

# Perceptions and Attitudes to Waste Disposal: An Assessment of Waste Disposal Behaviors in the Tamale Metropolis

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## Abstract

The study was done in the Northern Region of Ghana (Tamale metropolis) in 2012. Primary data on waste collection and management were collected at the household level (210 households) using questionnaires based on the Theory of Reasoned Action (TORA) construct. Secondary data was also collected from records of Zoomlion Ghana Limited as well as the Tamale Municipal Waste Management Department. The TORA model was employed to evaluate how perceptions and attitudes of households influenced disposal of solid waste and willingness to pay (WTP). Overall, attitude of households had strong influence on the intention to use collection bins in future. On the other hand, social referents had no influence on the intention to use collection bins. Neither the overall attitude nor subjective norms of households had influence on their intention to use open pit as a method of solid waste disposal. Overall, attitude of households had stronger influence on their intention to pay for solid waste collection than the subjective norms. Households are willing to pay an average amount of GH ₵4.0 monthly, which is subject to the type of job or income earned by the household heads.

**Keywords:** Solid waste, household, willingness to pay, attitude, subjective norm

## 1. Introduction

A United Nations Populations Fund (UNFPA) report revealed that, more than half of the 3.3 billion human populations live in towns and cities. This number is projected to swell to about 5 billion by 2030 (UNFPA, 2008). The challenge that such potential population growth presents to decision makers and planners in meeting corresponding needs for food, shelter and waste management is complex. For instance, rapid urban growth in Africa comes with the need for provision of sufficient food on sustainable basis as well as adequate and safe waste management. Countries with fast growing urban populations face serious waste disposal problems mainly because the rate of waste generation is often not matched by improvement in management and disposal of the waste materials. Studies have shown that the large amounts of garbage generated in urban settlements mostly come from households, schools, medical facilities and industrial activities (Boadi & kuitunen, 2002).

The concept of Human Development (HD) as outlined by the United Nations Development Programme (UNDP) incorporates other dimensions of life other than income levels. HD is viewed as a process of enlarging people's choices, including the option to lead a long and healthy life as well as enjoy decent standard of living (HDR, 2010). As part of the efforts to encourage governments to formulate and implement appropriate policies that will guarantee sustainable growth and development (as urban populations expand), the Millennium Development Goal (MDG) seven (7), has as its focus, environmental sustainability. The goal is expected to be achieved by meeting three important targets including halving the proportion of people without sustainable access to basic sanitation by 2015 (HDR, 2010; UN, 2013). Although 1.9 billion people have gained access to improved sanitation facilities between 1990 and 2011 a lot more is required to achieve the MDG sanitation target by 2015. According to the UN (2013) whereas a great deal of progress was achieved in Eastern Asia, where sanitation coverage increased from 27% in 1990 to 67% in 2011, Sub-Saharan Africa is still lagging behind in this regard. Environmental sanitation is an important factor that contributes to the health, productivity and welfare of the people of Ghana (GOG, 2001). Indeed, it was highlighted in the "Vision 2020" document as a key element underlying health and human development (GOG, 1995). In addition, environmental protection and improved management of human settlements were identified in the document as key factors in rural/urban development. Solid waste collection was therefore targeted as means of achieving targets in environmental sanitation.

The waste management problems in Ghana are national in character and complicated by population pressures in the heavily populated cities including Tamale. A combination of poor governance and human factors have been cited as reasons for the resultant refuse piles and choked drains in the major cities in the country (Hardoy & Satterthwaite, 1993). It is often alleged that waste material (especially organic) in itself is not harmful to humans or the environment but the manner in which it is treated that determines the level of health risks. In Ghana, infectious and vector borne diseases like malaria, diarrhea and typhoid are the most common making significant

health impact. According to UNFCC (2003) majority of these diseases are related to poor sanitary conditions, with dire economic and social costs.

