2025, vol. 12, issue 1, 69 - 83

RESEARCH ARTICLE

https://doi.org/10.5281/zenodo.15804516

FACTORS AFFECTING COMPLIANCE TO HOUSEHOLD SOLID WASTE SEGREGATION IN KASANGATI TOWN COUNCIL, UGANDA

DAVID R. MUTEKANGA [1]

WILSON BYAKUNO [2]

ISRAEL KIBIRIGE [3]

[1] Associate Professor, School of Graduate Studies, Bugema University, Uganda
http://orcid.org/0000-0002-6606-407x
[2] Graduate Assistant, School of Graduate Studies, Bugema University
[3] Professor, University of Limpopo, South Africa

ABSTRACT

Efficient segregation of waste is essential globally; however, it faces major challenges especially in the management of household solid waste. The study aimed to identify individual and institutional factors associated to compliance with household solid waste segregation at the primary source of generation in Kasangati Town Council, Central Uganda. A quantitative approach was used, and a questionnaire was applied to 334 respondents from three wards of the Town Council. Data were analysed using bi-variate, multivariate, and descriptive statistics. The results indicate that many respondents believe better domestic solid waste segregation can be achieved through public education. There was a high statistically correlation between household heads' compliance and the knowledge factor. Lastly, the results indicate a strong correlation between residential solid waste segregation compliance in this Town Council and the individual and institutional factors. The study recommends that all households get education to increase their awareness of the importance and usefulness of solid waste segregation and that this will allow other factors to be effectively appreciated.

Keywords: Compliance, Solid Waste Segregation, Health and safety, Household Waste Management, Individual and Institutional factors

Introduction

The segregation of individual solid waste types into dissimilar temporary storage containers at the primary source of waste generation is very critical and is directly related to the prevention of numerous diseases that are globally significant (Otitoju, 2014; Ferronato et al., 2020; IISD 2024; UNDP 2024, The World Bank 2023). The rising human population and needs have inevitably resulted in solid waste increases, which is not well managed (Kapil et al., 2020). This waste also damages the environment (Mamady, 2016; Zhang et al., 2022; UNEP, 2022). Studies reveal that failure to practice solid waste segregation leads to the generation of harmful gases and leachates caused by microorganisms led decay process (Ferronato & Torretta, 2019; Ssemugabo et al., 2020). Several researchers assert that solid waste segregation is important in preserving good health and eco-friendly status (WHO, 2024. Andeobu et al., 2023).

Globally, despite the fact that waste segregation has increased by 0.9% per year since 2017, the amount of solid waste has increased, especially in densely populated countries and developing economies around the world (Dolipas et al., 2020, Shahmoradi B, 2013; Yoada et al., 2014; Godfrey et al., 2020; The World Bank 2024). It has been reported that when household solid waste is segregated appropriately, it becomes easier and more efficient to manage (Aboor et al., 2025). This result into lower levels of pollution and reduced amounts going to landfills. It also reduces the costs of management, which is very crucial for developing economies in Africa (Mwita et.al., 2023, The World Bank 2024, WHO 2024).

It was further reported in Africa that 90% of household solid waste is often left unsegregated until it is predisposed off (Godfrey et al., 2020). Despite this there is no segregation of waste mainly due to insufficient resources (Wadehra & Mishra, 2018; Mwita et al., 2023).

In the East African region, this situation is not very different. Several urban centers have revealed major sanitation concerns (Babirye et al., 2020; Mwita et al., 2023). The increased quantities of household solid waste continue to be the main challenge for the local authorities. However, in Rwanda, solid waste management laws and regulations are in place and effectively implemented as opposed to the neighbouring countries of Burundi, Kenya, Tanzania and Uganda (Kabera et al., 2019; Mwita et al., 2023).

In Uganda, quite a number of laws and regulations regarding solid waste (Government of Uganda 2020) and managed by the National Environmental Management Authority (NEMA). However, there is limited effective implementation (Babirye et al., 2022; Mutekanga et al., 2022), hence the need to identify factors causing this low compliance with segregating household solid waste.

Several authors (Mwita et al., 2023; Maberi et al., 2022; Babirye et al., 2020; Kabera et al., 2019; Felisilda et al., 2018; Rodić & Wilson, 2017; Prakasam & Das, 2016) have reported that some of the individual compliance factors are age of household head, sex, educational level, marriage status, monthly income, household size, knowledge, attitudes and availability of a backyard. Other authors (Erasu et al., 2018, Yoada et.al., 2014) have also highlighted the institutional factors to include enforcement of regulations, motivation, training, and existence of bylaws as the major factors contributing to compliance with segregation. Solid waste segregation is a strategic stage in effectively managing waste (Otitoju, 2014). NEMA in Uganda (Government of Uganda, 2020) asserts that segregation of solid waste at the source of generation can benefit households when they abide with the regulations. A recent survey by Ssemugabo et. al., (2020) and Omona et al., (2023) reported that only about 40% of households were practising segregation compared to the set standard of 100% in Uganda.

Despite efforts by Kasangati Town council in Uganda to manage household waste earlier (Mwita et al., 2023; Mugambe et al., 2022), there is still a dismal level of waste segregation. It was therefore found necessary to establish both individual and institutional factors role waste segregation in this Town Council.

The specific objectives were to:

- determine the level of compliance with solid waste segregation in this Town Council;
- establish the association of individual and institutional factors to waste segregation, and
- assess the relationship between the factors (individual and institutional) and compliance with waste segregation.

Theoretical and Conceptual Framework

The planned behaviour theory (TPB) guided this study (Manstead et.al., 1995) which explores the relationship between behavior and belief, attitudes and intentions. TPB explains the reasons for compliance and non-compliance behaviour, and there is evidence that suggests that undesirable habits can be changed by using implementation intentions and /or using positive support to strengthen the connotation between behaviour and health benefits (Gollwitzer, 1999). TPB can forecast specific factors and the dependent variables, which is compliance with solid waste segregation.

The conceptual framework presents the association of individual determinants (age, sex, education, income, marital status, knowledge, attitudes, and availability of backyards) with institutional factors (enforcement, motivation, training, and legislation) as the independent variables; and compliance with waste segregation as the dependent variable. This conceptualisation was influenced by previous studies of Pratap et al. (2020) and Kyayesimira et al. (2019).

