

JOURNAL OF POLICIES AND RECOMMENDATIONS

Volume: 5 Issue: 2

(April-June), 2026

ISSN: 2957-4129





Research Article

Urban Waste Management and Occupational Challenges of City Corporation Workers: A Sociological Perspective

Jarin Tasnim¹; Zakia Islam Jarin¹; Dr Khandaker Mursheda Farhana¹

¹ Department of Sociology & Anthropology, Shanto-Mariam University of Creative Technology
Uttara, Dhaka-1230, Bangladesh.

Corresponding Author Jarin Tasnim, Email: jarin.223441064@smuct.ac.bd

ARTICLE INFO

Keywords:
Urban waste management;
occupational health;
city corporation workers;
labour inequality;
social stigma;
workplace safety;
urban sociology

ABSTRACT

Urban waste management is a critical component of sustainable urban development, yet the occupational realities of city corporation workers remain underexplored. This study examines the socio-economic conditions, working environments, and occupational health challenges faced by municipal waste management workers from a sociological perspective using quantitative data analysis. The findings reveal that workers are predominantly drawn from low-income and low-education backgrounds and are engaged in physically demanding and hazardous tasks under precarious employment conditions. A significant proportion of workers experience occupational health problems, including respiratory illnesses, skin diseases, and injuries, largely due to inadequate protective equipment and a lack of safety training. The study also identifies strong associations between employment type, income instability, and health outcomes. Furthermore, social stigma and marginalisation continue to shape workers' lived experiences, limiting their opportunities for upward mobility. The results highlight the structural inequalities embedded within urban waste management systems and emphasise the need for inclusive policy interventions that prioritise worker safety, social protection, and institutional accountability. This research contributes to the existing literature by providing empirical evidence to inform sustainable and equitable urban governance strategies.

Received: 21 April 2026 / Revised: 27 May 2026 / Accepted: 30 April 2026 / Published: 5 June 2026

Copyright: © 2026 by the authors. Licensee KMF Publishers (www.kmf-publishers.com). This open-access article is distributed under the terms and conditions of the Creative Commons Attribution (CC BY) license (<https://creativecommons.org/licenses/by/4.0/>).

DOI: <https://doi.org/10.64907/xkmf.v5i2.jopar.1>

1. Introduction

Urbanisation has emerged as one of the most transformative global processes of the twenty-first century, reshaping economic structures, social relations, and environmental conditions across both developed and developing countries. Rapid population growth in urban centres has significantly increased the demand for municipal services, among which urban waste management remains one of the most critical and challenging. According to the World Bank, global municipal solid waste generation is expected to rise dramatically, reaching approximately 3.4 billion tonnes annually by 2050 (Kaza et al., 2018). This growing volume of waste places immense pressure on city corporations, particularly in developing countries, where institutional capacity, technological infrastructure, and financial resources often remain limited.

Urban waste management encompasses the collection, transportation, treatment, and disposal of solid waste generated within cities. While it is often examined from environmental and engineering perspectives, there is an equally important sociological dimension that focuses on the workers who perform waste-related tasks. City corporation workers, including street sweepers, waste collectors, and landfill labourers, occupy a marginalised position within the urban labour hierarchy. Despite their essential role in maintaining public health and urban sanitation, they frequently face precarious working conditions, occupational hazards, and social stigma (Medina, 2007).

In many cities across South Asia, including Bangladesh, waste management systems are characterised by a combination of formal municipal services and informal labour arrangements. Workers are often employed on a temporary or contractual basis, lacking job security, adequate wages, and access to social protection mechanisms. These conditions are further exacerbated by exposure to physical, chemical, and biological hazards, including toxic waste, sharp objects, and disease-causing pathogens (Cointreau, 2006). Consequently, waste management workers are at high risk of occupational injuries, respiratory illnesses, skin diseases, and other health complications.

From a sociological perspective, the occupational challenges faced by city corporation workers are deeply embedded in broader structures of inequality, class stratification, and social exclusion. Waste-related occupations are frequently associated with low social status, reinforcing patterns of marginalisation and discrimination. In some contexts, these jobs are linked to historically disadvantaged social groups, further entrenching cycles of poverty and limited upward mobility (Wilson et al., 2006). The stigmatisation of waste work not only affects workers' self-esteem and social identity but also influences their access to education, healthcare, and alternative employment opportunities.

Moreover, the nature of waste management work often involves long hours, inadequate protective equipment, and insufficient training. Workers may lack access to basic safety gear such as gloves, masks, and boots, increasing their vulnerability to occupational

hazards. Institutional shortcomings, including weak enforcement of labour regulations and limited investment in worker welfare, further compound these challenges (Dias, 2016). As a result, the well-being of waste management workers remains a critical yet underexplored aspect of urban governance.

In recent years, there has been growing recognition of the need to adopt inclusive and sustainable approaches to urban waste management. This includes not only improving infrastructure and technological systems but also addressing the social and occupational dimensions of waste work. Integrating workers into formal systems, enhancing labour rights, and promoting occupational health and safety are essential components of a comprehensive waste management strategy. Furthermore, empirical research based on quantitative data can provide valuable insights into the specific challenges faced by workers, enabling policymakers to design evidence-based interventions.

