Factors That Affect Solid Waste Management in Adjumani Town Council Adjumani District.

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Abstract

Background:
The study was carried out at the Adjumani town council located in the Adjumani district. The researcher sought to determine factors affecting solid waste management in Adjumani Town Council. The study objectives were to identify the types of solid waste management, the methods of solid waste management, and to identify the challenges faced by solid waste management.

Methodology:
The study involved descriptive cross-sectional employing qualitative data collection using methods of simple random sampling with a sample size of 10 respondents, the study population included public health workers handling solid wastes with the help of questionnaires, oral interview and observation were the major data collection tools basing on both dependent and independent study variables. The data was analyzed and presented in tables.

Results:
70% were males and 30% females. Majority of the services related to waste management were rated 60% good and 20% fair, 10% very good and 10% bad while none were got a rating of excellent. The poor roads to the final disposal site, mechanical problems with the lorry, accumulated heaps of garbage, and lack of fences were among the problems associated with transportation.

Conclusion:[a]
The study thus concluded that through the capacity of government in liaison with administrators, the public health department should put more effort into continuing education to enable the staff to improve their skills at the work that is, by training, teaching, and well sensitizing all health workers and the public in the community and become aware of solid waste management and this will help to eliminate /reduce the factors affecting solid waste management in Adjumani Town Council while aiming at higher results with good performance at the workplace.

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1 Background of the study.

Throughout history, human development has been instinctually linked to the management of solid waste due to its effect on both public and environmental health. Solid waste management (SWM) has a long and convoluted history (Nathan, 2015). The system of SWM can trace its roots back to ancient times. One of the first instances of waste management occurred in the 4th century AD, with the ancient Greek. The Greeks had to deal with multiple challenges of aligning the waste removal system with a growing population, lack of space, and

sanitation problems. Waste management practices were very rudimentary with trash just being collected and transported to the pits outside the city (McAllister, 2015). It was not until the urban population boomed that garbage was viewed as a threat to human and environmental health. Cities began to grow rapidly to accommodate the growth and condition and condition began to worsen for these cramped commodities. The plagues that affected Europe between the $14^{th}$and 16^{th}centuries were often perpetrated by vermin that thrived in the unsanitary urban condition that were common during this time. Early waste management techniques were developed during this time. Early waste management techniques were developed during this period to combat the speed of diseases but the political and social problem of the time did not see great strides in waste management (Nathan, 2015).

It was not until 18^{th} century that municipal collection of garbage had begun in some of the world's major cities, but the methods were still fairly crude(Metzger, 2009). During the industrial revolution, Europe and the United States were experiencing rapid development that created greater amounts of waste(Chapter I.docx - STO TOMAS NATIONAL HIGH SCHOOL Sto Tomas Candon City Ilocos Sur Senior High School WASTE MANAGEMENT SYSTEM OF STO TOMAS NATIONAL HIGH | Course Hero, no date). Waste started to become a concern and this "age of sanitation' 'began. Communities began to organize waste collection and disposal to help maintain public health (Maiyo, 2018).

In the latter part of 19^{th} century, technological advances included the use of garbage cans and the creation of incinerators and sanitary landfills: the latter replaced the practice with open dumping and has become a common practice in the developed world (hoornweg and ginnelli, 2007) Waste system took on more organized to waste management, and technology industry and new politics and regulations imposed on waste to dramatically improve the waste management industry. With the passage of the clean air act in the united states in 1970, many early–energy plants(TANGGRI,2003) In recent years, the solid waste industry has employed other technologies, such as recycling and composting to compact our overgrowing waste issue. Processes of SWM have affected human history in many ways, just as they will continue to do so in the future.

The modern waste management industry in the developed world has come far, and with recycling and other advances, I e\will continue to grow and change with the needs of the community. However, countries in the developing world are quite dire. Present SWMS in these countries are more reminiscent of conditions found in past SWMS in the developed world.

Traditionally, the municipalities have been in charge of providing SWM service in developing countries (Al- Khatib et al., 2009) The municipal responsibility is to organize and manage the public sanitation system, including providing the infrastructure for the collection, transportation, treatment, and disposal of wastes. However, with over increasing population and economic growth, many municipalities in developing countries are struggling to keep SWMS working sustainably. Oftentimes these systems either become ill-managed or even cease to exist because of various social, institutional, and technical constraints. Global production of waste has practically doubled over the past ten years and is expected to reach 2.5 billion tonnes per year in 2025 as the result of the combined effect of urban development and changes in consumption patterns (Periou 2012).

