

Occupational Safety Indicators: A Nexus on Job Performance of Waste Collection Workers in Akwa Ibom North East Senatorial District

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Abstract

Occupational safety is a critical component of public health, particularly in occupations that involve direct exposure to environmental and health hazards. The purpose of this study was to examine the relationship between occupational safety indicators and job performance of waste collection workers in Akwa Ibom North East Senatorial District. The study adopted a correlational research design to determine the relationship between variables without manipulating them. The study was conducted in Akwa Ibom North-East Senatorial District, one of the three senatorial districts in Akwa Ibom State. Two research questions were poised to guide the study while two research hypotheses were tested at 0.05 level of significance. The population of the study comprised 203 registered waste collection workers, as contained in records from the Akwa Ibom State Environmental Protection and Waste Management Agency (AKSEPWMA, 2026). A sample size of 135 registered waste collection workers was used determined using the Taro Yamane 1967 formula. The validity of the instrument was done by three experts and a reliability coefficient from Cronbach's Alpha statistic yielded overall reliability coefficient of .87. The data collected for the study were analyzed using simple linear regression analysis for the research questions and research hypotheses. Findings shows that there was a strong positive and significant relationship between hazard communication and job performance, and between safety training indicators and job performance respectively. It was concluded that workers who received adequate information on workplace hazards, safety procedures, and preventive measures demonstrated higher levels of efficiency, safety consciousness, and productivity. It was recommended among others that waste management agencies should establish comprehensive hazard communication programmes that provide workers with regular information on workplace hazards, preventive measures, and safe work procedures

Keywords: Indicators, Nexus, Occupation, Safety, Waste Collection

Introduction

Occupational safety refers to established rules, procedures, and guidelines designed to ensure the safety and protection of workers from work place hazards. These indicators aim to minimize risks associated with occupational activities and promote safe working conditions. They include measures such as hazard communication, safety training, adherence to safety regulations, use of personal protective equipment, emergency response preparedness, and risk control strategies. Occupational safety is a multidisciplinary field that focuses on the identification, assessment and control of work place hazard to ensure safe healthy work

environment. Effective compliance reduces work place risks and prevents accidents, injuries, and job-related illnesses.

Job performance refers to the degree to which workers effectively and efficiently carry out their assigned duties in line with organizational expectations. It includes aspects such as productivity, timeliness, quality of output, adherence to procedures, and the ability to perform tasks with minimal errors or accidents.

Waste collection workers are individuals responsible for the collection, handling, transportation, and disposal of solid waste within communities. Their duties involve exposure to hazardous materials and physically demanding tasks, making their job environment highly risky. Consequently, their performance depends not only on their skills and experience but also on the safety conditions under which they operate.

There is a strong relationship between occupational safety indicators and the job performance of waste collection workers. When workers comply with safety indicators, they are less likely to experience injuries, infections, or fatigue that may hinder their performance. Compliance enhances confidence, promotes efficiency, and supports consistent task execution. In contrast, poor compliance exposes workers to hazards that can result in injuries, reduced productivity, increased absenteeism, and poor job performance. Therefore, occupational safety indicators compliance has a relationship with job performance of waste collection workers.

To mitigate the risk to waste collection workers, occupational safety indicators have been developed to ensure safe job practices and protect workers from harm. These indicators include but not limited to hazard communication, safety training, adherence to safety regulations, and use of personal protective equipment, emergency response preparedness, and risk control measures. Effective compliance with these indicators is essential in reducing work place accidents and improving workers' efficiency (Ajayi *et al.*, 2020; Olalekan *et al.*, 2022).

Hazard communication plays a vital role in ensuring that workers are adequately informed about the risks associated with their tasks and the necessary precautions to take. Similarly, safety training indicators are designed to equip workers with the knowledge and skills required to perform their duties safely. Adherence to safety regulations ensures that standard procedures are followed consistently, while PPE compliance provides a physical barrier against exposure to hazardous materials. Emergency response preparedness ensures that workers can effectively manage unexpected incidents, and risk control indicators help to identify, assess, and minimize work place hazards (ILO, 2019; WHO, 2021).

