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HOUSEHOLD WASTE MANAGEMENT IN THE CITY OF BUKAVU: EDUCATION HYGIENE AND SANITATION FOR SUSTAINABLE DEVELOPMENT. SPECIFIC CASE OF THE PANZI DISTRICT IN THE COMMUNE OF IBANDA.

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SUMMARY

This study aims to explore the mode of household waste management in the city of Bukavu by highlighting those of the Panzi district. To do this, it makes descriptive analyses on the primary data collected using a survey questionnaire addressed to 150 households in the Panzi district, city of Bukavu on the management of household waste. The analysis results revealed that plastic waste dominates the production, representing 35.4% of waste, while 78.7% of households do not have appropriate bins, which pushes them to adopt unhygienic management practices. The majority of residents use well water, increasing the risks of contamination. In addition, the absence of dumps and varied management methods, with 48.7% of households practicing stray waste, aggravate health problems. The consequences are alarming, with a high prevalence of diseases such as malaria and typhoid fever, highlighting the urgency of improving waste management infrastructure to protect the health of residents and the environment.

Keywords: Management, Household waste, hygiene and sanitation

1. INTRODUCTION

The problem of waste management is a crucial issue for modern societies, impacting both public health and the environment [1] . Inefficient management can lead to the accumulation of solid waste in urban spaces, causing odor nuisances and health risks [2], [3] . Soil and water pollution is also a direct consequence of poor waste management, affecting ecosystems and biodiversity [4] . To address these problems, it is essential to implement efficient collection, sorting and recycling systems [5] .

This is becoming increasingly difficult [1] given the increasing amount of waste produced each year. In 2019, some 53.6 million tonnes of plastic waste were produced worldwide, an increase of 21% over the last five years, and we must consider collecting this waste for recycling, but the large quantity ends up in lakes, seas and oceans [5] . Therefore, the attention paid to the issues of plastic waste in aquatic environments is becoming increasingly important [6], [7] .

These issues are particularly important in African countries where sanitation has often remained the poor relation of development [2], [8] ; generating little interest and attracting little public investment [9], [10] . In the DRC, for example, the government has not become aware of the scale of the problem of the production and management of plastic waste with a view to cleaning up cities [11] . Cities are developing without a rigorous sanitation plan, without a network for managing waste that ends up in waterways (lakes, rivers) .

In South Kivu, and more specifically in Bukavu, waste management is a real headache for both residents and local authorities [2], [12] . In the city streets, improvised dumps are visible on main roads, in playgrounds, and around markets [13] . Every day, more than 600 tons of waste are generated, with an average of 2 kg per household [5] . Although 95% of this waste is biodegradable, only 12.5% reaches landfills, leaving 82.5% to wander the streets [2], [13] . Out of approximately 277,400 households, only 3,000 are subscribed to waste disposal services, thus showing a lack of collective commitment to this problem [1], [2] .

The situation is particularly alarming around the markets of Nyawera , Kadutu and Beach Muhanzi , where waste is accumulating, creating unbearable odor nuisances for users [14] . Of the 11 markets in Bukavu, only six are managed by associations in partnership with the town hall, and with a maximum of four vehicles for the entire town, logistics are insufficient [12] . This low involvement, combined with organizational problems, makes each phase of waste management from production to disposal extremely difficult [2] . A striking example is the Panzi neighborhood in the commune of Ibanda , where residents are confronted daily with an overwhelming reality. The need for community mobilization and concerted action is more urgent than ever to improve this situation.

Thus, this study aims to explore the mode of household waste management in the city of Bukavu by highlighting those of the Panzi district . More specifically, this study aims to produce an empirical reference to guide policies for the management of household waste (solid and liquid) and the recycling of said waste.

2. METHODOLOGY

To explore waste management in Panzi district , we conducted a survey of 150 households in Panzi district selected non-probabilistically [15] . The collection tool used is the survey questionnaire containing questions related to the mode of household waste management as well as the effects of waste management on hygiene and sanitation in Panzi .

For our study, we used several analysis methods, including description and qualitative analysis with SPSS.26 statistical software. These approaches allowed us to better understand waste management practices in Panzi , identify community needs, and propose appropriate solutions. By focusing on the realities experienced by residents, we hope to foster constructive discussion on possible improvements and strengthen community engagement for a healthier environment.

3. RESULTS

Table1. Estimated quantity of waste produced per month.

No.	*CATEGORY*	*QUANTITY*	*EFFECTIVE*	*%*
01	Plastic waste	1kg to 15kg	53	35.4
02	Solid waste	15kg to 30kg	31	20.6
03	Liquid waste	30kg to 40kg	33	22
04	Electronic waste	40kg to 50kg	21	14
05	Others	50kg and over	12	08
TOTAL			150	100

Source: Field data

The table shows an estimate of the quantities of waste produced per month in different categories within households in the Panzi neighborhood . It is observed that plastic waste constitutes the most significant category, representing 35.4% of all waste, with a quantity varying between 1 kg and 15 kg. This predominance of plastic waste underlines the urgency of implementing reduction and recycling strategies, given their major environmental impact.

