MICROBIOLOGY ARCHIVES
Original Research Article | ISSN: 3041-590X
Journal homepage: https://microjournal.researchfloor.org/

# Socio-Demographic Survey of Waste Collectors and Scavengers in Port Harcourt, Rivers State, Nigeria

**Essien, I.I.*, Sampson. T., Nrior. R.R., and Baranu. S.B**

*Department of Microbiology, Rivers State University, Nkpolu-Orroworukwo, Port Harcourt, Nigeria*

**ARTICLE INFO**

**Citation:** Essien, I.I., Sampson. T., Nrior. R.R., and Baranu. S.B (2026). Socio-Demographic Survey of Waste Collectors and Scavengers in Port Harcourt, Rivers State, Nigeria. *Microbiology Archives, an International Journal.*
**DOI: https://doi.org/10.51470/MA.2026.8.2.116**

Received 10 July 2026
Revised 12 August 2026
Accepted 09 September 2026
Available Online October 15, 2026

Corresponding Author: **Essien, I.I.**
E-Mail: **essien.idorenyin@rsu.edu.ng**

***Copyright:*** *© The Author(s) 2026. This article is Open Access under a Creative Commons Attribution 4.0 International License, allowing use, sharing, adaptation, and distribution with appropriate credit. License details: http://creativecommons.org/licenses/by/4.0/. Data is under the CC0 Public Domain Dedication (http://creativecommons.org/publicdomain/zero/1.0/) unless otherwise stated.*

**ABSTRACT**

*Municipal solid waste collectors and informal scavengers experience frequent occupational contact with mixed waste streams, making their socio-demographic and work-related characteristics important considerations for occupational health planning. This study assessed the socio-demographic characteristics, occupational exposure patterns, duration of employment and hygiene practices of waste collectors and scavengers in Port Harcourt, Rivers State, Nigeria. A descriptive cross-sectional survey was conducted among 155 participants (108 formal waste collectors and 47 informal scavengers) recruited through convenience sampling at Rivers State Waste Management Agency operational bases and major dumpsites. Although the calculated minimum sample size was 384, practical constraints among mobile informal scavengers limited the final sample to 155 completed questionnaires. Data were collected between January and November 2025 using structured questionnaires, face-to-face interviews and field observations, and were summarised using descriptive statistics. Participants aged 26–35 years constituted the largest age group (45.8%), while 47.1% had no formal education and 56.8% were married. All 108 formal waste collectors worked daily, whereas 35 of the 47 scavengers (74.5%) reported daily occupational exposure. Regarding occupational duration, 46.5% had worked for 1–3 years, 22.6% for 4–6 years, 19.4% for less than one year and 11.6% for 7–10 years; none reported more than 10 years in the occupation. Hand washing after work was consistently practised by 65.8% of participants, whereas 34.2% reported doing so only sometimes. These findings describe a predominantly young to middle-aged workforce characterised by low educational attainment, frequent occupational exposure and incomplete adherence to post-work hand hygiene. Strengthening occupational hygiene education and workplace protection may therefore be beneficial for this workforce.*

***Keywords:*** *Waste collectors; Scavengers; Socio-demographic characteristics; Occupational exposure; Municipal solid waste; Port Harcourt; Hygiene practices.*

## Introduction

Waste is generally described as any unwanted material that emanates from industrial, agricultural, business and household sources [1]. Waste may occur in liquid, solid or gaseous form and may be hazardous or non-hazardous depending on its composition and the manner of handling [1]. According to the United States Environmental Protection Agency, waste includes garbage or refuse, sludge from wastewater treatment plants, and residues from air pollution control facilities [2].

In Nigeria and other developing countries, municipal waste streams are often poorly segregated and may become mixed with human and animal excreta, medical-related materials and sharp objects from informal healthcare facilities and patent medicine stores [3]. Such mixing increases the potential health and environmental risks associated with collection, transportation, sorting, disposal and informal recovery of recyclable materials.

Rapid urbanisation, changing consumption patterns, population growth and increasing use of packaged products have contributed to rising quantities and changing compositions of municipal solid waste [4,5]. In many African cities, large quantities of waste are deposited in open dumps and wetlands, contaminating surface and groundwater and creating major public-health risks [6].

