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Factors Affecting Household Solid Waste Management in Ishaka Division, Bushenyi Ishaka Municipality

Kisakye Jackline Kiboigo
Faculty of Medical Sciences and Dentistry, Kampala International University, Uganda

ABSTRACT

Effective household solid waste management is a critical challenge facing many urban centers in developing countries like Uganda. The rapid urbanization, population growth, and changing consumption patterns have led to a significant increase in solid waste generation, outpacing the capacity of local authorities to manage it properly. In Ishaka Division, Bushenyi-Ishaka Municipality, the problem of solid waste management is particularly acute, characterized by poor access for waste collection, congestion, and land tenure issues that hinder proper waste handling by residents. This study aimed to determine the factors affecting household solid waste management in Ishaka Division. A cross-sectional study was conducted using quantitative methods of data collection. The study population comprised heads of selected households, and a semi-structured questionnaire was used to collect information on socio-demographic characteristics, types of waste generated, waste management practices, and attitudes towards solid waste management. The findings revealed that the major categories of waste generated were food remains (41%), plastics (28%), and paper (20%). However, proper waste segregation and storage practices were largely unsatisfactory, with the majority of households (60%) storing waste in polythene bags and sacs, and only 36% practicing any form of waste separation. Crude dumping (32%) and burning (24%) were the most common waste disposal methods, while organized collection by trucks was practiced by only 26% of households. The study also found that women were primarily responsible for household waste management (59%), and residents expressed concerns about the health and environmental impacts of poor solid waste practices, particularly the presence of disease vectors and associated health risks. Nevertheless, the respondents generally had a positive attitude towards improving waste management, with most acknowledging the importance of public education and their role as community members in addressing the problem. The findings suggest that improving household solid waste management in Ishaka Division requires a multifaceted approach that addresses the socio-demographic factors, waste generation patterns, and the knowledge and attitudes of the residents. Recommendations include strengthening waste collection and disposal infrastructure, promoting waste segregation and recycling, and engaging the community through awareness campaigns and educational programs. By implementing such measures, local authorities can work towards developing sustainable solid waste management practices and mitigating the environmental and public health risks associated with poor waste management in the division and similar urban settings in Uganda.

Keywords: Solid waste management, Household waste, Socio-demographic factors, Waste generation, Waste disposal practices

INTRODUCTION

The rapid urbanization and economic development experienced by many developing countries have brought about substantial changes in consumption patterns and lifestyles, leading to a significant increase in the generation of household solid waste [1, 2]. This surge in waste production has overwhelmed the capacity of local authorities to effectively manage the collection, transportation, and disposal of solid waste in a safe and environmentally sustainable manner [3, 4]. Ishaka Division, located within Bushenyi-Ishaka Municipality in southwestern Uganda, is no exception to this growing challenge. As the municipality continues to urbanize and the population expands, the management of household solid waste has become an increasingly pressing issue. The division is characterized by poor accessibility for waste collection vehicles, overcrowding, and land tenure systems that hinder residents from implementing proper waste management practices. These factors, coupled with the limited financial and technical resources available to the local authorities, have resulted in a situation where a significant portion of the solid waste generated is either burned on the streets or indiscriminately dumped in drainage channels, marshy areas, and vacant plots [5, 6]. The mismanagement of household solid waste in Ishaka Division poses serious environmental and public health risks. Uncontrolled dumping and burning of waste can lead to the contamination

of surface and groundwater, ecosystem degradation, soil pollution, and the release of greenhouse gases [2, 3]. These environmental impacts, in turn, contribute to the spread of vector-borne diseases, respiratory problems, and other health issues among the residents. Addressing the factors that influence household solid waste management in Ishaka Division is, therefore, crucial for improving the overall environmental and public health conditions in the area. The existing literature suggests that the factors affecting household solid waste management are multifaceted and often interrelated [7, 8]. Socio-demographic characteristics, such as age, level of education, occupation, and household size, have been shown to influence the generation and management of solid waste [9, 10]. For instance, higher levels of education and income have been associated with improved waste segregation and recycling practices, as individuals with greater awareness and resources are more likely to engage in sustainable waste management behaviors [1, 11].

