

# Waste Management Issues at the Kisangani Central Market, Practices and Associated Factors

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## Abstract

The aim of this study was to describe waste management practices at Kisangani's central market and the associated factors. A cross-sectional analytical study was carried out among 403 users of the Kisangani central market during the period from 01 July 2023 to 02 September 2023. It was found that 80.40% of respondents had poor waste management practices. There was an association between waste management practices and marital status, the category of respondent, the category of goods sold, knowledge of the definition of waste, the management mechanism in place and the availability of management materials and equipment. In conclusion, the proper management of waste from Kisangani's central market by its users is proving to be a serious public health problem, and several factors are involved. Insufficient financial resources to make waste bins available at all vendors' stalls, combined with the ineffectiveness of the hygiene committee, are undermining waste management at Kisangani's central market, which calls for an effective management policy from the market's managers and sufficient financial resources to alleviate the problem.

## Keywords

Associated Factor, Users, Management, Waste, Market

## 1. Introduction

Waste management has become a critical challenge worldwide, with its complexity and urgency escalating as a result of rapid urbanization, increased industrialization, and changing consumption patterns. It is estimated that approximately 11.2 billion tonnes of waste are generated globally every year. This staggering

volume not only underscores the profound impact of modern economic activities on the environment but also highlights the mounting pressure on waste management systems worldwide. The surge in waste production is exacerbated by the accelerated pace of urbanization, which, combined with the expansion of the global population, poses grave risks to both ecosystems and human health (UN, 1992). In France, for instance, a total of 38.9 million tonnes of household waste were collected in 2019, with an impressive 80% of this waste being recycled or recovered, demonstrating some of the progress made in waste management practices (WHO, 1989).

At the heart of sustainable development, the Rio Declaration establishes a fundamental principle: “human beings are at the centre of concerns for sustainable development. They have the right to a healthy and productive life in harmony with nature” (Yukalang et al., 2018). This notion is critical in the context of waste management, which remains one of the most pressing issues for environmental and public health professionals. The complex interplay between the production and disposal of waste, its impact on ecosystems, and its direct consequences on human well-being makes urban waste management an urgent global priority. The threats to human health and the environment posed by waste mismanagement are evident, underscoring the need for effective policies and strategies to address this issue (WHO, 1989).

The current environmental landscape is marked by a series of interrelated crises, including climate change, desertification, loss of biodiversity, and pollution in air, water, and soil. In particular, the accumulation of plastic waste has emerged as a severe environmental concern, contributing to the degradation of natural habitats and further endangering species and ecosystems. These environmental challenges have far-reaching implications for sustainable development, as they hinder progress toward creating resilient communities and ecosystems (UN, 1992). Since the 1990s, waste management has become an omnipresent issue, influencing daily lives and demanding solutions that balance environmental protection with societal needs (WHO, 1989). The rapid population growth, coupled with an ever-increasing consumption of goods, has resulted in a dramatic rise in the production of solid waste (Bastie & Dezert, 1980).

The theme for 2024, centered on desertification and drought resilience, highlights the increasing scale of the global environmental challenge. Approximately 40% of the Earth’s land is now degraded, which directly affects the livelihoods of nearly half of the world’s population (Bastie & Dezert, 1980). In parallel, waste management has emerged as a multifaceted issue, encompassing not only environmental and public health dimensions but also significant economic implications. According to the World Bank’s “What a Waste 2.0” report, published in 2018, the global waste generated annually is expected to increase by 70% over the next three decades. This surge is projected to result in an additional 3.4 billion tonnes of carbon dioxide emissions by 2050, further intensifying the climate crisis (Ranzi et al., 2014; Sanchez, 1989).

In sub-Saharan Africa, poor waste management practices pose a severe public health threat. Inefficient waste disposal contributes to the proliferation of disease-carrying vectors, such as mosquitoes, rodents, and flies. The rapid and often unplanned urbanization of cities in developing countries compounds these risks, creating environments where inadequate waste management systems cannot keep pace with population growth. The lack of proper waste treatment and disposal increases the risk of outbreaks of diseases such as malaria, cholera, and diarrhoea (Ranzi et al., 2014). This is particularly concerning in developing nations, where resources for waste management are often insufficient, and where the composition of waste has shifted from largely organic materials to more hazardous and complex materials, such as plastics and electronic waste. These materials pose both health and environmental risks, further complicating waste management efforts (Sanchez, 1989).

