

CHALLENGES OF SOLID WASTE MANAGEMENT IN KWARA STATE, NIGERIA

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Abstract

Solid waste is regarded as unwanted material produced by individuals from various sources including homes, offices, markets among others which the producer has no use for it and wishes to dispose such material. The management of solid waste is an important aspect of our lives which when not properly handled can lead to various health effects and can also lead to a public nuisance or deter the aesthetic of the environment. The study specifically tried to find out what the problems pertaining to the transportation and disposal of solid wastes are in Kwara State. A descriptive research design of the survey type was adopted for the study. Four hundred social workers were systematically selected for this study. A researcher designed questionnaire was used for data collected and was tested for validity and reliability. Frequency counts, percentages and bar charts were used in the presentation of the findings. The study revealed that waste management facilities and equipment's that are currently used in managing solid waste are insufficient (96.3%). It was also revealed that dumpsites are poorly managed (94.3%). The study concluded that challenges of solid waste management in Kwara State includes insufficient social workers attached to trucks for collection of waste; waste collection trucks are inadequate and most of the ones available are below standard and faulty most of the time; dumpsites are poorly coordinated and some truck drivers are contributing to the problem on ground. It was therefore recommended that more social workers should be employed; the Government should endeavour to purchase more standard waste collection trucks, dumpsites should be properly monitored and coordinated and truck drivers should be educated and properly directed in the disposal of solid waste at dumpsites.

Keywords: solid waste, challenges, waste managers, facilities, dumpsites

Introduction

Waste generation is as old as humanity itself, and in one way or the other, the everyday activities of human beings create waste. Different sources, including domestic, industrial and hospital may produce waste. Due to the large area of available land, relatively low population size and low level of industrialization, solid waste disposal in the past was not a big problem. Waste is characterized as organic and inorganic materials generated by households, commercial and industrial facilities that are of no economic benefit to the owner (Ezebilo & Animasaun, 2011). This was corroborated by Chukwuemeka, Ugwu and Igbwegbe (2012) who stated that wastes are useless, unwanted and discarded materials. For an individual to be willing to get rid of something such a thing must have no value or he/she no longer wants to own the item. As the population began to increase, humans explored and developed more areas of land to meet their basic needs. The increase in population and the rise in industrialization, in turn, increased the amount of waste generated which has to be disposed of through whatever means necessary. The more the population increases, the more items are consumed and packaging becomes an essential part of the waste stream, whether paper or plastic, commonly referred to as garbage or trash (Vaughn, 2008). Globally, 7-9 billion tons of wastes are produced every year (Wilson & Velis, 2015). Municipal Solid Waste (MSW) is a particular household waste category which, depending on the reporting standard, may include commercial and industrial waste (Wilson & Velis, 2015). Of the total waste generated in 2016, MSW accounted for 2 billion tonnes. However, 70 percent of the world's waste today ends up in dumps and landfills (Kaza, Yao, Bhada-Tata & Van Woerden, 2018). As the most basic solid waste management system, dumps are large-scale storage of waste without any technological management, making them a major source of waste contamination as well. Landfills can require various degrees of technical measures, including impermeable layers and covers, to reduce and recover the quantity of leachate and gases emitted (Manfredi, Tonini, Christensen, & Scharff, 2009). Most advanced countries such as Germany have accomplished much in the way of developing sophisticated management techniques such as Enhanced Resolution and mobile sorting that prove useful in avoiding waste as well as with the creation of a better chance for recycling and re-use. While adequate laws are required to run a waste-free country, by defining organic content requirements, Germany has prohibited MSW land filling.