Despite the existence of these safety indicators, evidence from developing countries, including Nigeria, indicates that compliance among waste collection workers remains suboptimal. Studies have shown that factors such as inadequate safety training, poor enforcement of safety regulations, lack of supervision, irregular provision and use of PPE, and weak hazard communication systems contribute to low compliance levels (Adejumo *et al.*, 2021; Olalekan *et al.*, 2022). In many cases, waste collection workers operate under unsafe conditions, which increases their vulnerability to occupational hazards and negatively

affects their overall well-being.

Job performance is a critical outcome in occupational settings and which is the extent to which workers effectively carry out their assigned duties. In the context of waste collection, job performance includes efficiency in waste collection activities, adherence to operational guidelines, and timeliness in service delivery, ability to job with minimal errors or accidents, and consistency in meeting job expectations. Research has established that a safe and supportive job environment significantly enhances employee productivity, reduces absenteeism, and improves overall job performance (WHO, 2021; Ajayi *et al.*, 2020).

The Health Belief Model (HBM) was developed by. Rosenstock (1966) explain why individuals adopted or failed to adopt preventive health behaviors. The model proposed that individuals' decisions to engage in protective behaviors were associated with their personal beliefs and perceptions regarding health threats and the effectiveness of recommended preventive actions. The model has been widely applied in health promotion and occupational health studies because it provides a useful framework for understanding behaviors associated with disease prevention and job place safety.

The Health Belief Model is relevant to this study because it provided suitable framework and useful explanation of the relationship between waste collection workers' beliefs and perceptions and their compliance with occupational safety indicators. The model provides a sound theoretical foundation for explaining the relationship between occupational safety indicators compliance and job performance of waste collection workers in Akwa Ibom North East Senatorial District.

Another Theory relevant to the study is the Protection Motivation Theory (PMT) developed by Rogers (1975) which explain how individuals responded to perceived health and safety threats. The theory proposed that protective behavior was associated with two major cognitive processes, namely threat appraisal and coping appraisal. Workers who perceived these hazards as serious and believed that they were at risk of exposure were expected to demonstrate higher compliance with occupational safety indicators. This suggested that threat appraisal was related to occupational safety indicators compliance among waste collection workers. Protection Motivation Theory was highly relevant to this study because it provided a useful explanation of the relationship between workers' perception of occupational risks, their ability to adopt protective measures, and occupational safety indicators compliance. The theory further provided a suitable framework for explaining the relationship between occupational safety indicators compliance and job performance among waste collection workers.

Occupational safety refers to a structured system of formal rules, protocol, procedures, and preventive measures established within organizations to protect workers from work place hazards and ensure safe execution of job tasks. These indicators form a core component of occupational health and safety management systems and are designed to minimize the occurrence of work place injuries, illnesses, and exposure to harmful conditions

while promoting work well-being and productivity (International Labour Organization, 2019; World Health Organization, 2021). Occupational safety indicators provide a standardized framework for identifying potential hazards, assessing associated risks, and implementing appropriate control measures to prevent harm. Occupational safety indicators in such settings are therefore designed to regulate safe handling, collection, transportation, and disposal processes in order to minimize occupational exposure and prevent accidents (Abubakar *et al.*, 2020; Okoye *et al.*, 2021)

In summary, occupational safety represents an integrated framework of preventive and protective measures aimed at ensuring safe working conditions. They are essential for reducing occupational risks, reducing hazard communication, enhancing work safety and are related to overall job performance. In the same vein, Hazard communication refers to the systematic process of identifying work place hazards and ensuring that clear, accurate, and understandable information about these hazards is effectively transmitted to workers. According to the Occupational Safety and Health Administration (OSHA, 2024), hazard communication is a core element of occupational safety management that ensures workers are informed about chemical, biological, and physical risks present in their job environment, as well as the appropriate preventive measures required to reduce exposure. It involves workers' conformity with communicated safety measures such as warning labels, safety data sheets, safety signage, verbal instructions, toolbox meetings, and formal safety training programs. Compliance in this context reflects how consistently workers apply hazard information in their daily job activities to reduce risk exposure.

