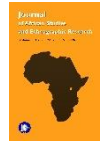




# A gendered perspective of knowledge of domestic solid waste management within informal settlement: A case of Kiandutu Informal Settlement, Kiambu County, Kenya



## Research article



This article is published in Nairobi, Kenya by Royallite Global in the **Journal of African Studies and Ethnographic Research**, Volume 3, Issue 3, 2021

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### Article Information

Submitted: 19<sup>th</sup> May 2021

Accepted: 22<sup>nd</sup> August 2021

Published: 3<sup>rd</sup> October 2021

Conflict of Interest: No conflict of interest was reported by the authors

Funding: None



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ISSN: e-2708-0811, p-2708-0803

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### Abstract

The disastrous way in which the domestic solid waste is managed has caused a global outcry due to its effect to both people and the environment. Subsequently it is the management of domestic solid waste at the household level that is envisaged to reduce these risks. This study aimed at examining the domestic solid waste management knowledge in men and women in Kiandutu Informal Settlement in Kiambu County, Kenya had. The consideration of men and women was a principal issue to put into consideration because every complete community is made up of the two sexes, with each exhibiting different perceptions and attitudes towards a similar situation as informed by their knowledge base in the matter in consideration. The study was guided by the Social Context Theory and Identity Theory. The findings revealed that knowledge passed on to either men or women through gendered socialization is critical in the shaping of how men and women perceive domestic solid waste. The domestic solid waste knowledge exhibited gendered opinions, thoughts and beliefs all being regulated by the irrefutable socio-cultural and environmental factors. The study therefore suggests that strategic gendered awareness creation is a prerequisite to effective knowledge base for domestic solid waste particularly in the informal settlements.

**Keywords:** domestic solid waste, gender, informal settlements, knowledge, socialization

### How to Cite:

Mwangi, W. W., Kimani, E., Okong'o, G., & Majale, C. (2021). A gendered perspective of knowledge of domestic solid waste management within informal settlement: A case of Kiandutu Informal Settlement, Kiambu County, Kenya. *Journal of African Studies and Ethnographic Research*, 3(3). Retrieved from <https://royalliteglobal.com/african-studies/article/view/683>



## Public Interest Statement

NEMA (2014) asserts that the informal settlements residents lack suitable domestic solid waste management (DSWM). Involving men and women in DSWM is important as it works towards eliminating gender bias in the solid waste management processes. Kiarie (2012) established that being one of the largest heterogeneous informal settlement outside Kenya's capital city Nairobi Kiandutu Informal Settlement (KIS), has 96.9% of the inhabitants unable to manage the domestic solid waste. Further, Koomen (2012), notes that KIS has poor DSWM systems. This study therefore aimed at establishing the participation of men and women in the management of domestic solid waste in Kiandutu informal settlement.

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## Introduction

Gender filters through the relations between men and women noting that the impact of gender relations in domestic waste management is indisputable Bacanovic (2011). This is an indication that within a society and in particular households, men, women and children have different perceptions and opinions with regard to domestic solid waste management (DSWM). This is because men and women are shaped by social determinants such as beliefs, culture and values accrued from the host society, Banga (2013). However, according to Muhammad and Manu (2013), women and girls in many African countries are socialized within the context is household chores. UN-Habitat, (2013) established that over half of Africa's urban population, which is estimated at 61.7%, lives in the usually densely populated informal settlements. Illustratively, the urban population in Sub-Saharan Africa increases by 10 million people annually, of whom seven million move to the informal settlements. According to the UN-HABITAT (2010), the biggest concern many African cities like Cairo in Egypt, Bamako in Mali and Lusaka in Zambia is how to address is the persistent serious pollution problem due to the generation of huge quantities of unmanageable domestic solid waste. These cities have been made to bear the brunt of un-recommended solid waste management practices, Mandevere (2015). This scenario replicates itself in Kenya, whereby between 60 and 80 per cent of the urban population lives in informal settlements (UN-Habitat, 2016). Poswa (2009) opines that DSWM is not a neutral concept and should therefore be understood within a context. This is from the realization that within a society and in a particular household, men, women and children may have different knowledge, perceptions and opinions in regard to domestic solid waste (DSW). Within the African context, the socialization patterns assign women and girls the roles associated with DSWM (Muhammad and Manu, 2013). This study therefore sought to determine the knowledge men and women have with respect to management of domestic solid waste in Kiandutu Informal Settlement, Kiambu County, Kenya.

## Theoretical framework

The theoretical framework for this study was drawn from Identity Theory (IT) advanced by Stryker and Burke (2000) and the Social Context Theory (SCT), propagated by Earle and Earle

(1999). Whereas in the IT, advances that an individual's identity or status in the society has a direct ability and capacity to control an individual into reflexively, SCT proposes social integration of community members through social interactions and by facilitating them to become comprehensive and productive individuals in the target community. These processes cause men and women to behave differently due to attitudes associated with one's gender, (Carter, 2014).

