Gender Perception of Solid Waste Management in the Sunyani Municipality in the Bono Region of Ghana

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Abstract: Sustainable Development Goal Six is about ensuring availability and sustainable management of water and sanitation for all. Sanitation situation in the Sunyani Municipality is getting worse and the role of gender in the worsening sanitation situation has least been explored. The cognitive dissonance theory suggests that we have an inner drive to hold all our attitudes and behaviour in harmony and avoid disharmony (or dissonance). Similarly, respondents with a good perception of solid waste management would experience dissonance when they engage in inappropriate solid waste management practices. Hence, respondents' perception of solid waste management helps to deduce their attitude and behaviour towards solid waste disposal practices. The study examined gender perception of waste and waste management in the Municipality. By adopting the pragmatism philosophy, data were collected through a quantitative approach and both case study and survey research designs were adopted for the research. Primary Data for the study were collected using a self-administered questionnaire and semi-structured interviews whereas a purposive sampling technique was used to select the four study areas. A sample of 304 households comprising 76 households from each community using the systematic random sampling method was used for the study. The results revealed that both males and females have a satisfactory to good knowledge and perceptions on solid waste and waste management. However, perceptions may differ in terms of gender and other contributing factors such as age, education, income and culture. As a result, waste generation surpasses the capacity of waste management companies for waste collection and disposal. Also, most respondents did not sort their solid waste into different

categories before disposing of it. The study recommends that the Municipal Assembly implement good waste disposal measures through the development and effective implementation of bylaws that will better improve sanitation in the Municipality.

1. INTRODUCTION

Human activities, all over the world, create waste which could be a resource or a problem depending on how it is handled. As the population grows and settlements sprawl so does waste generation increases. The management of waste which covers storage, collection, transportation, disposal and treatment has now become major developmental, environmental, economic, political and health issues (Lagerkvist and Dahlen, 2019). It is currently estimated that the rate of urban solid waste growth is faster than that of urbanization. Global estimates indicated that by 2002, 2.9 billion urban residents generated about 0.64 kg of waste per person per day and by 2012, this rose to 1.2 kg per person per day with a total urban population of 3 billion (Buor, 2020). Currently, it is projected that by 2025 there will be about 4.3 billion urban residents who on average will generate 1.42 kg of waste per day, worldwide (Tauš et al., 2023). The rapid increase in population with the attendant dramatic upsurge in solid waste production, comes with austere socio-economic and environmental effects on society (Lagerkvist and Dahlen, 2019).

The increase in solid waste generated per capita in Africa has not been accompanied by a commensurate growth in the capacity and funding to manage it. It is reported that less than 30% of urban waste in developing countries is collected and disposed of appropriately (United Nations, 2018). Sustainable Development Goal Six is about ensuring availability and sustainable management of water and sanitation for all. Explicitly it is captured as, "Ensure availability and sustainable management of water and sanitation for all" (UNDP, 2015). The first three targets relate to drinking water supply and sanitation. Equitable sanitation enjoins us to address the specific needs of women and girls and those in vulnerable situations, such as the elderly or people with disabilities (Narayanan, et al., 2012). Water sources are better preserved if open defecation is ended and sustainable sanitation systems are implemented (UNDP, 2017).

The management of solid waste comprises planning, administrative, financial, engineering and legal functions (UNDESA, 2015). Solid waste collection method is confronted with several difficulties and most of the time solid waste are left uncollected. Thus, there is overflow of waste, ground dumping at collection sites, and at unauthorized spaces (Atkinson et al., 2019). Ghana finds itself in an environment where waste is rather seen as a problem than a resource. For this reason, it has once been tagged the fourth dirtiest country in West Africa. There is the annual outbreak of cholera and other contagious diseases. Also, malaria is endemic in many communities. All these diseases result from poor management of waste in the environment (Connelly, 2017). There is, therefore, the need for many studies in the area of waste management to uncover the sources and effects of this situation and to identify ways of changing waste to resource. According to Smith-Asante (2015), Ghana has slipped further on its sanitation performance globally to become the world's 7th worst performing country. He posits that the challenge to access improved sanitation is problematic in Ghana, which has slipped even further amongst the worst-performing countries.

Several gaps exist within efficiency and effective waste domain in Ghana. Although some work has been done on perception of knowledge of waste, more questions remain unanswered (Kretchy et al., 2019; Boateng et al., 2019; Owusu-Nimo et al., 2019). Sunyani Township is adjudged one of the neatest regional capitals in Ghana. A good portion of the commercial centre of the town lies on a ridge and therefore drains (water in gutters) often flow easily reducing the extent of stagnant gutters. Sunyani, the capital of the Bono Region, over the

years was voted as the cleanest city in Ghana by the Ghana Tourist Board (Oppong-Kyekyeku, 2014). During the Award giving ceremony, the citation said "this cleanliness and freshness of the sights and sounds of this city makes it the toast of many a visitor to the Brong-Ahafo region. It continues to employ effective sustainable waste disposal and traffic management practices" (Oppong-Kyekyeku, 2014).

