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THE INFLUENCE OF STAKEHOLDER PARTICIPATION STRATEGIES ON DOMESTIC WASTE MANAGEMENT IN BIASHARA RESIDENTIAL AREA, RUIRU MUNICIPALITY KIAMBU COUNTY, KENYA

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Abstract

Stakeholder participation has been identified as one of the means through which the challenges of domestic waste management can be addressed. The objective of this study was to establish the influence of stakeholder participation strategies on domestic waste management in Biashara residential area. The study was guided by two theories; the stakeholder theory and the theory of waste management and applied a cross- sectional descriptive design using a total sample size to 383 respondents. Data was collected using questionnaires and interview guides, analyzed using SPSS version 23 and results presented in percentages, frequency tables, Pearson correlation inferences to show the relationship between the dependent and the independent variables. The study concluded that there is a statistically significant positive correlation between the various stakeholder participation strategies and improved domestic waste management; there is a moderately positive correlation between use of stakeholder partnerships in designating waste collection points and improved DWM (r=0.360, n=342, p=0.01) and strong positive correlation between stakeholder's empowerment to recycle their waste and improved DWM (r=0.539, n=342, p=0.01). The study recommended that more education should be offered to the citizens on all the aspects of domestic waste management to enable them play their rightful role in domestic waste management.

***Keywords**: Stakeholder participation, Domestic waste management, Strategies, Partnership, Empowerment*

Introduction

The rate of waste generation globally currently stands at 1.3 billion tonnes per year translating to 1.2kg of waste per person per day and expected to reach 2.2 billion tonnes per year by 2025 (Hoornweg & Bhada-Tata, 2012). In Kenya, (Mugo et al., 2015) estimate that on average 86.15 tonnes of waste are generated per day in Thika Municipality which is approximately 31,629 tonnes/year with individuals generating 0.412 Kg per person per day. Sustainable management of these waste requires an integrated approach and stakeholder involvement was found to play an important role in this management ((Visvanathan *et al*., 2004; Tai *et al*., 2011).

According to (Mukisa, 2009), the level of public participation in solid waste management at present in Kira Town Council, Uganda is low and that the best way to start dealing with the solid waste problem is for the Town Council authorities to show the people that they are worth by involving them in the initial planning process for solid waste management. According to (Mwangi, 2011), consolidation of the efforts of all

stakeholders handling domestic solid waste in Makina, Kibera, Kenya such as the Makina residents, civil societies, international organizations, Private Firms and the Local Government into an integrated approach of waste management could help improve the current domestic waste situation in the area. Other studies outline lack of public participation as one of the major challenges in management of solid waste; (Monyoncho, 2013) asserts that one of the major challenges in the management of solid waste in Kenya is apathy from households given that it has always been responsibility of county council/government to manage waste, (Muthoni, 2014) cites trust, accountability, communication and commitment breakdown amongst the stakeholders as the major cause for the sustained rise in unmanageable SWM in Nairobi while (Njogu *et al*., 2104) emphasized the building of public-private partnerships to provide more garbage collection and recycling services thus enhanced domestic waste management.

Statement of the problem

The community (households and residential areas) comprise the largest grouping of stakeholders in waste management as they are waste producers, waste service customers and recipients of waste management services as well as the people who lay the groundwork for waste to be collected by the municipal council or a private company (Kaseva & Mbuligwe, 2005). Effective domestic waste management requires an all-inclusive approach that combines infrastructure development, health promotion, and community contribution in solid waste management processes to improve the shortfalls to ensure quality sanitation (Amoah & Kosoe, 2014; Aarne, et al., 2002). In fact, the problem of indiscriminate dumping could be addressed through community participation in source separation and door to-door collection.