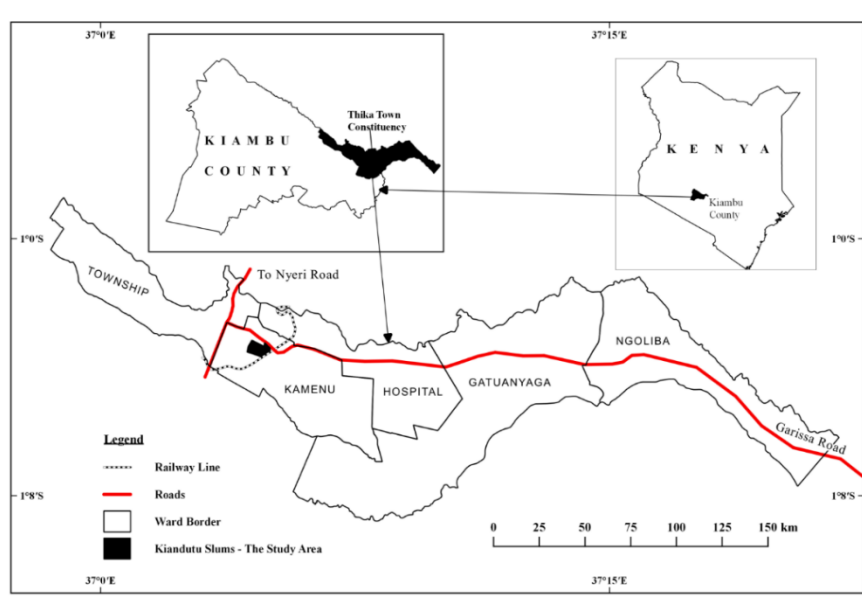
According to Stryker and Burke (2000), identity is created when gender socialized perceptions and roles are internalized in form of knowledge during one's early life and later in life become points of reference when acting in different contexts (Ridgeway, 1993). Thus, the knowledge expressed by men and women in DSWM is tied to one's identity, that is whom the individual thinks he or she is. The displayed DSWM knowledge by either men or women is a direct reflection of one's identity. This is courtesy of the gender categorization and socialization. Gender, therefore serves to advance societal norms that are replicated in the social structure. According to IT, gender socialization precepts acquired by individuals overtime supersede the application of rational thought thus causing individuals to act against reason. In the context of this study, domestic solid waste management continues to be displayed according to the societal gender expectations and stereotypes with the already acquired gender socialization and perceptions, thus determining the knowledge of individual men or women.

Briggs (2012) emphasizes that the SCT deliberates on factors that determine peoples' attitudes, perceptions and actions that emanate from the acquired knowledge. It advances the notion that although one may have acquired certain norms, perceptions and behaviour through socialization, they can be altered systematically within a given social context. Accordingly, a social context can specifically be designed with the aim of shifting an individual into a new paradigm with completely new experiences. The new place an individual has come to becomes the definer of the exhibited knowledge, perceptions, attitudes and behaviour. Consequently, SCT examines the interaction between social forces that affect individual behaviour and group actions that change society. It is presented as a tool of analysis whereby the social changes and associated needs among individuals in societies are examined and systematically addressed. The DSWM is a social role that requires an active and collaborative participation of men and women and can therefore be termed as one of the important components in environmental sustainability. When the social forces such as socialization, lack of good education and poverty acts on individuals, particularly in an informal settlement, they affect their behaviour. Responses of men and women within such environments will display skewed knowledge and therefore act in a certain way to the surrounding situations for survival, in this case in reference to DSW. The survival strategies inform them how to cope with DSW and they end up engaging in unconventional methods of managing that waste. By specifically addressing the specifics in the social context, an appropriate DSWM knowledge is strategically facilitated through social interaction at the household and community levels with regard to DSW.

## Methodology

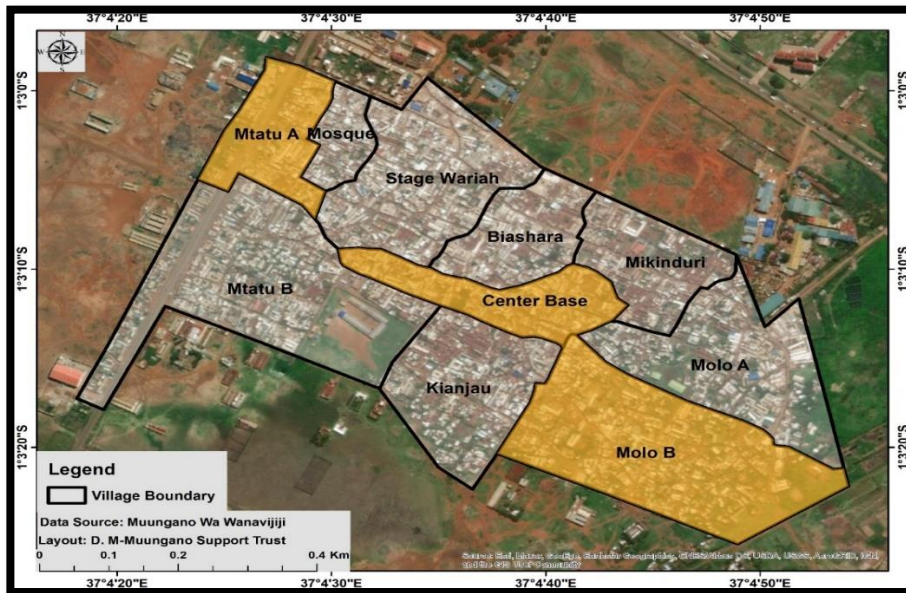
### The Study Site

The study was carried out in Kiandutu Informal Settlement (KIS) in Kiambu County. KIS is located at the southern part of the outskirts of Thika Town in Kiambu County, Kenya. According to Kiarie (2012), KIS is one of the largest heterogeneous urban informal settlements outside Kenya's capital city, Nairobi. With a population estimated to be 11,953 of whom 6,551 males and 5,402 females, the total number of households stood at 3,591 (KNBS, 2010). However, according to Kiambu County Government (2015) the total number of households in KIS stood at 8,329.