Literature Review

Sniehotta et al. (2014) have argued that the gap with the TPB is its failure to use other factors like interactive intention and inspiration, such as fear, threat, mood or experience, and also it does not consider normative influences, nor does it take into account environmental factors that affect a person's behaviour (Sniehotta et al., 2009; Sniehotta et al., 2014). However, Fishbein and Ajzen (2009) have argued that it is an empirically firm concept which has shown firm predictive value for intentions than behaviour. The main reason for low use of TPB may be partly because the theory does not specify techniques to modify the imagined intellectual influences for intention and conduct (Sniehotta et al., 2009)

Several authors (Maberi et al., 2023; Mohamed et al., 2022; Kalyanasundaram et al., 2021; Mecheo et al., 2019, Mukama et al., 2016 and Kinyua et al., 2016) reported that some individual factors were associated to compliance

with waste segregation, but this differs from area to area. These factors may be related to institutional factors, and again, this differs from country to country (UN Statistics, 2024; Mutekanga et al., 2022; Knickmeyer, 2020; Kattoua et al., 2019; Saghir & Santoro, 2018; Ilvebare & Femi, 2016).

Method

A positivistic paradigm (Park et al., 2020) was used because this philosophical approach strongly builds on measurement, objective observation and quantitative data to reveal universal laws and what causes such relationships. In addition, a survey research methodology in quantitative approach (Nardi, 2018) was relied upon because of its capacity to collect data from a sample of individuals using standardized questionnaires with closed-ended questions. It allowed the researcher to use statistical analysis to identify patterns and trends in the factors for this Kasangati Town Council population. Simultaneously, a cross-sectional research design by Cherry (2024) was used because it allowed the data to be collected from this population at a given time instance. It enabled the researchers to compare different groups within the population at the same time hence capture the actions of respondents regarding the segregation of household waste management.

Instruments

The researchers designed the instruments, guided by literature (Nardi P. M. 2018), using a set of well-designed questions. The questionnaire consisted of four sections: Individual Factors, Institutional Factors, Compliance to household solid waste segregation, and the individual's opinion. Each section had 20, 12, 11, and 1 questions, respectively. Thus, in this study, a total of 44 questions were used. The researcher developed and used a guideline for key informants (Akhter, 2022): the chief Town Council executive, the Senior Health Inspector, and the three Council Chairpersons of the three divisions.

Validity and Reliability

The Content Valid Index (CVI) was calculated to be 0.795, which is acceptable, as described by Nikolopoulou, K. (2023). The reliability of the instruments was tested by a pilot study of 10 households excluded in the final data collection using the Cronbach Alpha and its index. This was calculated as described by Collins (2007) and guided by Lund Research Ltd (2018) using the SPSS Statistics. For the first set of 20, it was 0.780; for the second set of 12 questions, it was 0.817; for the third set of 11 questions, it was 0.800; and for the fourth set of 1 questions, it was 0.825. The above values indicate that the instrument was suitable for the study.

Population and sample

The research was undertaken in Kasangati Town Council, which consists of nine wards: Kiteezi, Masooli, Wampewo, Kattadde, Gayaza, Bulamu, Nangabo, Wattubba, and Kabubbu. This town council has an approximate population of 205984 people with 51572 households. It comprises urban, semi-urban and rural settings. The study population was, therefore, 51572 households. According to Wakiso District Biostatistician (2023), of the 9 wards mentioned above, five (05) wards are urban, three (03) are peri-urban, and only one (01) is a rural ward (Table 1 below).

TABLE 1: Population of the Households of Kasangati Town Council

	Wards	Cells / Villages	Residence status	Households	Population
1.	Wattubba	5	Urban	4270	19821
2.	Gayaza	7	Urban	3546	27167
3.	Wampewo	6	Urban	9660	38682
4.	Masooli	5	Urban	3695	20957
5.	Kiteezi	5	Urban	8494	24085
6.	Kabubbu	7	Semi-urban	5366	19975
7.	Nangabo	6	Semi-urban	3470	12684
8.	Bulamu	5	Semi-urban	6680	30171
9.	Kattadde	5	Rural	3319	11802
	Totals	**51**		**51572**	**205984**

Target Population and Sample size

The target population was estimated at 24,834 registered households picked from the first 3 highest populated wards (Bulamu – 6680 Households, Wampewo – 9660 Households and Kiteezi – 8494 households), of which two are urban, and one is semi-urban. The Sloven formula (Sloven, 1960) was used to calculate the sample from the target population of 24834, and it was 433 (including the 10% error). It had to be divided into 3 wards using the allocation criterion by Kothari (2005), shown in Table 2 below. To select household respondents, the researcher used a systematic random sampling technique (Bridge Center, 2015) for each ward till the relevant ward sample size figure was reaced. Then, the researcher would go to the next ward till all three wards were covered.

TABLE 2: Target and Sample Size

Wards	Target Population	Sample Size (including 10% Error)
Kiteezi	6680	117
Wampewo	9660	168
Bulamu	8494	148
Total	**24,834**	**433**

If a a household had with two or more eligible respondents, a raffle method was used to identify one respondent. In cases where a household was found to have no eligible respondent, the next neighbouring household was considered. The inclusion criteria were those household heads who had stayed in this area for more than 6 months and were 18 years and above.

In addition to these 433 respondents, 7 Key Informants: the Town Clerk and Senior Health Inspector of the Kasangati Town Council and the Local Council II Chairpersons of the 4 Wards, were also interviewed using the Key Informants guidelines.

Data Collection

The study used a self-administered questionnaire for the 433 respondents and key informant guidelines for the 7 key informants.

Data was collected once when the researcher distributed the questionnaire and waited 45 minutes for the participants to fill it in before collecting it. A total of 433 questionnaires were distributed, and all were returned with a 100% success rate.

The questionnaire was in English and was translated into Luganda (a common local language in this area). The Luganda questionnaire was translated back to English, and any differences or inconsistencies were duly corrected to improve its accuracy.

Three research assistants fluent in English and Luganda were recruited and trained to conduct and collect the data, interact with respondents they met, and sign the consent form.

