WWW.IJRPR.COM

**International Journal of Research Publication and Reviews**

Journal homepage: www.ijrpr.com ISSN 2582-7421

# Perceived Influence of Occupational Health Hazards Knowledge on Informal Solid Waste Pickers in Rivers State

***Gabriel-Pepple, John [1] Abam, T.K.S [1] and Osaro, B. O. [2]***

[1]Institute of Geosciences and Environmental Management, Rivers State University, Nkpolu-Oroworukwo, Port Harcourt Nigeria
[2]Department of Community Medicine, Faculty of Clinical Sciences, College of Medical Sciences, Rivers State University, Nkpolu-Oroworukwo, Port Harcourt, Nigeria.

**ABSTRACT**

This study examined Perceived Influence of Occupational Health Hazards Knowledge on Informal Solid Waste Pickers in Rivers State. The aim of this study is to assess the health hazards, level of awareness, attitude and safety practices and address associated medical and environmental concerns and enhance their overall well-being. By employing a survey approach, 357 out of 384 distributed questionnaires were effectively collected, resulting in a noteworthy response rate of 92.96%. These responses were analyzed using SPSS software and results presented in tables and graphs. The study explores perceptions of medical services, knowledge levels, attitudes, and safety practices, providing a nuanced understanding of waste pickers' interactions with healthcare and safety measures. The results from the survey on occupational health hazards in solid waste picking revealed a high awareness level, with 88% acknowledged physical hazards, 42.6% recognized chemical hazards, 48.5% identified biological hazards, 64.7% acknowledged ergonomic hazards, and 60.2% being aware of psychological health hazards. In terms of perception and utility of medical health services, 31.9% reported easy access, 35.9% expressed confidence in service quality, 32.5% believed in the essentiality of medical services, 38.7% were satisfied with accessibility, and 59.1% felt supported by the healthcare system. Regarding knowledge on occupational health and safety, 19% were aware of potential hazards, 30.8% knew how to handle hazardous materials, 11.5% were familiar with proper use of PPE, 33.6% understood the importance of health checkups, and 24.4% knew proper waste disposal procedures. In terms of occupational health attitude, 92.4% prioritized personal health and safety, 87.7% believed in maintaining good health, 69.7% were proactive in risk reduction, and 72.8% actively sought information on health and safety. Lastly, on safety practice, 45.1% were influenced by PPE availability, 50.7% were well-informed about recommended PPE, 54.1% perceived cost as a barrier, 45.1% considered comfort in PPE usage, and 37.3% were influenced by peer behavior in PPE compliance during waste picking activities. The Chi-square test was employed to test for the levels of association between categorical variables related to occupational activities and health hazards, leading to the rejection of the null hypotheses and emphasizing the imperative for targeted interventions. The study revealed a heightened awareness among waste pickers concerning physical, chemical, biological, ergonomic, and psychological hazards associated with their occupation. Consequently, recommendations included targeted interventions for hazard mitigation, improvement in healthcare accessibility, knowledge enhancement programs, and the promotion of a safety culture. This research validated global patterns of occupational health risks among waste pickers, providing actionable insights for stakeholders, and informing future interventions in both the specific context of Port Harcourt Metropolis and the broader discourse on vulnerable occupational groups.

Key Words: Perceived Influence, Occupational, Health Hazards, Knowledge, Informal, Solid, Waste Pickers,

## INTRODUCTION

The nature of duties involved in informal waste picking requires the use of protective equipment. The protective equipment they require ranges from “toetector” footwear, nose mask, high visibility clothing capable of being seen by drivers from a reasonable distance, gloves, suitable raincoat, heat or cold and reinforced trousers to guide against punctured wounds from sharp objects. The protective equipment should be suitable to the task; where possible the personal protective equipment should be tried out before general use (California Occupational Guide, 2022). Across the developing world, informal waste pickers group exhibit certain common features. They are often marginalized populations living in extreme poverty (Samson, 2020), and are often some of the most vulnerable people in society (Medina 2017). They generally face high risks (WIEGO 2020), While a majority work with the informal sector preventing them from the benefits and social advantages of formal jobs (International Labour Organization & WIEGO 2017).

Worldwide, informal waste picking is a common way for people to earn an income by finding valuable material that can be exchanged for money. Infact, the only form of waste collection in many countries is provided by waste pickers (Dias, 2022). Around the world, millions of people earn a living collecting, sorting, selling, and recycling materials that have been disposed as waste. It is difficult to know just how many individuals participate in the practice of waste picking (Medina, 2018). Waste pickers can include women, children, elderly people and /or migrants, and although informal waste pickers are prevalent in developing countries they are also found in developed countries on a much smaller scale. Broadly, two types of scavengers exist in the city; itinerant pickers, who go from house to house picking useful items from bins. This group consist mostly unemployed young men with little

basic education (Agunwamba, 2018). The number of people engaged in this form of scavenging is not known as they operate on individual basis without any cooperation or association. The second group consists also of those scavengers that operate solely at the dump site, picking recyclable materials as they are dumped from the disposal vehicles. They also consist of uneducated young men who commute daily from neighboring slums and satellite towns to these dumpsites.

Informal waste pickers have some common names around the world. These terms are used to describe individuals or group involved in the informal collection and recycling of various materials from waste streams in different parts of the world. In India, they are often referred to as "ragpickers or "kabadiwalas,". While in Brazil, they are known as "catadores" in Colombia, they are sometimes called "recicladores," and in Egypt, they may be referred to as "zabbaleen". These terms reflect the local context and the specific activities of waste collection and recycling undertaken by these groups in various regions. Informal waste pickers are also known as "scavengers, "waste collector," waste reclaimers, garbage pickers or dumster divers." In 2008, waste pickers participated in the First World Conference, which resulted in allowing waste pickers to use the term-waste picker-for English usage globally, instead the previous term scavenger (WIEGO 2021).

Informal solid waste pickers are exposed to various health risks, including respiratory issues due to inhalation of dust and fumes, skin problems from direct contact with waste materials, and the potential transmission of infectious diseases (Dhibar, 2018). Waste pickers collect materials thrown away by others, including plastics, paper, cardboard, wires, glass bottles, rubber materials, sharp metals and harmful electronic materials. They collect these materials from different sources such as streets, on landfills and open dumpsites areas. They can be risky for their health as they are exposed to various infectious agents and toxic substances that may cause illness (Baral, 2018). The prolong exposure to dust and particulate matter during waste picking can lead to respiratory problems like asthma and chronic obstructive pulmonary diseases (COPD). Contact with various waste materials can lead to skin problems such as rashes, dermatitis, and other allergic reactions, particularly when proper protective gear is not utilized.