**Figure 1: Map of Thika Town Constituency in Kiambu County Showing the Location the Study Area (Kiandutu Slums).**

According to Koomen (2012), KIS is divided into ten sub-areas or villages namely; Biashara, Mosque, Mtatu A, Mtatu B, Molo A, Molo B, Stage Wariah, Centre Base, Mikinduri and Kianjau. Figure 2 shows the ten villages that make up KIS. In it also are the three villages, highlighted that were selected for the study – Mutatu-A, Centre Base and Molo-B



**Figure 2: Kiandutu Informal Settlement (Source: Muungano Wa Wanavijiji, 2010).**

## Research Design

The study used exploratory research method. This method was found fitting as it allowed investigation of the problem using diverse ways for a better understanding of the problem. Through explanatory research method, the researcher was able to collect data for the phenomenon which had not been studied in depth. It also allowed studying in detail the interaction of the phenomenon. Exploratory research is both interactive and open ended and therefore allowed different data collection methods to be used. The exploratory research method allowed the use of surveys, observations, interviews and focus group discussions for data collection. While surveys gather information from the selected group of respondents, observation allows the capture of data in various forms like in photos. Focus group on the other hand gathers information from a selected group of people brought together, and are allowed to express their insight of the topic in an open ended way. Data gathered using this exploratory research method was both qualitative and quantitative (Gall, Gall, & Borg, 2007). Among the major strengths of exploratory research method is that it is flexible and easily adapts to changes. The method also allows the use of theories which support the study findings as that will make it easier for the researcher to assess it and move ahead in his study. According to Stebbins (2001), social science exploration is a research design that maximizes descriptions and considerations of the study topic through use of purposive and systematic undertakings. This study aimed at investigating the knowledge men and women had in regard to domestic solid waste in Kiandutu informal settlement - Kiambu County.

## Sampling procedure

The study used multistage sampling procedures to select the villages and the households that participated in the study. In the first stage, simple random sampling technique was used and according to Grix (2004), a sample of 30% of the target population was an adequate representative. Three out of the ten villages were therefore selected using simple random technique. This ensured that each village had an equal chance for study selection. The selected villages were Mtatu A, Centre Base and Molo B, the three having a total number of 2637 households, as in Table 1. In addition, twelve (12) key informants participated in the study. Among them were the Village Elders, one from each village, the Community Health Workers (CHWs), two from each village, male and female (total six), Community Health Extension Worker (CHEW), one in-charge of KIS, the Area Chief and the County Director of Environment (CDE) as shown in Table 1.

**Table 1: Sample Size**

Name of selected village	Number of Households	Ten percent of the Households from selected villages	Respondents Sample					
			Household Heads		Key Informants		Others Key Informants	
			M	F	M	F		
Mtatu A	658	66	30	36	2	1	Area Chief	1
Centre Base	903	90	41	49	2	1	The CHWE	1
Molo B	1076	108	50	59	2	1	The CDE	1
<b>TOTAL</b>	<b>2637</b>	<b>264</b>	<b>121</b>	<b>143</b>	<b>6</b>	<b>3</b>		<b>3</b>

At the second level of sampling, the study obtained a 10% representative sample from each village selected for the study as depicted on Table 1 which according to Gay, Mills and Airasian (2009), a ten percent of a population can yield an adequate sample in a study. Thus, ten percent from each village were selected of the 2,637 households from the three villages yielding a total of 264 households. Since the focus of the study was to establish the participation of men and women in the management of domestic solid waste; both male and female household heads were considered in the study with the household being the unit of analysis. The study preliminaries had established that the KIS population was made up of 46% and 54% male and female headed households respectively. The study made an assumption that the said proportion of men and women household heads was harmonized in the entire population of KIS.

To ensure that the representation was achieved, purposive sampling technique was employed to select the male headed and female headed households in each village, the number of which is indicated in Table 1. This was done with the guidance of the village elders. This procedure is principally used in qualitative studies to select the study units based on specific purposes associated with the information required to answer the research questions. The technique was important as it helped gather the required information in depth (Teddlie & Yu, 2007). Different research instruments that included structured but guided questionnaires, interview schedule and observation checklist were used to generate primary data for this study.

## **Findings and discussion**

The study's sought to establish the knowledge men and women of KIS in Thika Sub-County had with respect to management of domestic solid waste. The analysis of the study revealed that both men and women. This study thematically considered the knowledge into four categories namely: The Meaning of Domestic Solid Waste, Meaning of Illegal Dumping of Domestic Solid Waste and Consequences of Illegal Dumping of Domestic Solid Waste

### **1. Demographics of the respondents:**

#### **a) Gender**

Both genders were represented from all villages considered for study. The differences in number of men and women household heads was due to the actual households in each village. Kimani and Mwikamba (2010) emphasize the importance of gender by stating that one's gender orientation dictates the relations between men and women as well as their involvement in specific engagements of life.