Ethical approval and safety

The researcher followed the Uganda Ministry of Health standard operating procedures (SOPs) to be protected against COVID-19. The Institutional Review Board (IRB) of The Aids Support Organization (TASO-2021-29) in Kampala, Uganda gave the ethical approval. Participation in the study was voluntary, the respondents made an informed consent after clarification about the study. The Ministry of Health and Kasangati Town Council will receive a copy of this publication as requested.

Data Analysis

The quantitative raw data was sorted, edited, cleaned, and analysed using the SPSS version 23.0. The package generated frequencies and percentages for objectives one and two. Further on objective two, the chi-square test at bi-variate level analysis was undertaken. The p-value calculation at the bi-variate level established the relationship between the two aspects: the individual factors and waste segregation behaviour and also institutional factors and waste segregation behaviour.

For objective three, the chi-square test at multivariate level analysis was undertaken producing crude odds ratio (COR) and adjusted odds ratio (AOR). The COR measured the association between the individual and institutional factors without considering any other confounding variables. The AOR gave a more accurate estimate of the relationship between these factors (Bobbitt, 2021; Szumilas, 2010). Therefore, the multivariate level

established simultaneously, which of these two factors weres significant in affecting waste segregation behaviour (Arifin, 2015).

Key informants data was used in the discussions to clarify further the respondents' views.
Only p-values less than 0.005 were considered statistically significant in all the analyses.

Findings and Discussion

Objective one determined the level of compliance with solid waste segregation in this Town Council. The majority (59.1%) of the households were not compliant with solid waste segregation. Hence, the need to establish which factors, individual and/or institutional, causes the high level of non-compliance.

Objective two examined how both the individual and institutional factors are associated to compliance with waste segregation in the Town Council. The results (Table 3 and 4 below) show that the individual factors most significantly related to waste segregation include (Age, sex of the adults at home who range from 25 years and above, those who had education above secondary school level, most had knowledge about waste segregation and had a positive attitude on solid waste segregation but had no backyard to their homes (Table 3 below). While on institutional factors (Table 4 below) the majority reported weak enforcement of the bye laws, they were not motivated to segregate solid waste, there was poor community awareness and they was inadequate community bye-laws on solid waste segregation.

Individual Factors

TABLE 3: The individual factors associated to compliance with household solid waste segregation

Variables	Categories	Frequency	Percentages
Sex of Household head	Male	97	22.4
	Female	336	77.6
Age of household head	>25 years	65	15.0
34.8±11.6	25-50 years	329	76.0
	>51 years	39	9.0
Formal Education level	None	68	15.7
	Primary	102	23.6
	Secondary	179	41.3
	Tertiary	45	10.4
	University	39	9.0
Marital Status	Married	296	68.4
	Unmarried	137	31.6
Income (Ugshs)	0	164	37.9
324,000 ± 544,000	<100,000	39	9.0
	100,000-490,000	180	41.6
	500,000-990,000	38	8.6
	≥1,000,000	12	2.9
Knowledge on solid waste segregation	Low	74	17.0
	High	359	83.0
Attitude towards solid waste segregation	Negative	138	31.9
	Positive	295	68.1
Availability of Backyard farm	No	237	54.8
	Yes	196	45.2

Sex of the household respondent

The results of the sex of the individuals who responded were mainly (77.6%) females.

Two key informers (KI 1 and KI 3) clearly reported that:

"Most homes in this Town Council have households where women stay at home and the men go out to work".

The above results imply that women play a big role in domestic activities, including waste management in homes. At this stage, women are seen as a significant factor in compliance with solid waste segregation in households.

Several researchers (Mutekanga et al., 2023; Maberi et al., 2022; Mohamed et al., 2022; Mugweri et al., 2018) have argued that women play a primary role in household solid waste segregation management as part of their home care responsibilities irrespective of their income levels. However, a study by Ilevbare (2016) assessing gender and its association to compliance with waste segregation behaviour of some households in Nigeria reported that there was no relationship between gender and household waste segregation, implying that both men and women could contribute to improper waste segregation.

Age of the household respondent

The majority (76%) of the respondents were 25-50 years old.

Age is an important factor and older but very active ages (25 to 50 years) are more concerned about waste management. It means further analysis may be able to critically identify this factor as being more significant.

Several researchers (Babirye et al., 2022, Maberi et al., 2022 and Kalyanasundaram et al., 2021) have reported that older persons (above 25 years) are more likely to segregate waste before disposal compared to those below that age. However, this is despite the record that those below 25 years have higher knowledge of waste segregation and are responsible for producing more household waste.

Education Level

The results on education level indicate that the majority (60.7 %) have had higher education above primary level (Table 3).

One key informant (KI 2) reported that:

"This town, just outside Kampala, the capital of Uganda, has many educated people, both young and old".

This is important because educated individuals are expected to be more concerned about segregating household solid waste and have some basic knowledge about the challenges of managing waste when it is not segregated.

These results agree with an earlier report (Knickmeyer, 2020) that educated people are more concerned about segregation and tend to be more compliant.

Marital status

The result in Table 3 further indicates that 68.4% were married.

Those who are married are more likely to comply with segregating waste, mainly because most household waste is handled by a stay-at-home adult.

The above findings concur with reports from Mukherjee et al. (2016) which show that stay-at-home adults are supportive of household waste segregation.

Household income

Regarding household incomes, the researchers established that the majority (88.5%) of the households earn less than 500,000 Uganda shillings (US$ 133) per month.

One key informant (KI 6) clarified that:

"Though this seems to be very low income, most women at home are not allowed by their male partners to talk about their husbands' incomes. I believe these people earn more than what they have said".

The majority of the residents have relatively low incomes compared to the demands in terms of accommodation, meals, and other regular home utility requirements. This makes the respondents more likely not to comply with the segregation of household solid waste.

Other researchers (Maberi et al., 2022; Mohamed et al., 2022) had earlier also reported that low-income households are bound not to comply with waste segregation.

Household Knowledge

Most (83%) of the households knew about solid waste segregation, but did not comply.

Key informant (KI 4) reported that:

"All these people know about waste segregation because we have conducted community engagements, but they may fear to say it because they think the Town Council will condemn them".

Despite having information about waste segregation, compliance is low. This could be due to absence of relevant facilities like bins and relevant.

Banga (2011) earlier reported that the absence of relevant knowledge on making further use of biodegradable waste, like turning it into manure once properly segregated, may contribute to increasing segregation. However, some studies (Knickmeyer, 2020; Mutekanga et al., 2022) have argued that this is related to some identified variables, such as the age and education level of the households.

