

AN ASSESSMENT OF SOLID WASTE MANAGEMENT AWARENESS IN YOBE STATE UNIVERSITY CAMPUS DAMATURU, YOBE STATE

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ABSTRACT

This study examines the awareness level on solid waste management among students and its impacts on waste management system in Yobe State University. The population sizes considered in this research includes 150 students both male and female students of Yobe state university Damaturu who are currently living in the campus. The sample size was calculated using Cochran formulae: $N = \frac{z^2pq}{d}$; A minimum sample size of 150 was calculated, though the study sample size of 100 was obtained after the addition of an assumed 10% attrition. The research adopted descriptive survey research designed to investigate the awareness level on solid waste management among students and its impacts on waste management System in Yobe State University. The sampling technique for this research is stratified random sampling technique among the university students. The method of data collection adopted is structured questionnaire; the questions used in the questionnaire were targeted at the respondents with a view to satisfying the purpose of the study and providing analysis. Each completed questionnaire was reviewed for completeness prior to analysis. The data collected was sorted and analyzed using tables, frequencies and percentages. The results showed that 81.5% of respondents were aware of solid waste management. The major types of waste generated in the campus are Polyethylene bag, Plastics, and Bottles (33.7%) followed by Food residues/Vegetable residues (28.3%) and paper/cartons (27.1%). Also poor waste management practices among students include burning, practiced by 66.3% of the students and open dumping as practiced by 29.35% of respondents. The commonest means of waste transport to final disposal site was by wheel barrow (41.4%). Based on the findings of this research, the following recommendations were made: Waste management policy in the campus; a proper waste management policy should be formulated and implemented. This policy should promote new healthy methods of waste disposal like recycling and incineration while phasing out the old and unhealthy methods like open dumping and burning which still predominates.

Keywords: *Campus; solid waste; management; awareness; Yobe state University*

INTRODUCTION

According to National Solid Waste Management Association (NSWMA, 2011), wastes are substances or objects, which are disposed of or are intended to be disposed of or are required to be disposed of by the provision of national law. However, the words “trash”, “garbage”, “refuse” and “rubbish”, are used to refer to some forms of solid waste and also According to Desa et al (2012) in University of Malaysia Case study, Solid waste is defined as the generation of undesirable substances which is left after they are used. It is further defined as the useless and unwanted products in the solid state derived from the activities often discarded by the society. The problem of solid waste is one of the most critical environmental problems facing many universities in Nigeria. According to Mason County Washington (2015) “the term solid waste refers to materials such as household garbage (includes recycling), food wastes, yard wastes, and demolition or construction debris. It also includes discarded items like household appliances, furniture, scrap metal, machinery, car parts and abandoned or junk vehicles”. Additionally, it can be classified into re-cycling, non-cycling, bio waste and paper waste. Waste can be considered as garbage but a useful material in other places, as there is no material in this world which cannot be re-used for other purposes.

Waste management is the process of collecting, transporting, processing or disposing, managing and monitoring of waste materials. The term usually relates to materials produced by human activity and the process is generally undertaken to reduce their effect on health, the environment or aesthetics. The major focus of this research is on an assessment of solid waste management awareness in Yobe state university campus. Waste includes all items that people no longer have any use for, which they either intend to get rid of or have already discarded and these include: packing items garden waste, old paints containers, vegetables, metals etc (Enete 2010), in the case of Yobe state university the waste includes Paper, cardboard, containers/bottles, food waste, clinical waste and construction waste that are used in the campus on daily basis. Poor waste management has been a major problem to human health and existence, affecting many university campuses. A clean environment influences good health and good health further affects the productivity of man. The figure below gives a picture of waste classification in the Yobe State University campus:

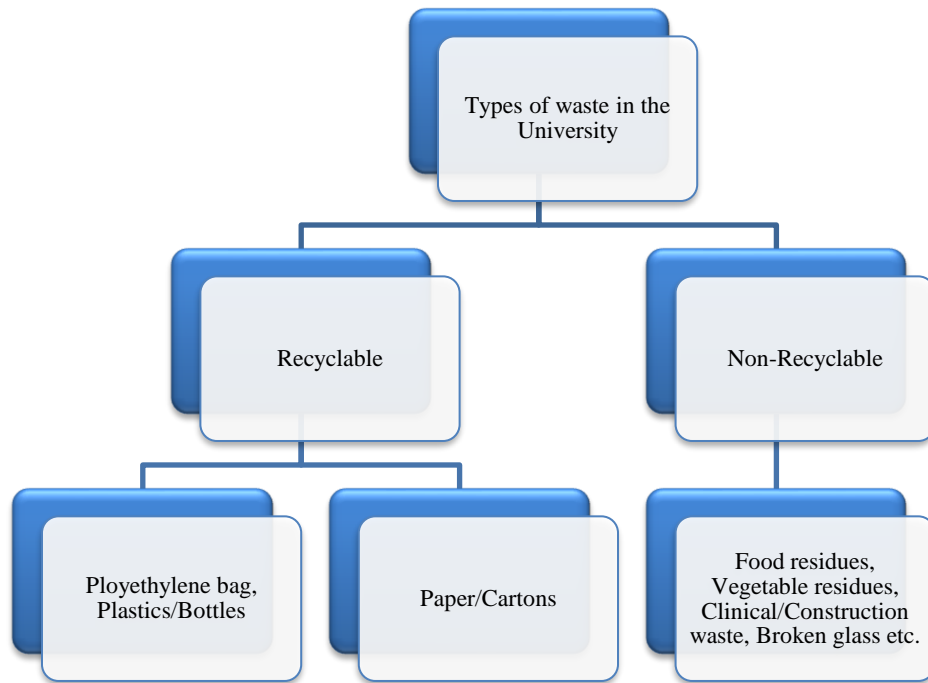


Figure one: Waste classification in the Yobe State University campus

Waste management is the term used for the collection, transportation, and disposal or recycling and monitoring of waste. It is used for the material, or the waste, which is produced by human activity. The main purpose of managing waste is to minimize its adversarial effects on human health and the nature (WRFound, 2009). Therefore, it is the mind of people that need to consider solid waste as useful resources rather than unwanted. In this research; change in habits, conducts and contribution of students and staff are signify cante important in solid waste management.