Recent studies from various African countries underscore the challenges faced by communities in managing household waste. For example, research conducted by Sogansa et al. (2019) in Benin revealed that over 80% of household waste is poorly managed, while a 2023 study by Avougla et al. in northern Togo found that a significant proportion of households—66.28%—dispose of their waste in streets, gutters, and open spaces, creating serious environmental and health hazards (Sogansa et al., 2019; Avougla et al., 2023). These findings highlight the urgent need for comprehensive waste management strategies that account for local conditions and the capacity of communities to manage waste effectively.

In the Democratic Republic of Congo (DRC), waste management remains a formidable challenge, compounded by institutional weaknesses and limited infrastructure. In Bukavu, a study on the socio-sanitary impacts of inadequate waste management at the Shabunda central market found that 100% of respondents were unaware of the existence of formal landfill sites and public latrines in the area. Similarly, a study conducted at Kadutu market revealed that 86.1% of participants recognized the risks associated with improper waste disposal but faced barriers to effective waste management. The national Ministry of Urban Planning and Housing in the DRC has acknowledged that cities like Kisangani face significant challenges in managing solid and liquid waste, with a low waste disposal rate of only 43.2%, putting public health at risk (Ministère National de l'Urbanisme et Habitat, 2020).

In Kisangani, a 2023 study of municipal markets revealed the catastrophic effects of poor waste management, placing traders, consumers, and market authorities at risk of health crises and potential epidemics (Salumu et al., 2023). This situation emphasizes the need for immediate intervention to improve waste management practices and protect public health.

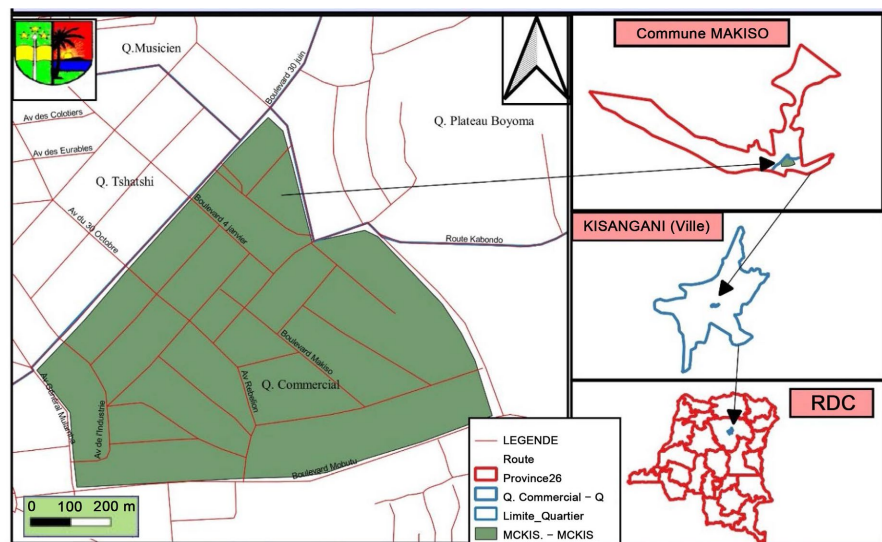
The goal of this study is to assess the factors contributing to inefficient waste management practices in Kisangani's central market and to propose strategies for improving the waste management system in the city. By identifying key challenges and potential solutions, this research aims to inform local policies and contribute

to the development of more sustainable and health-conscious waste management practices.

## 2. Materials and Methods

### 2.1. Study Framework

The study was conducted in the city of Kisangani, which has an estimated population of 1,484,000 (World Population Review, 2023). The study site chosen was the Marché Central de Kisangani (Figure 1), selected for its geographical accessibility, its size and its high footfall compared with other markets in the city. It is located in the commune of Makiso, in the centre of Kisangani, and represents a vital crossroads, welcoming people from various neighbourhoods thanks to the presence of public transport stops serving all the communes.