Household Attitudes

The results indicate that the majority (67.9%) of the respondents were positively towards compliance with solid waste segregation.

While this is important, it does not imply that the household will segregate waste. However, the attitude of the household is certainly very critical, especially in education, awareness, and, eventually, compliance.

The above results are in agreement with earlier reports (Amouei et al., 2016; Omar, 2019), though the authors relate it to the cultural norms of the societies studied.

Availability of Backyard farm

Finally, Table 3 results indicate that the majority (54.8%) of the households had no backyard farm.

One key informant (KI 5) further reported that:

"Some of these wards are very crowded and congested, so most homes do not have backyards, and hence, they cannot use them for waste segregation".

Having a backyard farm is potentially crucial because it provides the opportunity to segregate solid waste, especially into biodegradable and non-biodegradable which can be used to generate income.

The above results agree with earlier researchers (Sekito et al., 2013; Xiao et al., 2017) who reported that when segregated and biodegradable waste is allowed to decay it turns into usable organic manure. The non-biodegradable waste can be further segregated into plastics and metals, which are marketable to the recycling industries.

Institutional Factors

Objective two examined the institutional factors associated to compliance with waste segregation in this Town Council. This information was analysed, and the results are indicated in Table 4 below.

TABLE 4: The institutional factors associated to compliance with household solid waste segregation

Variables	Categories	Frequency	Percentages
Enforcement	Weak	314	72.5
	Strong	119	27.5

Motivation to segregate solid waste	Not Motivated	328	75.8
	Motivated	105	24.2
community Awareness on solid waste segregation	Never Attended	402	92.9
	Ever Attended	31	7.1
Community by-laws for solid waste segregation	Inadequate	298	68.8
	Adequate	135	31.2

Enforcement

The results (Table 4 above) show that the majority (72.4%) of the respondents reported weak enforcement towards compliance with solid waste segregation.

A Key informant (KI 5) reported that:

"The town council strongly enforces compliance, but sometimes, political opportunists and those who do not want the current leadership to be seen as working effectively hinder it. However, I know of some wards with low numbers of enforcement officers".

This low enforcement inevitably results in low compliance. A well-educated community, can easily be enforced to comply.

Omona et al. (2023) reported similar observations and indicated that when institutional enforcement is weak, people are likely not to comply with the segregation of solid waste.

Motivation to segregate solid waste

The results also show that only 24.3% of the households were motivated to carry out household solid waste segregation.

The absence of motivation is crucial and inevitably results in non-compliance. However, the potential exists especially through creating avenues for extra income.

Mukama et al. (2016) earlier reported the same observation above and argued that the lack of bins used in segregation and the absence of convenient collection stations hamper compliance.

Community awareness (Training)

The results in Table 4 (above) further show that the majority (92.9%) of the respondents have never attended an awareness meeting, community dialogue, or seminar related to household solid waste segregation.

A Key Informant, however, reported otherwise (KI 6):

"In the last three years, all six wards in this Town Council have received and participated in community education and awareness activities concerning waste segregation and management at least once a year".

This high level of absence of community awareness is very unfortunate because communities depend a lot on being continuously interacted with on top of enforcement of regulations. It is a crucial institutional factor because it may also expose the issues making households non-compliant.

Earlier authors (Mwita et al., 2023 and Mutekanga et al., 2022) argued that most communities need to be continuously educated ensuring that all concerned individuals are targeted.

Community by-laws for solid waste segregation (Legislation)

Table 4 finally shows that the majority (68.9%) of the households had inadequate information on legislation regarding compliance with waste segregation.

This finding shows that the households are do not know the by-laws and regulations related to appropriate household waste segregation. It could be due to the changing residents in this town council despite the several awareness seminars reported to have taken place.

This factor is related to the earlier factor on community awareness (training) and inevitably contributes to the very high level of non-compliance in this case. Several earlier authors (Mukama et al., 2016; Mutekanga et al., 2022; and Mwita et al., 2023) have also reported this scenario.

Objective three assessed the association between the factors (individual and institutional) and compliance with waste segregation. Knowledge was the only individual factor significantly associating with solid waste segregation its P-value of 0.000 was less than 0.005 (Table 5 below). Among the institutional factors (Table 6 below), none was found to be significant to compliance with waste segregation because their P-values were higher than 0.005.

TABLE 5: Investigating Individual factors associated to compliance with solid waste segregation using Chi square analysis.

Variables	**Categories**	**Compliance to Solid waste Segregation**		**Chi Square**	**df**	**p-value**
		No %	**Yes %**			
Sex of Household head	Male	55.7	44.3	0.594	1	0.441
	Female	60.3	39.7			
Age of household head	>25 years	51.7	48.3	6.7	2	**0.034**
34.8±11.6	25-50 years	62.7	37.3			
	>51 years	43.2	56.8			
Formal Education level	None	77.4	22.6	4.933	4	0.294
	Primary	56.3	43.7			
	Secondary	57.5	42.5			
	Tertiary	61.4	38.6			
	University	57.9	42.1			
Marital Status	Married	60.4	39.6	0.451	1	0.502
	Unmarried	56.8	43.2)			
income	0	60.7	39.3	5.289	4	0.259
324,000 ± 544,000	<100,000	47.2	52.8			
	100,000-490,000	61	39.0			
	500,000-990,000	64.7	35.3			
	≥1,000,000	36.4	63.6			
Knowledge on solid waste segregation	Low	82.1	17.9	17.446	1	**0.000**
	High	54.6	45.4			
Attitude towards solid waste segregation	Negative	63.8	36.2	1.597	1	0.206
	Positive	59.1	42,9			
Availability of Backyard farm	No	65.4	34.6	7.659	1	**0.006**
	Yes	51.7	48.3			

The results using chi-square (Table 5 above) confirm that knowledge is the only individual factor significantly associated to compliance with waste segregation. The P-value was 0.000 which is less than 0.005.