In developing countries like Nigeria, where solid waste management is a major concern, this issue is even more pronounced. Adeyemi et al. (2001) reported that in most developing countries, solid waste is indeed a major problem. Adeyemi et al. (2001) added that one of the most untenable concerns facing administrators and environmental organizations is waste management. Ogwueleka (2009) stated that the management of solid waste is by far one of the country's biggest problems facing environmental agencies. Adefemi and Awokunmi (2009) identified the breakdown of law and order in relation to waste management as a consequence of management challenges. According to Ohakwe et al. (2011), recent research shows that over 140 million people reside in Nigeria's large population. As for industrialization and the construction of homes and buildings, the lead author's quantification that Nigeria produces and discards over 1 million tons of waste per year lends support to that assertion. These waste products that are thrown away end up in open ditches or buried at poorly-lined (authorized or unauthorized) sites. The disposal at open dumps of these waste materials may lead to the release into the aquifer of a mixture of toxic chemicals. Such hazardous materials may also be washed into surface bodies of water used for domestic purposes by storm runoff. Emissions of hazardous gaseous materials arise from the unregulated open burning of waste materials. The potential threats to human health and the atmosphere are posed by released particulate matter and the resulting ash and cinder. Apart from posing risks to the atmosphere and human health, this approach to waste management constitutes pollution, smoke, insect and pest

infestation and disruption to the landscape and the aesthetics of the surrounding area (Ohakwe et al., 2011).

Domestic wastes consist of rotten food and garbage which produces foul stench in the environment and on some occasions, domestic waste is not just about food materials alone but some residents dump faeces alongside the household waste. When these wastes are not collected early after a while, it begins to decompose and most likely attracts and breeds vectors of diseases such as rats and mosquitoes that are responsible for diseases such as Lassa fever and malaria respectively. The burden of waste management is left to waste managers (social workers) who collect waste from various points of collection and dispose of such waste in designated areas. When waste is not collected in time at various points, they are disposed continually at the spot in heaps and the onus of packing such waste is shifted onto social workers who now have to pack and collect the waste from such points. This is done at a period when the odour being emitted from such points are becoming unbearable.

Solid Waste Management (SWM) involves six key components that address the proper methods in which solid waste should be managed. These components include generation, storage, collection, transportation, segregation and disposal of solid waste. Challenges could arise at any given point of these components. Timely collection of waste is a serious challenge that social workers face and which may be due to several reasons. When this is the case, the behaviour of the residents has a role in further worsening the situation. Some people carry their waste to designated points and dispose their waste on the ground when the dumpster in such location is filled to the brim. A commendable attitude would have been to pack the waste in nylon and tie it properly so that the waste does not litter the surrounding. In most cases, people are aware of the proper way to dump their waste but the fact that the disposal point is not their personal space, they tend to display a nonchalant attitude towards their way of disposing the waste. Yukalang et. al. (2017) asserted that lack of staff capacity and staff number is a barrier to municipal solid waste management. In most developing countries such as Nigeria, staff capacity when it comes to the management of solid waste is a problem. The numbers of social workers attached to solid waste collection trucks in some cases are insufficient to handle the amount of waste that is generated. In the opinion of Agunwamba et al. (2014), the challenge to solid waste management has to do with the distance to the approved dumpsites. In small cities where final disposal sites are nearby, the hauling of waste is not a serious problem but when the haul distance is far, this poses a challenge to solid waste management. Some truck drivers who after driving a long distance dispose their waste as they deem fit on getting to the site since most of these sites are not properly monitored. In some cases, some drivers overload their trucks in an attempt to reduce the number of trips to the disposal site (BioEnergy Consult, 2020).

Abdel-Shafy and Mansour (2018) opined that the supply of waste management facilities and equipment's have a great impact on the success or failure of the programme. In Nigeria, most solid waste management agencies are facing the challenges relating management facilities and equipment's. According to Yukalang et al. (2017), timely disposal of waste is affected by poor condition of waste collection trucks. Most collection trucks being used for the collection of waste in Nigeria are substandard. In most cases, vehicles that are used for the collection and transportation of waste are mostly tipping trucks meant for carrying sand or open non-tipping trucks that are not originally meant for waste collection. Igbinomwanhia, (2011) and Zhu et al. (2008) affirmed that irregular transport of waste in faulty vehicles significantly affects the management of solid waste in developing countries. Most of the so-called converted vehicles for the collection and transportation of solid waste which breaks down frequently reduces the timely collection rate of solid waste management.