#### **b) Marital Status**

Table 2 represents the marital within the area of study. Flood (2009) asserts that married people, especially males, exhibit perceptions and attitudes that differ from the unmarried because of their status. Marital status is seen a definer of power relations within a household and as such had a fundamental influence on any knowledge base within a household including knowledge on the solid waste. However, the society's expectation is that men, especially those who are married should not engage in the stereotyped household chores like waste thus describing the gendered nature of knowledge of domestic solid waste. Any man displaying more knowledge of DSW would be seen as demeaning to him since such knowledge is a preserve for women. As indicated in table 2, compare to the women respondents, majority of the male respondents were married with a small number of men being either separated or widowed. Further analysis indicated that the separated or widowed women were living with their children. Since a family context regulates men's and women's attitudes and perceptions.

**Table 2: Marital Status of the Household Heads per Village**

Marital Status	Mutatu-A				Centre Base				Molo-B			
	Men		Women		Men		Women		Men		Women	
	n=30		n=36		n=41		n=49		n=50		n=58	
	FC	%	FC	%	FC	%	FC	%	FC	%	FC	%
Married	23	76.7	4	11.1	30	73.2	5	10.2	36	72.0	6	10.3
Single	4	13.3	2	5.6	6	14.6	4	8.2	8	16.0	5	8.6
Separated	2	6.7	18	50.0	-	-	27	55.1	2	4.0	25	43.1
Widowed	1	3.3	12	33.3	5	12.2	13	26.5	4	8.0	22	37.9
<b>TOTAL</b>	<b>30</b>	<b>100</b>	<b>36</b>	<b>100</b>	<b>41</b>	<b>100</b>	<b>49</b>	<b>100</b>	<b>50</b>	<b>100</b>	<b>58</b>	<b>100</b>

(FC – Frequency Count)

**c) Level of Education**

Table 3 shows the formal education levels of the household heads respondents in the villages that participated in the stud. The inclusion of the level of formal education was important as it was deemed to have a contribution in the level of knowledge that men and women have in regard to domestic solid waste. More male than female household heads represented at 60(49.6%) and 37(25.9%) respectively had acquired secondary school education or higher. In addition, 106(74.1%) and 61(50.4%) of the female and male household heads respectively had no formal education or had acquired primary school education. The social cultural beliefs to this scenario ascribed that more men than women had access to education. Formal education shapes one’s knowledge and creates awareness in a particular issue and has the capacity to modify one’s understanding. Thus, it gives ability to an individual by enabling them to look at an issue logically (Mugweri *et al*, 2018). In this study, education was deemed to have the ability to regulate behaviour towards domestic solid waste. Table 3 shows the number of men and women household heads who had acquired specific levels of formal education in each village under study.

**Table 3. Level of Education Across Villages**

	Mtatu-A	Centre-Base	Molo-B	Total
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Level of Formal Education Attained	Men	Wome n	Men	Wome n	Men	Wome n	Men (n=121)	Women (n=143)
	n=30	n=36	n=41	n=49	n=50	n=58		
Did not attend school	(1) 3.3%	(1) 2.8%	(1) 2.4%	(2) 4.1%	(0) 0.0%	(3) 5.2%	(2) 1.6%	(6) 4.2%
Primary School	(10) 33.3%	(25) 69.4%	(25) 61.0%	(32) 65.3%	(24) 48.0%	(43) 74.1%	(59) 48.8%	(100) 69.9%
Secondary School	(15) 50.0%	(8) 22.2%	(8) 19.5%	(12) 24.5%	(21) 42.0%	(15) 15.5%	(44) 36.4%	(29) 20.3%
Post-Secondary	(4) 13.3%	(2) 5.6%	(7) 17.1%	(3) 6.1%	(5) 10.0%	(3) 5.2%	(16) 13.2%	(8) 5.6%

**Knowledge of domestic solid waste as exhibited by men and women**

The analysis of the study revealed that both men and women exhibited different levels of knowledge in regard to domestic solid waste. This study thematically considered the knowledge into four categories namely: The Meaning of Domestic Solid Waste, Meaning of Illegal Dumping of Domestic Solid Waste and Consequences of Illegal Dumping of Domestic Solid Waste

**1. The Meaning of Domestic Solid Waste**

As indicated in Table 4, men and women household heads involved in the study were supposed to indicate their understanding of ‘domestic solid waste’. Table 4 presents the results of their responses by gender per village.