According to (HOUSEHOLD WASTE MANAGEMENT PRACTICES IN SABON TASHA, CHIKUN LOCAL GOVERNMENT AREA., 2019), Communities in developing countries often turn to waste disposal methods that have proven to be destructive to human health and the environment, such as open dumping and burning (or unregulated landfill) because they feel they have no other option to manage their solid waste (Mwanthi and Nyabola, 1997, Goett, 1998; Alavi Moghadam et al 2009; Narayana, 2009; Al Khatib et al., 2015; Hilburn, 2015). With industrial progress, growing urban areas, and rapid growth, solid waste management has become a major concern in many developing countries.

A case study conducted in various rural cities in India found that trash was frequently dumped or burned in unregulated areas (Narayan, 2009). Although burning trash is illegal, hundreds of thousands of people with no garbage pickup have no other choice but disposal of their waste.

Households in those communities maintain localized trash pits, where waste is deposited daily and burn by weekly. Once the pit becomes full, the remnants are transported to larger ones on the edge of the town (Narayana, 2009).

In larger towns and cities like New Delhi, the availability of land for waste disposal is also very limited

(Venkateswaran, 1994). In the majority of urban centers, solid waste is disposed of by depositing it in low–lying areas outside the city without following the principles of sanitary landfilling such as leachate collection and monitoring that make this disposal method unsustainable (McAllister, no date a). In both rural and urban areas, open burning of household waste has become a place in areas. Where the collection is limited or non – existence (Narayana, 2009).

As the urban population of Nairobi and elsewhere in East Africa grows, so do the solid waste management burdens, a situation regulation. At least 100 million people in East Africa lack access to improve sanitation (Troschinetz and Mihelcic 2009) without proper controls, solid waste is often dumped in abandoned quarries or similar sites. In Nairobi for example municipal waste is often dumped in the Dandora dumping site, a former quarry. Residents living close to the dumpsite are therefore exposed to environmental and disease risks. The disposal sites are, in most cases located in environmentally sensitive, low-lying areas such as wetlands, forest edges to bodies of water(McAllister, no date b). They often do not have lines, fences, soil covers, and compactors as is in most developing countries (Troschinetz and Mihelcic, 2009).

More often than not, the urban poor has to make do with amid waste despite the health risks. a similar situation exists in many other developing nations where population and industrial growth are on the rise and systems are not too weak and ineffective to handle to added strain. With this exponential growth of waste new practices of SWM must be undertaken and this system needs to be sustainable and adapted to the needs and challenges prevalent throughout the developing world. Understanding the current research on this topic will allow us to fill in knowledge gaps about the topics of SWM in developing countries.

With the world becoming more urbanized and developed and with the population rapidly increasing each year, the consumption level is historic levels (IPA, 2014) An inevitable consequence of this growing trend is the amount of solid waste produced. Having an effective and waste management system in place will help to regulate waste disposal and will help alleviate some of the pressure consumption has put on the environment. It is also important to deal with this issue directly because waste can have detrimental effects, if left unmanaged, on both environmental and human health (Narayan, 2009). For example in a study in a study conducted in India researchers found that when citizens were exposed to open dumping burning of wastes they develop increased health problems due to the release of dangerous toxins such as toxins, which are known to cause cancer and other health challenges. Important consideration must be made about the ways we manage waste not just to ensure the health of the environment, but to ensure our health as well (Narayana, 2009)

2 Methodology.

Study design

A research design is an actual plan or roadmap which the researcher used during the field study. It was an overall plan and strategy for conducting research; it was a master plan specifying the nature and pattern the research intended to follow while carrying out the research study.

For this research that was carried out from the Adjumani district, across –sectional survey design was used (burns, 2000). Burns (ibid) expressed that such a design seemed to establish the cause and effect relationship of different variables. This study, therefore, establishes how different variables relate to one another in solid waste management. In congruence with Burns, Maree (2008) Raili(2009) noted that the aim for using a cross-sectional survey design is to investigate explain and describe the phenomenon of interest through obtaining different viewpoints relating to objectives. Oso and Omen (2008) assert that if such design use questionnaires, their research is carried out within a short period and gives accurate results. Such questionnaires were in a short period.

Both quantitative and qualitative methods of research were during this study. Qualitative methods were used to generalize the findings of the study instead of the objectives (Blanche et al,2006). Quantitative methods were also used on the other hand to provide factual figures by quantifying the findings. Despite using a quantitative method of research, this study was quantitative in the sense that it aimed to explore the real situation concerning solid waste management in the Adjumani district.