Ferronato (2019) opined that in an open dump site, the lack of compaction of waste, outright neglect of technical and hygienic considerations is some of the challenges facing solid waste management. The author further affirmed that landfills are not properly monitored, coordinated and managed and it poses a significant challenge to proper solid waste management and public health. Nwankwoala and Ofor (2018) affirmed that most dumpsites are poorly cited, some are full and others are poorly coordinated. Ogundele (2018); Ferronato (2019); McAllister (2015) affirmed that the careful situation of dumpsites is germane in the management of solid waste. It becomes a challenge when dumpsites are situated outskirts of the city while considering community health and at the same time, the site allocated for disposal is also home to a huge number of people. Kyere (2019) opined that a few of the problems associated with municipal solid waste management include proximity to final disposal site at a landfill, improper landfill operation, health deterioration, accidents, floods occurrences and pollution of surface water. Yadav and Kumar (2018) asserted that the various hazards associated with the waste dumpsites such as surface water contamination, bad smell or odour, release of greenhouse gases, accidental hazard caused by fire and so on are the challenges affecting the management of solid waste.

The appropriate procedures in the management of solid wastes start from the point of generation. Solid wastes are meant to be sorted from the point of generation into different containers or bins which clearly shows the categories of waste. After that, wastes are collected by agencies in charge of its management, transported to facilities that take care of segregation or recycling before those that are deemed useless are finally transported to landfills where they are properly compacted and treated. In developed countries, waste generation from source has been strictly minimized to reduce the number of solid wastes generated from each household. Efficient management of solid waste could be achieved when adequate equipment's and facilities such as standard waste collection and evacuation vehicles are in place; strategic public collection points are in place; waste are collected routinely among many others. It is a fact that successive governments in Kwara State have done one thing or the other concerning the proper management of solid waste but there seems to be no significant difference yet. Solid waste when not properly managed and evacuated in time breeds mosquitoes, rats and other vermin, emit foul odour as a result of decaying organic materials, contaminate ground waste, causes typhoid and many other diseases.

Managing solid waste has become a major concern in Nigeria. It is common view today in the nation to see piles of waste dumps in almost every corner of the communities. Many homes, markets, drainages, roads, streets and undeveloped plots of land have been converted into waste dumps. Despite all the efforts of the Government of Kwara State to control and manage waste, there appears to be a losing battle against the harmful consequences of unguided waste and the achievement of a clean and healthy environment in the State. The researcher has observed that heaps of waste lying on road verges, roadsides and designated waste collection points is a common sight in Ilorin. With the efforts of the Government ranging from the declaration of every last Saturdays of the month for environmental sanitation to the enactment of sanitation laws (Local and National) to guide waste disposal and the creation of the Kwara State Environment Protection Agency (KWEPA) which oversees the activities of waste management, one will think that the problems of waste disposal and management should be solved but that is not the case. The Kwara State Environmental Protection Agency, set up by law, appears to be ineffective in controlling and managing the volume of waste generated in the State, and the Agency faces problems ranging from the behaviour of residents in relation to waste disposal to the peculiarity of Nigeria's attitude; "government-does-everything". There is no doubt that there are challenges to the management of solid waste. It is against the background that the researcher has embarked on a study to identify the challenges of solid waste management in Kwara State. On these bases research Questions as follows were formulated;

What are the challenges inherent in the transportation stage of SWM in Kwara State? And What are the challenges inherent in the disposal stage of SWM in Kwara State?.