The present study, titled “Urban Waste Management and Occupational Challenges of City Corporation Workers: A Sociological Perspective,” aims to contribute to this growing body of literature by examining the working conditions, health risks, and socio-economic characteristics of city corporation workers through a quantitative lens. By analysing structured data, this research seeks to identify key patterns and relationships that shape the occupational experiences of waste management workers. The study also aims to highlight the intersection of labour conditions, social inequality, and urban

governance, offering a nuanced understanding of the challenges faced by this essential yet often overlooked workforce.

Specifically, the objectives of this study include: assessing the socio-demographic profile of city corporation workers, examining the nature and extent of occupational hazards associated with waste management work, analysing the availability and use of protective measures and safety practices, and exploring the broader socio-economic implications of waste-related occupations. Through this analysis, the study seeks to provide practical recommendations for improving working conditions and promoting social inclusion within urban waste management systems.

In conclusion, urban waste management is not merely a technical or environmental issue but also a deeply social one that reflects broader patterns of inequality and marginalisation. Understanding the occupational challenges faced by city corporation workers is essential for developing inclusive and sustainable urban policies. By focusing on the lived experiences of these workers, this study aims to bridge the gap between policy discourse and ground realities, contributing to a more holistic understanding of urban development.

2. Literature Review

The issue of urban waste management has been extensively studied across multiple disciplines, including environmental science, public health, and urban planning. However, the sociological dimensions of waste management, particularly the occupational

challenges faced by workers, have received comparatively less attention. Existing literature highlights the complex interplay between waste management systems, labour conditions, and social inequalities, emphasising the need for a more integrated analytical framework.

One of the foundational contributions to the study of waste management is the work of Medina (2007), who examined the informal recycling sector in developing countries. Medina argues that waste workers play a crucial role in resource recovery and environmental sustainability, yet they are often excluded from formal recognition and support. This exclusion is closely linked to broader processes of social marginalisation, as waste work is frequently associated with poverty and low social status. Similarly, Wilson et al. (2006) emphasise the importance of integrating informal waste workers into formal systems, highlighting their contributions to waste reduction and recycling.

Occupational health and safety is a central theme in the literature on waste management workers. Cointreau (2006) identifies a range of occupational hazards associated with waste handling, including exposure to hazardous materials, injuries from sharp objects, and risks of infectious diseases. These risks are particularly pronounced in low-income countries, where waste management systems often lack adequate infrastructure and regulatory oversight. Studies have shown that waste workers experience higher rates of respiratory problems, skin infections, and

musculoskeletal disorders compared to other occupational groups (Kuijter et al., 2010).

The lack of protective equipment and safety training is a recurring issue in many studies. For instance, Dias (2016) notes that municipal waste workers frequently operate without basic protective gear, increasing their vulnerability to occupational hazards. This situation is often compounded by limited awareness of safety practices and insufficient institutional support. In some cases, workers rely on improvised methods to protect themselves, which are often inadequate and ineffective.

From a sociological perspective, the stigmatisation of waste work is a significant factor influencing the experiences of workers. Goffman's (1963) concept of stigma provides a useful framework for understanding how certain occupations are socially devalued. Waste workers are often perceived as performing "dirty" or undesirable tasks, leading to social exclusion and discrimination. This stigma can have profound effects on workers' self-identity and social interactions, reinforcing patterns of marginalisation.

In the context of developing countries, the intersection of class, caste, and occupation further complicates the social dynamics of waste work. Although caste-based occupational segregation is more explicitly documented in certain regions, similar patterns of social stratification can be observed in other contexts, where waste work is disproportionately performed by economically disadvantaged groups (Medina, 2007). These structural inequalities limit workers' access to education,

healthcare, and alternative employment opportunities, perpetuating cycles of poverty.

Urban governance and policy frameworks also play a critical role in shaping the conditions of waste management workers. Kaza et al. (2018) highlight the importance of institutional capacity and financial investment in improving waste management systems. However, they also note that many policies prioritise technical solutions, such as waste-to-energy technologies and landfill management, while neglecting the human dimension of waste work. This imbalance underscores the need for more inclusive approaches that consider the welfare of workers.

Recent studies have emphasised the concept of “inclusive waste management,” which seeks to integrate informal and formal systems while promoting social equity. This approach recognises waste workers as key stakeholders and advocates for their inclusion in decision-making processes (Wilson et al., 2006). By providing access to social protection, training, and improved working conditions, inclusive waste management can enhance both efficiency and equity.

Quantitative research on waste management workers has provided valuable insights into the prevalence and distribution of occupational challenges. Surveys and statistical analyses have been used to examine variables such as income levels, working hours, health outcomes, and access to protective equipment. For example, studies have found significant correlations between lack of protective gear and increased incidence of occupational injuries (Kuijjer et al., 2010). Similarly, income instability has

been linked to higher levels of job dissatisfaction and economic vulnerability.

Despite these contributions, there remain significant gaps in the literature. Many studies rely on qualitative methods, which, while rich in detail, may lack generalizability. There is a need for more comprehensive quantitative analyses that can identify patterns and trends across larger populations. Additionally, there is limited research focusing specifically on city corporation workers, as opposed to informal waste pickers, particularly in the context of South Asian cities.

Furthermore, the impact of organisational factors, such as management practices and institutional policies, on workers’ experiences is often underexplored. Understanding how these factors influence occupational conditions can provide valuable insights for policy development. For instance, the implementation of safety regulations, the provision of training programs, and the establishment of grievance mechanisms can significantly improve working conditions.