Tamale is one of the fastest growing cities in Ghana where waste management has been described as a daunting challenge (HDR, 2010). According to the report, solid waste in the Tamale metropolis is managed using the communal container system, door-to-door collection services, street litterbin systems and evacuation of heaps. A private company (Zoom-lion Ghana Limited) oversees the door-to-door service while the Waste Management Department of the Metropolitan Assembly takes care of the rest. Solid Waste Collection (SWC) was first privatized in Ghana after the implementation of Structural Adjustment Programme (SAP) in the mid-1990s (Baud & Post, 2002). As a private concern, the door-to-door collection service provider charges monthly tariffs that are subject to periodic review. It is also important to note that the street litterbin system collapsed soon after it was introduced because of widespread abuse by residents.

Studies have shown that the rate of waste generation as well as quality of management varies with the nature of settlements (high vs. low-income areas). Low-income residents tend to generate more domestic garbage, which are often dumped indiscriminately either due to inability to pay for private collection or the services are not available. For instance, in 1998 about 80% of the waste generated in Accra was from low – income areas, 17% from middle-income areas while only 3% was from high-income settlements (Boadi & Kuitunen, 2003). Refuse Generation Rate (RGR) in the Tamale metropolis is estimated to be about 150 tons per day. Meanwhile, the number of collection containers in the metropolis is relatively small, capable of taking only 7.5 tons (0.05%) per day, leaving a daily excess of 142.5 tons. This, according to the HDR (2010) leads to widespread littering of streets and drains in the metropolis, which pose health and other hazards to residents. The collection system is also not effective due to wrong perceptions and attitudes of households. Similarly, attitudes and perceptions are the result of general ignorance about the health and environmental consequences of improper disposal. Other challenges associated with SWC in Tamale include irregularity in waste evacuation (communal container system), especially in low-income areas as well as inadequate service facilities. The premise of this research is the influence of perceptions and attitudes of people on adopting waste disposal methods and their willingness to pay for waste collection services in the Tamale metropolis.

## 2. Methodology

The study was carried out in Tamale, the administrative capital of the Northern Region of Ghana. Primary data on community waste management, waste collection services and perceptions on waste management were collected using key informant interviews, focus group discussions and direct observation. Questionnaires were also administered (at the household level) to 210 households following the TORA (Theory of Reasoned Action) construct. Secondary data was gathered from records of Zoom-lion Ghana Limited, Tamale Waste Management Unit as well as review of journals and library materials. Cluster sampling was used to categorize the metropolis into three zones (North, South and Central Tamale) based on waste collection service criteria. In each zone, random sampling was used to select five communities (table 1). Fourteen households were randomly selected from each of the communities. For purpose of the study, 210 individual households were selected from the three clusters.

**Table 1: Selected communities in the Tamale metropolis**

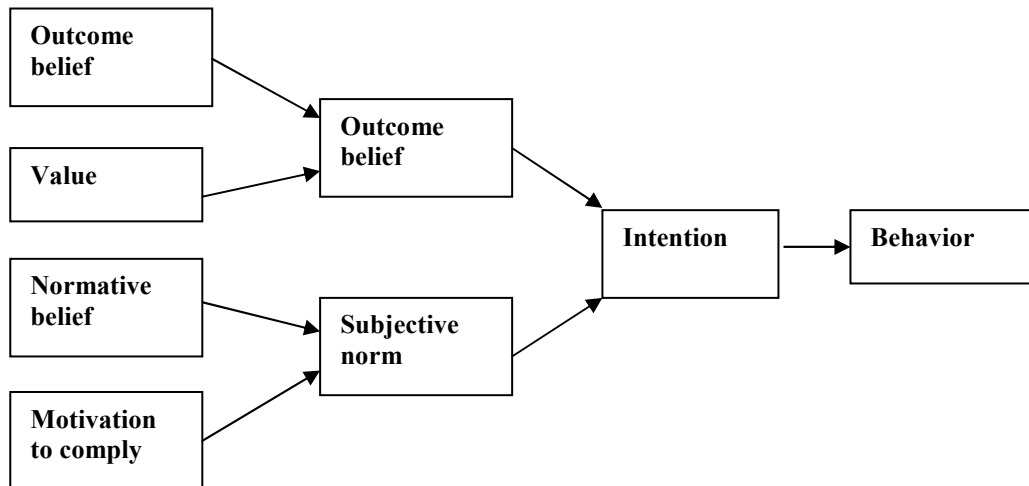
Clusters	Tamale North	Tamale Central	Tamale South
1.	<i>Kanvilli</i>	<i>Sakasaka</i>	<i>Lamashegu</i>
2.	<i>Sagnarigu</i>	<i>Salamba</i>	<i>Zogbeli</i>
5.	<i>Jisonayili</i>	<i>Chanli</i>	<i>Nyohini</i>
4.	<i>Kalpohini</i>	<i>Tishigu</i>	<i>Bulpela</i>
5.	<i>Yapalsi</i>	<i>Warizehi</i>	<i>kakpayili</i>