The types of solid waste generated in households also play a critical role in determining the appropriate waste management strategies. The presence of a high proportion of biodegradable waste, such as food remains, presents opportunities for waste recovery through separation and composting, while the prevalence of non-biodegradable materials, like plastics, poses significant challenges for collection, transportation, and disposal [10, 12]. Moreover, the knowledge and attitudes of the residents towards solid waste management are crucial in shaping their practices and participation in waste management initiatives [1, 11]. A lack of awareness about the importance of proper waste disposal, the consequences of poor management, and individual responsibilities can lead to apathetic attitudes and suboptimal waste management behaviors [13, 14]. Understanding the factors that influence household solid waste management in Ishaka Division is essential for developing effective and sustainable waste management strategies. By identifying the key determinants of waste generation, storage, and disposal practices, policymakers and local authorities can tailor interventions to address the specific challenges facing the division [15, 16]. This research study aims to explore the factors affecting household solid waste management in Ishaka Division, Bushenyi-Ishaka Municipality, with the goal of informing the development of comprehensive and evidence-based solutions. The findings of this study can contribute to the ongoing efforts by local and national authorities in Uganda to improve solid waste management and mitigate the associated environmental and public health risks in urban areas. Through a thorough investigation of the socio-demographic characteristics, waste generation patterns, and the knowledge and attitudes of the residents, this study seeks to provide a deeper understanding of the complex dynamics that shape household solid waste management practices in Ishaka Division.

METHODOLOGY

Study Design

The study was a cross-sectional study that used quantitative methods of data collection and analysis.

Study Area

The study was conducted in Ishaka Division, Bushenyi Ishaka Municipality. Open dumping of wastes and burning are main waste disposal methods used in the study area. This area is congested and unplanned, characterized by poor access to social amenities and poor solid waste management practices, and inhabited by people of low socioeconomic status.

Study Population

The study populations were heads of households in Ishaka Division of Bushenyi-Ishaka Municipality. The study population comprised of all households in Ishaka Division Bushenyi Ishaka municipality; with household heads being the respondents. In situations where the household heads were not available, their spouse or another present consenting member of the household responded to the questionnaire. A total of 100 respondents participated in the study.

Sample Size Estimation

To determine the sample size of the researcher used Fisher's formula.

$$n = \frac{Z^2 pq}{d^2}$$

Where n= desire sample size.

Z= standard normal deviation as 1.96 at a confidence level of 95%

P = prevalence of characteristic under investigation, since there isno base line, 50% was
Used to give the widest possible variability.
Therefore, =0.5 and q=standardized1.0-0.5=0.5

d=margin of error 0.05 or5%.

Therefore, $n = \frac{(1.96/x0.5x0.5)}{(0.05)2} = 384$

Since the number of households in the division of study is less than I0,000 i.e.163 (2014 national Population census)

$$nf = \frac{n}{1+n/N}$$

Where, nf = desire sample size for population less than10,000
n=calculated sample size for population greater than10,000
N=Target population.

$$nf = \frac{384}{1+384/163}$$ nf= 114

However, 100 households were visited and respondents who met the inclusion criteria and also consented were interviewed.

Sampling Technique

Ishaka Division of Bushenyi-Ishaka Municipality has four wards and by systematic random sampling two wards were selected. Depending on the size of the wards, a sampling interval was determined and systematic sampling was used to select households that participated in the study. A relative central point in each zone was established from which the researcher moved spirally outwards and administered the questionnaire to one respondent from each selected household.

Data Collection Techniques

A semi-structured interviewer administered questionnaire was used to collect quantitative data from the respondents. The questionnaire was written in English but questions were translated into the local languages like Runyakitara at the time of interviewing so that the respondents could understand and give appropriate responses. The responses were then translated and written in English by researcher herself during the interviews. Filled-in questionnaires were checked for completeness and consistency of the responses. Open ended questions were post-coded and entered on the questionnaire. Data entry was done using Microsoft Excel. Editing of the data was done after entry by running frequencies and checking for out-of-range responses.

Data Quality Control

The data collection tool (questionnaire) was pre-tested by the researcher on residents of Nyakabirizi in Ishaka Division Bushenyi Ishaka Municipality to ensure that it was valid and reliable. The questionnaire was then appropriately adjusted by the supervisor and the researcher following the pretest.

Ethical Consideration

The researcher used an introductory letter from the dean school of Allied Health Sciences Kampala international university. This letter introduced her to the local authorities in the study area. Each respondent was free decide to or not to participate the study. Personal identity of the respondents was not made reference to.

Limitations for the Survey

A limitation of this study is that it relied on responses provided by household members and did not directly observe the waste management practices. There is thus a chance that they gave socially desirable responses in some instances.

RESULTS

Demographic Characteristics of the Respondents

The majority of the respondents were less than 30 years, most of the respondents 64 (64%) were married, 80 (80%) had attended secondary school education and 57 (57%) had lived in the study area for more than 5 years.