**Table 4: Meaning Given to the Term ‘Domestic Solid Waste’**

Responses	MTATU-A				CENTRE-BASE				MOLO-B				TOTAL	
	Men		Women		Men		Women		Men		Women		Men (n=121)	Women (n=143)
	n=30		n=36		n=41		n=49		n=50		n=58			
	FC	%	FC	%	FC	%	FC	%	FC	%	FC	%		
All you get rid of from your house	24	80.0	25	69.4	33	80.5	30	61.2	42	84.0	53	91.3	99 (81.8%)	108 (75.5%)
Substances not being used in the house	0	0	5	13.9	2	4.9	10	20.4	0	0	2	3.4	2 (1.7%)	17 (11.9%)

Food left overs only	0	0	2	5.5	0	0	4	8.2	0	0	3	5.2	0 (0.0%)	9 (6.3%)
Anything not useful in the house but can be reused	6	20.0	4	11.1	6	14.6	5	10.2	8	16.0	0	0	20 (17.4%)	9 (6.3%)
<b>Total</b>	<b>30</b>	<b>100</b>	<b>36</b>	<b>100</b>	<b>41</b>	<b>100</b>	<b>49</b>	<b>100</b>	<b>50</b>	<b>100</b>	<b>58</b>	<b>100</b>		

**i. All you get rid of from your house**

As depicted in Table 4, majority of male and female household heads respondents, 99(81.8%) and 108(75.5%) respectively indicated having knowledge of the meaning of domestic solid waste as; all that one gets rid of from the house. According to Social Context Theory, this meaning was derived from the socialization processes of individuals from their early age. According to Muhammad and Manu (2013), socialization patterns of women within the African context are associated with involvement in household chores. Due to this association, women and girls find themselves associating with domestic solid waste differently from men hence, in some circumstances attaching different meaning to it.

**ii. Substances not being used in the house**

As study findings depicted on Table 4, indicate, a smaller percentage of both men and women household heads attached other meanings to domestic solid waste as; anything not useful in the house but can be reused was considered to be waste. The representation of male household heads who gave waste this meaning was 20(16.5%). The female household heads respondents represented at only 9(6.3%) gave a similar response and of a similar opinion. However, gender differentials emerged as men said that they did not bother much with the substances in the house as women were responsible of the household chores and therefore knew what was useful to them or not.

**iii. Food left overs only**

The study findings on Table 4 show that there are gender differentials in giving the meaning of domestic solid waste in that there was not a single male household head 0 (0%) who considered food left overs only as domestic solid waste while 9(6.3%) of the women household heads gave this label to domestic solid waste. This was attributed to the association that that men, within a household setup hardly deal with food issues with the exception of those living alone. A further interrogation of men household heads revealed that the menial jobs they engage in, their bodies

demand for energy and therefore there can never be any leftover food to be considered as waste. Men also said that they take for breakfast any food that was surplus at dinner. Besides this affirmation from men, the different gender roles ascribed to men and women determine the energy levels required. In most African cultures for example, men are expected to eat all the food portions served to them without leaving any remains. This is because leaving any food ration on a plate by a man was considered impolite to both the wife and the community. However, due to lack of proper food storage equipment like fridges and the presence of hot weather, the leftover food may go bad and therefore to waste; hence, the number of women 9(6.3%) n=143 that considered food remains as waste compared to 0% men.

#### **iv. Anything not useful in the house but can be reused**

As shown on Table 4, shows, 17(11.9%) of the women household heads regarded 'substances not being used in the house but can be reused' as waste as compared to only 2(1.7%) of men. This representation was as a result of gendered nature of looking at domestic solid waste. Women regarded most of the household items useful even after they had been utilized for their original purpose because they have wider opportunities for reusing the particular item. Men on the other hand had little touch with the reality of the household items that can be used or not reused. Female household respondents gave for examples of such items as cooking fat plastic containers that they use as lunch boxes for their children. Others said that they would use these containers to store items like sugar, salt and flour, depending on the size of the container.

These varied views were an expression of the gender differentials in the meaning of the concept 'domestic solid waste' which were derived from different gendered socialization processes that men and women go through. The findings of this study are consistent with the assertions of Mukama, *et al.* (2016) that the socially accepted gender conceptions form the foundation upon which gendered thoughts, interactions and behaviours originate. These study findings also validate the assertions of Banjo, Adebambo and Dairo (2009), that gender interplays within the society have greater influence on the knowledge held by a people. This creates gendered attitudes in a defined socio-cultural context that influence people's perceptions on distinction of meaning and knowledge of a particular thing or scenario.

This is further clarified by the Social Context Theory, that the social processes dynamically interact to shape individuals in different life dimensions from an early age. Thus, central to the socialization of individuals in society is the formation of perceptions, knowledge and values. Subsequently, the different socialization differentials will inversely impact on men and women, pointing members of either gender to define 'domestic solid waste' differently.

## **2. Meaning of Illegal Dumping of Domestic Solid Waste**

As shown in Table 5, men and women who participated in the study were supposed to demonstrate their knowledge of domestic solid waste by indicating what meaning they attached

to ‘illegal dumping of domestic solid waste’. As indicated in the table, men and women from the three villages involved in the study attached different meanings to ‘illegal dumping of domestic solid waste.’