TABLE 6: Investigating Institutional factors associated to compliance to solid waste segregation using Chi square analysis

Variables	Categories	Compliance to Solid waste Segregation		Chi Square	df	p-value
		No %	Yes %			
Enforcement	Weak	59.4	40.6	0.017	1	0.896
	Strong	58.7	41.3			
Motivation to segregate solid waste	Not Motivated	59.2	40.8	0.001	1	0.975
	Motivated	59.4	40.6			
community Awareness on solid waste segregation	Never Attended	59.4	40.6	0.055	1	0.815
	Ever Attended	57.14	42.9			
Community by-laws for solid waste segregation	Inadequate	55.5	44.5	5.0	1	**0.025**
	Adequate	67.5	32.5			

Among the institutional factors (Table 6 above), none was found to be significant for compliance with waste segregation, They all had P-values higher than 0.005.

To address the final aspect of objective 3, a multivariate logistic regression analysis test was done (Table 7 below).

Results show that knowledge was the only factor more significantly associated to compliance with the segregation of solid waste.

TABLE 7: Individual and Institutional factors associated to compliance with solid waste segregation using multivariate logistic regression analysis

Variable	Compliance to Solid waste Segregation		COR [CI 95%]	p-value	AOR [CI 95%]	p-value
	No %	Yes %				
Sex of household head						
Male	55.7	44.3			1	
Female	60.3	39.7	0.782[0.622-1.402]	0.328	0772[0.461-1.295]	0.328
Age of household head	34.8±11.6					
>25 years	51.7	48.3	1		1	
25-50 years	62.7	37.3	0.513[0.412-1.346]	0.049	0.553[0.304-1.004]	0.052
>51 years	43.2	56.8	1.223[0.231-2.494]	0.772	1.139[0.472-2.751]	0.772
Education level						
None	77.4	22.6	1		1	
Primary	56.3	43.7	2.217[1.341-5.662]	0.150	2.077[0.783-5.510]	0.142
Secondary	57.5	42.5	2.011[0.832-5.185]	0.157	1.986[0.776-5.082]	0.152
Tertiary	61.4	38.6	1.901[0.722-5.612]	0.277	1.863[0.624-5.561]	0.265

University	57.9	42.1	2.214[0.712-6.322]	0.223	2.071[0.681-6.297]	0.199
Knowledge on solid waste segregation						
Low	82.1	17.9	1		1	
High	54.6	45.4	3.939[1.991-7.731]	0.000	3.793[1.899-7.576]	0.000
Availability of Backyard farm						
No	65.4	34.6	1		1	
Yes	51.7	48.3	1.811[1.233-2.898]	0.017	1.728[1.118-2.669]	0.015
Community by-laws for solid waste segregation						
Inadequate	55.5	44.5	1		1	
Adequate	67.5	32.5	0.721[0.401-1.122]	0.049	0.657[0.409-1.056]	0.054

Sex

The result obtained (Table 7 above) revealed that females are 0.8 times less likely to comply with waste segregation. Though not significant for waste segregation, females are likely to comply with waste segregation .

Age

The results also revealed that the 25-50 age group was 0.6 times less likely to comply with waste segregation. The above age-group is more likely to comply even though not significantly.

Knowledge

Households with high knowledge were 3.9 times less likely to comply with household solid waste segregation than those with low knowledge. This difference is significant, with a P-value of 0.00.

Availability of backyard farm

The results (Table 7 above) further show that household respondents with backyard farms were 1.8 times less likely to comply with household solid waste segregation than their counterparts without backyard farms.

Community by-laws (Legislation) for solid waste segregation

Households with adequate awareness about community by-laws were 0.7 times less likely to comply with waste segregation than those with inadequate awareness. However, this is not statistically significant since the P-value was above 0.005. Nevertheless it is very important for the area management to ensure that these by laws are there and being enforced (Dalugdog 2021).

Conclusions

The researchers established low compliance to waste segregation. Objective two on individual factors, only knowledge was found to be highly associated with waste segregation. None of the institutional factors in this study was significantly associated to waste segregation.

The researcher therefore argues that knowledge increases compliance with segregation of solid waste. Knowledge is important in causing change and also improving the management of solid waste in developing economies resulting in better health, better environment and contributing towards achieving development goals. It agrees with the technical advice given by the global policy agencies on solid waste management (UNDP, 2024; World Bank, 202; WHO, 2024; Mwita et al., 2023; UNEP, 2022, Younis et al., 2023, Camarillo et al., 2021).

It should be noted that despite some earlier researchers (Sniehotta, 2009) reporting that the TPB, which was part of the basis of this study had challenges of failure to specify techniques for changing intellectual influences for the conduct, it offers liberty for the researcher to make practical recommendations of combinations and or multiple techniques in an open data-driven space as indicated above. The TPB fully agrees and supports the factor identified here as being crucial in changing behaviour, namely knowledge, which is very important in adherence to waste segregation practices (Apio et al., 2024; Fadhulla et al., 2022; Debrah et al., 2021).

References

Aboor, A. C. ., Mubiru, D., & Sendagi , M. (2025). ATTITUDES TOWARDS WASTE MANAGEMENT IN NABARI PAYAM SOUTH SUDAN. A CROSS-SECTIONAL STUDY. *Student's Journal of Health Research Africa*, *6*(3), 9. https://doi.org/10.51168/sjhrafrica.v6i3.1427

Akhter, S. (2022). Key Informants' Interviews. In: Islam, M.R., Khan, N.A., Baikady, R. (eds) Principles of Social Research Methodology. Springer, Singapore. https://doi.org/10.1007/978- 981-19-5441-2_27

Andeobu, Lynda; Santoso Wibowo and Srimannarayana Grandhi, (2023), Environmental and Health Consequences of E-Waste Dumping and Recycling Carried out by Selected Countries in Asia and Latin America, Sustainability, **15**, (13), 1-28

Amouei A, Hosseini SR, Khafri S, Tirgar A Aghalari Z, Faraji H, (2016) Knowledge, Attitude and Performance of Iranian Urban Residents Regarding the Management of Household Hazardous Solid Wastes. Archives of Hygiene Sciences, Volume: 5 Issue: 1, Winter 2016. Pages: 1 to 8. Down loaded from: https://www-magiran-com.translate.goog/paper/1507090/knowledge-attitude-and-practice-of-iranian-urban-residents-regarding-the-management-ofhousehold-hazardous-solid-wastes-in-2014?lang=en&_x_tr_sl=fa&_x_tr_tl=en&_x_tr_hl=en&_x_tr_pto=sc

Apio, E., Opio, B., Acanga, A. *et al.* (2024). Factors influencing willingness to pay for improved solid waste collection services among households in urban cities in Uganda: empirical evidence from Lira City. *BMC Public Health* **24**, 2150 (2024). https://doi.org/10.1186/s12889-024-19568-6

Arifin, W. N. (2015). The Graphical Assessment of Multivariate Normality Using SPSS Education in Medicine Journal 7(2). DOI: 10.5959/eimj.v7i2.361

Babirye Josephine, Peter Vuzi, David R. Mutekanga, (2020). Factors Influencing Adherence To Proper Health Care Waste Management Practices Among Health Workers In Wakiso District, Uganda. Journal of Environmental Science and Public Health 4 (2020): 96-111.