Methods and Material

The descriptive research design of the survey type was adopted for this study. The population of the study comprised of all the social workers (2,000) under the Kwara State Environmental Protection Agency (KWEPA). Four hundred samples were selected and used for the study. According to Krejcie and Morgan sample size selection table, for a population of two thousand (2000) respondents, a sample of three hundred and twenty-two (322) respondents is adequate to represent the population. Based on this assertion, the researcher decided to round up the figures to the nearest hundred thereby arriving at a sample size of four hundred (400) respondents. A systematic sampling technique was adopted in selecting the respondents for the study using an equal interval. This was done by requesting for the register containing the names of the waste managers and randomly selecting a name to start with and subsequently selecting every 5th name after the first name that was randomly selected until the desired number of samples was selected. The selection of respondents was done on the day of the monthly general meeting at the KWEPA office. A researcher designed questionnaire which was validated by three experts in the field of health education was used for data collection. The instrument was tested for reliability by administering it to twenty social workers and subjected to Cronbach Alpha statistics which yielded a coefficient of 0.78r. The instrument was administered to the respondents by the researchers and retrieved immediately. Descriptive statistics of frequency counts and percentages were used to analyse the data collected from the study. Bar charts were used to present the results and an observation schedule was used to ascertain the waste management equipment available for the management of solid waste.

Findings

Research question 1: What are the challenges inherent in the transportation stage of SWM in Kwara State?

Table 1: Challenges inherent in the transportation stage of SWM in Kwara State

S/N	Items	Agree	Disagree
1	Irregularity of waste collection frequency due to faulty vehicles is a problem to waste management	400 (100%)	NIL
2	Distance to approved dumpsites affects the timely collection of waste	400 (100%)	NIL
3	Insufficient number of evacuators per vehicle is a problem to easy collection of waste	379 (94.8%)	21 (5.3%)
4	Poor conditions of vehicles delay timely disposal of waste	385 (96.3%)	15 (3.8%)
5	Use of old waste evacuation vehicles constitutes a problem to solid waste management.	400 (100%)	NIL

It can be observed from table 1 above that all the respondents agreed that irregularity of waste collection frequency due to faulty vehicles is a challenge to waste management. The table further revealed

that all the respondents agreed that the distance to approved dumpsites affects the timely collection of solid waste. A critical observation of the table further revealed that 379 (94.8%) respondents agreed that insufficient number of evacuators per vehicle is a problem to easy collection of waste but 32 (5.3%) respondents disagreed. The table further revealed that 385 (96.3%) respondents agreed that poor condition of vehicles delay timely disposal of solid waste while 15 (3.8%) respondents disagreed. It can also be observed from table 1 above that all the respondents agreed that the use of old waste evacuation vehicles constitute a problem to solid waste management.

Figure 1: Bar chart showing the challenges inherent in the transportation stage of solid waste management in Kwara State

Figure 1 above revealed that all the respondents agreed that the use of faulty vehicles, distance to approved dumpsite and the use of old waste evacuation vehicles are challenges to solid waste management in Kwara State. It can also be observed that 379 respondents agreed that insufficient evacuators per vehicle delay the rate at which waste is collected at various collection points.

Research question 2: What are the challenges inherent in the disposal stage of SWM in Kwara State?

Table 2

Challenges inherent in the disposal stage of SWM in Kwara State

S/ N	Items	Agree	Disagree
1	Poor coordination of dumpsites affects easy disposal of waste	377 (94.3%)	21 (5.3%)
2	When waste is not compacted at dumpsites it makes easy disposal a problem	373 (93.3%)	27 (6.8%)
3	Having to go deep inside a disposal site before disposing waste is a problem	379 (94.8%)	21 (5.3%)
4	The foul stench at the disposal site affects the proper disposal of waste	385 (95.8%)	15 (3.8%)
5	Poorly situated disposal site affects waste management	354 (88.5%)	46 (11.5%)

A critical examination of table 2 revealed that 377 (94.3%) respondents agreed that poor coordination of dumpsites affects easy disposal of solid waste while 21 (5.3%) respondents disagreed. The table further revealed that 373 (93.3%) respondents agreed that when wastes are not compacted at dumpsites, it makes easy disposal a problem. A further observation of the table revealed that 379 (94.8%) respondents agreed that having to go deep inside a disposal site before disposing solid waste is a problem. The table also revealed that 385 (95.8%) respondents agreed that the foul stench at the disposal site affect the proper disposal of waste. Finally, it can be observed from the table that 354 (88.5%) respondents agreed that poorly situated disposal sites affect waste management but 46 (11.5%) disagreed.