**Table 5: Meaning Ascribed to Illegal Dumping of Domestic Solid Waste**

Responses	MTATU-A				CENTRE-BASE				MOLO-B				TOTAL	
	MEN		WOMEN		MEN		WOMEN		MEN		WOMEN		Total	Total
	n=30		n=36		n=41		n=49		n=50		n=58		Men	Wome n
	FC	%	FC	%	FC	%	FC	%	FC	%	FC	%	(n=121)	(n=143)
Placing garbage in any place	9	30.0	8	22.2	8	19.5	12	24.5	10	20.0	14	24.1	27 (22.3%)	34 (23.8%)
Placing waste in non-permitted areas	16	53.3	19	52.8	29	65.9	31	63.3	34	68.0	34	58.6	79 (65.3%)	84 (58.7%)
Throwing solid waste on roofs	3	10.0	3	8.3	2	4.9	4	8.2	4	8.0	7	12.1	9 (7.4%)	14 (9.8%)
Throwing rubbish outside the house	2	6.7	6	16.7	2	4.9	2	4.1	2	4.0	3	5.2	6 (4.9%)	11 (7.7%)
<b>Total</b>	<b>30</b>	<b>100</b>	<b>36</b>	<b>100</b>	<b>41</b>	<b>100</b>	<b>49</b>	<b>100</b>	<b>50</b>	<b>100</b>	<b>58</b>	<b>100</b>		

**i. Placing garbage in any place**

Table 5 revealed that of the male and female household heads that took part in the study, majority, 79(65.3%) and 84(58.7%) of male and female household heads respectively gave the meaning of ‘illegal dumping of domestic solid waste’ as ‘Placing domestic waste in non-permitted areas’. This was an indication that the study participants had adequate knowledge on illegal dumping of domestic solid waste. Observations during the field work revealed that the non-permitted areas included road sides and pathways, trenches, open spaces and inside incomplete house structures. Further, as Table 5 illustrates, majority of the men and women household heads who gave the meaning of illegal dumping domestic solid waste as ‘placing waste in non-permitted areas’ derived this meaning from a wider view of domestic solid waste disposal. These findings were further confirmed in an interview with the village elder from Centre-Base who was said,

*I ask the people to stop illegal dumping but they say ‘hii yangu ni kidogo tu’, [my waste is not much] and they go ahead and dump. ‘haba na haba hujaza kibaba’ [little by little fills the jar]. Soon the whole place will be filled with garbage (Interview with a key informant, Village Elder from Centre-Base, 25<sup>th</sup> November, 2015).*

The opinion voiced above is indicative of the level of knowledge the men had. The levels of knowledge were a precursor of where men and women placed their waste.

### **ii. Placing waste in non-permitted areas**

Further, data analysis revealed that 27(22.3%) and 34(23.8%) of the male and female household heads respectively tagged the meaning of ‘illegal dumping of domestic solid waste’ to ‘placing garbage in any place’. At the same time, only 6(4.9%) of male household heads and 11(7.7%) and female household heads gave the meaning of ‘illegal dumping of domestic solid waste’ as ‘Throwing rubbish outside the house’. Further interrogations revealed that ‘outside the house’ was understood to mean places that included roads and pathways, trenches and open spaces. The different meanings accorded to ‘illegal dumping of domestic solid waste’ was attributed to the respondents’ social economic status which was deemed to have influenced on their perceptions.

### **iii. Throwing solid waste on roofs**

Comparatively, a small percentage, 9(7.4%) and 14(9.8%) of male and female household heads across the villages respectively construed the meaning of ‘illegal dumping of domestic solid waste’ as ‘throwing waste on the roofs’. Further probing revealed that throwing of the waste on roofs was an occurrence that took place at night than during the day. Additionally, the waste that was majorly thrown on the roofs was human waste in polythene bags otherwise known as ‘flying toilets’. As the analysis in Table 5 indicates, more women than men participated in this activity. This was confirmed by a sentiment by a Community Health Worker from Molo-B who noted that,

*We used to hear women scream in the night and when we enquire in the morning, we would be told that a woman was attacked as she had gone to answer a nature’s call. Men would also be attacked and snatched phones and money. We are afraid and that’s why they do it (Interview with CHW, 25<sup>th</sup> November, 2015)*

This sentiment raised in an interview with a Community Health Worker indicated that insecurity and lack of adequate toilet facilities in the study area were the major contributing factor that led to the prevalence of the flying toilets. In addition, the few toilet facilities built in the area were too far away from majority of the respondents. Further interrogation revealed that women were aware that they were more prone to physical attacks and sexual violence than men. This awareness made them conceal and in the darkness, from the door of their houses, do the flying

toilets. By stating that majority of the study respondents represented at 79(65.3%) and 84(58.7%) for male and female household heads respectively placed waste their waste in non-permitted areas, they were confirming that DSWM was not properly carried out within the households thus ending in illegal dumping.

**3. Consequences of Illegal Dumping of Domestic Solid Waste**

As shown in Table 6, the respondents had varied responses as to the demonstrating the knowledge they had regarding the consequences of managing domestic solid waste, specifically illegal dumping. These responses were directly related to their daily interactions with each other and the environment. The respondents described these consequences as a result of their collaborations, experiences and knowledge about DSWM upon their personal convictions.