Study population

The study population included market vendors, shop owners/ attendance, town council administra-

tor, and public health officers working in the Adjumani town council. The response was targeted with study variables that focused on factors affecting solid waste management in Adjumani town council, in Adjumani district.

Study area.

Adjumani town council local government is comprised of 3 parishes with 18 villages.

The parishes have effective local council (LC) and parish development committees (PDC) who are responsible for the planning and coordination of all development programs at this level.

The urban council has elected representatives from all 6 parishes and some of them are part of the urban executive committee.

ATCLG is located in ATC-sub-county and lies in the heart of Adjumani central, Adjumani district, West Nile sub-region northern region.

ATC is a government-owned institution established through the act of the parliament under the local government s act 1997 following the adoption of Uganda's decentralization policy.

ATC's mission is to attain effective sustainable service delivery in partnership with the people, central government, district authority, development partners for the realization of socio-economic transformation and better livelihood of the urban population.

Sample size selection

The study included a total of 10 people in the town council at the time of the study. Convenient sampling was used in the selection of sample size and study population in 3.3above.

Sampling procedures

The sample size was chosen using convenient sampling techniques which identifies public health workers from the community and then simple random sampling was also used where communities within the town council were chosen to be interviewed.

The sample units of the study were officials from the Adjumani town council, administrators such as public health workers and workers from the solid waste management companies as well as managers of the dumping sites and the people surrounding sites. These were reached by using both purposive and random sampling techniques. While the purposive technique was used because it guides the researcher to reach respondents with rich information, random sampling techniques was used because it has never been segregated and it helps to reach individuals whose voice would not have been heard if using purposive techniques alone

Data collection methods

The researcher used an interview guide and questionnaires as the methods of data collection. An interview guide schedule was conducted among public health personnel. The interview guide was both open and closed-ended questions to collect data concerning the effective management of solid wastes.

Research tool/ instruments

The researcher used both questionnaires and interview guides. The self – administered questionnaires consisted of open and closed ended questions in the English language of each factor affecting solid waste management for respondents to answer either by filling or face to face interviewing with the researcher.

Quality control

Data validity

The researcher used a good approach to the respondents to ensure that they give the correct information needed for the study.

Data reliability

The researcher also trained research assistance whom they jointly worked together during data collection to speed up the study. The questionnaires were thoroughly checked personally and pretested to get qualitative and quantitative data which was easily compiled and edited before finalizing the printing and binding while ensuring the reliability of the research questionnaires.

3 Data analysis, processing, and management

In the review of waste methods, data were exhaustively analyzed by arranging it by tabulating the results from questionnaires obtained from the health workers and officers based on the response given about the objectives of the study. This was carried out by checking the completeness, legibility of the answer given by health workers and officers based on the response given about the objectives of the study. This was carried out by checking the completeness, legibility of the answers given by health workers or officers in both cases the data was analyzed using more quantitative than the qualitative mean of data processing on completion of data collection exercise on analysis of data was edited

to reduce errors and check for relevancy, accuracy, and completeness. Data was mathematically arranged and intergraded coded and captured into a computer using MS word excel computer package.

Ethical consideration

Informed consent of the participants was obtained by explaining the purpose of the study addressing any concerns like benefits, harmful effects, and they were required to sign a consent form thereafter.

Confidentiality and privacy were strictly emphasized in that quality of participants 'performance were kept confidential and private.

Study limitation

The limited period for the researcher to cover the whole study population hence research assistant was employed to cover the study population within the stipulated time.

Tiresome ness at the end of each day was overcome by having breaks during data collection and a work schedule plan was designed to timetable the activities.

There was poor response and attention from respondents pretending to be busy. But the researcher tried serious convincing and gave out some motivators like sodas to attract the response and attention of respondents as well as having enough time with them.

Dissemination of results

The researcher report will be submitted to the school of management and Applied Sciences of St. Francis School of Health sciences –Mukono for purpose of an award of a diploma in public health, feedback o the Adjumani town council, and last copy to the library of St. Francis School of Health sciences.

Presentation of study findings

Respondent's demographic data

There was a great need to collect data on biographic characteristics of respondents on gender. Age group, occupation, and experience and education level presented in the table 1 below.

Gender of respondents

The findings on gender of respondents were as presented in Table 2 below

From Table 2 above majority of the respondents (70%) were males and 30% females. The study found out that Adjumani Town Council employs more than females. This accounted for the imbalance in gender composition.

From table 3 above, Majority 50% of respondents were in the age group 18-30 years , 30% were between 31-44 years, while 10% were between the age group of 45-57 years and 58 and above years as can be seen in Figure 2 below .