Figure 2: Bar chart showing the challenges inherent in the transportation stage of solid waste management in Kwara State

It can be observed from figure 2 that almost all the respondents (385) agreed that the foul stench emanating from decomposing waste discourages truck drivers from going deep inside the dumpsite to

dispose of their waste. It can also be observed that 379 respondents also believed that having to go deep inside a disposal site before disposing waste is a problem. The chart revealed that the least of all the problems identified was the poor situation of disposal site which 354 respondents agreed that it is a challenge to solid waste management in Kwara State. The observation schedule also reveals that there is only one grader on the disposal site which is meant to be used for grading disposed waste. Based on observation of the disposal site, it can be observed that the disposal site is not properly monitored.

Discussion

What are the challenges inherent in the transportation stage of SWM in Kwara State? The result of the responses obtained indicated that insufficient number of evacuators per vehicle is a challenge to solid waste management ($f = 379$). This finding is in line with the finding of Yukalang et al. (2017) who asserted that lack of staff capacity and staff number is a barrier to municipal solid waste management. It can be observed that some trucks that are used in the collection of waste do not have more than two social workers attached to it. This ultimately reduces the collection rate per day and increases the amount of waste that is piling up in place yet to be evacuated.

Distance to approved dumpsite is a challenge to SWM in Kwara State ($f = 400$). This finding is corroborated by the finding of Agunwamba et al. (2014) in small cities where final disposal sites are nearby, the hauling of waste is not a serious problem but when the haul distance is far, this poses a challenge to solid waste management. This prompts evacuators to mount solid waste in excess in an attempt to reduce the number of times needed to go to the dumpsite. This eventually causes overflowing waste to litter the road while conveying the waste to the disposal site. BioEnergy Consult (2020) views the overloading of collection trucks in an attempt to reduce the number of trips as an unwelcome practice.

Use of old waste evacuation vehicles is a challenge to solid waste management ($f = 400$). This finding is in line with the finding of Abdel-Shafy and Mansour (2018) who opined that the supply of waste management facilities and equipment's have a great impact on the success or failure of the programme. This implies that the use of old vehicle which could develop fault at any time could negatively affect solid waste management. When sub-standard equipment's are used in place of standard ones, efficiency is reduced and the desired result may not be easily achieved.

Poor condition of vehicles delays timely disposal of solid waste ($f = 385$). This finding is in line with the finding of Yukalang et al. (2017) who reported that timely disposal of waste is affected by poor condition of waste collection truck. Some waste collection truck breaks down often when they are fully loaded. In some cases, it takes days before they are fixed and waste continues to rot in the vehicle while uncollected waste at various points continues to pile up.

Irregularity of waste collection frequency due to faulty vehicles is a challenge to solid waste management ($f = 400$). This finding is in line with the finding of Igbinomwanhia, (2011) and Zhu et al. (2008) who affirmed that irregular transport of waste in faulty vehicles significantly affects the management of solid waste in developing countries. Irregular transport of waste in open trucks that develops one fault or the other delays the transportation of waste and encourages the piling up of waste at designated collection points.

What are the challenges inherent in the disposal stage of SWM in Kwara State? The result of the responses obtained indicated that the absence of compaction of waste at disposal site is a challenge inherent in the disposal stage of SWM in Kwara State ($f = 373$). This finding is in line with the finding of Ferronato (2019) who opined that in an open dump site, the lack of compaction of waste, outright neglect of technical and hygienic considerations is some of the challenges facing solid waste management. When

wastes are not compacted at dumpsites, land is wasted and the easy movement of trucks is hindered. This encourages truck drivers to dispose their waste uncontrollably.

Poor coordination of dumpsites affects easy disposal of waste ($f = 377$). This finding was corroborated by the finding of Ferronato (2019) who opined that landfills are not properly monitored, coordinated and managed and it poses a significant challenge to proper solid waste management and public health. In the absence of proper monitoring of dumpsites, truck drivers dispose their waste at spots they deem fit or at their convenience.