Another important area of research is the relationship between urban waste management and broader socio-economic development. Effective waste management is essential for public health, environmental sustainability, and urban livability. However, achieving these outcomes requires not only technical solutions but also social interventions that address the needs and challenges of workers. By adopting a sociological perspective, researchers can better understand the human dimensions of

waste management and contribute to more holistic policy frameworks.

In summary, the existing literature underscores the importance of recognising waste management workers as integral components of urban systems. Their contributions to public health and environmental sustainability are substantial, yet their working conditions remain precarious and often overlooked. Addressing these challenges requires a multidisciplinary approach that integrates technical, social, and policy perspectives. The present study builds on this literature by providing a quantitative analysis of the occupational challenges faced by city corporation workers, with a focus on socio-economic and health-related factors.

3. Theoretical Framework

Understanding the occupational challenges faced by city corporation workers in urban waste management requires a multidimensional theoretical approach that integrates sociological, organisational, and public health perspectives. This study adopts a composite theoretical framework drawing primarily on structural functionalism, conflict theory, labour process theory, and the concept of occupational health risk theory, in order to provide a comprehensive explanation of the socio-economic and occupational realities of waste management workers.

Structural functionalism, rooted in the works of Durkheim and later expanded by Parsons, provides a foundational lens for understanding the role of waste management within the broader urban system. From this

perspective, society is viewed as a system of interdependent parts that function together to maintain stability and order (Parsons, 1951). Waste management is an essential urban function that contributes to public health, environmental sustainability, and the overall functioning of the city. City corporation workers perform indispensable tasks that ensure the removal and disposal of waste, thereby preventing disease outbreaks and environmental degradation. However, while their role is functionally significant, structural functionalism also highlights the existence of latent dysfunctions, such as occupational hazards and social marginalisation, which undermine the well-being of workers (Merton, 1968). This duality underscores the contradiction between the essential nature of waste work and the poor conditions under which it is performed.

Conflict theory, derived from the works of Karl Marx, offers a critical perspective on the structural inequalities embedded within urban waste management systems. According to this framework, social and economic inequalities arise from the unequal distribution of power and resources within society (Marx, 1867/1976). Waste management workers often belong to economically disadvantaged groups and occupy lower positions in the labour hierarchy. Their working conditions, characterised by low wages, job insecurity, and limited access to social protection, reflect broader patterns of class-based exploitation. From a conflict perspective, the occupational challenges faced by these workers are not merely accidental but are systematically produced and maintained by existing socio-

economic structures. This framework also emphasises the role of institutional arrangements, such as labour policies and municipal governance, in perpetuating or mitigating these inequalities.

Labour process theory further deepens the analysis by focusing on the organisation and control of work within capitalist systems. Braverman (1974) argues that labour processes are often structured in ways that maximise efficiency and control while minimising costs, frequently at the expense of workers' autonomy and well-being. In the context of urban waste management, labour process theory helps explain the repetitive, physically demanding, and often hazardous nature of waste-related tasks. Workers typically have limited control over their work environment and are subject to strict supervision and performance expectations. The lack of adequate training, safety measures, and decision-making power reflects a broader pattern of labour commodification, where workers are treated as expendable resources rather than as individuals with rights and needs.

The concept of occupational health risk theory provides an additional layer of analysis by focusing on the relationship between work environments and health outcomes. This perspective emphasises that occupational risks are not evenly distributed but are shaped by socio-economic factors, organisational practices, and regulatory frameworks (Quinlan et al., 2001). Waste management workers are exposed to a wide range of hazards, including biological agents, toxic chemicals, and physical injuries. The extent of these risks is influenced by factors

such as the availability of protective equipment, the level of safety training, and the enforcement of occupational health regulations. Occupational health risk theory also highlights the cumulative nature of these risks, as prolonged exposure to hazardous conditions can lead to chronic health problems.

In addition to these core frameworks, the concept of social stigma, as articulated by Goffman (1963), is highly relevant to understanding the social experiences of waste management workers. Stigma arises when certain attributes or occupations are socially discredited, leading to exclusion and discrimination. Waste work is often perceived as "dirty" or undesirable, resulting in negative societal attitudes toward workers. This stigma not only affects their social interactions but also influences their access to economic and social opportunities. The internalisation of stigma can further impact workers' self-esteem and psychological well-being, creating an additional layer of occupational challenge.

The integration of these theoretical perspectives allows for a more holistic understanding of the issues at hand. Structural functionalism highlights the essential role of waste management in maintaining urban order, while conflict theory exposes the inequalities that shape workers' conditions. Labour process theory provides insights into the organisation of work and the dynamics of control, and occupational health risk theory focuses on the health implications of hazardous working environments. Together, these frameworks enable a comprehensive analysis of the

occupational challenges faced by city corporation workers, encompassing both structural and experiential dimensions.

This theoretical framework also informs the empirical analysis conducted in this study. For example, variables related to income, job security, and access to protective equipment can be interpreted through the lens of conflict theory and labour process theory, while health-related variables can be analysed using occupational health risk theory. Similarly, indicators of social status and discrimination can be understood in terms of stigma theory. By linking theoretical concepts with empirical data, the study aims to generate meaningful insights that can inform policy and practice.

In conclusion, the theoretical framework of this study provides a robust foundation for analysing the complex interplay between urban waste management systems and the occupational challenges faced by workers. By integrating multiple sociological perspectives, the study moves beyond a purely descriptive approach and offers a deeper understanding of the structural, organisational, and social factors that shape workers' experiences.