In waste management operations, hazard communication compliance is especially critical due to the hazardous nature of waste handling activities. Effective hazard communication compliance also plays an important role in shaping workers' perception of risk and in turn promote their safety behavior. Hazard communication compliance indirectly enhances job performance by reducing fear, uncertainty, and hesitation during task execution. Hazard communication provides the foundation for work place safety by ensuring workers are informed about occupational risks and preventive measures, while hazard communication compliance determines the extent to which this information is effectively applied in practice.

Safety training indicators refer to the structured and continuous educational and practical programs designed to equip workers with the knowledge, skills, and attitudes required to perform their duties safely and effectively. The International Labour Organization (ILO, 2019) described safety training as a fundamental component of occupational health and safety management systems because it enables workers to recognize hazards, understand safe procedures, and apply appropriate preventive measures in the work place.

In occupational health practice, safety training indicators typically include induction training for new employees, refresher courses, on-the-job demonstrations, toolbox talks, and emergency preparedness drills. The World Health Organization (WHO, 2021) emphasized the importance of practical learning, noted that such training must be continuous, task-

specific, and context-based to ensure that workers not only understand safety measures but also comply with them consistently in real job situations.

In waste management operations, safety training indicators are particularly important due to the high-risk nature of the job. Waste collection workers are frequently exposed to biological hazards such as infectious waste, physical hazards such as sharp objects, and chemical hazards from toxic substances. When workers fail to comply with safety training guidelines, their risk of occupational injury increases significantly. Safety training indicators provide the foundation for equipping workers with essential occupational safety knowledge and skills, while safety training indicators compliance determines the extent to which this knowledge is effectively applied in practice. Together, they play a crucial role in enhancing hazard awareness, reducing occupational injuries, improving safety behavior, and ultimately contributing to better job performance among waste collection workers through increased efficiency, productivity, and operational reliability.

In Nigeria and Akwa Ibom State North East Senatorial District in particular, waste management systems continue to face numerous challenges, including inadequate infrastructure, poor funding, and limited enforcement of occupational safety standards. Waste collection workers often operate in conditions that do not fully support compliance with established safety indicators. This situation may have implications not only for their health and safety but also for their job performance and service delivery outcomes

Waste collection activities are carried out regularly; however, there is limited empirical evidence on the extent to which workers comply with occupational safety indicators and how such compliance relates to their job performance. This gap in knowledge underscores the need for a systematic investigation into the relationship of occupational safety indicators compliance and job performance of waste collection workers in the study area.

Statement of the Problem

In Nigeria, waste collection activities are still carried out under conditions that do not fully support occupational safety. Workers are frequently exposed to hazards. In addition, the level of compliance with occupational safety indicators is often inconsistent. As a result, many waste collection workers continue to operate under conditions that may compromise their safety and efficiency. Job performance in waste collection is expected to reflect efficiency, consistency, and safe execution of duties. However, when safety indicators are poorly complied with, workers may experience frequent work hazards which can negatively affect their performance and service delivery.

In Akwa Ibom North East Senatorial District, waste collection services are ongoing, yet there is limited empirical evidence on the extent to which workers comply with occupational safety indicators. Therefore, this study seeks to examine the relationship between occupational safety indicators compliance and job performance of waste collection workers in Akwa Ibom North East Senatorial District.

Purpose of the Study

The purpose of this study is to examine the relationship between occupational safety indicators compliance and job performance of waste collection workers in Akwa Ibom North East Senatorial District. Specifically, the study seeks to:

- i. examine the relationship between hazard communication and job performance of waste collection workers in Akwa Ibom State North East Senatorial District;
- ii. examine the relationship between safety training indicators and job performance of waste collection workers in Akwa Ibom State North East Senatorial District;

Research Questions

- i. What is the relationship between hazard communication and job performance of waste collection workers in Akwa Ibom North East Senatorial District?
- ii. What is the relationship between safety training indicators and job performance of waste collection workers in Akwa Ibom North East Senatorial District?