**Figure 1.** Map of the central market in Kisangani.

### 2.2. Study Population

The study population was made up of various stakeholders present at the Marché Central in Kisangani, including traders, customers, members of the hygiene committee and market managers.

### 2.3. Study Period

The survey took place between 1 July 2023 and 2 September 2023.

### 2.4. Type of Study

This was an analytical cross-sectional study.

### 2.5. Sampling

#### 2.5.1. Sample Size

The sample size was determined using simple random sampling, according to the

Schwartz formula below:

$$n = \frac{Z_{1-\alpha/2}^2 P(1-P)}{d^2}$$

Given that the proportion of Kisangani Central Market users was unknown ( $p = 50\%$ ), a  $Z$  coefficient of 99% (1.96), a tolerated margin of error of 5% and an expected non-response rate of 5%, the total sample size was estimated at 403 participants.

This sample was divided between the different groups of market users: vendors, customers, members of the hygiene committee and market managers.

### 2.5.2. Sampling Technique

Sampling was carried out by convenience. Data was collected as follows:

- 5 managers and 8 members of the hygiene committee were interviewed at their places of work.
- 195 vendors were interviewed directly at their stalls.
- 195 customers were interviewed in the vicinity of the stalls where they made their purchases.
- To ensure that the vendors were representative, the market was stratified into five groups according to the type of goods sold: vegetables, meat and poultry, second-hand goods, sundries and restaurants. Each stratum was made up of 39 vendors and 39 customers.

### 2.5.3. Inclusion Criteria

To be included in the study, participants had to belong to one of the following categories:

- Vendor present at the Kisangani Central Market on the day of the survey and available to answer the questionnaire.
- Customer present at the Kisangani Central Market on the day of the survey and available to answer the questionnaire.
- Member of the market's hygiene committee present on the day of data collection and available to answer the questionnaire.
- Market manager present on the day of data collection and available to answer the questionnaire.

## 2.6. Variables of Interest

### ❖ Dependent variable:

**Waste management practice:** This is considered "GOOD" when the respondent answers 60% of the questions about good waste management practice correctly, and "POOR" when the respondent obtains less than 60% correct answers.

### ❖ Independent variables:

- **Socio-demographic characteristics:** age, gender, level of education, marital status, category of goods sold, and category of respondent.
- **Users' level of knowledge about waste management:** classified as GOOD if the respondent answers at least 80% of the questions correctly, AVERAGE if

the respondent obtains between 50% and 79% correct answers, and POOR if the respondent answers less than 50% of the questions correctly. In addition, knowledge includes the definition of waste and associated risks, as well as illnesses linked to poor waste management.

- **Respondents' assessment of waste management:** assessed through questions on the waste management mechanism put in place by market managers, the availability of equipment (bins, wheelbarrows, public dumps, etc.), and the causes identified for poor waste management.

## 2.7. Data Collection Technique

The data was collected by means of guided interviews, using a pre-established survey form on the Kobotoolbox software, downloaded into the ODK Collect application. This method enabled the information to be collected in a structured and fluid manner.

## 2.8. Data Analysis

The data was analysed using STATA 13 software. The analysis was carried out overall and by stratum, in order to compare information and identify associated factors. Proportions were used to describe respondents' knowledge, practices and judgements regarding waste management, as well as the socio-demographic characteristics of users. Age, which was symmetrically distributed, was expressed as a mean and standard deviation, while seniority, which was asymmetric, was presented as a median and interquartile range. The Pearson chi-square test was used to examine the links between waste management practices and the socio-demographic characteristics, knowledge and judgements of the respondents.

## 2.9. Ethical Considerations

The study was approved by the ethics committee of the University of Kisangani. A research form was issued by the Faculty of Medicine and Pharmacy, and validated by the town hall and the management of the Marché Central de Kisangani. Informed consent was obtained from the participants before each interview. We also guaranteed the confidentiality and anonymity of the data collected.