However, certain parts of the township have recently fallen foul; the strong stench from refuse dumps that have developed into 'hills' is now a common experience. Nearby streams are often seen to be polluted with refuse which is usually dumped by runoffs from dumping sites. The number of contagious diseases on the health profile of the regional capital has increased. Also, it is now a common sight to see refuse dumped anywhere within the municipality (Municipal Health Directorate, 2019). Power dynamics within households, organizations, and governance structures can influence gendered perceptions and policies related to solid waste management. Decision-making positions in waste management sectors are often male-dominated, which can result in gender biases and limited perspectives. Ensuring diverse representation and involvement of all genders in waste management decision-making processes can lead to more comprehensive and inclusive solutions (Adams & Holmberg, 2016).

The conceptual framework, Theory of Planned Behaviour (TPB), provides a framework for studying human action. This supports the study on the basis that perceptions, like behaviour, are influenced by knowledge, beliefs, values, and norms but can be formed without experience and knowledge. Thus, the more knowledge respondents have on sanitation, the clearer their opinion tends to be, and the stronger their perception. (Mak, et al., 2020) Gender perceptions significantly influence how individuals engage with and perceive solid waste management. By acknowledging and understanding these gendered dynamics, we can develop more inclusive and effective waste management strategies. Promoting gender-responsive approaches in waste management allows us to address environmental challenges while also addressing gender inequalities. Ensuring the participation and perspectives of all genders will lead to more sustainable and equitable waste management practices (Natarajan & Bawakyillenuo, 2020). Studies showed that some parts of Sunyani, which include Penkwase, New Dormaa, New Town, Estate, the Zongo community, Area 1 to 4 and the Bosoma market indicated that filth is gradually taking over Sunyani, and it is partly as a result of the littering habits of some inhabitants (Oppong-Kyekyeku, 2014). It is against this backdrop that this study examined the gender perception of urban solid waste management in the Sunyani municipality. The study is timely and aligns with Sustainable Development Goal six (SDG 6) which seeks to ensure availability and sustainable management of water and sanitation for all by 2020. Conceptual Issues on Urban Waste Management.

2.1 Perceptions, Attitudes and Waste Management
Perception is the primary process by which human beings obtain knowledge of the world through the sense organs; sight, hearing, touch, taste and smell in order to respond to external stimulation (Gibson & Tierney, 2006; Oyedotun et al., 2020; Olukanni et al.,2020). Perceptions are informed by knowledge, resources, beliefs, values and norms but can be created without experience and knowledge of the object or person (Mariwah et al., 2010). Schultz and Zelezny (2000) and Adekola et al. (2021), defined attitude by taking into account environmental concerns. They describe attitudinal acts as important antecedents to the behavioural intention which is described as the degree of favourable or unfavourable evaluation of the behaviour under study. Whiles perception is described as how a person sees himself/herself and world around him or her with its governing behaviour, attitude can be expressed as an individual's way of thinking (Merton., 1968; Anchan, 2021). A positive attitude can be developed through imparting knowledge and educating the public regarding environmental conditions.

Perception and attitude influence waste disposal practices. As noted by Gyankumah (2004) and Adekola et al. (2021), efforts to address solid waste disposal challenges in developing countries have failed due to the negative perception people have regarding solid waste disposal. Residents assume that waste thrown on streets would be picked by local municipality. Anchan (2021) posited that this mindset leads to unscientific system of waste management. The perception of one's capability is said to set a limit to what to do and ultimately what can be achieved (Holland and Rosenberg, 1996; Suleman et al., 2015). The influence of perception explains that deviance can arise by accepting culturally determined goals without the acceptability of cultural means. Instances such as either paying for urban solid waste management services or the total rejection of its cost recovery methods, accepting the means but rejecting the goals or both may lead to a total breakdown of waste control system (Olukanni et al., 2020)

Residents' perception on taxes, revenues, government commitments influence the cultural values, responses, and success of urban solid waste management system. Thus, the perception that waste services are paid for through taxes or even considered as a social service to be paid for by the government could lead to littering, illicit burning and dumping inappropriately (Yuan, et al., 2019). Dladla et al. (2016) identified several factors associated with indiscriminate dumping of waste in African countries as institutional weaknesses, lack of awareness and lack of public perception which place a limitation to what can be done and, ultimately, to what can be achieved. Socio-economic background of citizens informing their perceptions and attitude directly impacts waste management activities (Adzawla et al., 2019). Alhassan et al., (2017) posited that sociopsychological factors influence households' willingness-to-pay for improved solid waste management services.

Waste defies precise definition but the various descriptions and definitions of the concept suggest that it is an abandoned material that has no consumption value to the one discarding it (McDougall F. et al., 2001; Suleman et al., 2015). Waste can be hazardous or non-hazardous depending on its location and toxic concentration; therefore, it needs to be properly disposed of or managed. Urban solid waste is defined as "waste that comprises all solid and semi-solid materials generated from residential and public locality excluding hazardous and wastewater in it" (Vergara and Tchobanoglous, 2012).