**Table 6 Consequences of Illegal Dumping of Domestic Solid Waste**

Responses	MTATU-A				CENTRE-BASE				MOLO-B				Total Men (n=121)	Total Women (n=143)
	MEN		WOMEN		MEN		WOMEN		MEN		WOMEN			
	n=30		n=36		n=41		n=49		n=50		n=58			
	FC	%	FC	%	FC	%	FC	%	FC	%	FC	%		
Brings bad smell and rodents	6	20.0	11	30.6	3	7.3	17	34.7	2	4.0	13	22.4	11 (9.8%)	41 (28.7%)
Makes surrounding s dirty and unhealthy	7	23.3	21	58.3	25	61.0	31	63.3	11	22.0	34	58.6	43 (35.5%)	86 (60.1%)
Increases incidences of sicknesses	9	30.0	20	55.6	7	17.1	26	53.1	14	28.0	39	67.2	30 (24.8%)	85 (59.4%)
Makes movement difficult in a place	24	80.0	31	86.1	34	82.9	43	87.8	45	90.0	51	87.9	103 (85.1%)	125 (87.4%)

**\*Multiple answers allowed**

**i. Brings bad smell and rodents**

As indicated in Table 6, the study established that more female than male household heads represented at 41(28.7%) (where n=143) and 11(9.8%) (where n=121) respectively considered illegal

dumping as the major source of bad smell as well as breeding places for rodents. A female household head from Mtatu-A expressed the following:

*There are so many rats here. I think they are attracted by the heaps of garbage all over. Since the houses are very close to each other, once some rats get into one house, they easily climb over to the next house. We use ray traps to kill them, or sometimes use sticks to kill them, although it is difficult. (Female household head from Mtatu – 22<sup>nd</sup> November, 2015).*

The sentiment expressed above indicated that the problem of the rats was real and the involvement of men and women to eradicate them through suitable DSWM practices was inevitable. They also identified that these rats also are very destructive to foods and clothing. In view of this, within the African culture, the household chores and all other unnamed tasks are associated with women. Part of the social expectations is that women should be in-charge of and take care of domestic solid waste and therefore play a role in the prevention of the breeding of the rodents and emergence of bad smell from the garbage heaps. These findings coincide with Yoda, Chirawurah, and Adongo (2014) who established that in most urban informal settlement, public health is threatened by poor waste management the grounds on which disease vectors such as mosquitoes and the increase of rodents' multiply. From a gender perspective, Muhammad and Manu (2013) noted that women and girls always find themselves in the context of handling and managing waste from the households due to the assigned gender roles. The society is therefore quick to judge and make conclusions that the women are the course of the rat menace and bad smell as they are seen not to have executed their duties well.

#### **ii. Makes surroundings dirty and unhealthy**

Study findings in Table 4.8 showed that both men and women were aware that the unmanaged DSW contributes to an unhealthy and dirty environment. This was reported by 86(60.1%) of female and 43(35.5%) of male household heads. This study finding conquer with the finding by Solomon (2011) who affirm that communities living in urban informal settlements in developing countries often turn to unorthodox DSWM methods in their quest to manage it. This practice eventually makes the environment a basis for a hostile environment in terms of health. Similar sentiments are advanced by Mukama *et.al*, (2016), who assert that using unsuitable DSWM practices such as illegal dumping may avert the achievement of sustainable environments.

#### **iii. Increases incidences of sicknesses**

As depicted in Table 6 more women than men represented at 85(59.4%) and 30(24.8%) respectively regarded illegal dumping of domestic solid waste as a cause of increased incidences of sicknesses. Similarly, the study analysis revealed that more women than men represented at 86(60.1%) and

43(35.5%) respectively, considered illegal dumping of solid waste as the greatest contributor to making the surroundings dirty and unhealthy. This was informed by the nature of the occupation undertaken that was self-employment for majority of the men as shown in Table 4.5. This resonates with Etengeneng (2012) who asserts that poor DSWM practice in many parts of urban informal settlements in many parts of the developing countries increases the incidences of sickness which could be avoided if apt DSWM was in place.

#### **iv. Makes movement difficult in a place**

The study established that the most common consequence to illegal dumping as a result of poor DSWM, was difficult movement within, being represented at as shown in Table 6, 103(85.1%) and 125(87.4%) for the male and female household heads respectively made movement within the area of study difficult as the waste blocked the pathways. illustrates the analysis of the findings revealing the commonly cited consequences. This concern was highly raised because solid waste dumped along the roads and pathways was an obstacle to smooth movement. This observance was heightened during the rainy seasons and made some sections difficult to walk through. The most affected category of the residents were women because most of them carried their young children to school, so they had to cross over waste ditches and heaps which sometimes would make them slip and fall. This was confirmed in a common sentiment by majority of the respondents who informed that;

*It becomes difficult for most of us and especially children to walk on these roads with all the waste dumped here. It becomes worse when it rains.*

This study finding agree with Suleman, Darko and Agyemang-Duah (2015) who upon assessing the solid waste disposal and community health implications in Ghana asserted that illegal dumping of domestic solid waste within the proximate of people dwellings has the capacity to cause sicknesses to both humans and animals, as well as negatively affect the environment. Nonetheless, there was a considerably high number of men and women household heads from Centre-Base represented at 25(61.0%) n=41 and 31(63.3%) n=49 respectively as compared to the other two villages involved in the study. This was because the said village, Centre-Base was a hub for businesses and anything that would disrupt or bar their customers from accessing their wares of trade was seen as a great disturbance. The solid waste discarded on the pathways was seen as a great hindrance.