In residential areas in Ruiru, open dumping sites continue to emerge due to rapid urbanization and population growth despite the county government's efforts in waste management. A study by (Njuguna, 2016) in Gitambaya, Ruiru echoes this in that the study established that community participation in domestic waste management in Gitambaya, as practiced by households and business operators is limited; hence further compounding solid waste menace. There is an imperative requirement to come up with a solution for the various open dumps in Ruiru as there are substantial public health risks for the people. Thus, this study sought to investigate what influence stakeholder participation strategies would have in domestic waste management in Biashara residential area.

Objective of the Study

The specific objective of the study was to establish the influence of stakeholder participation strategies on domestic waste management in Biashara residential area.

Literature Review

Stakeholder Participation Strategies in Domestic Waste Management

Active community participation in DWM is vital in domestic waste management. According to (Tauhid-Ur-Rahman, 2006) majority of community members are prepared to play a role in order to improve domestic waste management and agree that their involvement is important for enhanced domestic waste management and general setting of a locality. Stakeholder participation falls on a continuum with stakeholder participation varying in terms of where the power for decision making falls between community members and those in charge of a project or activity (Arnstein, 1969; Lithgow, 2004). At the very basic level, stakeholders may be manipulated into taking part in an activity, they may participate by being provided with basic information without being allowed to give feedback, they may be consulted as a formality or a few of them may be

handpicked to fulfill the requirement of involving them. Meaningful participation however takes place when planning and decision making is a partnership between community members and those in charge or when citizens hold delegated power but most importantly, when citizens have control over policy, planning and execution of programmes. According to (Asnani and Zurbrugg, 2007), community participation may be carried out through consultation where those in power hear from community members, business owners and industries on the type and frequency of services they desire, their willingness to pay for the desired services and at what frequency and their commitment and willingness to take part in decision making regarding waste management aspects like collection, transport, treatment and disposal. Further, researchers have found that functioning effectiveness of solid waste management depends upon active involvement of both municipal agencies and citizens with (Sharholy *et al.,* 2008) citing individuals partaking in decision making as critical in efficient solid waste management.

Theoretical Framework

The study was guided by two theories; the stakeholder theory by (Freeman, 1984) which uses empirical data to determine the links that exist between the management of stakeholder groups and the achievement of communal goals and this aligns with the study in that it seeks to establish how stakeholder involvement in waste management would impact on the effectiveness of the waste management process. The study was also guided by the theory of waste management which represents a more detailed description of the concepts and elements of waste management including giving a holistic view of the goals of waste management (Pongrácz, 2002). The theory of waste management aligns with the study in that it recognizes that accurate definition of waste and the clarification of the role of ownership in waste management have a role in effective waste management.

Research Methodology

The study applied a cross- sectional descriptive design, where, both qualitative and quantitative approaches were used to provide a better understanding of the research problem. Descriptive survey is a method of collecting information by interviewing or administering questionnaires to a sample of individuals, (Orodho, 2003). The target population for the study was three thousand eight hundred and twenty-one (3821) which comprised of one (1) sub county environmental officer, twenty (20) private waste collectors, eight hundred (800) business operators and three thousand (3000) household heads. One (1) sub- county environmental officer was purposively selected for this study while simple random sampling was used to select the household heads, business operators and private waste collectors to take part in the study so as to give an equal chance for all members of the target population to be a part of the study and to reduce bias in terms of the data collected. According to (Mugenda & Mugenda, 2003), *a* sample of 10% to 30% is satisfactory for a descriptive study therefore for this study, the researcher used 10% of each of the target population. The sample size for household heads therefore was 300, 80 for the business operators and 2 for the private waste collectors bringing the total sample size to 383 respondents as illustrated in Table 1.