Waste can be disposed of in many ways, including burying, recycling, incineration/burning, composting landfill, and indiscriminate dumping such as dumping it on the street and into the water bodies (McDougall et al., 2001) Estimating the quantity of urban solid waste generated is the key factor for waste management planning (Anchan (2021). However, in developing countries managing solid waste is a crucial challenge due to changing composition, limited policy frameworks and escalated waste management cost. There are various factors like population density, standard of living, environmental conditions, extent and level of commercial activities, seasons and eating habits deciding the quantity of waste generation in any location (. Olukanni, et al., 2020; Anchan, 2021).

According to Maria et al (2014), solid waste is the most visible environmental problem among many in urban areas. Increased solid waste generation creates more environmental problems. Marshall & Farahbakhsh (2013) concurred that many cities are not able to manage it due to institutional, regulatory, financial, technical, and public participation shortcomings. There is a need to practice integrated solid waste management approach such as incorporation of more environmental and economic friendly concepts of source separation; recovery of waste; legitimization of the informal systems; partial privatization and public participation (Assamoi & Lawryshyn, 2012).

Lutui (2001) identified five approaches that apply to the concept of waste management studies namely; engineering, environmental, scientific, economic, and behavioural approaches. The

behavioural approach focuses on how the management of waste can be a function of various human attitudes and perceptions (Olukanni et al., 2020). Residents' perception and attitude have been found to be an important predictor in explaining intention or behaviour towards solid waste management and the relationship are significant (Ifegbesan, 2010; Kumar, 2012). Attitudes may be positively influenced through awareness building campaigns and education about the negative aspects of inadequate waste collection. The design and implementation of municipal solid waste management system require an analysis of existing behaviour of key stakeholders, including their attitudes, perceptions, and values (Vicente and Reis, 2008; Goh, Tong and Ahmed, 2013).

2.2 Theoretical Framework
Festinger's (1957) cognitive dissonance theory suggests that we have an inner drive to hold all our attitudes and behaviour in harmony and avoid disharmony (or dissonance). This is known as the principle of cognitive consistency. The theory of cognitive dissonance has been widely researched in a number of situations to develop the basic idea in more detail, and various factors have been identified which may be important in attitude change. The causes of cognitive dissonance include forced compliance. When someone is forced to do (publicly) something they (privately) really don't want to do, dissonance is created between their cognition (I didn't want to do this) and their behaviour (I did it). Forced compliance occurs when an individual performs an action that is inconsistent with his or her beliefs. The behaviour cannot be changed since it was already in the past, so dissonance will need to be reduced by re-evaluating their attitude toward what they have done.

In an intriguing experiment, Festinger and Carlsmith (1959) asked participants to perform a series of dull tasks (such as turning pegs in a peg board for an hour). The participant's attitudes toward this task were highly negative. When the participants were asked to evaluate the experiment, the participants who were paid only $1 rated the tedious task as more fun and enjoyable than the participants who were paid $20 to lie.Being paid poorly is not sufficient incentive for lying and so those who were paid $1 experienced dissonance. They could only overcome that dissonance by coming to believe that the tasks really were interesting and enjoyable. Being paid $20 provides a reason for turning pegs, and there is, therefore, no dissonance. Similarly, respondents with a good perception of solid waste management would experience dissonance when they practice inappropriate solid waste management. Hence, having knowledge of respondents' perception of solid waste management is of much essence in this study.

2.3 Conceptual Framework
This study employs Icek Ajzen's (1991) Theory of Planned Behaviour (TPB), which provides a framework for studying human action (Figure 1). According to Ajzen (1991), human behaviour is guided by three kinds of considerations: behavioural beliefs, normative beliefs, and control beliefs. In their respective aggregates, behavioural beliefs produce a favourable or unfavourable attitude toward the behaviour. Normative beliefs result in a subjective norm, and control beliefs pertain to perceived behavioural control (Ajzen, 2002). In combination, the attitude towards the behaviour, the subjective norm, and the perceived behavioural control led to the formation of a behavioural intention (Ajzen & Schmidt, 2020). A person's intention to exhibit a particular behaviour is a fundamental factor in TPB. As a general rule, the more favourable the attitude and subjective norm, the greater the perceived behavioural control, the stronger should be a person's intention to engage in a given behaviour (Ajzen, 1991). Intentions are, thus, assumed to be the immediate antecedent of behaviour. The TPB also assumes that perceived behavioural control, in company with behavioural intention, can be utilized directly to predict behavioural achievement (Tekkaya *et al.,* 2011; Suleman et al., 2015). Thus, in order to better explain the nature of human behaviour, attention should focus on the antecedents of attitudes, subjective norms, and perceived behavioural control, which

in turn account for intentions and actions. To this end, the TPB portrays that an individual's behaviour is a function of beliefs pertaining to that specific behaviour (Ajzen & Schmidt, 2020).