Banga, M. (2011). Household knowledge, attitudes and practices in solid waste segregation and recycling: The case of urban Kampala. Zambia Social Science. Journal: Vol. 2: No. 1, Article 4. Available at: https://scholarship.law.corn ell.edu/zssj/vol2/iss1/4

Bobbitt Zach(2021). Adjusted Odds Ratio: Definition + Examples. Down loaded from: https://www.statology.org/adjusted-odds-ratio/

Bridge Center, (2015). Editors: Prabhat Pandey and Meenu Mishra Pandey. Research Methodology and Techniques. PP 40 - 51.Printed in Romania, European Union. ISBN 978-606-93502-7-0

Camarillo, M. E., & Bellotindos, L. M. (2021). A Study of Policy Implementation and Community Participation in the Municipal Solid Waste Management in the Philippines. *Applied Environmental Research*, *43*(2), 30–45. https://doi.org/10.35762/AER.2021.43.2.3

Collins L. M (2007). Cronbach's alpha. Research Design and Methods. *in* Encyclopedia of Gerontology (Second Edition)*, 2007*

David Meng-Chuen Chen *et al* 2020 *Environ. Res. Lett.* 15 074021. The world's growing municipal solid waste: trends and impacts. Environ. Res. Lett, 15074021. DOI 10.1088/1748-9326/ab8659

Debrah, J. K., Vidal, D. G., & Dinis, M. A. P. (2021). Raising Awareness on Solid Waste Management through Formal Education for Sustainability: A Developing Countries Evidence Review. *Recycling*, *6*(1), 6. https://doi.org/10.3390/recycling6010006

Dolipas, B. B., Ramos, J. L. S., Alimondo, M. S., Ocampo, P. S., & Fulwani, D. L. A. (2020). Awareness and compliance on waste segregation: Implication to a waste management program in a university. *Athens Journal of Sciences*, *7*(2), 67-76.

Dalugdog, W. D. (2021). Level of Compliance of the Local Government Units (LGUs) in the Implementation and Enforcement of R.A. 9003 (known as Ecological Solid Waste Management Act of 2000) in CALABARZON. *Asian Journal of Multidisciplinary Studies*, *4*(1), 25–38. Retrieved from https://asianjournals.org/online/index.php/ajms/article/view/339

Erasu, D., Feye, T., Kiros, A., & Balew, A. (2018). Municipal solid waste generation and disposal in Robe town, Ethiopia. Journal of the Air & Waste Management Association (1995), 68(12), 1391–1397. https://doi.org/10.1080/10962247.2018.1467351

Fadhullah, W., Imran, N.I.N., Ismail, S.N.S. *et al. (2022)* Household solid waste management practices and perceptions among residents in the East Coast of Malaysia. *BMC Public Health* **22**, 1 (2022). https://doi.org/10.1186/s12889-021-12274-7

Felisilda, Ma. Judith & Asequia, Shaira Julienne & Encarguez, Jhane Rose & Galarpe, Van Ryan Kristopher. (2018). Sociodemographic of Two Municipalities towards Coastal Waters and Solid Waste Management: The Case of Macajalar bay, Philippines. Environment Asia. 11. 182-202. 10.14456/ea.2018.47

Ferronato, N., Preziosi, G., Gorritty Portillo, M. A., Guisbert Lizarazu, E. G., & Torretta, V. (2020). Assessment of municipal solid waste selective collection scenarios with geographic information systems in Bolivia. Waste management (New York, N.Y.), 102, 919–931. https://doi.org/10.1016/j.wasman.2019.12.010

Fishbein, M., & Ajzen, I. (2009). Predicting and Changing Behavior: The Reasoned Action Approach (1st ed.). Psychology Press. Taylor & Francis Group. https://doi.org/10.4324/9780203838020

Godfrey, L., Tawfic Ahmed, M., Giday Gebremedhin, K., H.Y. Katima, J., Oelofse, S., Osibanjo, O., H. Yonli, A. (2020). Solid Waste Management in Africa: Governance Failure or Development Opportunity? IntechOpen. doi: 10.5772/intechopen.86974

Gollwitzer, Peter. (1999). Implementation Intentions: Strong Effects of Simple Plans. American Psychologist. 54. 493-503. 10.1037/0003-066X.54.7.493.

Government of Uganda (2020). Statutory Instruments 2020 no. 49. The National Environment (waste management) Regulations, 2020. The Uganda Gazette No. 18, Volume CXIII, dated 20th March, 2020. Printed by UPPC, Entebbe, by Order of the Government

IISD (2024). Sustainable Development Goals. SDG Knowledge Hub. Down loaded from: https://sdg.iisd.org/sdgs/

Ilevbare, Femi M. (2016). Socio-Demographic characteristics associated with waste disposal behaviour among residents in selected communities of south-western, Nigeria. Ife. Research Publications in Geography, [S.l.], v. 13, n. 1, p. 38-48, sep. 2016. ISSN 2636-5243. Available at: <https://irpg.oauife.edu.ng/index.php/irpg/article/view/71

Kabera T, Wilson DC, Nishimwe H. (2019). Benchmarking performance of solid waste management and recycling systems in East Africa: Comparing Kigali Rwanda with other major cities. Waste Management & Research. 2019;37(1_suppl):58-72. doi:10.1177/0734242X18819752

Kalyanasundaram, M., Sabde, Y., Annerstedt, K.S. et al. (2021). Effects of improved information and volunteer support on segregation of solid waste at the household level in urban settings in Madhya Pradesh, India (I-MISS): protocol of a cluster randomized controlled trial. BMC Public Health 21, 694 (2021). https://doi.org/10.1186/s12889-021-10693-0

Kapil Dev Sharma and Siddharth Jain, (2020), Municipal solid waste generation, composition, and management: the global scenario, *Social Responsibility Journal*, **16**, (6), 917-948

Kattoua, Mary & Khatib, Akram & Kontogianni, Stamatia. (2019). Barriers on the propagation of household solid waste recycling practices in developing countries: State of Palestine example. Journal of Material Cycles and Waste Management. 21. 10.1007/s10163-019-00833-5.