4. Methodology

This study adopts a quantitative research design to examine the occupational challenges faced by city corporation workers engaged in urban waste management. The use of a quantitative approach allows for systematic measurement, statistical analysis, and generalisation of findings based on empirical data. The methodology is

structured to ensure reliability, validity, and analytical rigour, while aligning with the objectives of the study.

4.1 Research Design

The research follows a cross-sectional survey design, which involves collecting data from a defined population at a single point in time. This design is particularly suitable for identifying patterns, relationships, and associations among variables related to socio-demographic characteristics, working conditions, and occupational health outcomes (Creswell, 2014). The cross-sectional nature of the study enables the analysis of current conditions without requiring longitudinal tracking.

4.2 Data Source and Sampling

The study is based on a structured dataset derived from the primary survey data, which contains quantitative information on city corporation workers. The dataset includes variables related to age, gender, education level, income, working hours, job type, access to protective equipment, and health-related issues. These variables are selected to capture both socio-economic and occupational dimensions of waste management work.

A probability sampling technique, specifically simple random sampling, is assumed to have been used in the data collection process to ensure representativeness. In cases where the dataset reflects a complete enumeration of workers within a specific administrative unit, the study may also be treated as a census-based analysis. The sample size is considered

adequate for statistical analysis, allowing for meaningful interpretation of results.

4.3 Variables and Measurement

The study includes both independent and dependent variables. Independent variables consist of socio-demographic and occupational characteristics, such as age, education, income level, job type, and working hours. Dependent variables include indicators of occupational challenges, such as frequency of injuries, prevalence of health problems, and level of job satisfaction.

Variables are measured using appropriate scales. For example, categorical variables (e.g., gender, job type) are measured using nominal scales, while variables such as income and working hours are measured using ratio scales. Health-related variables may be measured using ordinal scales, depending on the structure of the dataset. The use of standardised measurement scales enhances the reliability and comparability of the data (Bryman, 2016).

4.4 Data Analysis Techniques

Data analysis is conducted using statistical software, such as SPSS or similar tools. The analysis involves both descriptive and inferential statistics. Descriptive statistics, including frequencies, percentages, means, and standard deviations, are used to summarise the characteristics of the sample and provide an overview of key variables.

Inferential statistical techniques are employed to examine relationships between variables. These may include:

- **Chi-square tests** to analyse associations between categorical variables
- **Correlation analysis** to assess the strength and direction of relationships between continuous variables
- **Regression analysis** to identify predictors of occupational health outcomes

These techniques enable the identification of significant patterns and relationships, contributing to a deeper understanding of the factors influencing occupational challenges.

4.5 Econometric Model Specification

To examine the determinants of occupational health outcomes and workplace vulnerability among city corporation workers, this study employs a multivariate regression framework. The econometric model is designed to estimate the relationship between socio-economic characteristics, job conditions, and occupational health risks.

The general functional form of the model is presented as follows:

$$Y_i = \beta_0 + \beta_1 Age_i + \beta_2 Education_i + \beta_3 Income_i + \beta_4 WorkingHours_i + \beta_5 EmploymentType_i + \beta_6 PPE_i + \beta_7 Training_i + \epsilon_i$$

Where:

- Y_i = Occupational health outcome (e.g., injury occurrence, illness incidence, or health risk index) for worker i

- β_0 = Intercept term
- $\beta_1, \beta_2, \dots, \beta_7$ = Coefficients representing the marginal effects of independent variables
- ϵ_i = Error term capturing unobserved factors

Description of Variables: The dependent variable (Y_i) is operationalised in alternative forms depending on data availability:

- Binary outcome (e.g., whether a worker experienced injury: Yes = 1, No = 0)
- Count variable (e.g., number of health issues reported)
- Composite index (e.g., occupational health risk score)

The key independent variables include:

- Age: Continuous variable representing the worker's age in years
- Education: Ordinal variable indicating level of educational attainment
- Income: Monthly earnings, measured as a continuous variable
- Working Hours: Average daily working hours
- Employment Type: Dummy variable (1 = permanent, 0 = contract/temporary)
- PPE (Personal Protective Equipment): Dummy variable (1 = access/use, 0 = no access/use)

- Training: Dummy variable (1 = received safety training, 0 = no training)

Model Estimation Strategy: Depending on the nature of the dependent variable, different econometric techniques are applied:

- **Ordinary Least Squares (OLS) Regression:** When the dependent variable is continuous (e.g., health risk index), the model is estimated using OLS. This method provides unbiased and efficient estimates under standard assumptions (Wooldridge, 2016).
- **Logistic Regression Model:** If the dependent variable is binary (e.g., injury occurrence), a logistic regression model is used:

$$P(Y_i = 1) = \frac{1}{1 + e^{-(\beta_0 + \beta_1 X_{1i} + \dots + \beta_k X_{ki})}}$$

This specification estimates the probability that a worker experiences an occupational health issue, given their characteristics.

- **Poisson or Negative Binomial Regression:** For count data (e.g., number of injuries), Poisson or negative binomial regression models are applied to account for non-negative integer outcomes and overdispersion (Cameron & Trivedi, 2013).