Source: Field survey, 2012

### 2.1 The concept of TORA

The Theory of Reasoned Action (TORA) model was used to analyze how perceptions and attitudes of household members influenced their disposal of solid waste and willingness to pay (WTP) as well as other socio-economic factors influencing WTP. TORA is a sequence of related concepts and suggestions developed to help understand and predict human behavior (McKemey & Saky-Dawson, 2000). Having been applied in many fields of research to explore cognitive decision-making processes of different social groups (Ajzen & Fishbein, 1980) the theory was described as one of the most reliable means to understanding the cognitive construct underpinning decision-making processes. It is based on the assumption that humans act in a rational manner, taking account of available information, considering the implications of their actions. The theory suggests that a person's intention to perform (or not perform) a behavior is the immediate determinant of that action. People's intentions also depend on their *own attitudes* and the *subjective norm*, regarded as two independent factors. Attitudes, in turn depend on beliefs as regards the outcomes of performing the behaviors and the values attributed to these outcomes. The

perceived social pressure or subjective norm is also a function of *normative believes* (regarding how they feel others would expect them to behave) and their *motivation to comply*. Therefore, in order to change behavior it is necessary to change attitudes and/or subjective norms affecting the underlying beliefs. A summary of the TORA model is presented in Figure 1.



**Figure 1: Schematic representation of the TORA**

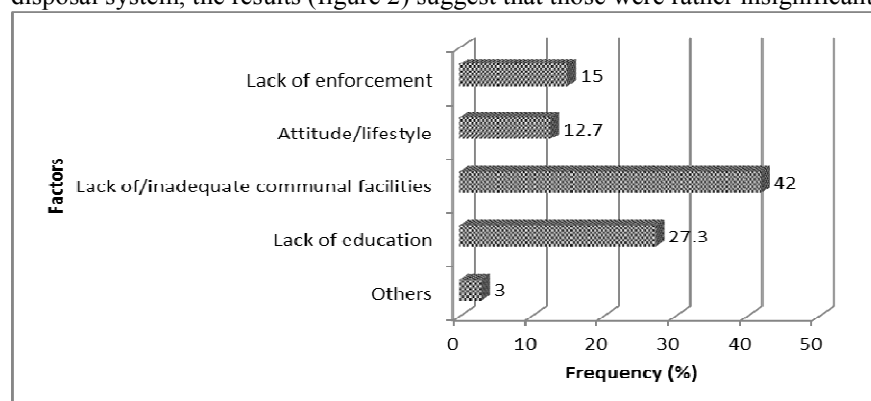
The strength of the relationships between variables was measured using correlation coefficient. Multiple-correlation coefficient (R) serves as an index of the extent to which behavioral intention can be predicted considering the attitude subjective norm. The theory is represented symbolically as follows

$$B \sim BI = (A_{act}) W_1 + (SN) W_2$$

Where A is attitude toward the behavior, BI is the behavioral intention, B is the behavior,  $A_{act}$  is the person's attitude towards the behavior and SN is the influence of the person's subjective norm. W represents the weight, (indicative of the relative importance of the variables' contribution to the prediction of intention) (Ajzen & Fishbein, 1980).