Kendra Cherry (2024). How Do Cross-Sectional Studies Work? Gathering Data From a Single Point in Time. Down loaded from: https://www.verywellmind.com/what-is-a-cross-sectional-study-2794978

Kinyua, Maureen N. & Rowse, Laurel E. & Ergas, Sarina J., 2016. "Review of small-scale tubular anaerobic digesters treating livestock waste in the developing world," Renewable and Sustainable Energy Reviews, Elsevier, vol. 58(C), pages 896-910. DOI: 10.1016/j.rser.2015.12.324

Knickmeyer D (2020). Social factors influencing household waste separation: A literature review on good practices to improve the recycling performance of urban areas, Journal of Cleaner Production, Volume 245, 2020, https://doi.org/10.1016/j.jclepro.2019.118605.

Kothari, C. (2005). Research Methodology. New International Publishers.Down Loaded from: https://www.scirp.org/reference/referencespapers?referenceid=3305758

Kyayesimira, J. Ssemaganda, A. , Muhwezi, G. and Andama, M. (2019) Assessment of Cadmium and Lead in Dried Sewage Sludge from Lubigi Feacal Sludge and Wastewater Treatment Plant in Uganda. Journal of Water Resource and Protection, 11, 690-699. doi: 10.4236/jwarp.2019.116040.

Lund Research Ltd (2018). Cronbach Alpha Using SPSS Statistics. Down loaded from:https://statistics.laerd.com/spss-tutorials/cronbachs-alpha-using-spss-statistics.php

Maberi Musa, Mutekanga David R, Ndoboli Fred, Ddamulira Christopher, , Katamba Paul (2022). Household compliance to solid waste management practices in Masaka city, Uganda.. (2022). Int. J. Adv. Multidiscip. Res. 9(12): 258-268. DOI: http://dx.doi.org/10.22192/ijamr.2022.09.12.021

Mamady K. (2016). Factors Influencing Attitude, Safety Behavior, and Knowledge regarding Household Waste Management in Guinea: A Cross-Sectional Study. Journal of environmental and public health, 2016, 9305768. https://doi.org/10.1155/2016/9305768

Manstead A. S. R. & Parker D (1995). Evaluating and Extending the Theory of Planned Behaviour, European Review of Social Psychology, 6:1, 69-95, DOI: 10.1080/14792779443000012

Mecheo O. Naftal, P. Omondi, Abdirizak Nunow (2019). Nature and Collection Systems of Domestic Solid Wastes in Kisii Town, Kenya, World Environment, Vol. 9 No. 1, 2019, pp. 1-12. doi: 10.5923/j.env.20190901.01.

Mohamed, F. B., Mutekanga, D. R., Ddamulira , C., & Katamba, P. (2022). Factors Associated with Compliance to Solid Waste Segregation among Health Care Workers in Martini Hospital, Somalia. Pan-African Journal of Health and Environmental Science, 2022 1(1). Retrieved from https://journals.aua.ke/ajhes/article/view/129

Mugambe, R. K., Nuwematsiko, R., Ssekamatte, T., Nkurunziza, A. G., Wagaba, B., Isunju, J. B., Wafula, S. T., Nabaasa, H., Katongole, C. B., Atuyambe, L. M., & Buregyeya, E. (2022). Drivers of Solid Waste Segregation and Recycling in Kampala Slums, Uganda: A Qualitative Exploration Using the Behavior Centered Design Model. International journal of environmental research and public health, 19(17), 10947. https://doi.org/10.3390/ijerph191710947

Mugweri Frederick, Oonyu, Joseph and Sentongo, John. (2018). Influence of Education on the Solid Waste Management Practices of Communities in Kampala City J. Environ. Waste Manag, Vol 5, 261-274.

Mukama, T., Ndejjo, R., Musoke, D., Musinguzi, G., Halage, A. A., Carpenter, D. O., & Ssempebwa, J. C. (2016). Practices, concerns, and willingness to participate in solid waste management in two urban slums in Central Uganda. Journal of Environmental and Public Health, 2016. Hindawi Publishing Corporation. https://doi.org/10.1155/2016/6830163

Mukherjee, A., Debnath, B., & Ghosh, S. K. (2016). A review on technologies of removal of dioxins and furans from incinerator flue gas. Procedia Environmental Sciences, Volume 35, 2016, Pages 528-540, https://doi.org/10.1016/j.proenv.2016.07.037.

Mutekanga, D. R, Ddamulira, C., Bagagire, N., Ndoboli, F., & Katamba, P. (2022). Predictors of Compliance to Biomedical Waste Segregation among Workers in Health Facilities in Jinja District, Uganda. Pan-African Journal of Health and Environmental Science, 1(2), 111-128. https://doi.org/10.56893/ajhes.2022-v1i2.252

Mwita, G., Ndungutse, D., Wanziima, J. G., & Mutekanga, D. R. (2023). Waste Minimization Factors Among Food Vendors in Manzese Ward, Dar Es Salaam. Pan-African Journal of Health and Environmental Science, 2(2), 125–142. Retrieved from https://journals.aua.ke/ajhes/article/view/266

Nardi, P.M. (2018). Doing Survey Research: A Guide to Quantitative Methods (4th ed.). Routledge. https://doi.org/10.4324/9781315172231

Nikolopoulou, K. (2023, June 22). *What Is Content Validity? | Definition & Examples.* Scribbr. Retrieved from https://www.scribbr.com/methodology/content-validity/

Omona, K., & Maderu, P. (2023). Assessment of Solid Waste Management at Source in Compliance With Guidelines. Journal of STEAM Education, 6(1), 1-16. https://doi.org/10.55290/steam.1079136

Omar, Abdikadir & Hossain, Md Sahadat & Parvin, Mst. Mahmuda. (2019). Study on knowledge, attitude and practices towards the solid waste management in Karan district, Mogadishu Somalia. Environmental Contaminants Reviews. 1. 22-26. 10.26480/ecr.02.2018.22.26.