It is however known that scavengers in Nigeria suffer from health consequences of their occupation such as frequent fever and malaria from mosquito bites, cuts and bruises, body aches and general weakness (Nzeadibe, 2019). Informal waste pickers are constantly in touch with the wider public during the course of their daily jobs. Their health status is therefore a medical concern, as they could be potential pathways for the transmission of various communicable diseases to the general public.

Informal solid waste pickers often encounter various occupational health hazards, including exposure to harmful chemicals, biological contaminants, and sharp objects, leading to potential infections, injuries and long-term health complications. Undoubtedly, most landfill sites are faced with inadequate health and safety measures, which include the use of personal protective equipment (PPE) and hazard awareness that could negatively impact the health status of the waste pickers. Hence, the health conditions of the waste pickers could be adversely affected. Due to cuts and contact with toxic substances like dust inhalation, bacteria, and chemicals, a large proportion of waste pickers are at a higher risk of being infected by injuries and diseases unlikely the general population. Health impact of waste pickers is also affected by their socioeconomic characteristics, such as age, educational level, income earned, and number of days worked weekly.

Informal waste pickers often face social stigma and discrimination, leading to mental health issues such as anxiety, depression, and low self-esteem. They also live in poor housing conditions often lacking access to the supply of good quality water and sanitation (Nzeadibe and Iwuoha, 2018). Many waste pickers in Port Harcourt Metropolis face poverty, lack of access to clean water and sanitation, and limited education and job alternatives. Access to healthcare services is a significant concern for waste pickers. Many informal waste pickers do not have access to proper healthcare services, exacerbating health issues and leading to delayed treatment for various illnesses and injuries (ILO & WIEGO, 2021).

Their informal employment status often excludes them from social security and health insurance schemes. This lack of financial resources, coupled with stigma and discrimination, leads to inadequate healthcare seeking behaviors and delays in receiving medical attention when needed (UNEP, 2020). Also, economic challenges and irregular income can contribute to food insecurity and inadequate nutrition among waste pickers and their families. Several studies reported that waste pickers are at high risk for developing diseases resulting from exposure to various work hazards. Workers in this occupation line are mostly exposed to several forms of injuries and diseases in their work, arising from collection point, when transporting and during dumping sites (Cointreau, 2016).

On global concern, "International Labour Organization" evaluated that over two hundred million work connected injuries, and sickness which occurs yearly and over one hundred and sixty million people globally live with work associated issues which includes respiratory issues, heart associated problems, hearing loss, bone and muscles related disease, reproduction disorder and mental/neurological sickness (ILO, 2010). Studies have highlighted the significance of occupational health in preventing work-related injuries and illnesses. For instance, research by Agba (2020) underscores the importance of implementing effective occupational health programs in reducing occupational risks and improving overall employee well-being.

### *Concept of Occupational Health*

Occupational Health is a multidisciplinary field that addresses the two main elements in the study of work and its hazards with a focus on preventative strategies against diseases and injuries as well as the protection and management of the environment and natural resources from occupational activities. Occupational health studies the relationship between different types of work and diseases, illnesses and wellness (ILO 2014). According to World Health Organization (WHO), occupational health aims to promote and maintain the highest degree of physical, mental and social well-being of workers in all occupations.

Occupational health looks at the potential health issues that could be consequential from the workplace activities and/or interactions. Certain occupational risks, such as injuries, noise, carcinogenic agents, airborne particles and ergonomic risks account for a substantial part of the burden of chronic diseases: 37% of all cases of back pain, 16% of hearing loss, 13% of chronic obstructive pulmonary disease, 11% of asthma, 8% of injuries, 9% of lung cancer, 2% of leukaemia and 1% of depression (https://www.who.int/news-room/fact-sheets/detail/protecting-workers'-health). The first major cause of work-related fatalities (i.e deaths) is cancer, followed by circulatory diseases and then certain communicable diseases and, in fourth place is injuries from occupational accidents. Most of these occupational diseases, illnesses and accidents, fatal and non-fatal, are preventable through existing and tested measures and methods that have proven to reduce occurrences and ensure significant human, social and economic benefits (Alli 2014).

As Alli (2014) put it: "work should take place in a safe and healthy working environment; - conditions of work should be consistent with workers' well-being and human dignity;- work should offer real possibilities for personal achievement, self fulfillment and service to society". Research conducted by Samson (2021) emphasizes the role of psychosocial factors in occupational health, highlighting the importance of addressing workplace stress and fostering supportive environments to enhance employee well-being. Additionally, the concept of occupational health has gained further importance in the context of COVID-19 pandemic, as organizations have had to implement measures to ensure workplace safety and health, including remote work policies, infection control practices, and mental health support for employees facing challenges during these unprecedented times.

### *Statement of the Problem*

The health problems associated with informal solid waste pickers are enormous and cannot be ignored. The city of Port Harcourt Metropolis is grappling with pressing issues of occupational health challenges among informal solid waste pickers in the metropolis. Informal waste pickers often come into direct contact with hazardous materials such as chemicals, toxins, and infectious waste, leading to various health risks. Informal waste pickers are at a higher risk of contracting infectious diseases such as hepatitis, tuberculosis, and gastrointestinal infections due to their exposure to contaminated waste materials. They often work in hazardous environments without proper safety equipment, leading to high risk of injuries, cuts, and accidents.

The limited access to healthcare facilities contributes to the lack of timely medical intervention and exacerbates the overall health burden experienced by this marginalized population. Also, limited access to healthcare services, not only hampers the timely diagnosis and treatment of occupational health ailments but also perpetuates the cycle of health inequity among these marginalized individuals. In the urban landscape of Port Harcourt Metropolis, informal solid waste pickers endure severe medical challenges that demand urgent attention. Research conducted by Uddin. (2016) emphasizes the detrimental health effects stemming from prolonged exposure to heavy metals and toxic organic compounds found in the waste materials, leading to potential risks of cancer, neurological disorders, and respiratory ailments among the workers.

### *Aim and Objectives of the Study*

The study examines Perceived Influence of Occupational Health Hazards Knowledge on Informal Solid Waste Pickers in Rivers State. Specifically, the objectives of the study are to:

i. Assess the level of knowledge of occupational health hazards among informal solid waste pickers Port Harcourt Metropolis.

ii. Assess the attitude of Informal Solid Waste Pickers towards occupational health hazard.