Waste picking is the informal extraction of recyclable and reusable materials from mixed waste [7]. A waste scavenger is a person who salvages reusable or recyclable materials to sell or for personal use [8]. Scavenging provides income for an estimated 15 million people worldwide, predominantly in cities of developing countries, and generates several billion US dollars annually [9]. Formal waste collectors and informal scavengers face significant physical hazards, including injuries from lifting heavy containers, contact with sharp objects, slips and falls, traffic-related accidents and musculoskeletal strain from repetitive manual handling [10,11].

Despite the occupational importance of this workforce, detailed socio-demographic and work-related data on waste collectors and scavengers in Port Harcourt, Rivers State, Nigeria, remain limited. Understanding the age structure, educational attainment, marital status, income patterns, duration of employment, frequency of occupational exposure, and basic hygiene practices of these workers is essential for designing targeted occupational health interventions. Therefore, the study was undertaken to describe the socio-demographic characteristics of formal waste collectors and informal scavengers in Port Harcourt; determine their patterns of occupational exposure and duration of employment; and to assess selected hygiene practices, particularly hand washing after work.

## Materials and Method

### Study Area

The study was conducted in Port Harcourt, the capital of Rivers State, Nigeria (coordinates $4^0$ $49^{'}27^{''}$ N $7^0 2^{'}1^{''}$ E). The study sites are the operational bases of the Rivers State Waste Management Agency (RIWAMA) and major dumpsites in Port Harcourt. The study locations are presented in Fig. 1

### Research Design

A descriptive cross-sectional survey was employed. The survey component assessed socio-demographic characteristics, occupational exposure patterns, duration of employment and selected hygiene practices among formal waste collectors and informal scavengers. This design is appropriate for characterising hard-to-reach informal work populations [12,13].

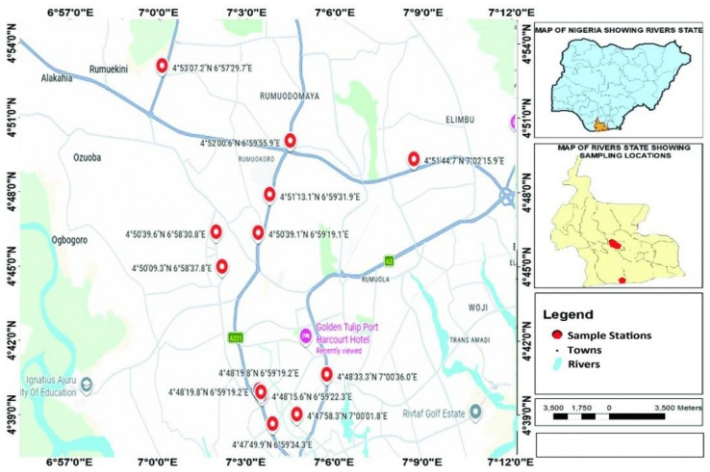



*Fig. 1: Map showing the sample locations*

### Study Population

The target population comprised formal solid waste collectors employed by RIWAMA and informal waste scavengers operating at selected landfill and dump sites in Port Harcourt who had been engaged in waste-related activities for at least six (6) months and spent a minimum of five hours per day in direct contact with solid waste.

### Sample Size Determination

The sample size for the questionnaire survey was calculated using the single-proportion formula for cross-sectional studies:

$$n = \frac{Z^2 p(1-p)}{d^2} \quad \text{Eqn. 1}$$

Where Z = 1.96 (95% confidence level); P = 0.5 (maximum variability in the absence of precise prior prevalence data for the combined population in Port Harcourt), and d = 0.05 (desired precision). This yielded a minimum of 384 participants, allowing for 10% non-response. However, because of the mobile and informal nature of scavengers, practical access constraints and resource limitations, a minimum of 200 completed questionnaires was initially targeted [14,15]. Ultimately, 155 valid questionnaires were completed (108 formal collectors and 47 scavengers). The shortfall relative to both the calculated minimum and the operational target is acknowledged as a limitation of the study and is discussed further below. Participants were recruited by convenience sampling at RIWAMA operational bases and major dumpsites after permission had been obtained from the relevant authorities.

### Data Collection

Primary data were collected from January to November 2025 using structured questionnaires, face-to-face interviews and field observations. A preliminary reconnaissance survey was conducted to appraise the study area, refine the questionnaire and establish contact with RIWAMA leadership and scavenger representatives. The questionnaire contained both open- and closed-ended items organised into sections covering demographic characteristics, socio-economic status, occupational exposure and hygiene practices. Face-to-face interviews and periodic field observations supplemented the questionnaire data and helped contextualise working conditions and hygiene behaviours.