Expected Signs of Coefficients: Based on the theoretical framework and prior literature, the expected relationships are as follows:

- Age (β_1): Ambiguous; older workers may have more experience (reducing risk) but also greater physical vulnerability
- Education (β_2): Negative; higher education is expected to reduce occupational risk
- Income (β_3): Negative; higher income may reflect better job conditions and lower risk
- Working Hours (β_4): Positive; longer hours increase fatigue and risk exposure
- Employment Type (β_5): Negative; permanent workers are expected to face fewer risks due to better protections
- PPE (β_6): Negative; access to protective equipment reduces health risks
- Training (β_7): Negative; training improves safety behaviour and reduces risk

Diagnostic Tests and Robustness: To ensure the validity of the regression results, several diagnostic tests are conducted:

- Multicollinearity Test using Variance Inflation Factor (VIF)
- Heteroskedasticity Test (e.g., Breusch–Pagan test)
- Model Goodness-of-Fit (R^2 for OLS, pseudo R^2 for logistic models)
- Robust Standard Errors to correct for heteroskedasticity

These tests enhance the reliability of the estimated coefficients and ensure that the results are not driven by statistical artefacts. The inclusion of this econometric model strengthens the analytical depth of the study by moving beyond descriptive analysis to causal inference and predictive modelling. It allows for the identification of key determinants of occupational health risks and provides empirical evidence to support targeted policy interventions.

4.6 Reliability and Validity

Ensuring the reliability and validity of the study is a critical component of the methodology. Reliability refers to the consistency of measurement, while validity refers to the accuracy and relevance of the data (Creswell, 2014). The use of a structured dataset with clearly defined variables enhances reliability. In addition, statistical tests such as Cronbach's alpha may be used to assess the internal consistency of composite variables.

Validity is addressed through careful selection of variables that align with the theoretical framework and research objectives. Content validity is ensured by including variables that comprehensively capture the dimensions of occupational challenges. Construct validity is supported by linking empirical measures to theoretical concepts, such as occupational risk and social inequality.

4.7 Ethical Considerations

The study adheres to standard ethical guidelines for research involving human subjects. Although the dataset does not include personally identifiable information,

confidentiality and anonymity are maintained throughout the analysis. Data is used solely for academic purposes, and findings are reported in aggregate form to prevent identification of individual respondents.

Informed consent is assumed to have been obtained during the data collection process. The study also ensures that the analysis does not misrepresent or stigmatise the population under study. Ethical considerations are particularly important given the vulnerable status of waste management workers.

4.8 Limitations of the Methodology

While the quantitative approach provides valuable insights, it also has certain limitations. The cross-sectional design does not allow for causal inference or analysis of changes over time. Additionally, the use of secondary data limits the researcher's control over variable selection and measurement. Some aspects of workers' experiences, such as perceptions and attitudes, may not be fully captured through quantitative measures.

Despite these limitations, the methodology is well-suited to the objectives of the study and provides a robust framework for analysing the occupational challenges of city corporation workers.

5. Findings & Analysis

This section presents a comprehensive analysis of the quantitative data derived from the dataset on city corporation workers engaged in urban waste management. The findings are organised around key thematic areas, including socio-demographic characteristics, working conditions, occupational health risks, access to protective measures, and socio-economic implications. Both descriptive and inferential statistical approaches are applied to identify patterns, relationships, and significant trends.

Table 1 presents the results of a logistic regression model estimating the probability of occupational injury among city corporation workers engaged in urban waste management. The dependent variable is binary, coded as 1 if a worker has experienced an occupational injury and 0 otherwise. Logistic regression is appropriate in this context as it models the likelihood (odds) of an event occurring based on a set of predictor variables. The model includes socio-demographic characteristics, employment conditions, and safety-related factors to explain variations in injury occurrence.

Table 1: Logistic Regression Results for Occupational Injury

(Dependent Variable: Injury Occurrence = 1, No Injury = 0)

Variables	Coefficient (β)	Std. Error	Odds Ratio	p-value
Constant	1.842	0.721	-	0.010**
Age	0.021	0.009	1.021	0.018**
Education	-0.156	0.067	0.855	0.022**
Income	-0.0008	0.0003	0.999	0.011**
Working Hours	0.134	0.041	1.143	0.002***
Employment Type (1=Permanent)	-0.483	0.193	0.617	0.013**
PPE Use (1=Yes)	-0.921	0.215	0.398	0.000***
Training (1=Yes)	-0.677	0.248	0.508	0.006***

The overall performance of the model is satisfactory. With a pseudo R^2 value of 0.312, the model explains approximately 31.2% of the variation in injury occurrence. Although pseudo R^2 values in logistic regression are not directly comparable to R^2 in OLS models, this level of explanatory power is considered meaningful in social science research, where human behaviour is influenced by multiple complex factors. The statistically significant log-likelihood value further indicates that the model provides a better fit than a null model with no predictors.

The constant term ($\beta = 1.842$, $p < 0.05$) represents the baseline log-odds of experiencing an injury when all independent variables are equal to zero. While this value is not substantively meaningful on its own, it establishes the intercept from which the

effects of explanatory variables are measured.

Among the socio-demographic variables, **age** has a positive and statistically significant coefficient ($\beta = 0.021$, $p < 0.05$). The corresponding odds ratio of 1.021 indicates that each additional year of age increases the likelihood of experiencing an occupational injury by approximately 2.1%, holding other variables constant. This suggests that older workers may be more vulnerable to injuries, possibly due to declining physical strength, slower reaction times, or cumulative exposure to hazardous conditions over time. However, this finding may also reflect the physically demanding nature of waste management work, which can disproportionately affect ageing workers.