## 3. Results

### 3.1. Socio-Demographic Parameters

**Table 1** shows the socio-demographic characteristics of the respondents.

**Table 1.** Distribution of respondents by socio-demographic parameters.

PARAMETERS	FREQUENCY (n = 403)	PERCENTAGE
Age range	30.47 (11.09)	
11 - 29	228	56.58
30 - 49	138	34.24

**Continued**

≥50	37	9.18
Gender		
Female	267	66.25
Male	136	33.75
Level of study		
No	56	13.90
Primary	96	23.82
Secondary	180	44.67
Higher/university	71	17.62
Marital status		
Single	218	54.09
Married	135	33.50
Divorced	19	4.72
Widow	31	7.69
Category of respondent		
Member of the Hygiene Committee	8	1.99
Market manager	5	1.24
Customer	195	48.39
Sales	195	48.39
	Age = 5 (10 – 3)	
Category of goods sold		
Vegetables	78	19.35
Friperie	78	19.35
Restaurants	78	19.35
Meat/Poultry/Fish	78	19.35
Other articles	91	22.58

This table shows that the average age of our respondents was 30.47 years, with the majority in the 11 to 29 age bracket, predominantly female, most with secondary education and all single. The median age according to length of service was 5 years.

## 3.2. Knowledge of Waste Management

### 3.2.1. Level of Knowledge

**Table 2** shows the level of knowledge of the respondents.

**Table 2.** Distribution of respondents' level of knowledge by category.

Level of knowledge	Number (n = 403)	Percentage
Low	326	80.89
Medium	73	18.11
Good	4	0.99

**Table 2** shows that the majority of our respondents had a low level of knowledge, with only 0.99% displaying a good level of knowledge.

### 3.2.2. Knowledge of the Risks and Illnesses Associated with Poor Waste Management

**Table 3** shows the distribution of respondents' knowledge of the definition of waste and the risks and illnesses associated with poor waste management in Kisangani's central market.

**Table 3.** Distribution according to knowledge of risks associated with poor waste management.

VARIABLE	NUMBER (n = 403)	PERCENTAGE
Knowledge of the definition		
YES	65	16.13
NO	338	83.87
Risk awareness		
YES	352	87.34
NO	51	12.66
Knowledge of diseases		
YES	251	62.28
NO	152	37.72

**Table 3** shows that more than half of our respondents did not know the definition of waste, most of them had a good knowledge of the risks associated with poor waste management and the majority knew about the diseases caused by poor waste management.

### 3.3. Waste Management Practices

**Table 4** assesses respondents' waste management practices by category.

**Table 4.** Distribution of respondents according to practice.

Practice	Number (n = 403)	Percentage
Good	79	19.60
Wrong	324	80.40

**Table 4** shows that the majority of respondents had poor waste management practices.

### 3.4. Respondents' Views on Waste Management at the Kisangani Central Market

**Table 5** shows the respondents' assessment of waste management at Kisangani's central market.

**Table 5.** Respondents' assessment of waste management.

PARAMETERS	NUMBER (n = 403)	PERCENTAGE
Management mechanism put in place		
Effective	210	52.11
Ineffective	193	47.89
Sufficient equipment and materials		
YES	131	32.51
NO	272	67.49
Causes of poor management		
Lack of penalties	73	18.11
Ignorance of users	44	10.92
Ineffective hygiene committee	23	5.71
Lack of waste disposal sites	103	25.56
Lack of funding	160	39.70

**Table 5** shows that more than half of our respondents considered the management mechanism put in place by the market managers to be effective, but the majority found the materials and equipment used for waste management at Kisangani's central market to be inadequate. The table also shows that the majority of respondents attributed the poor waste management observed at Kisangani's central market to a lack of funding, followed by a lack of waste disposal sites, while only a minority attributed it to the ineffectiveness of the hygiene committee.