### *Research Questions*

The following research questions were drawn to guide the study:

i. What is the occupational health hazards associated with informal solid waste picking?

ii. How do informal solid waste pickers perceive utilization of medical services in Port Harcourt Metropolis?

### *Research Hypothesis*

The following research hypothesis was adopted:

**$H0_1$** There is no significant correlation between the level of knowledge and occupational health hazards among informal solid waste pickers in Port Harcourt Metropolis and environs.

**$HA_1$** There is a significant correlation between the level of knowledge and occupational health hazards among informal solid waste pickers in Port Harcourt Metropolis and environs.

**$H0_2$** There is no significant association between occupational health attitude and health hazard among informal solid waste pickers in Port Harcourt Metropolis and environs.

**$HA_2$** There is a significant association between occupational health attitude and health hazard among informal solid waste pickers in Port Harcourt Metropolis and environs.

## METHODOLOGY

**Research Design:** The descriptive study design was used in this study in order to acquire information. According to Elendu (2020), survey design method is that which investigates, studies reports and describes events. He further stated that the design could be public opinion survey, fact finding survey, studies and so on. He explained that descriptive survey research design is used for the study or a group of persons to assess behavior, preferences, perception and opinions from a few member of the entire population, considered true representative of the entire group. Therefore, descriptive survey design was desirable since it used a representative sample of the population to enable the researcher to systematically collect, analyze and interprets data to describe the current situation in assessment of occupational health hazards among informal solid waste pickers in Port Harcourt Metropolis.

**Table 1: Showing Dumpsites Coordinates**

| DUMPSITES | EASTING | NORTHING |
|---|---|---|
| Rumuolumeni Dumpsite 1 | 6°56'6.78"E | 4°48'25.61"N |
| Rumuolumeni Dumpsite 2 | 6°57'19.52"E | 4°49'2.73"N |
| Mile 3 Market dumpsite, Port Harcourt | 6°59'26.25"E | 4°48'10.43"N |
| Navy Market Dumpsite Borokiri | 7° 2'16.92"E | 4°44'34.69"N |

**Population of Study:** The populations of Port Harcourt metropolis as at 2006 population census were 538,558 and 462,350 for Port Harcourt LGA and Obio/Apkor LGA respectively, with an annual growth rate of 3.02%. This sums to 1,000,908 (National Population Commission of Nigeria, 2006). This was projected using the stated growth rate, to obtain a 2022 current population forecast using the population growth model as proposed by Al-EidehandAl-Omar, (2019)

$$P_t = P_0 e^{r\Delta t} \quad (3.1)$$

Where

$P_t =$ Projected population at time *t (*in years)

$P_0 =$ Initial population = 1,000,908

$e =$ Exponential growth constant

$r =$ Annual population growth rate in percentage (3.02%)

$\Delta t =$ Absolute change in time (in years) = 16

So we obtained the 2022 projected population of Port Harcourt metropolis as

$$P_{2022} = 1000908\left(e^{(0.0302)(16)}\right)$$

$$P_{2022} = 1{,}622{,}566$$

Thus using the formula, we obtained the 2022 projected population of the study area to be approximately1,622,566.

**Sample and Sampling Techniques:** In conducting a socio-economic study within Port Harcourt Metropolis, a thoughtful and robust sampling strategy is imperative to ensure the accuracy and representativeness of the data collected. This study employs a simple random sampling technique, treating each Local Government Area (LGA) within Port Harcourt Metropolis as an individual stratum. The LGAs comprising Port Harcourt Metropolis are Port Harcourt City and Obio- Akpor LGA'S. The choice of a simple random sampling technique is rooted in the diversity of the LGAs within Port Harcourt Metropolis. This method allows for a systematic and comprehensive representation of the entire population by categorizing it into distinct strata based on geographic location (LGAs, in this case). Each LGA is treated as a separate stratum, acknowledging the unique characteristics and variations that may exist across different areas within the city. This study applied Cochran's formula to obtain the sample size. Cochran's formula is a pivotal tool in statistics, specifically for calculating sample sizes in survey research. It provides a systematic approach to determining the number of observations needed to estimate a population parameter with a specified level of confidence and precision. The formula incorporates factors such as the desired level of confidence, estimated population proportion, and margin of error:

$n = \frac{Z^2 pq}{d^2}$ (3.2)

Where

n = sample size

Z = standard normal deviation corresponding to 95% level of significance.

p = prevalence (proportion of informal waste pickers in the study area)

q = (1-p)

d = Desired margin of error (5%)

Now, computing the sample size, let p be the proportion of Informal Waste pickers in Port Harcourt metropolis which is estimated to be 0.5, with a confidence level of 95% and a margin of error of 5%. In this case, the Z-score would be 1.96 (corresponding to a 95% confidence level).

Assuming an estimated proportion *(p)* of Informal Waste pickers in Port Harcourt metropolis based on prior knowledge is 0.05 (which is taken by default).

We can apply Cochran's formula(3.2) above:

$$n = \frac{(1.96)^2 . 0.5(1 - 0.50)}{(0.05)^2}$$

$$n \approx 384$$

The sample size for the study is 384. This was distributed across the two LGAs (Obio-Akpo and Port Harcourt City) within the Port Harcourt metropolis of Rivers State.

**Instrument for Data Collection:** The study researcher used primary data. A researcher-designed instrument titled Assessment of Occupational Health Hazards Questionnaire (AOHHQ) was used for data collection. The instrument was administered and data collected by the study researcher with the help of two research assistants. Three hundred and eighty-four (384) copies of the questionnaire were administered to the study respondents. The questionnaire consists of 25scaled questions and 7 demographic questions. Further, the questionnaire was designed to assess the 5 hypotheses relative to the study research questions.

Since the research instrument used was the questionnaire, it was designed using the 3-point Likert scale method. The questionnaire was designed in the following ways:

| | | | |
|---|---|---|---|
| i) | NO | - | 1 |
| ii) | NOT SURE | - | 2 |
| iii) | YES | - | 3 |

**Pre-test Questionnaire:** To ensure the reliability of the data collection tool, this research employed both face and content validity. The AOHHQ instrument underwent a comprehensive review by the research supervisor. In this study, face validity involves ensuring that the questions in the AOHHQ instrument appear relevant and appropriate for assessing the intended aspects, such as occupational health hazards, medical services perception, and knowledge, attitude, and level of occupational health and safety. The instrument should seem, at a glance, to be a suitable tool for gathering information on these specific areas from informal solid waste pickers. Content pretest in this study entails a rigorous review of the AOHHQ instrument by the research supervisor at the Institute of Geosciences and Environmental Management (IGEM). The supervisor, being an expert in the field, evaluated the contents whether the questions effectively captured the various dimensions of the study objectives, including occupational health hazards, access to medical services, knowledge of occupational health, and psycho-social health problems. All recommendations or concerns raised by the supervisor were addressed through necessary adjustments to enhance the instrument's comprehensiveness and relevance. Feedback from the reviewers was carefully considered, and necessary adjustments were made to enhance the instrument before administration.