### Ethical Considerations

Permission to conduct the study was obtained from the leadership of the Rivers State Waste Management Agency and from landfill managers. Informed consent was sought from all participants; confidentiality was assured and participation was voluntary. The study protocol for the survey component was reviewed in accordance with the institutional ethical guidelines of Rivers State University. Formal ethical clearance for any future laboratory components will be sought from the Rivers State Health Research Ethics Committee before sample collection.

### Measures of Variables in the Questionnaire

The questionnaire contained both open and close ended questions and was categorised into four main thematic areas thus; Part A: Demographic characteristics (gender, age, marital status and education levels of collectors and scavengers), Part B: Socio-economic status (occupation, income, working days, duration and period, marital status and education levels of collectors and scavengers), Part C: Attitudes, knowledge, practices, perception and motivation, and Part D: Health risk, protection behaviours and safety practices.

### Validity of the Instrument

To ensure the validity of the instrument, the questionnaire, together with the study objectives, research questions and hypotheseswas presented to the researcher's supervisors and three other experts in the Department of Microbiology, Rivers State University, Nkpolu-Oroworukwo, Port Harcourt. Their corrections and inputs were included to produce the final copy of the questionnaire.

### Data Analysis

Survey responses were analysed using descriptive statistics (frequencies, percentages and means) with Microsoft Excel. Qualitative observations were summarised thematically to support interpretation of the quantitative findings.

## Results

### Socio-Demographic Profile of Waste Collectors and Scavengers

The results of the socio-demographic profile of waste collectors and scavengers are shown in Tables 1 to 9.

The results obtained for age distribution showed that the majority (45.8%) of waste collectors and scavengers were aged 26-35 years, followed by the age bracket of 36 – 45 years with 32.3%, 46 and above with 16.1% and 16 -25 years with 5.8% (Table 1).

The results of the educational status of the waste collectors and scavengers showed that the majority of them (47.1%) had no formal education, 27.1% of them had primary education, 24.5% of them had secondary education, while 1.3% of them had tertiary education (Table 2).

The results showed that the majority of the waste collectors and scavengers (56.8%) were married, 38.7% of them were single, 3.2% of them were widowed, while 1.3% of them were divorced (Table 3).

The result for weekly exposure rate of the waste collectors and scavengers showed that all the waste collectors (100%) were exposed daily, 74.4% of waste scavengers were exposed daily, 21.3% of waste scavengers were exposed 4 – 6 days a week, while 4.3% of waste scavengers were exposed 2 – 3 days a week (Table 4).

Among scavengers, the most common monthly income bracket was ₦51,000–100,000 (42.6%), followed by ≤₦50,000 (21.3%). Smaller proportions earned ₦101,000–150,000 (10.6%), ₦151,000–200,000 (14.9%) and ≥₦201,000 (10.6%). Among formal waste collectors, 70.4% earned ₦51,000–100,000 and 29.6% earned ≤₦50,000; none reported income above ₦100,000 (Table 5).

The results for duration in the occupation showed that the majority (46.5%) of the waste collectors and scavengers have spent between 1 to 3 years in the occupation, 22.5% of them have spent between 4 to 6 years in the occupation, 19.4% of them have spent less than a year in the occupation, 11.6% of them have spent between 7 to 10 years in the occupation, while none of them have spent above 10 years in the occupation (Table 6).

The result for hygiene practices of waste collectors and scavengers is shown in Table 7.

The result showed that the majority (65.8%) of waste collectors and scavengers always wash their hands after work, while 34.2 of them sometimes wash their hands after work.