Table 1: Socio-demographic characteristics of respondents

Characteristics	category	Frequency	Percentage(%)
Age	<-30 years	63	63
	>30 years	37	37
Gender	Male	21	21
	Female	79	79
Marital status	Married	64	64
	Single	30	30
	Separated	06	06
Religion	Christian	65	65
	Moslem	35	35
Education level	Primary and below	20	20
	Secondary and above	80	80
Duration of the stay	< 1 year	17	17
	> 1 year to < 5 years	26	26
	> 5 years	57	57
Number of members in household	I to 4	70	70
	> 4	30	30

Categories of Solid Waste Generated in Households

The major categories of waste generated in households were food remains, 58 (41%), plastics, 39 (28%) and paper, 28 (20%).

Table 2: Categories of waste generated in households

Category	Number	Percentage(%)
Food remains	58	41
Plastics	39	28
Paper	28	20
Glass	05	04
Wood	04	03
Others	06	04

**Responses are not mutually exclusive.*

Solid Waste Storage and Segregation

Most households, 60(60%) stored their waste in polythene bags and sacs, 23 (23%) while 17 (17%) kept their waste outside their houses in the open. The majority, 64 (64%) were not carrying out any form of segregation.

Table 3: Solid waste storage and segregation

Characteristics	Category	Number	Percentage(%)
Storage of solid waste	Sac	23	23
	Polythene bag	60	60
	Open space	17	17
Segregation	Yes	36	36
	No	64	64

Frequency of Waste Collection from Households

The most common frequencies of waste collection from households were weekly, 36 (36%) and biweekly, 33 (33%).

Table 4: Frequency of Waste Collection from Households

Frequency of collection	Number	Percentage(%)
Daily	08	08
Weekly	36	36
Biweekly	33	33
Fortnightly	13	13
Monthly	07	07
Rarely	03	03
Total	**100**	**100**

Methods of Waste Management

Regarding the methods of waste management, 49(32%) disposed off their waste at the dumping site, 36 (24%) burnt it and 40 (26%) had it collected by trucks.

Table 5: Waste Management Methods

Methods of waste management	Number	Percentage(%)
Crude dumping	49	32
Burning	36	24
Collection by trucks	40	26
Others	28	18

**Responses are not mutually exclusive*

Responsible Person for Solid Waste Management

In 59 (59%) of households' women were responsible for waste management. In other households, the responsibility of waste management was on male adults 13 (13%) and housemaids, 19 (19%).

Table 6: Responsible person for the waste management

Responsible person	Number	Percentage(%)
Adult male	13	13
Women	59	59
Female children	05	05
Male children	04	04
House-maids	19	19
Total	100	100

Concerns Expressed by Residents towards Solid Waste Management

Most residents were generally concerned about solid waste management aspects assessed in the study. They mainly showed concern for presence of vectors such as mosquitoes, 92 (21%), and diseases related to poor waste disposal, 84 (20%)

Table 7: Concerns expressed by residents about solid waste management

Concerns	Number	Percentage(%)
Collection of disease vectors	92	21
Diseases related to improper disposal	84	20
Pollution of waste bodies	78	18
Blockage of drainage systems	77	18
Health risks due to burning waste	62	15
Effects on natural resources	32	08

Responses are not mutually exclusive.

Attitude Towards Solid Waste Management

Most of the respondents had a positive attitude towards improving solid waste management practices. Most, 95 (15%) mentioned that as community members, they played as important role in solid waste management in their area.

Table 8: Attitude towards solid waste management

Solid waste management aspect	Number	Percentage(%)
Public education about proper waste management is one way to reduce the problem	98	15
I play a role in waste management in the community	95	15
Regular collection of waste is the only solution to the problem	92	14
The purchase decisions I made can affect the amount of waste that my household generates.	94	15
I care. that burning waste can be had for my health and for others	91	14
Picking up waste around by neighbors hold is my responsibility as a resident.	88	14
The local authorities are not doing enough to for the problem	42	07
Other personal issues are more important to me than a waste free community.	38	06

Responses are not mutually exclusive

DISCUSSION

Poor solid waste management is among the major challenges facing urban settings in developing countries including Uganda. Proper solid waste management is one of the most cost-effective health investments in combating under-five-year-old morbidities and mortalities [17]. Therefore, determining the types of waste generated by households, solid waste disposal methods and attitudes towards solid waste management is crucial to improving solid waste management in resource-limited settings.