**Reliability of the Instrument:** The reliability of the instrument deplored the Kuder-Richardson-20 (KR-20) to obtain a measure of internal consistency of the items making up the research instrument using the formula

$$\propto = \left(\frac{K}{K-1}\ \ 1 - \frac{\sum Vi}{Vt}\right) \qquad (3.3)$$

$$where\ K = No.of\ items$$

$$\sum Vi = sum\ of\ variance\ of\ items$$

$$Vt = Variance\ of\ total\ items$$

$\propto = Cronbach's\ Alpha = 0.74$ was obtained which a sample of 5 responses was tested using SPSS software, indicating that the instrument is very reliable.

**Methods of Data Analysis:** Data for the study obtained through questionnaire, was analyzed using descriptive statistical techniques (frequency and percentage) and presented using tables, charts and graphs. This was used to analyze the demographics and responses. Chi-square statistic was used to obtain inferential conclusion based on the research hypotheses.

**Chi-Square Statistic:** The Chi-square statistic is commonly used for testing relationships between categorical variables in other to draw inferential conclusion.

The general form of the Chi-square test statistics is given by:

$$\chi^2 = \sum_{i=1}^{n} \frac{\left(O_i - E_i\right)^2}{E_i} \quad (3.4)$$

Where

$\chi^2$ = Chi-square test statistic

$O_i$ = Observed frequency

$E_i$ = Expected frequency

n = number of observations

**Decision Rule for Chi-square Statistic**

Reject $H_o \, at \, the \, critical \, value \, \alpha = 0.05$ if the $\chi^2_{Calculated} > \chi^2_{Critical}$ and do not reject $H_o$, otherwise. Also, we will reject $H_0$ if the probability (*p-value)* for the test is less than the critical value of 0.05. That is if $p<0.05$, otherwise do not reject $H_0$.

Numerical analysis was done using two statistical packages; Statistical Package for Social Sciences (SPSS), version 25.

## RESULTS

**Table 1: Knowledge Regarding Occupational Health and Safety**

Table 1 offered a detailed distribution of responses on the knowledge regarding occupational health and safety among 357 waste pickers in Port Harcourt Metropolis. Regarding awareness of potential health hazards associated with waste picking, 23.5% affirmed their lack of awareness, 57.4% were uncertain, and 19% claimed awareness. In terms of the ability to identify and handle hazardous materials, 24.6% lacked this knowledge, 44.5% were unsure, and 30.8% asserted competency. Familiarity with the proper use and disposal of personal protective equipment (PPE) shows that 47.3% lacked awareness, 41.2% were uncertain, and 11.5% were knowledgeable. Awareness of the importance of regular health check-ups and screenings exhibits that 15.1% were unaware, 51.3% were uncertain, and 33.6% recognized their importance. Regarding knowledge of proper waste disposal procedures, 21.8% lacked awareness, 53.8% were uncertain, and 24.4% were informed. These findings highlighted significant gaps in the knowledge base of waste pickers, emphasizing the need for targeted educational programs and interventions to enhance their understanding of occupational health and safety measures, ultimately promoting a safer working environment for this vulnerable occupational group.

The results depicted in Table 1, detailed the distribution of responses on knowledge regarding occupational health and safety among waste pickers in Port Harcourt Metropolis, are corroborated by the graphical representation in Figure 1. The visual presentation offered a complementary perspective, reinforcing the patterns observed in table 4.6. The graphical representation visually underscores the prevalent lack of awareness and uncertainty among waste pickers regarding potential health hazards, identification and handling of hazardous materials, proper use of personal protective equipment (PPE), understanding the importance of health check-ups, and awareness of proper waste disposal procedures.

Table 1 presented the results of the chi-square test for Hypothesis 1, evaluating the association between waste pickers' knowledge regarding occupational health and safety and their awareness of potential health hazards, ability to identify and handle hazardous materials, familiarity with the proper use of personal protective equipment (PPE), understanding the importance of health check-ups, and awareness of proper waste disposal procedures. Table 4.6 breaks down responses into 'NO,' 'NOT SURE,' and 'YES' categories for each variable. For instance, concerning awareness of potential health hazards, 94.60% of respondents who lacked awareness, 177.20% who were unsure, and 85.20% who claimed awareness contributed to the total chi-square value of 141.176 with 8 degrees of freedom and a p-value of 0.000. Similar patterns are observed for the other variables, emphasizing a statistically significant association between waste pickers' knowledge and their awareness of occupational health and safety practices. The p-value of 0.000 supports the rejection of the null hypothesis, indicating a strong association between respondents' knowledge levels and their awareness of key occupational health and safety aspects.

**Table 2: Distribution of Responses on Knowledge Regarding Occupational Health and Safety**

| Variable | Frequency (n=357) | Percentage (%) |
|---|---|---|
| I am aware of the potential health hazards associated with waste picking | | |
| No | 84 | 23.5 |

| | | |
|---|---|---|
| Not Sure | 205 | 57.4 |
| Yes | 68 | 19 |
| I know how to identify and handle hazardous materials encountered during waste picking. | | |
| No | 88 | 24.6 |
| Not Sure | 159 | 44.5 |
| Yes | 110 | 30.8 |
| I am familiar with the proper use and disposal of personal protective equipment (PPE) during waste picking. | | |
| No | 169 | 47.3 |
| Not Sure | 147 | 41.2 |
| Yes | 41 | 11.5 |
| I understand the importance of regular health check-ups and screenings for waste pickers. | | |
| No | 54 | 15.1 |
| Not Sure | 183 | 51.3 |
| Yes | 120 | 33.6 |
| I am aware of the proper procedures for waste disposal to minimize health risks. | | |
| No | 78 | 21.8 |
| Not Sure | 192 | 53.8 |
| Yes | 87 | 24.4 |