Figure 1: Theory of Planned Behaviour (TPB)
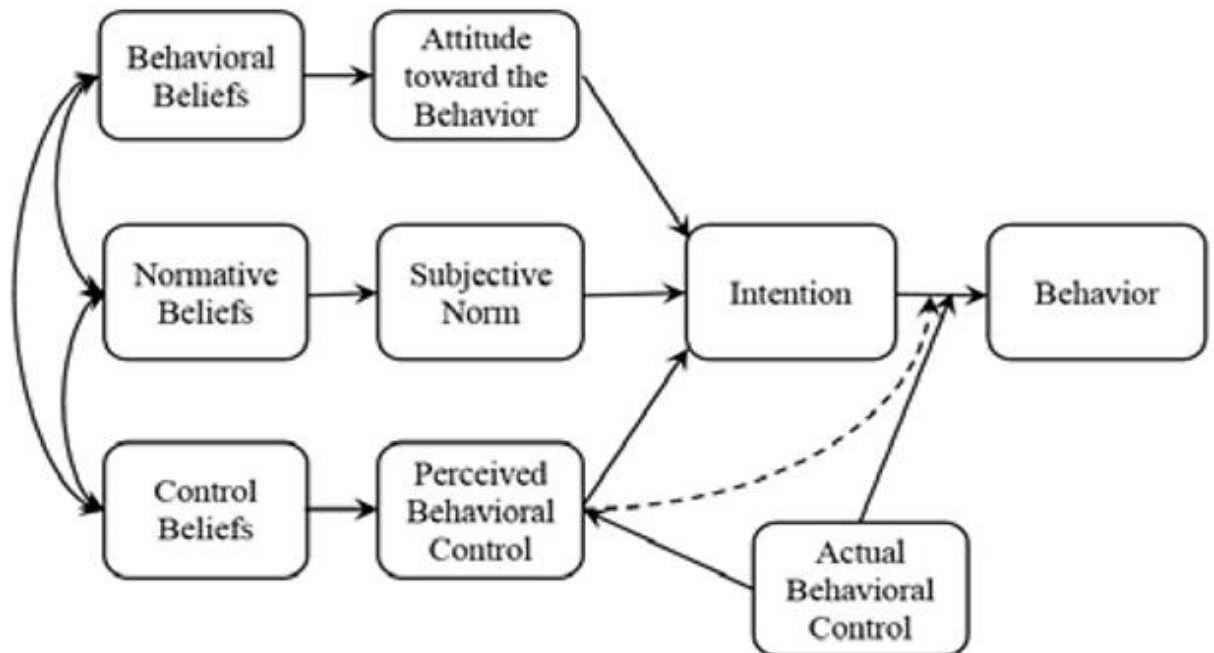
Source: Adopted from Ajzen, & Schmidt, (2020)

Figure 1 supports the study on the basis that perceptions, like behaviour, are influenced by our knowledge, beliefs, values, and norms but can be formed without experience and knowledge. Thus, the more knowledge we have on sanitation, the clearer our opinion tends to be, and the stronger our (feelings) perception. Besides, being informed about an issue is even more likely to influence behaviour when knowledge is gained from first-hand experience (Mariwah et al, 2010 cited in Suleman, Mariwah, & Agyapong, 2015). In a nutshell, residents' perceptions to a larger extent, have influence on urban solid waste management.

2. MATERIALS AND METHODS
3.1 Study Area
The study was conducted in the Sunyani Municipality which covers a total land area of 506.7 Km^2. The Sunyani Municipality has a population of 193,595, which is 16.0 per cent of the entire Bono Region (GSS, 2021). The Municipality was selected on the basis of its population size, economic activities and the amount of waste generated by residents.