Socio-Demographic Characteristics

The mean age of the respondents was 31.7 years (SD= 12.7) most of the respondents, 64 (64%) were married, 80 (80%) had attended secondary school education and 57 (57%) had lived in the study area for more than 5 years. This is averagely a fairly young population that is very adaptable to new modern means of solid waste disposal. In addition, their fairly good education level means that they can appreciate proper solid waste disposal strategies. Therefore, engaging the population of Ishaka Division, Bushenyi-Ishaka Municipality on proper waste disposal is highly recommended. Since most residents had lived for more than five years in the study area. This is more or less their home or permanent residence. They would therefore be motivated to make their permanent residencies more environmentally friendly through better waste disposal practices.

Types of Solid Waste Generated

The major categories of solid waste generated in households were the easily biodegradable food remains (41%) followed by the non-biodegradable plastics (28%). This is in line with a study conducted [10] which noted that biodegradable wastes contribute the largest portion of municipal waste. Plastics are non-biodegradable and when inappropriately dumped, end up blocking drainage channels creating water pools that are convenient for mosquito breeding and generating nuisance of smell. Plastic collection and disposal practices observed among residents in this study create difficulty for recollection, recycling, and profitable reuse by recycling companies and individuals. Providing incentives for the separation and collection of plastics can ease their collection.

Methods of Solid Waste Management

Most of the solid wastes were disposed of at open dumping sites according to 40 (26%) of the respondents. This kind of disposal is likely to cause nuisances like foul smells and breeding insect vectors and vermin that endanger the health of the division dwellers and the environment. The large proportion of biodegradable wastes provides an opportunity for waste recovery through separation and composting and provides an alternative to reduce waste volumes and stress on waste collection and disposal services. These alternatives, however, were minimally practiced in our study corresponding to findings from a previous study in Nairobi [12] in which only a few households carried out waste separation at a household level. Waste reduction and other waste recovery options like waste for fuel that has been used in similar communities should be encouraged for biodegradable waste.

In this study, the majority of the respondents, 59 (59%) responded that women were responsible for solid waste management. Similar to other studies conducted in urban settings [18], solid waste management was primarily the responsibility of women and girls. Initiatives targeting improving solid waste management should therefore consider the dominant role played by women and girls in the management of solid wastes.

The Attitude of the Respondents Toward Solid Waste Management

Ishaka division dwellers were more concerned with the effects of poor solid waste management than the causes. Residents, for example, showed more concern for high vector populations and high burden of diseases related to poor solid waste management than for the presence of wastes in their neighborhood [19]. This could be an indication that community members lack sufficient knowledge of the casual relationships between poor solid waste management and its related consequences [19]. There is thus a need to create awareness among slum residents on the importance of proper solid waste management while putting emphasis on aspects with the most significant impacts on public health. Attitudes towards social responsibility on solid waste management were also low among slum residents. Whereas, most respondents felt that they were doing enough to address solid waste management in their community, they did not think it was their responsibility to pick up waste in their neighborhood. This clearly indicates that most did not understand their roles as regards solid waste management at both household and community levels further indicating the need to raise awareness about solid waste management among slum dwellers. Other studies done elsewhere have previously suggested that such awareness could increase participation in solid waste management initiatives [1].

Indeed, results from this study showed that most respondents believed that providing public education could improve the waste management situation. The division residents had a high willingness to participate in solid waste management initiatives including separation of wastes and composting. Knowing that there are groups with low willingness to participate in solid waste management improvement initiatives are aimed at helping programmers in designing awareness campaigns particularly targeting them.

CONCLUSION

Solid waste management practices such as storage and disposal practices in the division were unsatisfactory, and separation and composting were minimally practiced. The residents' practices, concerns, and attitudes indicated a lack of sufficient knowledge about good waste practices, their responsibilities, and the consequences of poor waste management. However, division residents had a high willingness to participate in waste separation and composting.

RECOMMENDATION

To enhance solid waste management in Ishaka Division, Bushenyi-Ishaka Municipality, the following recommendations could be implemented:

Firstly, providing adequate skip containers within communities would promote regular waste disposal and reduce the distance to disposal sites. Secondly, the enforcement of division waste management bylaws is essential to penalize those who dispose of waste in unauthorized areas. Thirdly, the authorities should promote recycling initiatives, encouraging both government and private sector involvement in waste management to boost recycling efforts. Lastly, engaging with residents through education and community involvement initiatives is crucial for improving solid waste practices, including waste separation and responsible disposal. These measures aim to address waste management challenges effectively within the municipality.

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