written consent was sought and obtained from respondents and subsequently preserved by the authors as per university requirements

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