The most widely used method of solid waste disposal in the Municipality is by public dump in containers followed by public dump (open space) and burning of solid waste (GSS, 2021). Figure 2 shows the administrative map of the municipality. It is bordered on the north by Sunyani West District; west by Dormaa East District, south by Asutifi District and to the South-east by Tano North District (Ghana Statistical Survey, 2014).
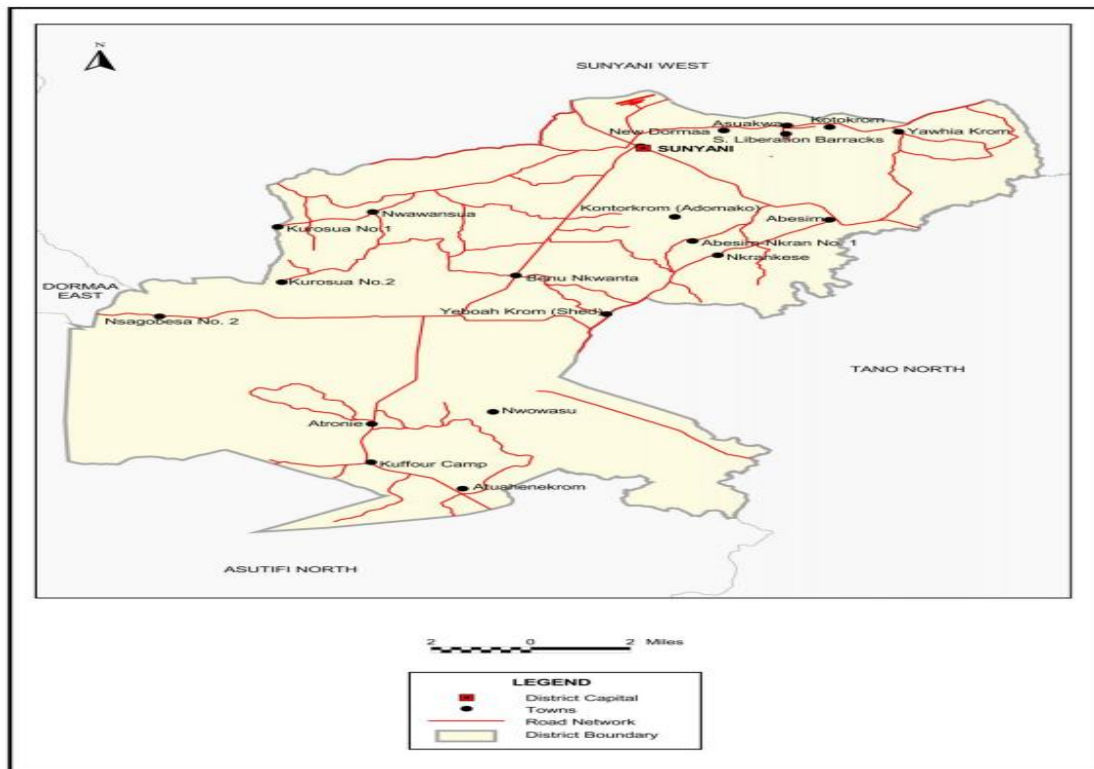
Figure 2: Map of Sunyani Municipality

Figure 2. Map of Sunyani Municipality   Source: Ghana Statistical Service (2014)

2.2 Research and Sampling Design

The research philosophy adopted for the study is pragmatism as pragmatists hold the view that, truth is to be found in the process of verification (Legg & Hookway, 2020). Quantitative and qualitative data were collected using case study and field survey. Case study research enabled the researcher to closely examine the phenomenon within a specific context. Zainal (2007) is of the view that in the use of a case study, a geographical area and specific individuals are needed as subjects of enquiry. The descriptive survey design, on the other hand, gave the respondents the chance to express their opinions without much restriction from the researcher.

Both primary and secondary data were used for the research. The primary data were collected from sampled residents' residents of Adomako, Area 1 (Municipal), Abonsuam and Ahenboboano. The purposive sampling technique was used to select the four areas in the community where open dumpsites are located. In all four settlements, those who lived in a radius of about 150 metres from the dumpsite were considered the core, and those who lived beyond the 150-metre radius formed the periphery. This division is based on a study by Mahboobeh & Beydokhti (2014) on 'Solid Waste Landfill Site Selection Methods.' Secondary data were gathered from both published and unpublished documents related to waste management; annual reports from waste management organizations and other waste disposal related documents from the Sunyani Municipality.

A sample of 304 households was chosen based on Miller and Brewer (2003) method of sample size calculation and a margin of error of 0.05. Over 56%of the houses in the Municipality are compound houses. The average household per house is 3.9 whilst the total population per house is 8.4. The study used the heads of the households as respondents; where the head is the one chosen by the household to be in charge of waste management in the household. For each of the four suburbs, the systematic random sampling method was used to select 76

households. Thus, 38 households each from the core and the periphery residents were selected.

3.3 Data Collection and Analysis

Data were collected using researcher-administered questionnaire and semi-structured interviews. The items on the questionnaire comprised of both open and close-ended questions which reflect the themes on the theoretical and conceptual frameworks and the objectives. The major themes that emerged from the coding frame include biodata of respondents; meaning of solid waste; waste reduction and recycling; and attitude towards solid waste. The data collected from the questionnaire, survey and semi-structured interviews were coded and with the help of these coding sheets, the data were transformed into SPSS.v.24.0. Some variables were drawn from the data structure covering the socio-economic, demographic and environmental variables that largely determined the perceptions and attitude of households on solid waste management.

3. RESULTS

Socio-demographic Background of Respondents

The socio-demographic characteristics of the respondents covered their sex, age, level of education, income level, place of residence, length of stay in the community, distance from home and time spent to dumpsite and back (table 1).