**Table 1: Chi-square Test for Hypothesis 1**

| | **NO** | **NOT SURE** | **YES** | **Total** | **DF** |
|---|---|---|---|---|---|
| I am aware of the potential hea | 84 | 205 | 68 | 357 | 8 |
| | 94.60 | 177.20 | 85.20 | | |
| I know how to identify and hand | 88 | 159 | 110 | 357 | 8 |
| | 94.60 | 177.20 | 85.20 | | |
| I am familiar with the proper u | 169 | 147 | 41 | 357 | 8 |

| | | | | | |
|---|---|---|---|---|---|
| | 94.60 | 177.20 | 85.20 | | |
| I understand the importance of | 54 | 183 | 120 | 357 | 8 |
| | 94.60 | 177.20 | 85.20 | | |
| I am aware of the proper proceed | 78 | 192 | 87 | 357 | 8 |
| | 94.60 | 177.20 | 85.20 | | |
| Total | 473 | 886 | 426 | 1785 | 1785 |
| Chi-square | 141.176 | | | | |
| p-value | 0.000 | | | | |

*Cell Contents* *Count* *Expected count*

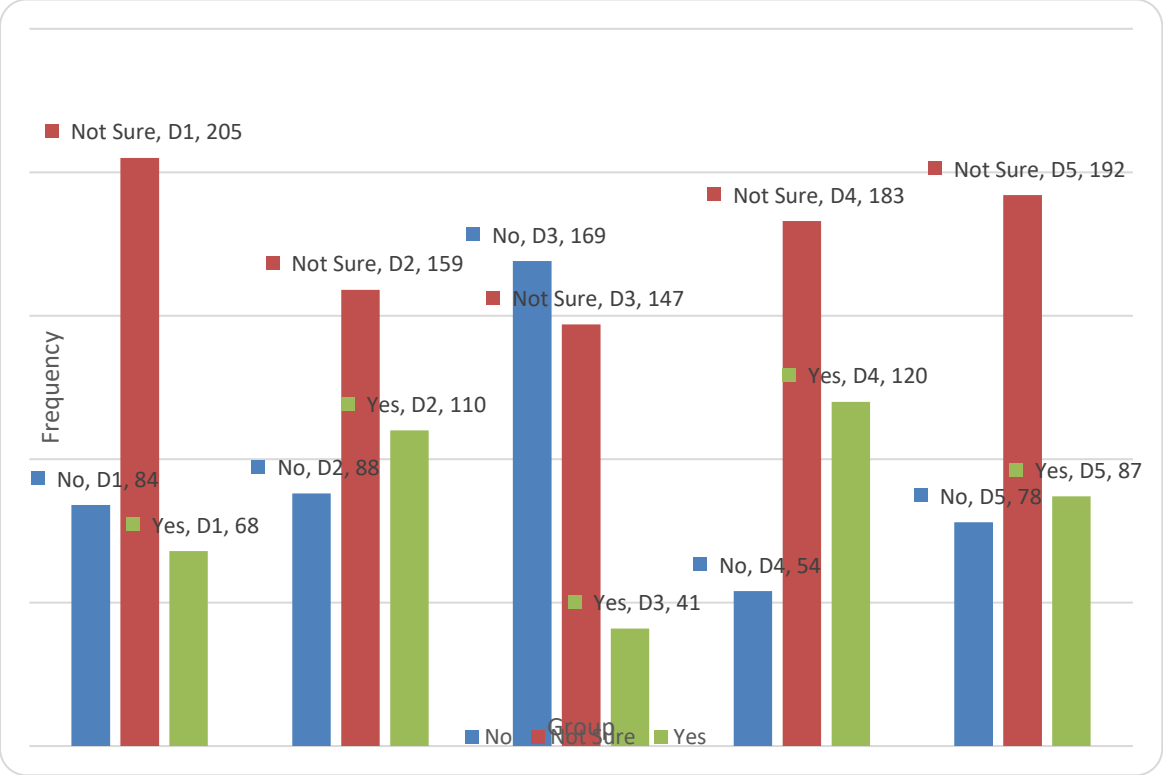


**Figure 1: Graphical Representation of Responses on Knowledge Regarding Occupational Health and Safety**

D1 = I am aware of the potential health hazards associated with waste picking

D2 = I know how to identify and handle hazardous materials encountered during waste picking.

D3 = I am familiar with the proper use and disposal of personal protective equipment (PPE) during waste picking.

D4 = I understand the importance of regular health check-ups and screenings for waste pickers.

D5 = I am aware of the proper procedures for waste disposal to minimize health risks.

**Table 2: On the Level of Occupational Health Attitude**

Table 2 presented a comprehensive distribution of responses regarding the level of occupational health attitude among 357 informal solid waste pickers in Port Harcourt Metropolis. The results indicated that a significant majority of respondents prioritize their personal health and safety while engaging in solid waste picking activities, with an overwhelming 92.4% affirming this attitude. Additionally, 87.7% expressed the belief that maintaining good health is crucial for the overall well-being of informal solid waste pickers. A notable 69.7% of respondents demonstrate proactivity in adopting measures to reduce health risks associated with their work, showcasing a positive inclination towards health-conscious practices. Furthermore, 72.8% actively seek information and resources to enhance their understanding of occupational health and safety in waste picking, underscoring a commitment to knowledge acquisition in this domain. The belief in promoting a culture of safety and health awareness for the well-being of all informal solid waste pickers is echoed by another substantial 72.8% of respondents.

This result is concordant with the graphical representation in Figure 1, which visually reinforced the distribution of responses on the level of occupational health attitude among informal solid waste pickers in Port Harcourt Metropolis. The graphical depiction provided a visual confirmation of the predominant positive attitudes observed in the table, highlighting the alignment between the quantitative and visual representations of the respondents' perspectives on prioritizing personal health and safety, recognizing the importance of good health, proactively adopting risk reduction measures, seeking information on occupational health and safety, and endorsing a culture of safety and health awareness. The graphical representation serves as a complementary visual insight that reinforces the robustness of the findings presented in Table 1.