Table 1: Sample Size Grid

Categories	Target Population	Sample Size	Sampling Technique
Sub-county environmental officer	1	1	Purposive sampling
Household heads	3000	300	Simple random sampling

Business operators	800	80	Simple random sampling	
Private waste collectors	20	2	Simple random sampling	
Total	**3821**	**383**		

Questionnaires were used to collect data from household heads and business operators while interviews were carried out with the sub- county environmental officer and the private waste collectors in Biashara area. The quantitative data collected was coded and analyzed using Statistical Package for Social Sciences (SPSS) Version 23 and presented in percentages, frequency tables, Pearson correlation inferences to show the relationship between the dependent and the independent variables. Qualitative data obtained from the key informant interviews was transcribed and processed in themes and presented and discussed in light of the conceptual framework.

Research Findings

Response Rate

The sample size for this study was 383 respondents with 380 of those respondents were household heads and business owners in Biashara ward who participated by filling a questionnaire. Of the 380 questionnaires handed out the researcher received back 342 representing a 90% response rate. Further, 2 waste private collectors and 1 sub-county environment officer were also interviewed for the study.

Stakeholder participation and Waste separation and recycling

The study sought to establish whether households and business operators carry out waste separation at source and established that 30.7% of the respondents separate their waste at household level while the remaining 69.3% did not as shown in Table 2.

Table 2: Respondents who Separate Waste

Waste management practice	**Frequency**	**Percentage (%)**
Separation	105	30.7%
Do not Separate	237	69.3%
TOTAL	**342**	**100%**

The study compared the levels of education with waste separation and the results are as indicated in Table 3. The study found that overall, across the levels of education, respondents agreed that waste separation is carried out in Biashara residential area with 78.9% of the respondents affirming that they agreed or strongly agreed with the assertion that waste separation is carried out at the household level. The results also indicated that there is a significant positive correlation between level of education and separation of waste ($r=0.180$, $n= 342$, $p=0.01$). These findings agree with those of (Kitavi, 2015) who in his study on the role of public participation in solid waste management in Mlolongo town found that 76% of respondents could separate their solid waste while only 24% could not separate waste. As was the finding of this study, (Kitavi, 2015) also indicated that this separation was essential in promoting effective DWM as it encouraged re-use and recycling of waste.

Table 3: Respondents views on waste separation per education level

Waste separation is carried out						
Level of education	**Undecided**	**Disagree**	**Strongly Disagree**	**Agree**	**Strongly Agree**	**Pearson Coefficient**
Postgraduate	0	0	0	1	0	
Bachelor's Degree	2	3	0	19	10	r= 0.180
Diploma	3	3	1	16	24	p= 0.01
Certificate	3	8	0	34	26	
Secondary School	6	21	17	40	51	
Primary School	3	2	0	42	7	
Total	**17**	**37**	**18**	**152**	**118**	
Percentage	**5%**	**10.8%**	**5.3%**	**44.4%**	**34.5%**	

Further, the study established overall, the respondents felt that they were empowered to recycle their waste with 59% of the respondents strongly agreeing that they were empowered to recycle their waste and 39% of the respondents agreeing. Only 2% of the respondents disagreed that they were empowered to recycle their waste as indicated in Figure 2.