*Table 1: Age Distribution of the Waste Collectors and Scavengers*

| S/N | Age | No | % |
|---|---|---|---|
| 1 | 16-25 | 09 | 5.8 |
| 2 | 26-35 | 71 | 45.8 |
| 3 | 36-45 | 50 | 32.3 |
| 4 | 46 above | 25 | 16.1 |
| | **Total** | **155** | **100** |

*Table 2: Educational Status of the Waste Collectors and Scavengers*

| S/N | Education | No | % |
|---|---|---|---|
| 1 | No formal | 73 | 47.1 |
| 2 | Primary | 42 | 27.1 |
| 3 | Secondary | 38 | 24.5 |
| 4 | Tertiary | 02 | 1.3 |
| | **Total** | **155** | **100** |

*Table 3: Marital Status of the of the Waste Collectors and Scavengers*

| S/N | Marital Status | No | % |
|---|---|---|---|
| 1 | Married | 88 | 56.8 |
| 2 | Single | 60 | 38.7 |
| 3 | Widowed | 05 | 3.2 |
| 4 | Divorced | 02 | 1.3 |
| | **Total** | **155** | **100** |

*Table 4: Weekly Exposure rate of the of the Waste Collectors and Scavengers*

| S/N | Days Per week | Waste Collectors No. (%) | Waste Scavengers No. (%) |
|---|---|---|---|
| 1. | Once a week | - | 0 |
| 2. | 2-3 Days a week | - | 2 (4.3) |
| 3. | 4-6 Days a week | - | 10 (21.3) |
| 4. | Daily | 108 (100) | 35 (74.4) |
| | Total | 108 (100) | 47 (100) |

*Table 5: Monthly Income of the Waste Collectors and Scavengers*

| S/N | Income (₦) | Waste scavengers (n = 47) No. (%) | Waste collectors (n = 108) No. (%) |
|---|---|---|---|
| 1 | ≤50,000 | 10 (21.3) | 32 (29.6) |
| 2 | 51,000–100,000 | 20 (42.6) | 76 (70.4) |
| 3 | 101,000–150,000 | 5 (10.6) | 0 (0.0) |
| 4 | 151,000–200,000 | 7 (14.9) | 0 (0.0) |
| 5 | ≥201,000 | 5 (10.6) | 0 (0.0) |
| | **Total** | **47 (100)** | **108 (100)** |

*Table 6: Duration in the Occupation*

| S/N | | NO | % |
|---|---|---|---|
| **1** | Less than 12 months | 30 | 19.4 |
| **2** | 1-3 years | 72 | 46.5 |
| **3** | 4-6 years | 35 | 22.5 |
| **4** | 7-10 years | 18 | 11.6 |
| **5** | Above 10 years | 00 | 0.0 |
| | **Total** | **155** | **100** |

*Table 7: Hygiene Practices of the participants*

| S/N | Hand washing after work | Number | Percentage |
|---|---|---|---|
| 1 | Always | 102 | 65.8% |
| 2 | Sometimes | 53 | 34.2% |
| 3 | Not all | - | - |
| | **Total** | **155** | **100%** |

### Discussion

The socio-demographic profile revealed a workforce dominated by individuals in the productive age groups of 26–35 years and 36–45 years. This age distribution is consistent with findings from recent Nigerian studies showing that informal waste recovery is concentrated among young to middle-aged adults who possess the physical stamina required for demanding manual labour [16]. High youth unemployment and limited formal-sector opportunities help explain this pattern.

Educational attainment was low: 47.1% of participants had no formal education and a further 27.1% possessed only primary education. These figures mirror broader patterns in the Nigerian informal waste sector, where limited formal schooling predominates [17,18]. Low literacy and limited formal skills constrain alternative livelihood options and reinforce dependence on scavenging and collection as survival strategies driven by poverty and unemployment [17].

The predominance of married individuals (56.8%) is consistent with reports from informal recycling hubs across Nigeria, where family responsibilities often motivate entry into and persistence within the sector [17]. Occupational exposure was intensive: all formal collectors worked daily, and nearly three-quarters of scavengers also worked daily. Duration in the occupation was relatively short for most participants, with nearly half reporting only 1–3 years of experience and none exceeding 10 years. Short tenure may reflect high occupational hazards, economic volatility or transition to other informal activities [16].

Income levels were modest. The majority of both scavengers and collectors earned between ₦51,000 and ₦100,000 monthly. These earnings, while above the extreme poverty line for some households, remain unstable and subject to fluctuations in recyclable-material prices, underscoring the economic vulnerability of the sector. Hygiene practices were incomplete: although 65.8% reported always washing hands after work, 34.2% did so only sometimes. Incomplete hand hygiene increases the risk of pathogen transfer and may facilitate community transmission of resistant microorganisms. Collectively, these socio-demographic and occupational features portray a population that is young, poorly educated, economically marginalised and heavily exposed to occupational biohazards. The combination of low education, limited alternative employment and incomplete protective practices creates structural vulnerability that amplifies health risks among waste workers [19].