### 3.Results and Discussion

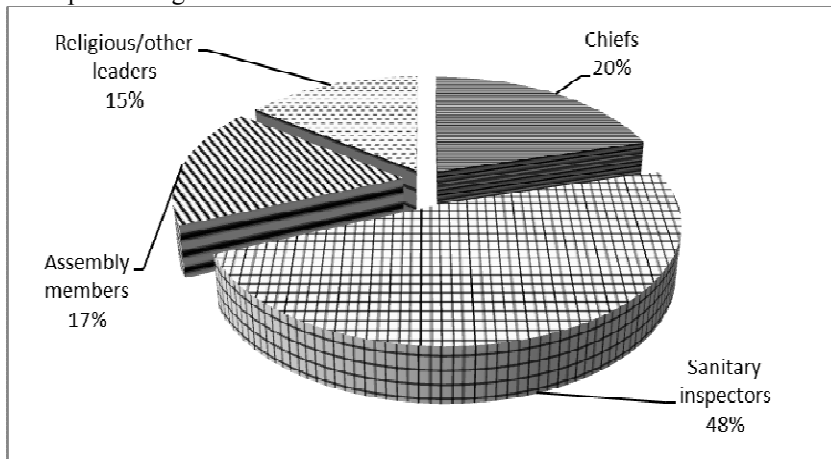
The findings revealed that 85% of households were willing to support the use of collection bins as means of disposing solid waste while 15% support the use of open disposal (i.e. burning, burying, and throwing into gutter). Households that support the door-to-door bin collection service believe it is hygienic and ensures easy conveyance to proper disposal sites. Interestingly, majority (54%) of households actually practice open disposal of solid waste in the metropolis. Even though *cost* and *poor services* were cited as reasons for opting for the open disposal system, the results (figure 2) suggest that those were rather insignificant reasons compared to the others.



**Figure 2: Factors influencing the practice of open waste disposal in Tamale**

The results show that lack of or inadequate communal garbage collecting facilities is the major contributory factor. This was followed by lack of education on proper disposal, lack of law enforcement and individual attitudes in that order. As indicated earlier, only 3% of the responses alluded to the claims of cost and poor services on the part of service providers. Majority (92%) of the respondents agreed that there is a problem of improper waste disposal in the metropolis. Figure 3 shows the distribution of respondents in terms of what they consider the most effective channels that could be utilized to either compel or encourage residents in the

metropolis to sign onto the use of collection bins.



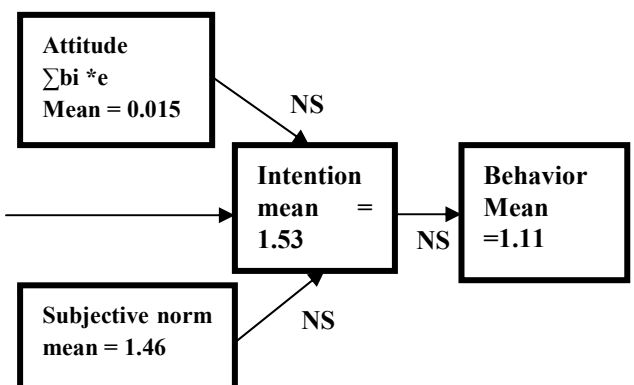
**Figure 3: Means to achieve increased use of bin collection system in Tamale**

From the figure, that majority of the respondents believe that deployment of sanitary inspectors would influence households most to opt for the use of collection bins. This suggests that even though issues of sanitary law enforcement featured third among the factors that negatively affect proper waste disposal in the metropolis, it is the most important factor that can force residents to comply. In addition, chiefs, assembly members and other leaders can assist to achieve that goal.

**3.1 Waste Disposal Intentions and Attitudes/Subjective Norms (Open Disposal)**

The stated intention to practice open disposal of solid waste in the near future was weakly expressed (mean intention score of -2) by household heads. This may be due to awareness of the negative consequences of open disposal and suggests that in future, households may discourage the practice under certain conditions. The overall attitude (sum of statement products,  $\sum b_i * e_i$ ) towards the intention to practice open waste disposal in future is also very weak, hence serves as a barrier to perform the stated behavior. Thus, the overall attitude does not significantly influence the intention to perform the behavior in the near future. The results also show that subjective norm has negative correlation (-0.02) with the intention to practice open disposal in the near future. This suggests that both the overall attitude and subjective norm of households in the municipality do not have significant influence on the intention to practice open waste disposal (figure 4).