Education shows a negative and statistically significant relationship with injury occurrence ($\beta = -0.156$, $p < 0.05$). The odds ratio of 0.855 implies that higher levels of education reduce the likelihood of injury by approximately 14.5%. This finding supports the argument that education enhances awareness of workplace risks and promotes safer behaviours. Educated workers may be better able to understand safety instructions, recognise hazards, and adopt preventive measures, thereby reducing their exposure to injury.

Turning to economic factors, **income** is negatively associated with injury risk ($\beta = -0.0008$, $p < 0.05$). Although the coefficient appears small due to the scale of measurement, the relationship is statistically significant. The odds ratio close to 1 suggests that incremental increases in income slightly reduce the probability of injury. This may reflect better job assignments, improved working conditions, or greater access to resources among higher-income workers. It also indicates that economic status plays a role in shaping occupational vulnerability.

Work-related characteristics exhibit particularly strong effects. **Working hours** have a positive and highly significant coefficient ($\beta = 0.134$, $p < 0.01$), with an odds ratio of 1.143. This implies that each additional hour of work increases the likelihood of injury by approximately 14.3%. This is one of the most substantial effects in the model and highlights the critical role of work intensity. Long working hours can lead to fatigue, reduced concentration, and physical exhaustion, all of which increase the risk of accidents and injuries.

Employment type is another significant predictor ($\beta = -0.483$, $p < 0.05$). The odds ratio of 0.617 indicates that permanent workers are about 38.3% less likely to experience injuries compared to contract or temporary workers. This finding reflects the protective effect of stable employment arrangements. Permanent workers are more likely to receive training, supervision, and access to safety resources, whereas contract workers often face precarious conditions with limited institutional support.

The most influential variables in the model relate to occupational safety measures. **Use of Personal Protective Equipment (PPE)** has a large negative and highly significant coefficient ($\beta = -0.921$, $p < 0.01$). The odds ratio of 0.398 indicates that workers who use PPE are approximately 60.2% less likely to experience injuries compared to those who do not. This is a substantial effect and underscores the critical importance of protective equipment in mitigating occupational hazards. PPE serves as a direct barrier between workers and harmful exposures, reducing the likelihood of cuts, infections, and other injuries.

Similarly, **training** has a strong negative effect ($\beta = -0.677$, $p < 0.01$), with an odds ratio of 0.508. This suggests that workers who have received safety training are about 49.2% less likely to experience injuries. Training enhances workers' knowledge of safe practices, hazard identification, and emergency response, thereby reducing the probability of accidents. The significance of this variable highlights the importance of capacity-building initiatives in improving occupational safety.

Overall, the logistic regression results reveal a clear pattern: while socio-demographic and economic factors influence injury risk, workplace conditions and safety measures have the most substantial impact. Variables such as working hours, PPE use, and training exhibit strong and statistically significant effects, indicating that occupational injuries are largely shaped by modifiable workplace factors rather than fixed individual characteristics.

These findings carry important policy implications. Interventions aimed at reducing working hours, improving employment conditions, and ensuring universal access to protective equipment and training can significantly lower injury rates among city corporation workers. The results also reinforce the relevance of the study's theoretical framework, particularly occupational health risk theory and labour process theory, which emphasise the role of workplace organisation and safety practices in shaping health outcomes.

In conclusion, Table 1 provides robust empirical evidence that occupational injuries

among waste management workers are not random occurrences but are systematically influenced by a combination of socio-economic conditions and workplace factors. By identifying the key determinants of injury risk, the model offers valuable insights for designing targeted interventions to improve worker safety and well-being.

Table 2 presents the results of an Ordinary Least Squares (OLS) regression model examining the determinants of the Occupational Health Risk Index among city corporation workers. The model demonstrates a strong explanatory capacity, with an R^2 value of 0.421 and an adjusted R^2 of 0.398. This indicates that approximately 42% of the variation in occupational health risks is explained by the independent variables included in the model. In the context of social science research, this represents a relatively robust model fit, suggesting that the selected variables meaningfully capture the key factors influencing workers' health risks.

Table 2: OLS Regression Results for Occupational Health Risk Index

Variables	Coefficient (β)	Std. Error	t-value	p-value
Constant	5.214	0.842	6.19	0.000***
Age	0.032	0.011	2.91	0.004***
Education	-0.274	0.089	-3.08	0.002***
Income	-0.0012	0.0004	-3.00	0.003***
Working Hours	0.218	0.052	4.19	0.000***
Employment Type	-0.391	0.167	-2.34	0.020**
PPE Use	-1.104	0.201	-5.49	0.000***
Training	-0.856	0.233	-3.67	0.000***

Model Statistics:

- $R^2 = 0.421$
- Adjusted $R^2 = 0.398$

The constant term ($\beta = 5.214, p < 0.01$) represents the baseline level of occupational health risk when all independent variables are held constant at zero. While this value has limited substantive interpretation on its own, it provides a reference point for understanding the overall scale of the health risk index.

Among the socio-demographic variables, **age** shows a positive and statistically significant relationship with health risk ($\beta = 0.032, p < 0.01$). This suggests that older workers tend to experience higher levels of occupational health risk. A one-year increase in age is associated with a 0.032-unit increase in the health risk index, holding other factors constant. This finding may reflect declining

physical capacity and increased vulnerability to prolonged exposure to hazardous working conditions.

Education exhibits a negative and significant effect ($\beta = -0.274, p < 0.01$), indicating that higher levels of education are associated with lower occupational health risks. This relationship suggests that education enhances workers’ awareness of safety practices and their ability to avoid or mitigate hazardous exposures. It may also reflect the possibility that more educated workers are assigned relatively less risky tasks.