As for the other categories, solid and liquid waste follow closely behind, with 20.6% and 22% of total production, respectively. Electronic waste, although less numerous, represents 14% of the quantity produced, also signaling a growing need for appropriate management of this specific waste. Finally, the "Other" category, which includes waste weighing more than 50 kg, is not insignificant, although it represents only 8% of the total. This distribution highlights the diversity of waste generated and the need for a targeted approach for each type, in order to improve overall waste management and, in turn, preserve hygiene and sanitation.

Table 2. Household waste management in Panzi and its consequences

Variables	***Terms and conditions***	***Frequency***	***%***
Trash Existence	YES	32	21.3
	NO	118	78.7
TOTAL		150	100
Type of water used	REGIDESO faucet	13	08.7
	Spring water	43	28.7
	River water	26	17.3
	Well water	68	45.3
TOTAL		150	100
Existence of a dump in the environment	YES	0	0
	NO	150	100
TOTAL		150	100
Waste management method	Composting	55	36.7
	Incineration	14	9.3
	Wandering	73	48.7

	Others	8	5.3
TOTAL		150	100
Consequences of poor waste management	Cholera	6	4
	Amoebiasis	12	8
	Malaria	76	50.7
	Typhoid fever	52	34.7
	Other diarrhea	4	2.6
TOTAL		150	100

Source: Field data

Table 2 highlights the situation of household waste management in Panzi and the resulting consequences. Looking at the first variable, it is striking to note that an overwhelming majority of households, 78.7%, do not have garbage cans in the Panzi neighborhood . This means that many households are managing without an appropriate means of managing their waste, which may lead them to adopt unhygienic practices. This lack of garbage cans contributes to a difficult and unsanitary living environment, where waste accumulates and becomes a source of health problems.

Regarding the water used by residents, the majority, 45.3%, rely on well water, closely followed by spring water at 28.7%. This reliance on untreated water sources can exacerbate the risk of contamination, especially in a context where waste management is already problematic. The use of substandard water, combined with poor waste management, creates a breeding ground for disease, making the need to improve local infrastructure all the more urgent.

The complete absence of dumpsites in the neighborhood is also revealing: 100% of respondents indicated that there are no designated waste disposal sites. This means that waste is not managed in an organized manner, which affects the cleanliness of public spaces and can lead to odor and visual nuisances. Households are therefore forced to dump their waste anywhere, increasing the risk of pollution and disease in the community.

Waste management methods vary considerably, with 48.7% of households practicing stray waste disposal, while only 36.7% opt for composting, and 9.3 % for incineration. This diversity of methods demonstrates a lack of uniformity and awareness regarding best waste management practices. The prevalence of stray waste disposal is particularly worrying, as it reflects a lack of resources and education regarding sustainable management methods, thus contributing to the accumulation of waste in the environment.

The consequences of this poor waste management are alarming. Nearly 50.7% of respondents reported cases of malaria, while 34.7% reported typhoid fever. These statistics clearly illustrate the link between waste management and public health. Diseases such as cholera and amoebiasis, although less common, remain a concern. It is therefore imperative to act to improve waste management in Panzi , not only for the sake of cleanliness, but also for the health and well-being of residents.

4. DISCUSSION

The results of our study reveal crucial issues that align with those observed in other research. Our analyses demonstrate that plastic waste represents 35.4% of total production, highlighting a well-known problem on a global scale: plastic pollution. This situation is confirmed by recent studies [5] , which highlight the devastating

effects of plastics on our ecosystems. It is therefore urgent to develop reduction and recycling strategies that specifically address the needs of the Panzi community .

Looking at the pattern of household waste management in Panzi , it is striking to note that 78.7% of households do not have dustbins, which is a major obstacle to proper waste management. This lack encourages residents to adopt unhygienic practices, leading to accumulation of waste in their environment. Research, such as [2], [13] , indicates that poor infrastructure exacerbates public health problems, a reality we also observe in Panzi , where 50.7% of respondents report cases of malaria.

Furthermore, analysis of water sources used by residents shows that 45.3% of them rely on well water, which increases the risk of contamination, especially in a context of ineffective waste management. This situation recalls the warnings of [12] and [2] on the dangers of untreated water, which, combined with poor waste management, promotes the spread of diseases. The results of our study highlight the need to improve access to safe drinking water sources and to establish effective waste management systems. It is essential to act quickly to protect the health of communities and develop a healthier environment for all.

5. CONCLUSION

Waste management in the Panzi neighborhood represents a major challenge that directly impacts the health of residents and the environment. The results of our study highlight an alarming situation: the predominance of plastic waste, almost all households without access to trash receptacles, and dependence on potentially contaminated water sources. These factors contribute to an unsanitary environment where diseases such as malaria and typhoid fever are becoming endemic.

It is crucial to recognize that responsibility for this situation lies not only with the community, but also with local authorities, who must establish adequate waste management infrastructure. Increasing awareness among residents about sorting, composting, and recycling practices is essential. Furthermore, improving sanitation systems and ensuring access to clean water sources are priorities that must be addressed urgently.

In conclusion, building a healthier future in Panzi requires a collaborative approach involving residents, local authorities, and non-governmental organizations. Together, we must work towards sustainable solutions that will not only manage waste effectively, but also protect public health and preserve the environment for future generations.

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