Omona, K., Maderu, P. (2023). Assessment of solid waste management at source in compliance with guidelines. Journal of STEAM Education, 6(1), 1-16. https://doi.org/10.55290/steam.1079136

Otitoju, T.A. (2014). Individual Attitude towards Recycling of Municipal Solid Waste in Lagos Nigeria. American Journal of Engineering Research, Vol. 3, No.7, 78-88. Down loaded from: https://www.ajer.org/papers/v3(7)/L0377888.pdf

Park, Yoon Soo PhD; Konge, Lars MD, PhD; Artino, Anthony R. Jr PhD. (2020) The Positivism Paradigm of Research. Academic Medicine 95(5):p 690-694, May 2020. | DOI: 10.1097/ACM.0000000000003093

Prakasam, V. R., & Das, S. Y. (2016). A Sustainable Approach to the Municipal Solid Waste Management in Neyyatinkara Municipality, Kerala, India. Applied Ecology and Environmental Sciences P 89-95. 2016. doi:10.12691/aees-4-4-2. Down loaded from: http://pubs.sciepub.com/aees/4/4/2

Pratap, V., Dayashankar, M., & Biju, S. (2020). Role of Psychosocial Factors in Effective Design of Solid Waste Management Programmes: Evidence from India. Environment and Urbanization ASIA. 11(2), 266-280. https://doi.org/10.1177/0975425320938518

Rodić, L.; Wilson, D.C. (2017). Resolving Governance Issues to Achieve Priority Sustainable Development Goals Related to Solid Waste Management in Developing Countries. Sustainability 2017, 9, 404. https://doi.org/10.3390/su9030404

Saghir, J., & Santoro, J. (2018). Urbanization in Sub-Saharan Africa. Meeting Challenges by Bridging Stakeholders (pp. 1-7). Washington DC: Center for Strategic & International Studies.

Sekito, T.; Prayogo, T.B.; Dote, Y.; Yoshitake, T.; Bagus, I. (2013). Influence of a community-based waste management system on people's behavior and waste reduction. Resources, Conservation & Recycling, Elsevier, vol. 72(C), pages 84-90. DOI: 10.1016/j.resconrec.2013.01.001

Shahmoradi, Behzad. (2013). Book Review: Collection of municipal solid waste in developing countries. International Journal of Environmental Studies. 70. 1013-1014. 10.1080/00207233.2013.853407.

Sloven et al (1960) Sloven's formula. Down loaded from: https://www.statisticshowto.com/probability-and-statistics/how-to-use-slovins-formula/

Sniehotta F. F, Justin Presseau & Vera Araújo-Soares (2014) Time to retire the theory of planned behaviour, Health Psychology Review, 8:1, 1-7, DOI: 10.1080/17437199.2013.869710

Sniehotta F. F. (2009). Towards a theory of intentional behaviour change: plans, planning, and self-regulation. British journal of health psychology, 14(Pt 2), 261–273. https://doi.org/10.1348/135910708X389042

Ssemugabo, C., Wafula, S. T., Lubega, G. B., Ndejjo, R., Osuret, J., Halage, A. A., & Musoke, D. (2020). Status of Household Solid Waste Management and Associated Factors in a Slum Community in Kampala, Uganda. https://doi.org/10.1155/2020/6807630; JF - Journal of Environmental and Public Health: Vol 2020.

Szumilas M. (2010). Explaining odds ratios. *Journal of the Canadian Academy of Child and Adolescent Psychiatry = Journal de l'Academie canadienne de psychiatrie de l'enfant et de l'adolescent*, *19*(3), 227–229.

The World Bank (2024). WHAT A WASTE 2.0. A Global Snapshot of Solid Waste Management to 2050. Trends in solid waste management, Down loaded from::https://datatopics.worldbank.org/what-a-waste/trends_in_solid_waste_management.html

The World Bank, (2023). Solid Waste Management. Washington DC: World Bank Group.https://www.worldbank.org/en/topic/urbandevelopment/brief/solid-waste-management.

UN Statistics. (2024). Time-Use Statistics, Department of Economic and Social Affairs Statistics. Down loaded from: https://unstats.un.org/UNSDWebsite/demographic-social/time-use/data-and-metadata

UNDP (2024). The Sustainable Development Goals in Action. The United Nations Development Program. Down loaded from: https://www.undp.org/sustainable-development-goals

UNEP (2022). Solid Waste management – Cities. The United Nations Environment Program UNEP). Down loaded from: https://www.unep.org/explore-topics/resource-efficiency/what-we-do/cities/solid-waste-management.

Wadehra, S., & Mishra, A. (2018). Encouraging urban households to segregate the waste they generate: Insights from a field experiment in Delhi, India. Resources, Conservation and Recycling. Volume 134, 2018, Pages 239-247. https://doi.org/10.1016/j.resconrec.2018.03.013.

Wakiso District Biostatician (2023) Annual Report on Biostatistics of Wakiso District. Unpublished District Report.

WHO (2024). Compendium of WHO and other UN guidance on health and environment: Guidance on solid waste and health. Down loaded from: https://www.who.int/tools/compendium-on-health-and-environment/solid-waste

Xiao Lishan, Bo Fu, Tong Lin, Liang Meng, Ouwen Zhang, Lijie Gao (2023). Promoting and maintaining public participation in waste separation policies — A comparative study in Shanghai, Chin. Resources, Environment and Sustainability, Volume 12, 2023. https://doi.org/10.1016/j.resenv.2023.100112.

Yoada, R.M., Chirawurah, D. & Adongo, P.B. (2014) Domestic waste disposal practice and perceptions of private sector waste management in urban Accra. BMC Public Health 14, 697 (2014). https://doi.org/10.1186/1471-2458-14-697

Younis Ahmad Hajam, Rajesh Kumar, Ajay Kumar, (2023). Environmental waste management strategies and vermi transformation for sustainable development, Environmental Challenges, Volume 13, 2023, 100747, ISSN 2667-0100, https://doi.org/10.1016/j.envc.2023.100747.