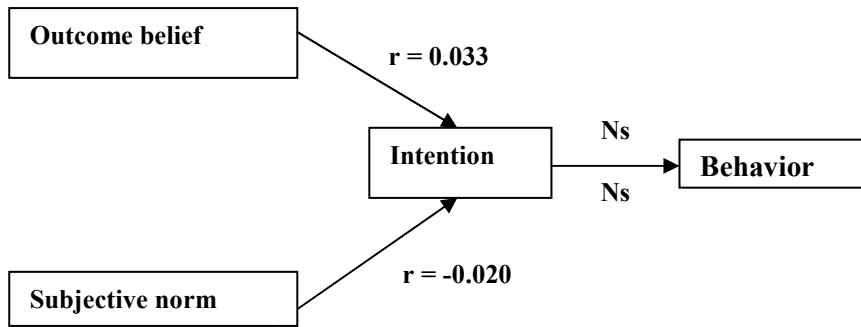
Ranked influential attitude ( $b * e$ ) correlation with intention		
	Barrier	rs sig
Very easy to construct and use	Barrier	0.160 (**)
Helps to reduce the expenditure of HHs	Barrier	0.156 (**)
Saves time in waste disposal	Barrier	0.09 (0.00)
It is not costly	Barrier	0.036 (**)
Leads to food contamination and disease outbreak	Barrier	0.007 (**)
Unavailability of dustbins	Barrier	0.002 (**)
Serves as breeding place mosquitoes and poisonous reptiles	Barrier	-0.054 (**)
Serves as dead traps for children and animals	Barrier	-0.096 (**)
Leads to air pollution	Barrier	-0.136 (**)
Ignorance of its effects	Barrier	-0.198 (**)



**Figure 4: Barriers and motivators regarding use of open pits as disposal type**

**3.2 Disposal Intention and Attitudes/Subjective Norms (Use of Collection Bins)**

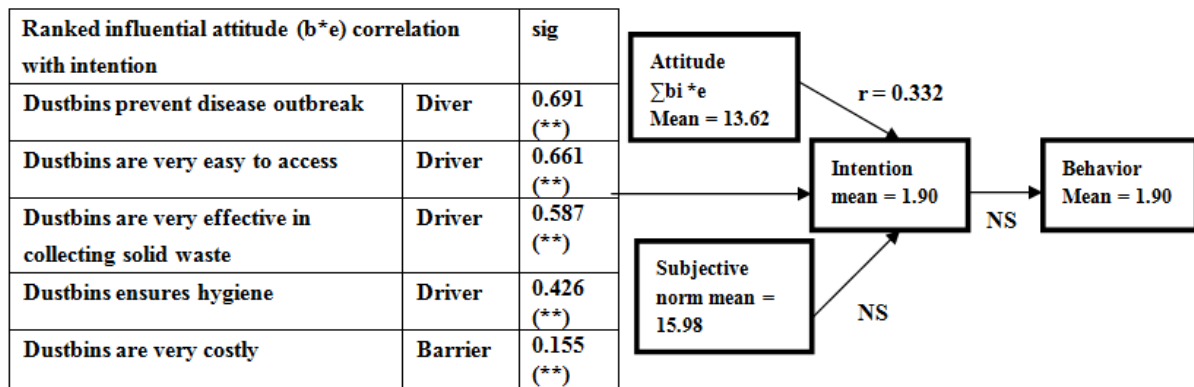
The stated intention to use waste collection bins in future was strongly (Mazvimavi & Twomlow, 2009) expressed by households who viewed the practice as one that ensures environmental hygiene. The strong positive intention (0.332) suggests that households would encourage the use of door-to-door bin collection in subsequent years to come. Overall, the attitude of households towards future intention to sign onto door-to-door bin collection was also strong. The strong positive attitude was a result of reduced environmental hazards and other health benefits associated with the use of collection bins. The analysis also revealed that there is a positive correlation, but very weak social pressure on the stated intention to use collection bins in future. This implies that social referents have little influence on others regarding the decision to use dust/collection bins (figure 5).