Table 1: Socio-demographic background of respondents

Variable		Frequency (N)	Percent (%)
Sex	Male	126	41.4
	Female	178	58.6
Age	< 18	36	11.8
	18-30	120	39.5
	31-60	138	45.4
	60+	10	3.3
Educational level	No Formal Education	20	6.6
	Basic	128	42.1
	Secondary	136	44.7
	Tertiary	20	6.6
Length of stay in the community	less than 1 year	74	24.3
	1 to 5 years	106	34.9
	6 to 10 years	22	7.2
	11 years +	102	33.6
Distance from home to community dumpsite	< 100 m	90	29.6
	100m to < 200 m	118	38.8
	200 m to < 300 m	38	12.5
	300 m to < 400 m	12	3.9
	400 m plus	46	15.1
Time taken to walk to the dumpsite and back	1 to 10mins	198	65.1
	11 to 20mins	74	24.3
	21 to 30mins	26	8.6
	31 to 40mins	6	2.1
	Total	**304**	**100.0**

Source: Filed survey, 2022

From Table 1, the findings showed that 41.4% (126) of the respondents were males compared to 58.6% (178) of respondents who were females. Hence, this result indicates that the majority of the respondents were females implying that females were duty-bearers in terms of waste management in households. Regarding the age group of the respondents, the findings indicated that 45.4% (138) who were the larger portion of the respondents falls within the age

group of 31 – 60. The rest of the respondents who were between the ages of 18 – 30, above 60, and less than 18 years constitute 39.5% (120), 3.3% (10), and 11.8% (36), respectively. The above data revealed that the larger portion of respondents, 44.7% (136) were secondary school graduates, while, 42.1% (128) were basic school graduates and 6.6% (20) of the respondents were tertiary graduates. Respondents who had no formal educational background formed 6.6% (20). The findings showed that the majority of the respondents had a good educational standing. From the Table 1, 34.9% (106) of the respondents have stayed in the community for 1 – 5 years, and 33.6% (102) of the respondents have stayed for 11 years and above. Then, 24.3% (74) and 7.2% (22) have stayed in the community for less than 1 year and 6 – 0 years, respectively. This finding showed that the majority of the respondents, 40.8% (124), had stayed much longer in the community than the other respondents.

On the question of distance from home to community dumpsite, 11.2% (34) of the respondents indicated that the distance from their home to the community dumpsite was less than 100 metres; 38.8% (118) of the respondents indicated that the distance from their home to the community dumpsite was between 100m and 200 metres. Furthermore, 12.5% (38) of the respondents indicated that the distance from their home to the community dumpsite was between 200 metres and 300 metres, while 22.4% (68) of the respondents indicated that the distance from their home to the community dumpsite was between 300 metres and 400 metres, and 15.1% (46) of the respondents stated that the distance from their home to the community dumpsite was 400 metres and above. The findings showed that majority of the respondents 38.8% (118) lived within a range of 100 metres and 200 metres from the dumpsite, followed by 22.4% (60) respondents who lived between 300 metres and 400 metres from the community dumpsite. Thus, this result simply means that most of the respondents had access to the community dumpsite. Also, the majority (who live from less than 100 metres to 200 metres from the dumpsite) were exposed to unsanitary conditions surrounding the dumpsite.

Again, with regards to the time taken for respondents to walk to the dumpsite and back, 65.1% (198) of the respondents said they spent between 1 to 10 minutes walking to and from the dumpsite; and 2.1% (6) of the respondents said they spent between 31 to 40 minutes to walk to and from the dumpsite. This finding indicated that the majority of the respondents 65.1% (198) spent less time walking from the home to the dumpsite and back; similarly, 24.3% (74) of the respondents could be considered as spending less time walking to the dumpsite and back.

Perceptions of Waste and Waste management
In this section, attention is focused on respondents' perception of solid waste and solid waste management issues. Here, questions and statements that relate to solid waste generation, storage of solid waste, sorting of solid waste, ways of reducing waste generation, and waste disposal methods such as composting, burning, and burying were posed. Psychophysical methods are widely employed to investigate perceptual phenomena, particularly in the field of sensory perception. Cognitive tests, often employed in psychological research, provide valuable insights into these complex perceptual processes. Another self-report measures commonly used in perception research is the Semantic Differential Scale. This scale presents bipolar adjectives, such as pleasant-unpleasant or efficient-inefficient, and participants are asked to rate where they fall on the continuum. his study adopted the subjective self-report measures that allow individuals to provide insights into their own perceptual experiences, specifically the Likert scale, which assesses participants' agreement or disagreement with specific statements related to perception. Mean scores of respondents' perception was computed and classified into poor (≤49), satisfactory (50 - 60), and good (61+) on a gender basis (Table 2).

Table 2: Classification of respondents' perception of solid waste generation by Gender

Classification		Frequency (n)	Percent (%)
Good	Male	82	27.0
	Female	101	33.2
Satisfactory	Male	27	8.9
	Female	53	17.4
Poor	Male	17	5.6
	Female	24	7.9
	Total	**304**	**100.0**

Table 2 shows that majority of both males (27.0%, n=82) and females (33.2%, n=101) had a good perception on solid waste management. Thus, in comparing male/female perception on solid waste generation, the females had a better perception than males. Moreover, 8.9% (n=27) of males and 17.4% (n=53) of females had a satisfactory perception whiles 5.6% (n=17) of males and 7.9% (n=24) of female's respondents had poor perception on solid waste management in the study area.