## Conclusion

Waste collectors and scavengers in Port Harcourt were predominantly young to middle-aged adults, with a substantial proportion having little or no formal education. Occupational exposure was frequent, particularly among formal waste collectors, all of whom reported working daily. Nearly half of the participants had spent between one and three years in waste-related occupations. Although most participants reported consistently washing their hands after work, approximately one-third did so only sometimes. These findings identify important socio-demographic and occupational characteristics that should be considered when developing workplace health and hygiene policies for waste workers. Improved access to appropriate protective measures, practical hygiene education and occupational health support may help reduce preventable workplace exposure among formal waste collectors and informal scavengers.

## Declaration of AI Use

This manuscript was prepared through the intellectual contributions of the author(s) to the study design, data analysis, interpretation of results and scholarly content. Generative AI tools were used solely to assist with grammatical refinement and reference formatting during manuscript revision. The author(s) accept full responsibility for the accuracy, integrity and final content of the manuscript.

## References


1. Davies AR. The geographies of waste: Governance, globalisation and environmental justice. Ashgate; 2008.
2. United States Environmental Protection Agency. Definition and classification of waste. Washington, DC: USEPA; 2015.
3. Karshima SN. Public health implications of poor municipal waste management in Nigeria. Vom J Vet Sci. 2016;11:142–148.
4. Guerrero LA, Maas G, Hogland W. Solid waste management challenges for cities in developing countries. Waste Manag. 2013;33(1):220–232.
5. United Nations Environment Programme. Global waste management outlook. Nairobi: UNEP; 2015.
6. United Nations Human Settlements Programme. Solid waste management in the world's cities. London: Earthscan; 2010.
7. Thirarattanasunthon P, Siriwong W, Robson MG, Borjan M. Health risk reduction behaviors model for scavengers exposed to solid waste in municipal dump sites in Nakhon Ratchasima Province, Thailand. Risk Manag Healthc Policy. 2012;5:97–104.
8. Medina M. Solid wastes, poverty and the environment in developing country cities: Challenges and opportunities. WIDER Working Paper 2010/23. Helsinki: UNU-WIDER; 2010.
9. Kuijer PPFM, Sluiter JK, Frings-Dresen MHW. Health and safety in waste collection: A systematic review. Int J Ind Ergon. 2010;40(5):453–460.
10. Mehrdad R, Majlessi-Nasr M, Aminian O, Malek M. Musculoskeletal disorders among municipal solid waste workers. Acta Med Iran. 2008;46(3):233–238.
11. Padgett DK. Qualitative methods in social work research. 3rd ed. Thousand Oaks: Sage; 2016.
12. Temesgen LM, Mengistu DA, Mulat S, Mulatu G, Tolera ST, Berhanu A, et al. Occupational injuries and associated factors among municipal solid waste collectors in Harar Town, Eastern Ethiopia: A cross-sectional study. Environ Health Insights. 2022;16:1–8.
13. Kasemy ZA, Rohlman DS, Abdel Latif AA. Health disorders among Egyptian municipal solid waste workers and assessment of their knowledge, attitude, and practice towards the hazardous exposure. Environ Sci Pollut Res. 2021;28(24):30993–31002.
14. Nuripuoh JG, Duwiejuah AB, Bakobie N. Awareness and health risk protection behaviours of scavengers in the Gbalahi landfill site, Ghana, in the era of sustainable development. Discov Sustain. 2022;3:1.
15. Emetumah FC, Ajaegbu OO, Nwokorie CN. Determinants of occupational health and safety practices among solid waste scavengers in Owerri, Nigeria. Afr J Health Saf Environ. 2025;6(1):36–48.
16. Ogwueleka TC, Naveen BP. Activities of informal recycling sector in North-Central, Nigeria. Energy Nexus. 2022;1:100003.
17. Kumar R, Singh S. Socio-demographic characteristics and health hazards among waste workers in India. Int J Environ Res Public Health. 2020;17(6):2034.
18. Adebola OA, Adebayo TS, Oladipo O. Occupational health risks among informal waste collectors in urban Nigeria: A cross-sectional study. Environ Health Perspect. 2022;130(4):470–478.
19. Smith JD, Brown LM, Wilson G. Socioeconomic factors influencing waste scavenging in urban areas: A global perspective. Waste Manag Res. 2021;39(5):601–609.