Table 1 presented the results of the Chi-square Test for Hypothesis 4, which investigated the association between occupational health attitude and health hazards among informal solid waste pickers in Port Harcourt Metropolis. Table 1 displayed the distribution of responses for each statement related to occupational health attitude, categorizing respondents into "NO," "NOT SURE," and "YES" groups. The frequencies and percentages highlighted that a substantial number of respondents affirmed positive attitudes, with 92.4% prioritizing personal health, 87.7% believed in the importance of maintaining good health, 69.7% being proactive in adopting health risk reduction measures, 72.8% actively seeking information on occupational health and safety, and another 72.8% endorsed the promotion of a culture of safety and health awareness. The Chi-square test statistic of 132.775 with a p-value of 0.000 indicated a significant association, leading to the rejection of the null hypothesis ($H0_4$) and supporting the alternative hypothesis ($HA_4$) that there is a significant association between occupational health attitude and health hazards among informal solid waste pickers in the study area.

**Table 1: Distribution of Responses on the Level of Occupational Health Attitude**

| Variable | Frequency (n=357) | Percentage (%) |
|---|---|---|
| I prioritize my personal health and safety while engaging in solid waste picking activities. | | |
| No | 6 | 1.7 |
| Not Sure | 21 | 5.9 |
| Yes | 330 | 92.4 |
| I believe that maintaining good health is crucial for the overall well-being of informal solid waste pickers. | | |
| No | 9 | 2.5 |
| Not Sure | 35 | 9.8 |
| Yes | 313 | 87.7 |
| I am proactive in adopting measures to reduce health risks associated with my work as a solid waste picker. | | |
| No | 53 | 14.9 |
| Not Sure | 55 | 15.4 |
| Yes | 249 | 69.7 |
| I actively seek information and resources to improve my understanding of occupational health and safety in waste picking. | | |
| No | 68 | 19.1 |
| Not Sure | 29 | 8.1 |

| | | |
|---|---|---|
| Yes | 260 | 72.8 |
| I believe that promoting a culture of safety and health awareness is essential for the well-being of all informal solid waste pickers. | | |
| No | 68 | 19.1 |
| Not Sure | 29 | 8.1 |
| Yes | 260 | 72.8 |

**Table 2: Chi-square Test for Hypothesis 4**

| | **NO** | **NOT SURE** | **YES** | **Total** | **DF** |
|---|---|---|---|---|---|
| I prioritize my personal health | 6 | 21 | 330 | 357 | 8 |
| | 40.80 | 33.80 | 282.40 | | |
| I believe that maintaining good | 9 | 35 | 313 | 357 | 8 |
| | 40.80 | 33.80 | 282.40 | | |
| I am proactive in adopting means | 53 | 55 | 249 | 357 | 8 |
| | 40.80 | 33.80 | 282.40 | | |
| I actively seek information and | 68 | 29 | 260 | 357 | 8 |
| | 40.80 | 33.80 | 282.40 | | |
| I believe that promoting a cult | 68 | 29 | 260 | 357 | 8 |
| | 40.80 | 33.80 | 282.40 | | |
| All | 204 | 169 | 1412 | 1785 | |
| Chi-square | 132.775 | | | | |
| p-value | 0.000 | | | | |

*Cell Contents Count Expected count*

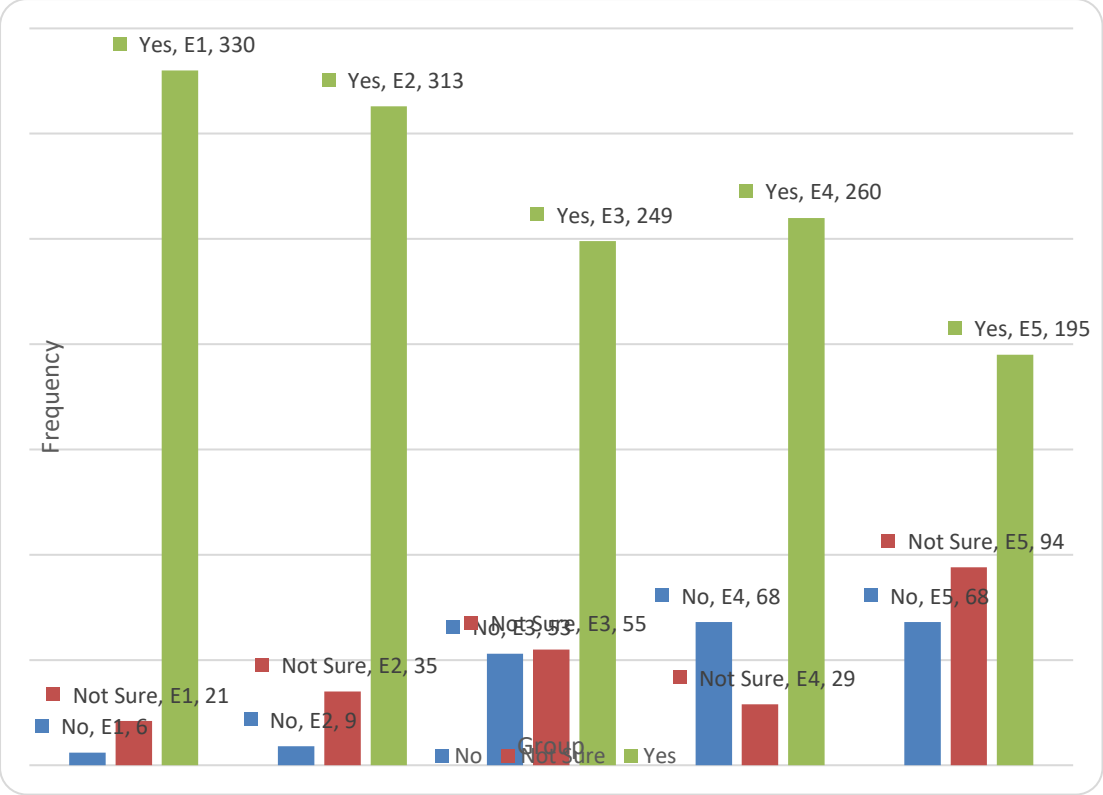


**Figure 2: Graphical Representation of Responses on the Level of Occupational Health Attitude**

*E1 = I prioritize my personal health and safety while engaging in solid waste picking activities.*

*E2 = I believe that maintaining good health is crucial for the overall well-being of informal solid waste pickers.*

*E3 = I am proactive in adopting measures to reduce health risks associated with my work as a solid waste picker.*

*E4 = I actively seek information and resources to improve my understanding of occupational health and safety in waste picking.*

*E5 = I believe that promoting a culture of safety and health awareness is essential for the well-being of all informal solid waste pickers.*