Table 3: Classification of respondents' perception of storage of solid waste by gender

Classification		Frequency (n)	Percent (%)
Good	Male	31	10.2
	Female	109	35.9
Satisfactory	Male	59	19.4
	Female	44	14.5
Poor	Male	36	11.8
	Female	25	8.2
	Total	**304**	**100.0**

In Table 3, the majority of the females (35.9%, n=109) had a good perception of the storage of solid waste as compared to males (10.2%, n=31) whose perception was classified as good. This means, more females had better perception of solid waste storage than males. The majority of the males (19.4%, n=59) possessed a satisfactory perception. On storage of solid waste, 14.5% (n=44) had their perceptions classified as satisfactory, 8.2% (n=25) of females showed poor perception and 11.8% (n=36) of the males had a poor perception.

Table 4: Classification of respondents' perception on sorting of solid waste by Gender

Classification		Frequency (n)	Percent (%)
Good	Male	24	7.9
	Female	66	21.7
Satisfactory	Male	72	23.7
	Female	80	26.3
Poor	Male	30	9.9
	Female	32	10.5
	Total	**304**	**100.0**

With regards to the perception of sorting of solid waste, the majority of males (23.7%, n=72) and females (26.3%, n=80) had a satisfactory perception. Only 7.9% (n=24) of males and 21.7% (n=21) of females had a good perception of the item. This is an indication that females have better perception of sorting than males. This is corroborated by some residents and the sanitation guards in FGD interview. On the question of who has a better perception of waste management, these were the responses: sorting of solid waste, this was his response from a sanitation guard:

'Women are better managers of the solid waste in the home. From childhood, females are trained to do household chores including solid waste management so they are better at it and also have a better perception of waste management than males.' (FGD, Male respondent, 30 years)

'In my space, males are dominant even though there are females in the industry. Also, when you observe those who bring waste to the dump site, you see, the majority are males. I think, this is because conveying waste involves driving and men dominate the driving space, but when it comes to sorting of solid women have better perception because culturally, they handle waste at home' (Interview, Sanitation guard, 35 years)

Also, 9.9% (n=30) of males and 10.5% (n=32) of females had poor perception of sorting of solid waste. Comparatively, the percentage of females who had a good perception of sorting was higher than males hence the difference in male/female percentage on poor perception still makes females better than males.

Table 5: Classification of respondents' perception on ways of reducing waste generation by Gender

Classification		Frequency (n)	Percent (%)
Good	Male	73	24.0
	Female	71	23.4
Satisfactory	Male	39	12.8
	Female	92	30.3
Poor	Male	14	4.6
	Female	15	4.9
	Total	**304**	**100.0**

On ways of reducing waste generation, male respondents (24.0%, n=73) possessed a good perception than female respondents (23.4%, n=71). Thus, the majority of the female respondents' perception was classified as satisfactory as compared to 12.8% (n=39) of males who had a satisfactory perception. Nonetheless, 4.6% (14) of males and 4.9% (n=15) of females had a poor perception of ways of reducing waste generation.

Table 6: Approaches used by households to dispose of solid waste by gender

								95% Confidence Interval for Exp(B)	
			Std.						Upper
Gender[a]		B	Error	Wald	df	Sig.	Exp(B)	Lower Bound	Bound
Male	Intercept	2.013	1.593	1.597	1	.061			
	WasteMgtPractice1Burn	-.333	.265	1.577	1	.092	1.395	.830	2.345
	WasteMgtPractice2Gutters	.637	.515	1.533	1	.016	.529	.193	1.450
	WasteMgtPractice3Composting	1.133	.455	6.191	1	.013	.322	.132	.786
	WasteMgtPractice4Farm	-.694	.475	2.130	1	.144	2.001	.788	5.078
	WasteMgtPractice5Animalfeed	-.234	.432	.294	1	.058	1.264	.542	2.948
	WasteMgtPractice6Dumpsite	-.919	.295	9.690	1	.002	.399	.224	.711

<div align="center">Parameter Estimates</div>

a. The reference category is: Female.

Table 6 delves into gender-based disparities in waste management practices, drawing insights from a logistic regression analysis of six distinct approaches. First, it is notable that while the significance level for burning waste (Burn) was moderately high (Sig. = 0.092), the odds ratio (Exp(B) = 1.395) suggests that males exhibit a slightly higher likelihood of adopting this practice compared to females. In contrast, dumping waste in gutters (Gutters) presents a

significant gender divergence (Sig. = 0.016), with females (Exp(B) = 0.529) showing a greater tendency for this practice. Thus, females were more likely to dump waste into gutters than males. The composting of waste (Composting) had significant gender influence (Sig. = 0.013), revealing that females (Exp(B) = 0.322) were notably more inclined toward composting than males. However, farming for waste reduction (Farm) exhibited a moderate significance level (Sig. = 0.144), with males (Exp(B) = 2.001) displaying a higher propensity for this method. For animal feed disposal (Animal feed), despite a moderately significant Sig. value (0.058), males (Exp(B) = 1.264) exhibited a slightly higher tendency. Finally, dumpsite utilization (Dumpsite) was profoundly impacted by gender (Sig. = 0.002), with males (Exp(B) = 0.399) revealing a reduced likelihood of employing dumpsites for waste management compared to females.