### 3.5. Bi-Variate Analysis

#### 3.5.1. Association between Practice and Socio-Demographic Parameters

**Table 6** shows the associations between the variables representing the socio-demographic characteristics of the respondents and their waste management practices.

**Table 6.** Association between practice and socio-demographic parameters.

VARIABLE	WASTE MANAGEMENT PRACTICES			P-Value
	GOOD n (%)	BAD n (%)	TOTAL n (%)	
Age				
11 - 29	42 (53.16)	186 (57.41)	228 (56.58)	0.736
30 - 49	30 (37.97)	108 (33.33)	138 (34.24)	
≥50	7 (8.86)	30 (9.26)	37 (9.18)	
Total	79 (100.00)	324 (100.00)	403 (100.00)	
Gender				
Female	48 (60.76)	219 (67.59)	267 (66.25)	0.249

**Continued**

Male	31 (39.24)	105 (32.41)	136 (33.75)	
TOTAL	79 (100.00)	324 (100.00)	403 (100.00)	
Level of study				
No	8 (10.13)	48 (14.81)	56 (13.90)	
Primary	17 (21.52)	79 (24.38)	96 (23.82)	
Secondary	39 (49.37)	141 (43.52)	180 (44.67)	0.612
Higher/university	15 (18.99)	56 (17.28)	71 (17.62)	
TOTAL	79 (100.00)	324 (100.00)	403 (100.00)	
MARITAL STATUS				
CELIBATORY	31 (39.24)	187 (57.72)	218 (54.09)	
MARIE(E)	32 (40.51)	103 (31.79)	135 (33.50)	
DIVORCE (E)	6 (7.59)	13 (4.01)	19 (4.71)	0.035*
VEUF (VE)	10 (12.66)	21 (6.48)	31 (7.69)	
TOTAL	79 (100.00)	324 (100.00)	403 (100.00)	
Category of respondent				
Member of the Hygiene Committee	0 (0.00)	8 (2.47)	8 (1.99)	
Market manager	0 (0.00)	5 (1.54)	5 (1.24)	
Customer	11 (13.92)	184 (56.79)	195 (48.39)	0.000*
Sales	68 (86.08)	127 (39.20)	195 (48.39)	
TOTAL	79 (100.00)	324 (100.00)	403 (100.00)	
Category of goods sold				
Vegetables	11 (13.92)	67 (20.68)	78 (19.35)	
Friperie	28 (35.44)	50 (15.43)	78 (19.35)	
Restaurants	18 (22.78)	60 (18.52)	78 (19.35)	
Meat/Poultry/Fish	1 (1.27)	77 (23.77)	78 (19.35)	0.000*
Other articles	21 (26.58)	70 (21.60)	91 (22.58)	
TOTAL	79 (100.00)	324 (100.00)	403 (100.00)	

**Table 6** shows that the practice of managing waste produced at the central market in Kisangani was statistically linked to marital status, the category of respondents and the category of goods sold.

### 3.5.2. Association between Respondents' Knowledge, the Management Mechanism and Waste Management Practices

**Table 7** shows the correlation between waste management practices and respondents' knowledge, the management mechanism in place and the availability of waste management materials.

**Table 7** shows that knowledge of what waste is, the availability of materials (dustbins, wheelbarrows, etc.) and equipment (PPE) and the effectiveness of the

mechanism set up to manage waste from Kisangani's central market are closely linked to waste management practices.