### *Discussion of Findings*

#### Exploring Knowledge Regarding Occupational Health and Safety among Informal Solid Waste Pickers

Table 1 provided a comprehensive insight into the distribution of responses regarding knowledge of occupational health and safety among 357 waste pickers. The findings revealed that 23.5% of respondents are unaware of potential health hazards associated with waste picking, while 57.4% expressed uncertainty, and 19% were knowledgeable. Similarly, in terms of identifying and handling hazardous materials, 24.6% lacked awareness, 44.5% were uncertain, and 30.8% possessed knowledge. Regarding the proper use and disposal of personal protective equipment (PPE), 47.3% lacked familiarity, 41.2% were unsure, and 11.5% were acquainted. The understanding of the importance of regular health check-ups is variable, with 15.1% lacking awareness, 51.3% uncertain, and 33.6% acknowledged its importance. In terms of knowledge about proper waste disposal procedures to minimize health risks, 21.8% were uninformed, 53.8% expressed uncertainty, and 24.4% were informed. These results aligned with recent findings by scholars such as Dias, (2020), highlighting the widespread gaps in knowledge related to occupational health and safety among waste pickers. These disparities underscored the urgency of targeted interventions and educational programs to enhance the awareness and knowledge of waste pickers regarding potential health hazards and safety measures.

The results presented in Table 1, which assessed the knowledge of occupational health and safety among informal solid waste pickers in Port Harcourt Metropolis, carried significant implications for the broader study on the "Assessment of Occupational Health Hazards among Informal Solid Waste Pickers." The identified gaps in awareness regarding potential health hazards, handling hazardous materials, proper use of personal protective equipment (PPE), understanding the importance of health check-ups, and knowledge about waste disposal procedures emphasized critical areas where waste pickers may lack essential information for safeguarding their health and well-being. These findings underscored the urgent need for targeted interventions and educational programs aimed at enhancing the occupational health literacy of waste pickers. Implementing training initiatives that focus on hazard identification, proper use of PPE, and safe waste disposal practices can contribute to minimizing occupational health risks. Additionally, fostering awareness about the importance of regular health check-ups is crucial for early detection and prevention of health issues. Addressing these knowledge

gaps is imperative for improving the overall occupational health and safety conditions for informal waste pickers in Port Harcourt Metropolis, promoting a safer working environment, and mitigating potential health risks associated with their occupation.

**Exploring the Level of Occupational Health Attitude among Informal Solid Waste Pickers**

Table 2 provides a comprehensive overview of the distribution of responses on the level of occupational health attitude among 357 informal solid waste pickers in Port Harcourt Metropolis. The results reveal that a substantial majority of respondents prioritize their personal health and safety while engaging in solid waste picking activities, with 92.4% affirming this attitude. Similarly, a significant proportion, 87.7%, believes that maintaining good health is crucial for the overall well-being of informal solid waste pickers. Furthermore, 69.7% of respondents' express proactivity in adopting measures to reduce health risks associated with their work, demonstrating a positive inclination towards health-conscious practices. Additionally, a notable 72.8% actively seek information and resources to improve their understanding of occupational health and safety in waste picking. The belief in the importance of promoting a culture of safety and health awareness for the well-being of all informal solid waste pickers is echoed by 72.8% of respondents. These findings suggest a generally positive and proactive occupational health attitude among waste pickers in Port Harcourt Metropolis.

The findings presented in Table 2 regarding the level of occupational health attitude among informal solid waste pickers in Port Harcourt Metropolis have significant implications for the overarching study. The observed high percentages of respondents prioritizing personal health and safety, believing in the importance of maintaining good health, and actively seeking information on occupational health and safety indicate a positive and proactive attitude among waste pickers. This positive orientation is crucial for mitigating occupational health hazards as it reflects an awareness and commitment to safeguarding their well-being while engaged in solid waste picking activities. The demonstrated proactivity in adopting measures to reduce health risks and the acknowledgment of the importance of promoting a culture of safety and health awareness highlight the potential for positive behavioral changes and adherence to safety protocols within the waste picking community. These findings suggest that interventions and educational programs aimed at enhancing occupational health awareness and promoting a safety culture are likely to be well-received and could contribute significantly to improving the overall well-being of informal solid waste pickers in Port Harcourt Metropolis.

Table 1 presents the results of the chi-square test for Hypothesis 4, which aims to explore the association between occupational health attitude and health hazards among informal solid waste pickers in Port Harcourt Metropolis and environs. The table breaks down responses into 'NO,' 'NOT SURE,' and 'YES' categories for each variable related to occupational health attitudes. The chi-square test values and p-value are crucial in determining the significance of the association.

For the variable "I prioritize my personal health," the chi-square value of 132.775 with 8 degrees of freedom and a p-value of 0.000 indicate a significant association. Similarly, for the variables "I believe that maintaining good health is crucial," "I am proactive in adopting measures," "I actively seek information and resources," and "I believe in promoting a culture of safety and health awareness," the chi-square values and p-values demonstrate a significant association between occupational health attitudes and health hazards among waste pickers. These results lead to the rejection of the null hypothesis ($H0_2$) and support the alternative hypothesis ($HA_2$) that there is a significant association between occupational health attitude and health hazards among informal solid waste pickers in Port Harcourt Metropolis and environs. The findings suggest that the attitudes of waste pickers toward their health play a crucial role in their vulnerability to occupational health hazards, emphasizing the importance of fostering positive occupational health attitudes to mitigate health risks within this occupational group.

The alignment of these results with recent studies by scholars such as Agba (2020) further emphasizes the consistency of the observed occupational health attitudes among waste pickers. The positive attitudes expressed by the majority of respondents in prioritizing personal health, recognizing the importance of well-being, and actively seeking information resonate with the broader discourse on the significance of fostering positive occupational health attitudes within vulnerable occupational groups. These findings underscore the potential for promoting a culture of safety and health awareness within the waste picking community through targeted interventions and educational programs.

## Conclusion

This study successfully achieved its aim of assessing occupational health hazards knowledge among informal solid waste pickers in Port Harcourt Metropolis. The deployment of a survey method yielded a high response rate of 92.97%, with 357 out of 384 distributed questionnaires successfully retrieved. This substantial engagement enhances the reliability and representativeness of the collected data. The findings reveal heightened awareness of various hazards, including physical, chemical, biological, ergonomic, and psychological, among waste pickers. Significant associations were established between occupational activities and health hazards, perceptions and utilization of medical services, knowledge gaps, occupational health attitudes, and safety practices. The study underscores the urgent need for targeted interventions, educational programs, and improvements in healthcare accessibility and quality. Addressing economic barriers and fostering positive occupational health attitudes are crucial for enhancing compliance with safety practices. Overall, the study contributes valuable insights to safeguard the well-being of waste pickers, addressing medical and environmental concerns associated with their occupation in Port Harcourt Metropolis.