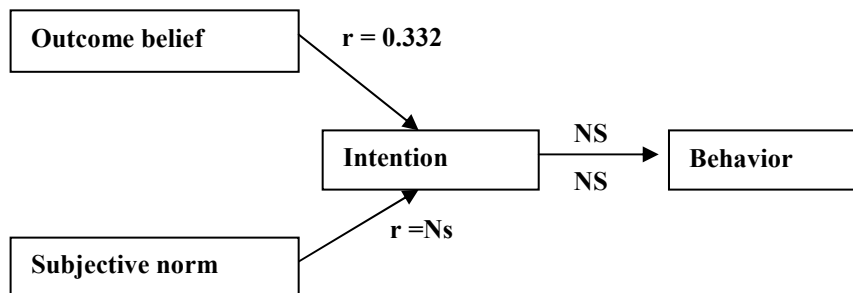
**Figure 5: Influence of subjective norm and attitude on the intention to practice open disposal**

**3.3 Influence of Subjective Norms and Attitudes on Intention to Use Collection Bins**

When attitude measure ( $\sum b_i * e_i$ ) and subjective norm (SN) were correlated with the intention to use collection bins, it revealed that the decision making process of households was governed by their own perceptions, beliefs and value importance attached to their expectations. In other words, their attitude with respect to the beliefs and the value importance attached to it has much influence on the intention to perform the behavior. Furthermore, the referents whose subjective norms correlate most strongly with the intention are those that have much influence on the subject's decision regarding the behaviors. Figure 6 and 7 illustrate this analysis.



**Figure 6 : Barriers and motivators regarding use of collection bins**



**Figure 7: Effect of subjective norm/attitude on the stated**

### 3.4 Factors influencing the willingness to pay (WTP)

The analysis revealed that the overall attitude of households would influence their intention to be willing to pay for solid waste collection in future as compared to their perceived social pressure. In other words, WTP is influenced by beliefs, attitudes and the value importance that households attach to the outcome expectations regarding solid waste collection. They believe that paying for SWC would help ensure environmental cleanliness and prevent possible outbreak of diseases. Figure 8 illustrates the belief statements that serve as drivers or barriers to the stated intention.