**Table 7.** Association between respondents' knowledge, management mechanism and waste management practices.

VARIABLE	WASTE MANAGEMENT PRACTICE			P-Value
	GOOD n (%)	BAD n (%)	TOTAL n (%)	
Knowledge of waste				
YES	24 (30.38)	41 (12.65)	65 (16.13)	<b>0.000*</b>
NO	55 (69.62)	283 (87.35)	338 (83.87)	
Total	79 (100.00)	324 (100.00)	403 (100.00)	
Risk awareness				
YES	7 (8.86)	44 (13.58)	51 (12.66)	0.258
NO	72 (91.14)	280 (86.42)	352 (87.34)	
Total	79 (100.00)	324 (100.00)	403 (100.00)	
Knowledge of diseases				
YES	45 (56.96)	206 (63.58)	251 (62.28)	0.276
NO	34 (43.04)	118 (36.42)	152 (37.72)	
Total	79 (100.00)	324 (100.00)	403 (100.00)	
Level of knowledge				
Low	67 (84.81)	259 (79.94)	326 (80.89)	0.444
Medium	12 (15.19)	61 (18.83)	73 (18.11)	
Good	0 (0.00)	4 (1.23)	4 (0.99)	
Total	79 (100.00)	324 (100.00)	403 (100.00)	
GD mechanisms put in place				
Effective	57 (72.15)	153 (72.15)	210 (52.11)	<b>0.000*</b>
Ineffective	22 (27.85)	171 (52.78)	193 (47.89)	
Total	79 (100.00)	324 (100.00)	403 (100.00)	
Equipment and materials				
Available at	42 (53.16)	89 (27.47)	131 (32.51)	<b>0.000*</b>
Not available	37 (46.84)	235 (72.53)	272 (67.49)	
Total	79 (100.00)	324 (100.00)	403 (100.00)	

## 4. Discussions

### 4.1. Socio-Demographic Characteristics

Our study reveals that 56.58% of the participants were in the 11 - 29 age group, with an average age of 30.47 years. These findings differ from those of Modesta Banda, who studied the social factors linked to improper waste disposal at Lilongwe Central Market (Banda, 2014), where 36% of participants were aged

between 36 and 45 years. Similarly, Ndachetere M.J. et al., in their research on waste management at the Kadutu central market in Bukavu, found a predominance of participants aged 31 - 45, accounting for 42.4% of their sample (Ndachetere et al., 2022). The younger age distribution in our study could reflect the fact that younger individuals are generally more engaged in market activities, thus more likely to participate in such research. This difference in age demographics highlights the dynamic nature of market populations and the potential for different waste management challenges across age groups.

Regarding gender, 66.25% of respondents were women, which aligns with the findings of Rafiu Babatunde Ibrahim et al. in their study of sanitation practices in Akure, Nigeria, where 67.5% of participants were women (Ibrahim et al., 2019). In contrast, Kitoga Mwenyi Josué et al. (2021), studying waste management in Shabunda's central market, found a male-dominated group (70%). This variation might stem from cultural and economic factors, including the specific involvement of women in the markets of Kisangani, where women often dominate retail and food-related trade activities. This high female participation could influence the types of waste produced and the disposal practices in the market.

In terms of education, 44.67% of respondents had secondary education, a result that contrasts with Awa Kanté's study in Banankabougou, where 61.1% of participants had never attended school (Kanté, 2019). The higher literacy rate in our study environment could point to greater access to educational opportunities and possibly a higher level of public awareness regarding waste management practices, which would be expected to contribute to better overall waste management knowledge and behavior.

Marital status also varies across regions; 45.41% of participants were single, whereas Ndachetere M.J. et al. found that 70.8% of their respondents in Bukavu were married (Ndachetere et al., 2022). This difference may be attributed to the younger demographic in Kisangani, where economic pressures, including unemployment or unstable income from market activities, delay marriage compared to other regions.

## 4.2. Knowledge of Waste Management

Our study found that 80.89% of participants had a low level of knowledge regarding waste management. This result stands in stark contrast to the findings of Anthony C. Iwu et al. in Nigeria, where 47.4% had an average level of knowledge and 33.4% had a good understanding of waste management (Iwu et al., 2016). However, our results are closer to those of NM Naim et al., who found that 70% of participants in Malaysia had an average level of knowledge (Naim & Abdul Rahman, 2020). The substantial difference in knowledge levels can be attributed to multiple factors, including the limited educational programs on waste management, the absence of training initiatives for traders, and the lack of formalized waste management policies in Kisangani. A general lack of public awareness and inadequate access to information could significantly hinder efforts to improve

waste management practices. Moreover, while a majority of participants (87.34%) acknowledged the risks associated with poor waste management, only 62.28% understood its health consequences. This disparity suggests that while general awareness of waste-related risks exists, the deeper understanding of specific health impacts remains insufficient, limiting the effectiveness of preventive measures.