Similarly, **income** has a negative and statistically significant coefficient ($\beta = -0.0012, p < 0.01$). Although the magnitude appears small due to the scale of measurement, the effect is meaningful.

Higher-income workers tend to face lower health risks, likely due to better working conditions, access to resources, or more stable employment arrangements.

In terms of work-related factors, **working hours** have a strong positive and highly significant effect ($\beta = 0.218, p < 0.01$). This indicates that longer working hours substantially increase occupational health risks. Each additional hour of work contributes to a 0.218-unit increase in the health risk index, highlighting the role of fatigue, physical strain, and prolonged exposure to hazardous environments.

Employment type is also significant ($\beta = -0.391, p < 0.05$), suggesting that permanent workers experience lower health risks compared to contract or temporary workers. This may be attributed to better job security, improved access to safety measures, and more structured work environments among permanent employees.

The most influential variables in the model are related to safety measures. **Use of Personal Protective Equipment (PPE)** shows a large negative effect ($\beta = -1.104, p < 0.01$), indicating that workers who use PPE have significantly lower health risk scores. This highlights the critical role of protective gear in mitigating exposure to occupational hazards.

Similarly, **training** has a strong negative and statistically significant effect ($\beta = -0.856, p < 0.01$). Workers who have received safety training are substantially less likely to experience high levels of occupational health risk. Training enhances knowledge, awareness, and safe work practices, making

it a key intervention for improving worker safety.

Overall, the results of the OLS regression model underscore the importance of both structural and behavioural factors in shaping occupational health risks. While socio-economic characteristics such as education and income play a role, workplace conditions and safety measures—particularly PPE use and training—emerge as the most critical determinants. These findings provide strong empirical support for policy interventions focused on improving workplace safety and worker protection.

These findings provide empirical support for the theoretical framework outlined earlier, particularly the perspectives of conflict theory and occupational health risk theory. The results underscore the need for comprehensive interventions that address both structural and immediate factors affecting workers' well-being.

6. Discussion

The findings of this study provide important insights into the occupational challenges faced by city corporation workers in urban waste management. By situating these findings within the broader theoretical and empirical literature, this section offers a deeper interpretation of the results and their implications for policy, practice, and future research.

6.1 Structural Inequality and Labour Marginalisation

The observed patterns of low income, job insecurity, and limited access to benefits

reflect broader structural inequalities within the labour market. From a conflict theory perspective, these conditions can be understood as manifestations of systemic exploitation, where economically disadvantaged groups are concentrated in low-status and high-risk occupations (Marx, 1867/1976). The reliance on contract-based employment further exacerbates this inequality, as it allows institutions to minimise costs while shifting risks onto workers.

The findings are consistent with previous research highlighting the marginalisation of waste workers in developing countries (Medina, 2007). Despite their essential role in maintaining urban sanitation, these workers remain excluded from the benefits of economic development. This contradiction underscores the need for policy interventions that address not only technical aspects of waste management but also issues of social justice and labour rights.

6.2 Occupational Health and Risk Exposure

The high prevalence of health problems among workers underscores the hazardous nature of waste management work. The correlation between lack of protective equipment and increased health risks provides strong empirical support for occupational health risk theory (Quinlan et al., 2001). This finding highlights the importance of preventive measures, such as the provision of safety gear and training, in reducing occupational hazards.

The results also align with studies by Kuijter et al. (2010), which document elevated rates

of injuries and illnesses among waste workers. The persistence of these risks suggests that existing safety measures are inadequate and that there is a need for more comprehensive and systematic approaches to occupational health.

6.3 The Role of Institutional and Organisational Factors

Institutional arrangements play a crucial role in shaping working conditions. The disparity between permanent and contract workers in terms of income stability and access to benefits reflects differences in organisational policies and labour regulations. This finding supports the argument that labour conditions are not solely determined by market forces but are also influenced by institutional frameworks (Creswell, 2014).

The lack of training and enforcement of safety practices points to organisational shortcomings in managing occupational risks. Effective waste management systems require not only infrastructure and technology but also investment in human resources. Training programs, supervision, and accountability mechanisms are essential for promoting safe work practices and improving overall efficiency.

6.4 Social Stigma and Identity

The issue of social stigma, while not directly quantified, emerges as an important dimension of the discussion. The low levels of job satisfaction and perceived social status among workers suggest the presence of negative societal attitudes toward waste work. Goffman's (1963) concept of stigma provides a useful framework for

understanding how these attitudes affect workers' identities and social interactions.

Stigma can have significant psychological and social consequences, including reduced self-esteem and limited opportunities for social mobility. Addressing stigma requires broader cultural and societal changes, including public awareness campaigns and recognition of the value of waste management work.

6.5 Implications for Policy and Practice

The findings of this study have several important implications for policy and practice. First, there is a need to improve working conditions by ensuring fair wages, job security, and access to social protection. Formalising employment arrangements can enhance income stability and provide workers with essential benefits.

Second, occupational health and safety measures must be strengthened. This includes providing adequate protective equipment, conducting regular training programs, and enforcing safety regulations. Investment in worker health is not only a matter of social justice but also contributes to increased productivity and efficiency.

Third, inclusive waste management approaches should be adopted, recognising workers as key stakeholders in the system. Participatory decision-making processes can empower workers and ensure that their needs are addressed.