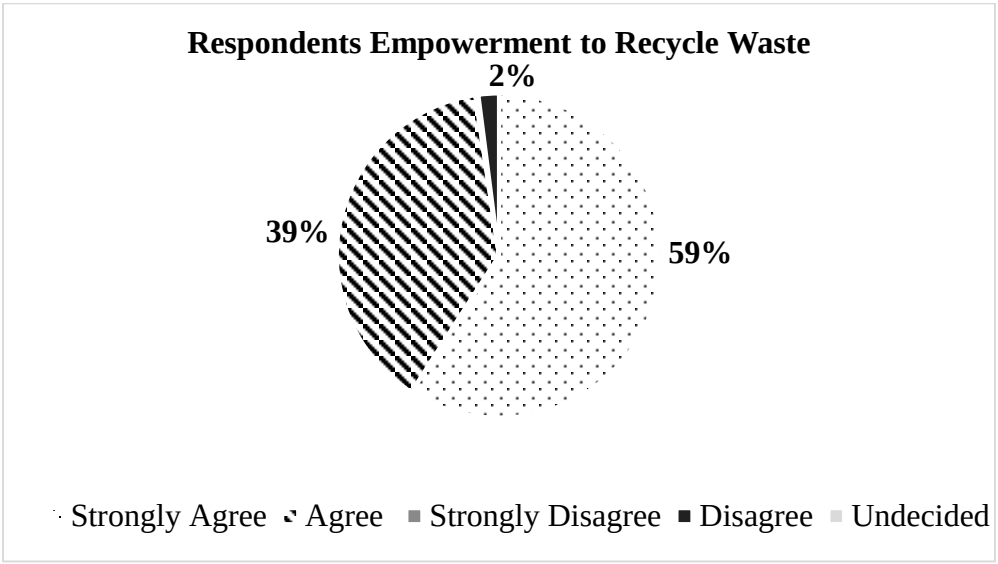

Figure 2: Respondents Empowerment to Recycle Waste

Stakeholder participation and waste storage

On waste storage, the study found that, a majority of the households had a waste container with 92.1% of the respondents saying that they waste containers and only 7.9% saying that they did not. The study established that of the 92.1% of the households where there are waste storage containers, 41.9% of the respondents have bought the waste containers for themselves while 24.9% had waste containers provided by their landlords. Additionally, 20% of the respondents had their waste containers provided by their private waste collectors and 11.1% were supplied waste containers by the county council. As illustrated in Figure 3, 54% of the respondents use plastic bins as their waste containers while 36% of the households use plastic bags for waste storage. The other 6% the respondents use metal bins and 4% use sacks to store their waste.

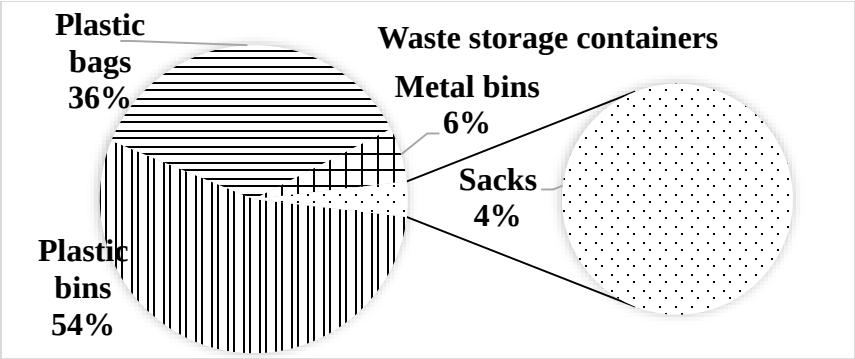

Figure 3: Waste Storage containers used by respondents

According to the results in Table 4 below, the respondents were asked whether they employed the above identified appropriate storage techniques through stakeholder consultations. The results illustrated that 19.3% of the respondents strongly agreed that it was through consultations that they had been able to use appropriate storage techniques, 42.7% agreed, 9.1% strongly disagreed while 17.8% disagreed. The results indicated that there is a significant positive correlation between stakeholder consultations on appropriate waste storage techniques and improved DWM (r=0.328, n=342, p=0.01), as stakeholders' consultations are held respondents increasingly use appropriate waste storage.

Table 4: Consultations and Use of Appropriate Waste storage Techniques

Consultations	Frequency/Percent	Pearson Coefficient (r)	P value
Strongly Agree	66(19.3%)	0.328	0.01
Agree	146(42.7%)		
Undecided	38(11.1%)		
Disagree	61(17.8%)		
Strongly Disagree	31(9.1%)		
Total	**342 (100)**		

Stakeholder Participation and Waste Collection

With regards to waste collection, the researcher first sought to establish who is in charge of waste collection in Biashara residential area. The respondents were asked who collected their waste and 43.9% of the respondents said that their waste is collected by the county council vans while 42.6% of the respondents cited private companies as the collectors. However, as illustrated in Figure 4, 5% of the respondents did not know who collected their waste once they put it outside their apartments while a further 8.5% of the respondents did not answer that question. According to the Sub- county Environment Officer, the county council licenses private companies to assist it in waste collection since so much waste is generated in the sub- county that it exceeds their capacity. This explains the 42.6% of the respondents who said that their waste is collected by private companies.