Research Hypotheses

1. There is no significant relationship between hazard communication and job performance of waste collection workers in Akwa Ibom North East Senatorial District.
2. There is no significant relationship between safety training indicators and job performance of waste collection workers in Akwa Ibom North East Senatorial District

Methodology

The study adopted a correlational research design to determine the relationship between variables without manipulating them. The study was conducted in Akwa Ibom North-East Senatorial District, one of the three senatorial districts in Akwa Ibom State. The population of the study comprised 203 registered waste collection workers, as contained in records from the Akwa Ibom State Environmental Protection and Waste Management Agency (AKSEPWMA, 2026). A sample size of 135 registered waste collection workers was used for the study. The sample size was determined using the Taro Yamane 1967 formula. This method was considered appropriate and simple random sampling technique was used to select the respondents because it provided a scientific basis for selecting a representative sample from a known population. To ascertain the validity of the instrument, the instrument was subjected to face validation. The instrument was given to three experts for validation. Their corrections and suggestions were used to modify and improve the instrument before final administration. Cronbach's Alpha statistical analysis was used to determine the reliability of the instrument. A trial-test approach was adopted on 30 respondents who were not part of the main study population but possessed characteristics similar to those of the respondents selected for the study. The scores obtained were subjected to Cronbach's Alpha which yielded overall reliability coefficient of .87. The respondents were properly briefed on

the purpose of the study, this was done to ensure uniformity in the administration process and to minimize response bias.

The data collected for the study were analyzed using simple linear regression analysis for the research questions and research hypotheses. The value of beta (β) coefficient and correlation index (r) obtained in the regression model was used to answer the research questions and to determine the extent to which the independent variable relates to the dependent variable as follows; ± 0.81 to 0.100 -very strong influence, ± 0.61 to 0.80 -strong influence, ± 0.41 to 0.60 - moderate influence, ± 0.21 to 0.40 -weak influence, ± 0.00 to 0.20 -very weak influence. In testing the hypotheses, where the calculated value is less than the p-value, it was concluded that there is a significant influence. On the other hand, where the calculated value is greater than the p-value, the null hypotheses is not significant.

Results and Discussion

Research Question 1 What is the relationship between hazard communication and job performance of waste collection workers in Akwa Ibom North senatorial District?

Table 1: Summary of the Relationship Between Hazard Communication and Job Performance of Waste Collection Workers in Akwa Ibom North Senatorial District

Model	R	R Square	Adjusted R Square	Remark
1	.812 ^a	0.659	.0578	Very high relationship

Table 1 presents the model summary of the relationship between hazard communication and the job performance of waste collection workers in Akwa Ibom North Senatorial District. The results show a strong positive relationship between hazard communication and job performance, as indicated by the correlation coefficient ($R = 0.812$). The coefficient of determination ($R^2 = 0.659$) suggests that (65.9%) of the variation in job performance is explained by hazard communication. The Adjusted R^2 (0.578) indicates that, after adjusting for the number of predictors, the model explains (57.8%) of the variance in job performance. The result shows a strong positive relationship between hazard communication and job performance of waste collection workers.

Research Question 2: What is the relationship between safety training indicators and job performance of waste collection workers in Akwa Ibom North senatorial District?

Table 2: Summary of the Relationship between Safety Training Indicators and Job Performance of Waste Collection Workers in Akwa Ibom North Senatorial District

Model	R	R Square	Adjusted R Square	Remarks
1	.980 ^a	.961	.961	.very strong positive relationship

Table 2 presents the model summary of the relationship between safety training indicators and the job performance of waste collection workers in Akwa Ibom North Senatorial District. The results indicate a very strong positive relationship between safety training indicators and job performance, as shown by the correlation coefficient ($R = 0.980$). The coefficient of determination ($R^2 = 0.961$) reveals that (96.1%) of the variation in the job performance of waste collection workers is explained by safety training indicators. The Adjusted R^2 (0.961) is identical to the R^2 value, indicating that the model remains highly stable after adjusting for the number of predictors and that the predictor contributes substantially to explaining job performance. The findings indicates that safety training protocol is a very strong predictor of job performance among waste collection workers in Akwa Ibom North Senatorial District.