Poorly cited dumpsites affect solid waste management ($f = 354$). This finding was corroborated by the finding of Nwankwoala and Offor (2018) who affirmed that most dumpsites are poorly cited, some are full and others are poorly coordinated. The finding was also corroborated by the findings of Ogundele (2018); Ferronato (2019); McAllister (2015) who opined that the careful situation of dumpsites is germane in the management of solid waste. It becomes a challenge when dumpsites are situated outskirts of the city while considering community health and at the same time, the site allocated for disposal is also home to a huge number of people.

Distance to final disposal point at a dumpsite is a challenge to SWM ($f = 379$). This finding is in line with the finding of Kyere (2019) who opined that a few of the problems associated with municipal solid waste management include proximity to final disposal site at a landfill, improper landfill operation, health deterioration, accidents, floods occurrences and pollution of surface water. Some landfills cover a large expanse of land and require one to drive deep into the dumpsite before one can empty the trucks. Such landfills emit foul odours emanating from decamping waste and this could prompt drivers to dispose solid waste carelessly within the site without getting to the proper point to dispose the waste.

The foul stench at disposal site affects waste management ($f = 385$). This finding is in line with the finding of Yadav and Kumar (2018) who asserted that the various hazards associated with the waste dumpsites such as surface water contamination, bad smell or odour, release of greenhouse gases, accidental hazard caused by fire and so on are the challenges affecting the management of waste at dumpsites.

Conclusion

Based on the findings of this study, it was concluded that challenges of solid waste management in Kwara State includes insufficient social workers attached to trucks for collection of waste; waste collection trucks are inadequate and most of the ones available are below standard and faulty most of the time; dumpsites are poorly coordinated and some truck drivers are contributing to the problem on ground.

Recommendations

Based on the conclusions of the study, it was therefore recommended that more social workers should be employed; the Government should endeavour to purchase more standard waste collection trucks, dumpsites should be properly monitored and coordinated and truck drivers should be educated and properly directed in the disposal of solid waste at dumpsites.

References

- Adefemi, S. O. & Awokunmi, E. E. (2009). The impact of municipal solid waste disposal in Ado Ekiti metropolis, Ekiti State, Nigeria. *African Journal of Environmental Science & Technology*, 3, 186-189.
- Adeyemi, A. S., Olorunfemi, J. F., & Adewoye, T. O. (2001). Waste scavenging in Third World cities: A case study in Ilorin, Nigeria. *Environmentalist*, 21(2), 93-96. <https://doi.org/10.1023/A:1010655623324>
- Chukwuemeka, E., Ugwu, J. & Igbwegbe, D. (2012). Management and development implication for solid waste management in Nigeria. *Asian Journal of Business management*. 4(4):352-358.
- Ezebilo, E. E. & Animasaun, E. D. (2011). Households' perceptions of private sector municipal solid waste management services: A binary choice analysis. *International Journal of Environmental Science & Technology*. 8; 677-681.
- Kaza S, Yao L, Bhada-Tata P and Van Woerden F (2018). What A Waste: A Global Snapshot of Solid Waste Management to 2050 (Urban Development Series) (Washington, DC: WorldBank) (<https://doi.org/10.1596/978-1-4648-1329-0>)
- Manfredi, S., Tonini, D., Christensen, T. H. & Scharff, H. (2009). Landfilling of waste: accounting of greenhouse gases and global warming contributions. *Waste Manage. Res.* 27:25–36.
- Ogwueleka, T. (2009). Municipal solid waste characteristics and management in Nigeria. *Iranian Journal of Environmental Health Science & Engineering*, 6(3), 173-180.
- Ohakwe, J., Nnorom, I. C. & Iwueze, I. S. (2011). Survey of Attitude of Residents towards Environmental Deterioration in Nigeria and Factors Influencing their Willingness to Participate in Reducing the Trend: A Case Study of Waste Management. *Trends in Applied Sciences Research*. 6,154-164.
- Vaughn, J. (2008). Waste Management: A Reference Handbook. ABC-Clío. Santa Barbara, California.
- Wilson, D. C. & Velis, C. A. (2015). Waste management—still a global challenge in the 21st century: an evidence-based call for action. *Waste Management Research*. 33,1049–51