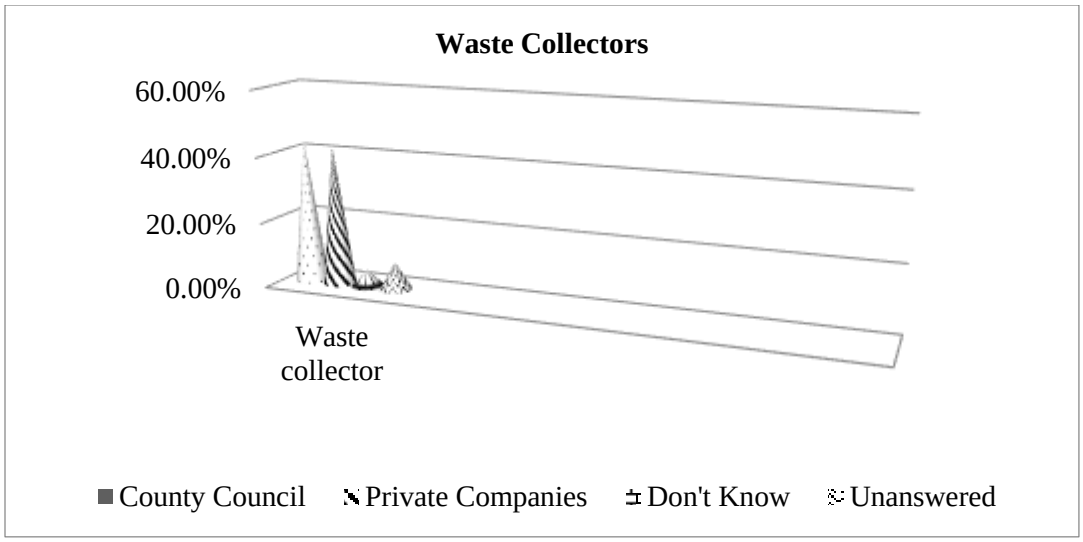

Figure 4: Waste Collectors in Biashara area according to respondents

Further, the researcher tried to establish the frequency with which waste collection is carried out in Biashara residential area. The results indicated that 60% of the residents empty their waste weekly while 30.7% of the respondents empty their waste twice per week. Waste is said to be collected either at a central place within apartments, outside apartments and by collection trucks directly from the houses on certain set days. As illustrated in Table 5, some of the households also dump in open spaces outside their apartments especially those without waste storage containers. The arrangement is to have this waste collected later by private companies or the county council for final disposal.

Table 5: Waste Collection Site and Frequency

Collection site	**Frequency of Waste Collection**					**Total**
	Weekly	**Twice/week**	**Monthly**	**Fortnightly**	**Daily**	
Within Apartment	35	15	15	0	0	65
Outside Apartment	89	48	0	6	13	156
Open space	22	26	0	0	24	72
Waste collection trucks	21	28	0	0	0	49
Total	**167**	**117**	**15**	**6**	**37**	**342**
Percentage (%)	**53.9%**	**30.8%**	**4%**	**1.6%**	**9.7%**	**100%**

In line with these results, the researcher sought to find out whether stakeholders have partnerships to designate waste collection sites and whether dialogues are used to designate waste collection days. The responses for these questions are summarized in Table 6 below.