### 4.3. Waste Management Practices

In this study, 80.40% of participants engaged in inappropriate waste management practices. This figure is notably higher than the 44.8% of participants exhibiting inappropriate practices in Anthony C. Iwu et al.'s study (Iwu et al., 2016). The discrepancy may stem from differences in waste management infrastructure and participant education in Kisangani. McCauley et al. observed similar trends in Kenya, where waste management practices were directly related to available resources, with better-equipped traders more likely to adopt proper practices (McCauley et al., 2019). This highlights the role of infrastructure availability—specifically waste disposal equipment and access to organized waste collection services—in influencing market waste management behaviors.

### 4.4. Respondents' Assessment of Waste Management

Almost half (47.89%) of participants considered the waste management mechanisms at Kisangani's central market ineffective, with 67.49% believing the waste management equipment was inadequate. Additionally, 39.70% identified lack of funding as a major contributor to poor practices, followed by the absence of waste disposal points (25.56%) and the ineffectiveness of hygiene committees (5.71%). These findings differ from Kitoga et al., who reported that poor waste management in Shabunda was largely attributed to the lack of waste disposal sites and public latrines. In contrast, a study by Pandey et al. in India emphasized the need for clear management policies and sufficient investment in waste management infrastructure (Pandey et al., 2020). This suggests that in Kisangani, the absence of a coordinated policy, along with insufficient financial resources, hampers efforts to establish an efficient waste management system.

### 4.5. Factors Associated with Poor Waste Management

Our study identifies several key factors contributing to poor waste management at Kisangani's central market, including marital status, participant category, type of goods sold, knowledge of waste, and the availability of materials like bins and wheelbarrows. Interestingly, this finding diverges from NM Naim et al.'s study, where waste management practices were primarily linked to age (Naim & Abdul Rahman, 2020). Anthony C. Iwu et al. also identified a relationship between waste management practices and participants' education and knowledge of waste management (Iwu et al., 2016). These differing results underline the complex nature of waste management, where multiple socio-economic and infrastructural factors interact.

Akinyemi et al. in Nigeria found a strong correlation between traders' age,

gender, and length of activity and the quality of waste management practices (Akinyemi et al., 2021), while Dube et al. in Zimbabwe emphasized the importance of local authority involvement and trader training for better waste management outcomes (Dube et al., 2019). Our study similarly suggests that a lack of understanding of waste types and their impact on health, combined with limited waste disposal infrastructure, exacerbates the problem.

The persistent low level of knowledge about waste types and their risks could be a critical factor driving improper waste disposal practices. Participants' general awareness of the negative consequences of poor waste management does not translate into effective practices due to the inefficacy of the management mechanisms in place. This is exacerbated by the lack of taxes, penalties, and incentives to encourage proper waste disposal. Comparative studies across different regions show that regardless of cultural or geographical contexts, the absence of infrastructure, knowledge gaps, and weak local authority involvement remain central challenges in improving waste management. Addressing these factors is crucial for enhancing the effectiveness of waste management systems at Kisangani's central market.

## 5. Conclusion

This study provided a detailed picture of waste management at Kisangani's central market, highlighting several key aspects relating to the socio-demographic characteristics of traders, their knowledge and practices in terms of waste management, and the factors influencing the effectiveness of management mechanisms. The results indicate a low level of knowledge about waste management and a prevalence of inappropriate practices, despite an awareness of the health risks associated with poor waste management. The inefficiency of management mechanisms and the lack of appropriate infrastructure, particularly dustbins and dumpsites, were identified as major obstacles to effective waste management. In addition, socio-demographic factors such as marital status, education and the type of goods sold were associated with less appropriate waste management practices. These results highlight the need for an integrated approach that combines greater awareness among traders, improved infrastructure and the involvement of local authorities to promote more responsible and sustainable waste management practices within the market. Comparisons with other regional studies show that although different contexts exist, similar challenges persist in waste management at urban market level.

## Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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