4. DISCUSSION

Gender perceptions significantly influence how individuals engage with and perceive solid waste management and this helps to develop more inclusive and effective waste management strategies. Promoting gender-responsive approaches in waste management allows us to address environmental challenges while also addressing gender inequalities (Lubin et al., 2017). Thus, in comparing male/female perceptions of solid waste generation, females had a better perception than males. Sahu (2022), found that gender influenced certain practices related to solid waste management, such as the use of separate bins and the use of community bins. Vineeshiya (2017) highlighted that woman tend to express higher levels of concern for the environment and play different roles in solid waste management. Cultural norms and expectations can further shape gender perceptions of solid waste. In some societies, women are socially conditioned to be more concerned with cleanliness and hygiene, leading to a greater awareness of waste-related issues. Additionally, women often play a significant role in the household and are responsible for the management of domestic waste. Yin (2013), observed that in Ashaiman, Ghana, waste management was perceived as the duty of women based on local tradition and values. These findings suggest that in some societies, women may have a greater awareness of waste-related issues due to social conditioning and cultural expectations. This direct involvement can result in a deeper understanding of waste management practices and potentially more sustainable behaviours (Natarajan & Bawakyillenuo, 2020). The results also showed that more females had a better perception of solid waste storage than males. This is an indication that females have a better perception of sorting than males. However, male respondents possessed a better perception than female respondents on ways of reducing waste generation. Ali et al., (2022), found that female university students had better awareness, attitude, concern, and practice towards solid waste management compared to their male counterparts. Sahu 2022 also found that gender influenced certain solid waste management practices, such as the use of separate bins and burning of plastic. However, Ramos et al., (2016), did not specifically address the gender difference in perception, focusing more on knowledge, attitudes, and practices among secondary school students.

Comparatively, the percentage of females who had a good perception of sorting was higher than males hence the difference in male/female percentage on poor perception still makes females better than males. Thus, females are more likely to dump into gutters than males. The composting of waste (Composting) showed significant gender influence revealing that females were notably more inclined toward composting than males. However, farming for waste reduction (Farm) exhibited a moderate significance level with males displaying a higher propensity for this method. For animal feed disposal (Animal feed), despite a moderately significant Sig. value males exhibited a slightly higher tendency. Finally, dumpsite utilization (Dumpsite) was profoundly impacted by gender revealing a reduced likelihood of females employing dumpsites for waste management compared to males. Amanah (2013), identified a gender gap in waste management practices, with men having better access to information and innovative waste treatment technologies. These findings collectively indicate that females are less likely to employ dumpsites for waste management compared to males, suggesting a

reduced likelihood of female dumpsite utilization. The findings underscore the significance of gender perceptions in solid waste management, indicating that gender-responsive approaches can enhance both environmental sustainability and gender equality. Women generally exhibit better awareness and involvement in waste management due to cultural conditioning and household responsibilities.

5. CONCLUSION

The recent study provides substantial evidence that both men and women generally possess a range of satisfactory to excellent knowledge and insights regarding the domain of solid waste management. This understanding encompasses awareness of the environmental impacts of waste and the importance of effective management practices. However, the study also highlights a nuanced landscape where perceptions and attitudes towards waste management are influenced by a tapestry of demographic factors, including but not limited to, gender distinctions, the breadth of educational experiences, economic status, and the depth of cultural roots. Despite this foundational knowledge, a significant disconnect emerges between awareness and behavior. The capacity of waste management infrastructure is routinely outstripped by the sheer volume of waste generated, suggesting that having knowledge does not necessarily translate to environmentally conscious actions. This gap is further exemplified by the observation that a majority of individuals do not engage in pre-disposal sorting of their waste, foregoing a critical step in the recycling and resource recovery process. To address these challenges and improve municipal sanitation, the study advocates for a multifaceted approach spearheaded by the Municipal Assembly. Such an approach would include the enactment and enforcement of stringent waste disposal regulations. These could take the form of bylaws tailored to encourage compliance and foster a culture of accountability and environmental stewardship.

Furthermore, the study underscores the need for targeted educational initiatives to elevate the perceptions of those with a limited understanding of solid waste management. These initiatives could be strategically timed and delivered, such as through documentary screenings in the evenings when people are more likely to be at home and receptive, or through the distribution of educational materials like flyers to school-aged children, who are instrumental in shaping the future of community environmental practices. The physical infrastructure for waste management requires attention, with a recommendation for the widespread distribution of appropriate waste receptacles for residential use. This not only facilitates the separation and containment of waste but also ensures that the collection process is streamlined, preventing the accumulation of waste and mitigating the risk of environmental degradation. Through these combined efforts, the study suggests a path forward that could significantly enhance the management of solid waste, with ripple effects that benefit the broader ecosystem and the quality of life within the community.

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