As to whether waste collection points were designated through stakeholder partnership, the results showed that 28.7% of the respondents were undecided, 26% agreed, 25.1% disagreed, 14.3% strongly agreed while 5.9% strongly disagreed. The researcher determined that there is a moderate positive correlation between use of stakeholder partnerships in designating waste collection points and improved DWM ($r=0.360$, $n=342$, $p=0.01$), waste collection improves moderately as stakeholder partnerships to designate waste collection sites are carried out.

As to whether there are stakeholder dialogues to designate waste collection days and the results showed that 37.7% of the respondents disagreed, 30.1% strongly disagreed, 22% agreed, 14.3% strongly agreed and 0.3% were undecided.

Table 6: Respondents views on stakeholder partnerships in designation of waste collection sites

Designated waste collection sites provided through stakeholder partnership	**Frequency (%)**	**Pearson coefficient (r)**	**P value**
Strongly Agree	14.3	0.360	0.01
Agree	26		
Undecided	28.7		
Disagree	25.1		
Strongly Disagree	5.9		
Total	**100**		
Designated waste collection days provided through stakeholder dialogues			
Strongly Agree	14.3		
Agree	22		
Undecided	0.3		
Disagree	37.7		
Strongly Disagree	30.1		
Total	**100**		

The researcher also sought to find out whether the designated waste collection days were adhered to and whether the waste collection services offered were therefore satisfactory. The results obtained indicated that cumulatively, 67.5% of the respondents felt that the designated waste collection days were not adhered to while 32.5% of the respondents said that the designated waste collection days were adhered to. As to whether the waste collection services were satisfactory, the results indicated a low level of satisfaction with 46.5% of the respondents strongly disagreeing that the waste collection services were satisfactory, 33.9% disagreeing and 19.6% of the respondents agreeing that the services are satisfactory. Cumulatively, 80.4% of the respondents felt that the waste collection services were unsatisfactory, these findings are captured in Table 7. The study established that there is a significant positive correlation between using stakeholder dialogues to designate waste collection days and the level of satisfaction with the waste collection services provided ($r=0.564$, $n=342$, $p=0.01$). However, there is a significant negative correlation between adherence to the designated waste collection days and the level of satisfaction with waste collection services offered ($r= -0.122$, $n=342$, $p=0.01$).

Table 7: Adherence to designated waste collection days and level of satisfaction with waste collection services according to respondents

	Frequency (%)	Cumulative Percent	Pearson Coefficient(r)	P Value
Adherence to designated waste collection days				
Undecided	8(2.3)	2.3	0.564	0.01
Disagree	117(34.2)	36.5		
Strongly Disagree	106(31)	67.5		
Agree	111(32.5)	100		
Total	**342(100)**			
Level of satisfaction with waste collection services				
Disagree	116(33.9)	33.9	-0.122	0.01
Strongly Disagree	159(46.5)	46.5		
Agree	67(19.6)	19.6		
Total	**342(100)**	**100**		

These results are in line with those by (Yoada *et al*., 2014) from their study on domestic waste disposal practice and perceptions of private sector waste management in urban Accra where they found a low community satisfaction with waste management services with only 37.1% of respondents being satisfied with the provided services. In Biashara residential area, the low level of satisfaction with waste collection services is linked to the lack of adherence to the designated waste collection days thus irregularity in the process.

To get the real picture of how stakeholder participation strategies influence domestic waste management in Biashara Ward, the researcher asked the respondents several questions; first, whether stakeholder partnerships improve waste collection and transportation, second, whether stakeholder consultations have increased efficiency in domestic waste management, third, whether stakeholder empowerment has increased efficiency in domestic waste management and fourth, whether stakeholder dialogues have improved domestic waste management . The responses for these two questions are captured in Table 8.