As postulated in the Social Context Theory (SCT), social forces affect individual behaviour and group actions; hence, changing a society. Thus, the common patterns of social behaviour point to the prevailing social patterns that are resident in people's perceptions, attitudes and values. The affirmation by Bacanovic (2011) that gender filters through people's relations within a context, their operations are highly guided by either one being man or woman. In the context of the



consequences of illegal dumping of domestic solid waste, it would be rare to find men quarrelling over the issues of domestic solid waste. This is because socially, they have not been brought up and socialized with that disposition.

This study also found that level of knowledge or awareness affects people's perceptions. The study findings revealed that those that had acquired relatively better education at secondary and postsecondary levels, displayed diverse result where voice of reason was overshadowed by societal and cultural influence as in the case that illegal dumping. Further, these findings correlate with what Guerrero, Maas, and Hogland (2013) posit that the appropriateness of knowledge is attributed to how humans interact and care for the environment. Al-Khatib, Kontogianni, Abu-Nabaa, Alshami, and Al-Sari, (2015) also add that educational programs affect the relationship between people's attitudes towards DSWM.

From a wider perspective, there is a clear indication that, within a social context, culture and gender regulates and advances societal norms even at the household and individual levels. According to Social Context Theory, the prevailing forces dominant in the society shape both men and women covering different streams of life. Thus, individuals learn how to relate with their social and physical environments in a certain way. A major social force in the stream of influence is on knowledge which in turn influences behaviour. Consequently, men and women will align to specific behaviours that they identify with within the environment in line with particular gender roles as defined by the society (Stryker & Burke, 2000).

In summary, the study findings indicate that the DSWM knowledge that men and women had with respect to management of domestic solid waste varied at the individual levels. The range of knowledge from individuals was driven by personal experiences both present and the past. Across the villages, the DSWM knowledge displayed by men and women differed as a result of gender differentials that are as a result of early life socialization (Mukama, *et al.* (2016). The identity theory posits that an individual's identity is created and functions within a defined social context and further proposes that the gender differentials created as a result of socialization are permanent. According to Carter (2014), this socialization causes men and women to express themselves differently due to gender association. As far as the knowledge that men and women had in regard to DSW, the study findings indicated that the statements made by men and women were a clear demonstration of the gendered cultural socialization processes.

## Conclusion

These findings indicated that the nature of values and attitudes inculcated through the gendered socialization process from early years among men and women were found to have a bearing on the DSW knowledge they had. The DSWM knowledge men and women had was also included the point of reference as socialization: formal education level, social status in the community, one's past experiences with DSW. The study findings established that both men and women household heads expressed knowledge that unconventional methods in the management of DSW should be

discouraged. The study revealed that while women 97.9% (n=143) perceived the accountability of DSW to be for both men and women, men 89.3% (n=121) saw it as a prerogative for women. This finding denotes that majority of the male and female household heads represented at 137(95.8%) and 94(77.7%) respectively knew that sensitization is a channel through which new DSW knowledge can be acquired for its better management. The study showed that the respondents' demographic characteristics which included their gender, marital status, formal education and nature of occupation were found to have a bearing on the men and women household heads practices in DSWM. The residents' locality of dwelling within Kiandutu Informal Settlement was also found to influence their decisions on how to manage the DSW.

## Recommendations

Based on the findings and the conclusions of the study, the following recommendations were drawn in regard to the knowledge of domestic solid waste. The study recommends inclusion of measures for intervention, that would include intensification of levels of knowledge, build capacity in good DSWM practices and promote community involvement in DSWM. This will strategically empower the local community with apt knowledge. The information can easily be cascaded to the target community as they have a *language (a particular way of communication)* unique to that community. To implement the process, there is need to partner and work with NEMA, the CGK and other development partners in order to actualize the programme. Through the Public Health System, develop relevant and gender sensitive policies through which structures and strategic mobilization systems will be built to equip men and women with knowledge and skills so as to shape the management of domestic solid waste. This should be planned and implemented by the County Government. This move is envisaged to modify their perception and build consciousness and awareness of DSW generated within their households. Both men and women could also be reached and educated during schools' parents meeting. Facilitate establishment of community involvement programmes and provide adequate information on the management of DSW. Specifically, women could be reached through the social women groups known as *chamas* as well as Self Help Groups (SHGs) where both men and women are active. Collaborate with the County Government, relevant government ministries and structures, for example Ministry of Public Service, Youth and Gender Affairs and Ministry of Information, Communication and Technology, Non-Governmental Organizations (NGOs) and UNEP to prepare materials for human resource training to have an awareness raising in suitable DSWM in the target population.

**Funding:** This research received no external funding

## Acknowledgments:

I extend my gratitude to the My research assistants Irene Nzioka, Benedict Makau and Benny Mukonyo deserves special thanks for their hard work and commitment during the field work and data collection. Equally appreciated is the team of the Kiandutu village elders - Solomon Mwet, Josephat Irungu and Mary Thuku for leading the research team in the village and helping in locating specific research respondents within their areas of jurisdiction.

**Conflicts of Interest:** The authors declare no conflict of interest.

## Disclaimer Statement

This paper has been extracted from my Thesis entitled 'Participation of men and women in the management of domestic solid waste in Kiandutu informal settlement, Kiambu county, Kenya'. Presented to Kenyatta University for the award of a PhD, Department of Sociology, Gender and

Development Studies. The amount of work extracted includes part of the background information, the literature review covering objective number one, methodology and the corresponding results, analysis and conclusions to objective one.

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