Education level of respondents

The respondents were classified according to their professions and the findings were as presented in table 4 below.

From Table 4 above, majority of the respondents (50%) were in secondary level while 30% in primary level while 10% were in Diploma and 10% were in degree. This indicated that Adjumani Town Council employs more staff that completed secondary level than diploma level and degree level as can be seen in figure 3 below

Occupation of the respondents

The respondents were classified according to their professions and the findings were as presented in table 5 below.

From Table 5 above, majority of the respondents (40%) were Business men / women while 30% were teachers, 20% were peasants while 10% were others. This indicated that Adjumani Town Council employ more business men / women than others.

Experience of respondents in handling wastes.

From Table 6 above 40% had experience in waste management of 5 years and above, 30% had the experience of 3 years, and while 10% had the experience of 1 year, 2 years, and 4 years respectively. Generally, this indicated that the respondents had reasonable experience in solid waste management and could reliable information as far as solid waste management at Adjumani Town Council in figure 5 below.

Findings on the services related to solid waste management in Adjumani town council.

The study sought to establish whether space is an important factor in records management. The responses were as presented below.

Shows Responses on the services related to relate solid waste management in Adjumani town council.

From table 7 above, majority of the services 60% good and 20%fair, 10% very good and 10% bad while none were excellent. This indicated that solid waste management needs more improvement for it to be effective.

Responses on the collection of solid waste in Adjumani town council.

Table 1. Shows Respondents demographic data

Variables	Frequency(n=10)	Percentage (%)
Gender		
Male	7	70
Female	3	30
Age group		
18-30	5	50
31-44	3	30
45-57	1	10
58 and above	1	10
Occupation		
Peasant	2	20
Business men/ women	4	40
Teacher	3	30
Others	1	10
Experience		
Less or one year	1	10
Two years	1	10
Three years	3	30
Four years	1	10
Five years and above	4	40
Educational level		
Secondary	5	50
Diploma	1	10
Degree	1	10
Others	3	30

Source: Primary data 2020

Table 2. Shows Gender of respondents

Gender	Frequency (n=10)	Percentage (%)
Male	7	70
Females	3	30
Total	10	100

Source: Primary data, 2020

Table 3. Shows age group of respondents.

Age group	Frequency(n=10)	Percentage (%)
18-30	5	50
31-44	3	30
45-57	1	10
58 and Above	1	10
Total	10	100

Source: primary data, 2020

Table 4. shows Education level of respondents.

Education level	Frequency9N=10)	Percentage (%)
Primary	3	30
Secondary	5	50
Diploma	1	10
Degree	1	10
Total	10	100

Source: primary data, 2020

Table 5. Shows classification according to professions.

Occupation	Frequency(n=10)	Percentage (%)
Peasant	2	20
Business men/ women	4	40
Teacher	3	30
Others	1	10
Total	10	100

Source: primary data, 2020

Table 6. Shows Experience in handling wastes.

Experience	Frequency (n=10)	Percentage (%)
Less or 1 year	1	10
2 year	1	10
3 year	3	30
4 year	1	10
5 year and above	4	40
Total	10	100

Source: primary data, 2020

Table 7. Responses on the services related to relate solid waste management in Adjumani town council.

Responses	Frequency(N=30)	Percentage
Excellent	0	0
Very good	1	10
Good	6	60
Fair	2	20
Bad	1	10
Total	10	100

Source: Primary Data, 2020

Table 8. Shows Responses on the methods of waste collection in Adjumani town council.

Responses	Frequency(N=30)	Percentage
Door to door collection	2	20
Communal collection	6	60
Others	2	20
Total	10	100

Source: Primary Data, 2020

From Table 8 above, the majority of the collection method used 60%were communal collection, while 20% were door-to-door collection and 20% others respectively indicating communal collection as the most preferred method of solid waste collection at Adjumani Town council.

Findings on the problems associated with collection of solid waste in Adjumani town council.

The respondents were asked whether there were problems associated with the collection of solid waste and the findings were presented in table 9 below.

From Table 9 above, the majority of the respondents 70% said yes while 30% said no indicating solid waste collection has more associated problems at Adjumani Town Council.

Findings on the problems associated with transportation of solid waste in Adjumani town council.

The respondents were asked about problems associated with transportation of solid wastes and the poor road to the final disposal site, mechanical problems with the lorry were among the problems associated with transportation.

Findings on the challenges associated with disposable points in Adjumani town council.

Poor roads leading to the disposal ground, accumulated heaps of garbage, and lack of fence was noted from the study.

Findings on the formal types of waste generated in Adjumani town council.