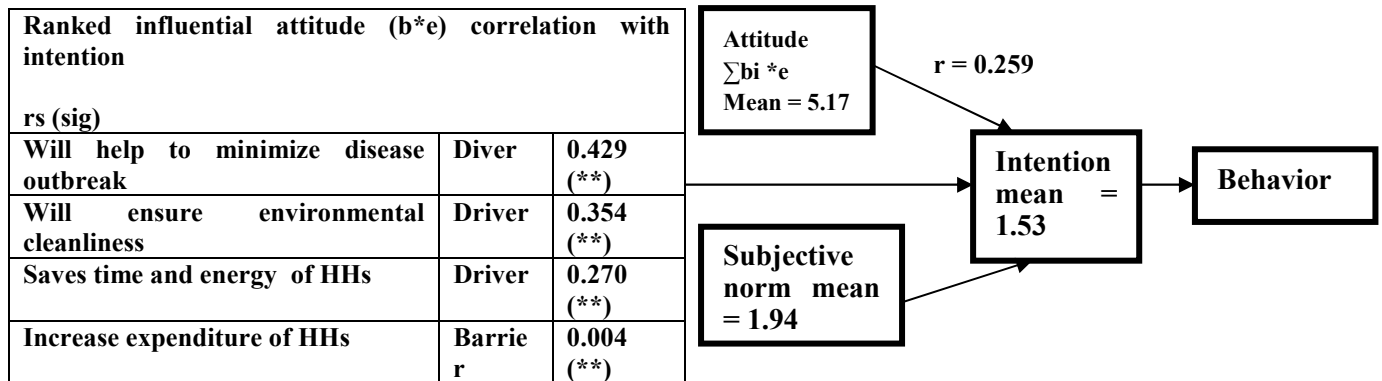


Figure 8: Barriers and motivators regarding households' WTP for solid waste

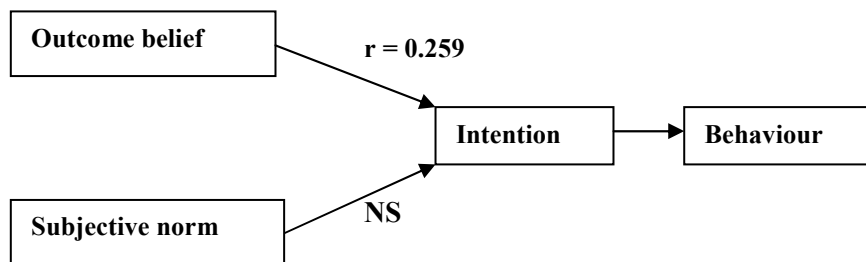


Figure 9: Effect of subjective norms/attitudes on intention to pay

#### 3.4.1 Average amount willing to be paid

The study revealed that households are willing to pay an average amount of GH ₵4.0 per month for waste collection. This amount was not influenced by the sex, age, marital status and level of education of the household head (figure 10). The major occupation of (household heads) significantly influenced their intention regarding the amount they are willing to pay for waste collection. It came out as a driver on household's intention with a strong correlation of 0.556.

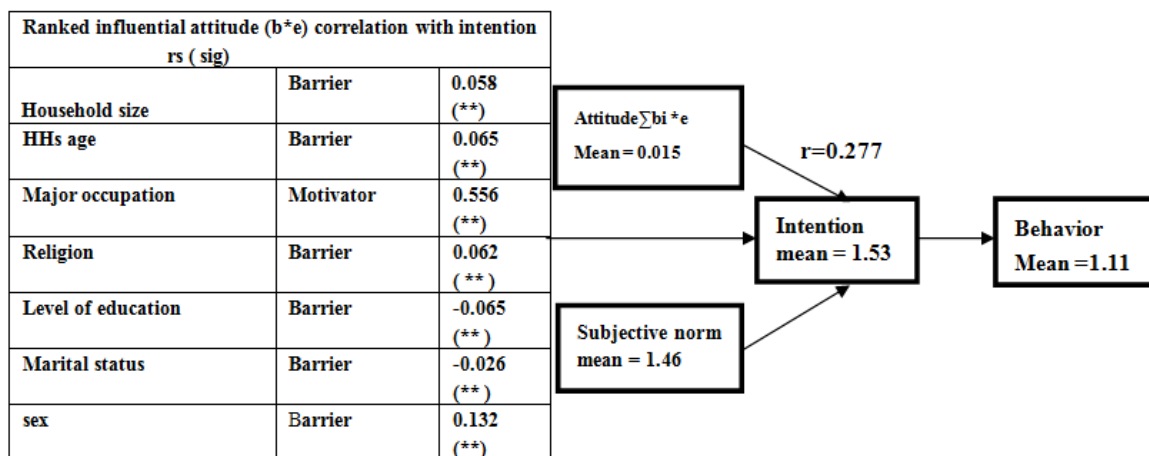


Figure 10: Barriers/motivators influencing households' intention to sign up to waste management services



## Conclusions

The overall attitude of households has a strong influence on their intention to use bin collection as means of solid waste disposal in future. On the other hand, the subjective norms have no influence on the stated intention. This suggests that households would support the use of dustbins based on their perceptions and beliefs. Neither the overall attitude nor subjective norms of households have influence on their intention to practice open waste disposal. This indicates that households are generally not in support of open disposal hence their beliefs and perceptions of social pressure would not influence them to choose that option in the near future. This can be attributed to their knowledge of the negative effects associated with the use of that option. Furthermore, the overall attitude has stronger influence on household intention to pay for solid waste collection than the subjective norm of households, which also constitute normative beliefs and the motivation to comply with regard to the social referents. This implies that household's willingness to pay for solid waste depends on their beliefs, which is a function of their cognitive structure. The average amount that households are willing to pay was GH¢ 4.0 and is influenced only by the type job or income earned by the household heads. Sex and religion have influence on household intention and for that matter the decision to use collection bins. Households are generally not in support of the practice of open disposal as none of their characteristics has an influence on their intention to use it.

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