Table 8: Influence of stakeholder participation strategies on domestic waste management

	SA	A	U	SD	D	r	p
stakeholder partnerships improve waste collection and transportation.	8.5	50.9	1.5	8.8	30.4	0.039	0.470
stakeholder consultations have increased efficiency in domestic waste management.	20.5	49.7	2	5.3	22.5	0.328	0.01
stakeholder empowerment has increased efficiency in domestic waste management.	43.3	30.7	5.6	2.9	17.5	0.539	0.01

The results indicated that on whether stakeholder partnerships improved waste collection and transportation, 50.9% agreed, 30.4% disagreed, 8.8% strongly disagreed, 8.5% strongly agreed and 1.5% of the respondents were undecided. Also, there is a weak positive correlation between stakeholder partnerships in waste collection and transport and improved DWM (r=0.039, n=342, p=0.470). On whether stakeholder consultations increased efficiency of DWM, the results were that 49.7% agreed, 22.5% disagreed, 20.5% strongly agreed, 5.3%

strongly disagreed and 2% of the respondents were undecided. The study revealed that there is a medium positive correlation between stakeholder consultations and improved DWM (r=0.328, n=342, p=0.01). The researcher also found that stakeholder empowerment in recycling of domestic had increased efficiency in domestic waste management, where 43.3% of the respondents strongly agreed, 30.7% agreed, 17.5% disagreed, 5.6% were undecided and 2.9% of respondents strongly disagreed. There is a strong positive correlation between stakeholder's empowerment to recycle their waste and improved DWM (r=0.539, n=342, p=0.01), as stakeholder empowerment to recycle increases so does improvement in DWM.

Summary of the findings

The study set out to find out the influence of stakeholder participation strategies on domestic waste management in Biashara residential area. On waste separation, the study established that, across the levels of education, majority of the respondents (78.9%) agreed that waste separation is carried out in Biashara residential area and that there is a statistically significant positive correlation between level of education and separation of waste (r=0.180, n= 342, p=0.01). On waste storage, the results illustrated that majority of the respondents (62%) felt that it was through consultations that they had been able to use appropriate storage techniques, and it was determined that there is a significant positive correlation between stakeholder consultations on appropriate waste storage techniques and improved DWM (r=0.328, n=342, p=0.01), as stakeholders' consultations are held respondents increasingly use appropriate waste storage. With regards to waste collection, the study established that less than half of the respondents (40.3%) felt that stakeholder partnerships were used to designate waste collection sites and that there is a moderately positive correlation between use of stakeholder partnerships in designating waste collection points and improved DWM (r=0.360, n=342, p=0.01). Further, the study found out that majority of the respondents (67.8%) disagreed that stakeholder dialogues are used to designate waste collection days. The study established that there is a significant positive correlation between using stakeholder dialogues to designate waste collection days and the level of satisfaction with the waste collection services provided (r=0.564, n=342, p=0.01). On waste transport, the results indicated that majority of the respondents (59.4%) felt that stakeholder partnerships improved waste collection and transportation, and that there is a weak positive correlation between stakeholder partnerships in waste collection and transport and improved DWM (r=0.039, n=342, p=0.470). There is a strong positive correlation between stakeholder's empowerment to recycle their waste and improved DWM (r=0.539, n=342, p=0.01), as stakeholder empowerment to recycle increases so does improvement in DWM. These findings are in line with the findings by (Minn, *et al*., 2010) who found that stakeholder participation through empowerment with knowledge and skills relevant to domestic waste management had the effect of motivating people to carry out good waste management practices like recycling. Empowerment was also cited as a gratifying achievement that gave people more power to participate decisively in domestic waste management hence reducing reliance on the municipal council for waste management.

Conclusion of the Study

The study concluded that there is a statistically significant positive correlation between the various stakeholder participation strategies and improved domestic waste management hence stakeholder participation strategies should be used to enhance domestic waste management.

Recommendations of the Study

The study recommends that more education should be offered to the citizens on all the aspects of domestic waste management to enable them play their rightful role in domestic waste management. More dialogues,

consultations and partnerships between the residents and those in charge of domestic waste management in Biashara residential area should be held on various aspects of the DWM process as the study has established this would improve the process.

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