The respondents agreed with commercial wastes, agricultural wastes, and houses hold wastes as the formal types of solid wastes generated in Adjumani Town Council.

Findings on the methods/ equipment used in solid waste management in Adjumani town council.

The respondents were asked on methods/equipment used in solid management and they mentioned hard broom, wheelbarrow, tractor/lorry, spades, and hoes were among the equipment used in solid waste management in Adjumani Town Council

4 Discussions, Conclusions, And Recommendations.

5 Discussion of results

The study involved a majority of 70% males and 30% females, as can be seen in Table 2, with more males employed than females at the study site which accounted for the imbalance in gender composition. Majority 50% of respondents were in the age group 18-30 years, 30% were between 31-44 years, while 10% were between the age group of 45-57 years and 58 and above years respectively and the most qualification level of education of respondents were (50%) secondary level while 30% were primary level while 10% were in degree respectively indicating that Adjumani Town Council employs more staff that completed secondary level than diploma level and degree level where the majority (40%) were Businessmen/women while 30% were teachers, 20% were peasants while 10% were others. Among these staff 40% had experience in waste management of 5 years and above and above, 30% had the experience of 3 years while 10% had the experience of 1 year and 4 years respectively. Generally, this indicates that the respondents had reasonable experience in solid waste management and could provide reliable information as far as solid waste management at Adjumani Town Council is concerned who offered 60% good services and 20 fair services, 10% very good services and 10% bad services while none were excellent hence indicated that solid waste management

Table 9. Shows the problems associated with the collection of solid waste in the Adjumani town council.

Responses	Frequency(N=30)	Percentage (%)
Yes	7	70
No	3	30
Total	10	100

Source: Primary Data, 2020

needed more improvement for it to be effective at the study site,

The major waste collection method used 60% were communal collection Table 8, which disagrees with a study by Hardoy, Mitlin, and Satterth Waite (2001) who remarked that in collecting solid waste, the commonly used method is a door – to –door collection as applied as various households in urban areas while 20% were door to door collection and 20 % others respectively in the current study site indicating communal as the most preferred method of solid waste collection at Adjumani Town Council. Table 9, solid waste collection had various associated problems as indicated by the majority of the respondents 70% who said yes while 30% said no indicating solid waste collection has more associated problems at Adjumani Town council which mainly included; frequent break down of lorry using mentally sick people to transport garbage and few garbage collectors were noted which agrees with a study by Mohammed and Elsa (2003), where the frequencies and regularity of solid waste collection are not always maintained due to the less number of equipment's or collection services and less number of laborers with their low payment which was worsened by the problems associated with transportation of solid wastes due to poor roads to the final disposal site, mechanical problems with the lorry which were among the problems associated with transportation to the disposal points. The disposal points also had poor roads leading to the disposal ground. Accumulate heaps of garbage and lack of fences which relates to the study by Kumar(2006) as he noted that open dumpsites or disposal areas are major problems to the problems to the environment, especially on the air that the people inhale, this also agree with a study by (Achankeng,2003) who noted the landfills or disposal points not protected therefore waste pickers use the chance to visit the sites and sort variable materials for selling or their consumption.

The study agreed with commercial wastes, agricultural wastes, and household wastes as the formal types of the solid wastes generated in Adjumani Town Council with the main methods, equipment used in solid waste management as hard brooms, Wheelbarrow, tractor/ lorry, spades, and hoes which agrees with the study by Ally(2008) that more methods or equipment need to be used for the reduction of solid at the study site. Most of the respondents were male (70%), and the rest (30%) were female (figure:2) Many of the respondents (30%) were in the age group of 31-40 (figure: 2). The indication that the respondents were adults and the study targeted this age group because they are the respondents were knowledgeable and had relevant information as regards the problem under study.

6 Conclusion

Although Adjumani town council had public health department, its public health is not yet properly and effectively managed due to inadequate funds, poor roads, and lack of protection of the disposal points with limited supervision of workers. Awareness of solid waste management as a field needs to be looked at to provide effective waste management with the town council.

Recommendation

The public and government should consider proper funding of the public health department to purchase the equipment used in the department to have effective solid waste management for the quality of the environment or public health to the community, planning, decision-making, and research and also improve on the bad roads for god transport.

The organization should consider motivating or staff by giving them incentives, welfare allowance, transport allowances, financial compensations like

support training, promotions, and accommodation for effective services by the staff.

The capacity of public health should be built through continuing education to enable staffs to improve their skills at the workplace with more a research study in the current topic to update the study and provide more lucrative information on the study.

7 Acknowledgment

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