Research Hypothesis 1: There is no significant relationship between hazard communication and job performance of waste collection workers in Akwa Ibom North senatorial District

Table 3: Summary of ANOVA on relationship between hazard communication and job performance of waste collection workers in Akwa Ibom North Senatorial District

		Sum of Squares	Df	Mean Square	F	Sig.
1	Regression	124.820	1	124.820	274.079	.006 ^b
	Residual	90.172	133	.455		
	Total	214.992	134			

Table 3 presents the Analysis of Variance (ANOVA) results for the relationship between hazard communication and the job performance of waste collection workers in Akwa Ibom North Senatorial District. The regression model produced a Regression Sum of Squares of 124.820 and a Residual Sum of Squares of 90.172, giving a Total Sum of Squares of 214.992. The model yielded an F-value of 274.079 with degrees of freedom (1, 133) and a significance value of 0.06, which is less than the conventional 0.05 level of significance. This indicates that the regression model is statistically significant, implying that hazard communication significantly predicts the job performance of waste collection workers.

Research Hypothesis 2: There is no significant relationship between safety training protocol and job performance of waste collection workers in Akwa Ibom North senatorial District

Table 4: Summary of ANOVA on relationship between hazard communication and job performance of waste collection workers in Akwa Ibom North senatorial District

		Sum of Squares	Df	Mean Square F	Sig.
1	Regression	847.292	1	847.292	4845.867 .0.000 ^b
	Residual	34.620	133	.175	
	Total	881.912	134		

Table 4 presents the Analysis of Variance (ANOVA) results for the relationship between safety training indicators and the job performance of waste collection workers in Akwa Ibom North Senatorial District. The regression analysis produced a Regression Sum of Squares of 847.292 and a Residual Sum of Squares of 34.620, resulting in a Total Sum of Squares of 881.912. The model yielded an F-value of 4845.867 with degrees of freedom (1, 133) and a significance value of 0.000 ($p < 0.05$). This indicates that the regression model is statistically significant and that safety training indicators have a significant positive relationship with the job performance of waste collection workers in Akwa Ibom North Senatorial District.

Findings

- The results show a strong positive and significant relationship between hazard communication and job performance,
- The results indicate a very strong positive and significant relationship between safety training indicators and job performance.

Discussions of Findings

Hazard Communication and Job Performance of Waste Collection Workers

Hazard communication refers to the systematic process of informing workers about work place hazards, the associated risks, and the appropriate preventive and protective measures required to minimize occupational injuries and illnesses. The significant positive relationship between hazard communication and job performance indicates that waste collection workers who receive timely, accurate, and comprehensive hazard information perform their duties more safely, efficiently, and productively than those who receive inadequate safety communication. This finding is supported by the Safety Management System (SMS) framework and the Occupational Safety and Health Administration (OSHA) Hazard Communication Standard, both of which recognize hazard communication as a fundamental strategy for preventing work place accidents and improving organizational performance. The present finding is consistent with several empirical studies. Burke *et al.*

(2006) reported that comprehensive occupational safety communication and training programs significantly improve workers' safety knowledge, behavioral compliance, and job performance.

Safety Training Indicators and Job Performance of Waste Collection Workers

Safety training indicators are structured educational program, procedures, and guidelines designed to equip workers with the knowledge, skills, and attitudes required to recognize work place hazards, adopt safe job practices, respond effectively to emergencies, and comply with occupational safety standards. These indicators are essential to waste collection workers as they operate in environments characterized by numerous occupational hazards that require continuous safety awareness and competence. The positive relationship between safety training indicators and job performance indicates that waste collection workers who receive regular and effective safety training perform their duties more efficiently, safely, and productively than workers with limited or no safety training. Emmatty and Panicker (2019) found that comprehensive ergonomic and safety training programmes reduced work place injuries and improved operational performance in waste collection activities.

Conclusion

The findings revealed that hazard communication has a significant positive relationship with work performance. Workers who received adequate information on workplace hazards, safety procedures, and preventive measures demonstrated higher levels of efficiency, safety consciousness, and productivity. Regular safety training equips workers with the knowledge and practical skills required to identify hazards, comply with safety procedures, and respond appropriately to workplace emergencies. Consequently, trained workers are less likely to experience occupational accidents and are better able to perform their duties effectively.

Recommendation

Based on the findings of this study, the following recommendations were made:

- i. Akwa Ibom state Waste management agencies should develop policies that strengthen hazard communication, regular safety training, enforcement of safety regulations, adequate provision and utilization of personal protective equipment, emergency preparedness, and comprehensive risk control systems.
- ii. Waste management agencies should establish comprehensive hazard communication programmes that provide workers with regular information on workplace hazards, preventive measures, and safe work procedures

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