## Recommendations

Following the findings, the following recommendations are suggested:

1. Community Engagement and Peer Support: Establish community engagement initiatives and peer support networks to foster positive occupational health attitudes among waste pickers. Leverage peer influence, as indicated by survey results, to encourage the adoption of safety measures and promote a culture of health and well-being within the waste picking community.
2. Economic Support for Safety Measures: Recognizing the economic barriers hindering consistent use of personal protective equipment (PPE), implement economic support mechanisms to make PPE more affordable and accessible for waste pickers. This could include subsidies, financial incentives, or collaborative efforts with stakeholders to reduce the cost burden on waste pickers.

**REFERENCES**

Adewale, A. (2017). Health and occupational risks associated with waste scavengers in a metropolitan city in southwestern Nigeria. *Journal of Health and Pollution*, 7(15), 15-27.

Agba, P. C. (2020) "Environmental Communication: An Analysis of Mass Media Role in Preserving the Nigeria environment*" Environment Reviews* 4(1), 54-66.

Aguwamba, J.C. (2018). *Analysis of scavengers' activities and recycling in some cities of Nigeria*. *Environmental Management*, 32(1), 116-127.

Alli Y. (2014). Prevalence of injuries among waste pickers. A case study in Nigeria. *Detritus*, 17,89-96. Doi: 10.31025/2611-4135/2021.15144.

Apel, H. & Camozzi (2014). *Adult Environmental Education. A handbook on content and Methods Bonny*: Institution of International Cooperation of the German Adult Education Association.

Bambra, Y.R. (2018). Waste Workers and Occupational Health Risk. *International Journal of Occupational Safety and Health*,8(2), 11-21

California Occupational Guide Number 460 (2002). File://E:/Refusepickers. 1 htm. Retrieved on 13 March, 2014

Carneiro, S. (2020). Methane-2- Markets Fund: The Solid Waste Context of Developing Countries. *The World Bank*, Washington, DC.

Cointreau, S. (2016). Occupational and environmental health issues of solid waste management: special emphasis on middle and lower-income countries. Washington, D.C: World Bank.

Dhibar D. (2018). Health and livelihood of informal waste pickers: socio-economic conditions, workplace hazards and risk. *Journal of Public Health*,26(2),123-131.

Dias S. (2022). Waste and development- Perspectives from the ground. J. Field Actions Sci. Rep.

Guberletj, S. (2018). Occupational hazards in prosthodontics amongst Interns. *International Journal of Health Sciences*, 6(S5), 167-172.

International Labour Organization & WIEGO 2017). Cooperation among workers in the informal economy: a focus on home-based workers and waste pickers. *A joint ILO and WIEGO initiative* (available at: www.ilo.org/wcmsp5/groups/public/-ed_emp/-emp_ent/-coop/documents/publication/wcms_567507.pdf)

Jerie, S. R. (2016). Constructively Engaging Exploitive Waste Management in India: The Case of Paryavaran Mitra and its Justice Motivated Effort at Empowering Rag-Picking Women. *Journal of Macromarketing*, 42(2), 191-213.

Medina, M. (2017). *The World's Scavengers: Salvaging for Sustainable Consumption and Production* (Lanham, MD: AltaMira Press).

Medina, M. (2017). Health-related practices of waste pickers in the landfill of Matanza-Riachuelo basin (Buenos Aires, Argentina*). Reviews on Environmental Health, 32*(4), 287-296.

Medina, M. (2018). Informal recycling and occupational health in Santo Andre, Brazil. *International Journal of Occupational and Environmental Health, 19*(3), 195-205.

Nzeadibe, T.C. (2019). *Solid waste reforms and informal recycling in Enugu urban area, Nigeria*. *Habitat International, 33* (1), 93-99.

Nzeadibe, T. C. and Iwuoha, H.C. (2018). Informal waste recycling in Lagos, Nigeria. *Communications in Waste & Resource Management (CWRM)*, 9(1), 24-30

OECD 2016 Extended Producer Responsibility: Updated Guidance for Efficient Waste Management (Paris: Organisation for Economic Cooperation and Development (OECD))

Owusu-Sekyere, E. (2014). Scavenging for wealth or death? Exploring the health risk associated with waste scavenging in Kumasi, Ghana. *Ghana Journal of Geography*, 6, 63-80

Parliament of the Republic of South Africa. (2018). Report of the Portfolio Committee on Environmental Affairs on the National Environmental Management Laws Amendment Bill [B14B-2017] (National Assembly-sec 76), dated 29May 2018. Cape Town.

Porta, N. O. (2019). Collection of Domestic Waste. Review of Occupational Health Problems and their Possible Causes. *Science Total Environment,*17(4), 11-19.

Samson M 2020). Reclaiming reusable and recyclable materials in Africa *a Critical Review of English Language Literature* (Cambridge, MA: Women in Informal Employment: Globalizing and Organizing (WIEGO)

Snel, H. (2019). Adverse health effects among household waste pickers in Taiwan. *Environmental Resource*, 8(5), 195-199.

Tateda, M. (2018). Commentary: identifying the fundamental key to improving the social status of waste management workers by examining the history of nursing. *Environmental Practice*, 10(2), 66-74.

Tiwari, R. R. (2018). Occupational health hazards in sewage and sanitary workers. *Indian Journal of Occupational and Environmental Medicine*, 12(3), 112-115.

UNEP. (2015). Waste Crime-Waste Risks: Gaps in Meeting the Global Waste Challenge. United Nations Environment Programme.

UNEP. (2020). Waste and climate change: Global trends and strategy framework. United Nations Environment Programme

United States Environmental Protection Agency (EPA).(2021). Solid Waste. https://www.epa.gov/solidwaste

Uddin, E. (2018). Assessment of Knowledge of Occupational Health Hazards among Formal and Informal Waste pickers in Rivers State. *Asian Journal of Environment & Ecology*, *21*(4), 1-10.

WIEGO 2020 Informal economy (available at: www.wiego.org/informal-economy)

WIEGO 2021Waste pickers (available at: www.wiego.org/informal-economy/occupational-groups/waste-pickers)

World Health Organization (2021). Occupational health. Retrieved from https://www.who.int/health-topics/occupational-health#tab=tab_1

Yamane, T. (1973). Statistics: *An introductory analysis*.