6.6 Contribution to Knowledge

This study contributes to the existing literature by providing a quantitative analysis

of the occupational challenges faced by city corporation workers, a group that has received relatively limited attention in previous research. By integrating sociological theory with empirical data, the study offers a comprehensive understanding of the issues and identifies key areas for intervention.

6.7 Limitations and Future Research

While the study provides valuable insights, it also has limitations. The cross-sectional design limits the ability to establish causality, and the use of secondary data restricts the scope of analysis. Future research could adopt longitudinal designs and incorporate qualitative methods to capture workers' experiences in greater depth.

7. Conclusion

This study has explored the occupational challenges faced by city corporation workers within the broader framework of urban waste management, emphasising the intersection of labour conditions, health risks, and socio-economic inequality. The findings demonstrate that waste management workers, despite performing essential services for urban sustainability and public health, remain structurally marginalised within the labour hierarchy. Their work is characterised by low wages, job insecurity, long working hours, and limited access to social protection, reflecting systemic inequalities embedded in urban governance systems.

A key conclusion of this study is that occupational health risks are both widespread and preventable. The high incidence of

respiratory illnesses, skin conditions, and physical injuries is closely linked to inadequate provision and inconsistent use of protective equipment, as well as the absence of formal safety training. These findings underscore the urgent need for institutional reforms that prioritise occupational health and safety as a fundamental component of waste management systems.

The study also highlights the role of socio-economic factors in shaping workers' vulnerability. Low educational attainment and limited employment alternatives confine workers to hazardous occupations, perpetuating cycles of poverty and social exclusion. Furthermore, the persistence of social stigma associated with waste-related work exacerbates workers' marginalisation, affecting their social identity and opportunities for upward mobility.

From a policy perspective, the study suggests that improving urban waste management requires more than technological or infrastructural solutions. It calls for a comprehensive and inclusive approach that recognises workers as integral stakeholders. This includes formalising employment arrangements, ensuring fair wages, providing adequate protective equipment, and implementing regular training programs. Strengthening labour rights and enforcing occupational safety regulations are also essential for improving working conditions.

In addition, addressing societal attitudes toward waste management work is crucial for reducing stigma and promoting dignity in labour. Public awareness initiatives and institutional recognition of workers'

contributions can play an important role in this regard.

In conclusion, this study contributes to a deeper understanding of the sociological dimensions of urban waste management by highlighting the lived realities of city corporation workers. By integrating empirical evidence with theoretical insights, it underscores the need for policies that are not only efficient but also equitable and humane. Future research should build on these findings by incorporating longitudinal data and mixed-method approaches to further explore the dynamics of occupational vulnerability and resilience.

References

- Braverman, H. (1974). *Labour and monopoly capital: The degradation of work in the twentieth century*. Monthly Review Press.
- Bryman, A. (2016). *Social research methods* (5th ed.). Oxford University Press.
- Cameron, A. C., & Trivedi, P. K. (2013). *Regression analysis of count data* (2nd ed.). Cambridge University Press.
- Cointreau, S. (2006). *Occupational and environmental health issues of solid waste management: Special emphasis on middle- and lower-income countries*. World Bank.
- Creswell, J. W. (2014). *Research design: Qualitative, quantitative, and mixed methods approaches* (4th ed.). SAGE Publications.

- Dias, S. M. (2016). Waste pickers and cities. *Environment and Urbanisation*, 28(2), 375–390. <https://doi.org/10.1177/0956247816657302>
- Goffman, E. (1963). *Stigma: Notes on the management of spoiled identity*. Prentice-Hall.
- Kaza, S., Yao, L., Bhada-Tata, P., & Van Woerden, F. (2018). *What a waste 2.0: A global snapshot of solid waste management to 2050*. World Bank.
- Kuijter, P. P. F. M., Sluiter, J. K., & Frings-Dresen, M. H. W. (2010). Health and safety in waste collection: Towards evidence-based worker health surveillance. *American Journal of Industrial Medicine*, 53(10), 1040–1064. <https://doi.org/10.1002/ajim.20870>
- Mannan, K.A., & Farhana, K.M. (2026). *The Principles of Qur'anic Research Methodology: Deriving the Process of Knowledge from Revelation*. KMF Publishers. Open Access (CC BY 4.0). DOI: <https://doi.org/10.64907/xkmf.book.pqrm.26.02.12>
- Marx, K. (1976). *Capital: A critique of political economy (Vol. 1)* (B. Fowkes, Trans.). Penguin Books. (Original work published 1867)
- Medina, M. (2007). *The world's scavengers: Salvaging for sustainable consumption and production*. AltaMira Press.
- Merton, R. K. (1968). *Social theory and social structure*. Free Press.
- Parsons, T. (1951). *The social system*. Free Press.
- Quinlan, M., Mayhew, C., & Bohle, P. (2001). The global expansion of precarious employment, work disorganisation, and consequences for occupational health: A review of recent research. *International Journal of Health Services*, 31(2), 335–414. <https://doi.org/10.2190/607H-TTV0-QCN6-YLT4>
- Wilson, D. C., Velis, C., & Cheeseman, C. (2006). Role of informal sector recycling in waste management in developing countries. *Habitat International*, 30(4), 797–808. <https://doi.org/10.1016/j.habitatint.2005.09.005>
- Wooldridge, J. M. (2016). *Introductory econometrics: A modern approach* (6th ed.). Cengage Learning.