Human behaviour is crucial in the development of a waste management programme as a framework in communicating and understanding .The variable of the subject in this research is human behaviour which is critical. The results that will be derived from the quantitative approach will show the current constraints and a description of processes that need to be followed. These will give a clear picture and understanding of the extent to which students and staff will comply with system. According to the case study of University of Malaysia (2012) a school campaign that focuses on recycling can influence children and their parents' awareness and attitude toward waste management in a positive way. Similarly, bringing up the matter at a higher level in Universities may lead to a positive culture and impact on the environment, eventually bringing sustainability. According to Maddox,Doran, Williams &Kus, (2011) students' awareness about environmental problems and solutions can be increased through education, which can lead to controlling the harm that has been done to the

environment. According to Ballantyne, Connell, & Fien (2006) in their Environmental Educational Research have stated that the particular skills and knowledge gained from environmental education would help in changing human behaviour towards the environment.

Awareness and education are important for a successful management of any system. According to Ayodeji, (2012) paper and paper products characterise a huge amount of the components of solid waste due to academic and research activities. These can be controlled by educating the students about the fact and figures, and the consequences of over using paper Ayodeji, (2012). Aside from this there is other general waste, which includes catering waste, clinical waste, etc. due to high increase of student and staff population, at University campus. Furthermore poor waste management and disposal could lead to various diseases, infections and infestation and these include fly transmitted diseases like myiasis, diarrhoea, typhoid, cholera; rodent transmitted disease likelassa fever plague, leptospirosis, murine typhus; mosquito borne diseases such as malaria, yellow fever, filariasis, and dengue hemorrhagic fever (Obionu, 2007). Also gases like methane, carbondioxide, hydrogen sulphide and mercury vapour emitted from land fill site can constitute air contaminants and pollution.

Yobe State University is a new institution which was established in 2006, located in Damaturu the capital of Yobe state however, students with different background of managing and disposing solid waste across and outside the state are admitted into the university. Therefore, it is worth digging and discussing how we can make the students and staff to be aware and make improvements in the present waste management system of the University in order to help achieve a sustainable waste management. If the students and staff are more aware about the waste management system of the University it will bring more effectiveness to the system. The key benefit of this research is to propose recommendations to the University and its stakeholders which will identify and improve areas which need improvements in order to achieve efficiency in its waste management system. The research will also help in recommending programmes that should be launched by the University to raise the students and staff awareness on Environmental and Waste Management system and to educate them on how to practice environmentally responsible behaviours. In addition, it will also give an idea that will aids in running programmes to change the attitude and mind-set towards solid waste management, and promote recycling culture not only within the University but on a higher level.

METHODOLOGY

Study area: The study was conducted in Yobe state university campus km 7, Kashim Ibrahim way, Damaturu, Yobe State, Nigeria.

Study population: The population sizes considered in this research includes 150 students both male and female students of Yobe state university Damaturu who are currently living in the campus.

Sample size: A sample size consists of the number of individuals from which responses expected from sampling purpose. In selecting those elements from which the data would be obtained, the research does aim using the whole population by taking a sample of the students in the campus. The sample size was calculated using Cochran formulae: $N = z^2pq/d$; A minimum sample size of 150 was calculated, though the study sample size of 100 was obtained after the addition of an assumed 10% attrition.

Study design: This is the plan which guides the data collection analysis and phases of the research work. It is frame work of the research which discusses the methodology adopted for the research, the large sample size, data collection method and data analysis method. This research adopted descriptive survey research designed to investigate the awareness level on solid waste management among students and it impacts on waste management System in Yobe State University. Unlike in experimental studies, the researcher exercised very little control over extraneous variables.

Sampling techniques: The sampling technique for this research is stratified random sampling technique among the university students.

Method of Data Collection: The method of data collection adopted is structured questionnaire; the questions used in the questionnaire were targeted at the respondents with a view to satisfying the purpose of the study and providing analysis.

Materials and process: The research instrument used was a semi-structured questionnaire which was constructed based on the research topic and objectives: Section A consisted of bio-data of the respondent while section B consisted of questions to assess their level of awareness on solid waste management among students and it impacts on waste management System in Yobe State University, assessing their attitude towards waste management, assessing the type of waste management practiced and the means of transporting waste from collection centres to final disposal site.

Data analysis: Each completed questionnaire was reviewed for completeness prior to analysis. The data collected was sorted and analyzed using tables, frequencies and percentages.

Limitation of study: The study is limited to the students of the Yobe state university living in the campus.

RESULTS

One hundred (100) questionnaires were distributed but only ninety-two (92) were collected and analyzed.

Question 1: Sex Distribution of Respondents**Table 1**

Sex	Frequency	Percent (%)
Male	29	31.5
Female	63	68.5
Total	92	100

Source: Field Survey 2018

The table above shows that out of the 92 respondents, 29 of them were male and 63 were female, which constituted 31.5% and 68.5% respectively. This shows that majority of the respondent are female.

Question 2: Hostel of Respondents**Table 2**

Hostel	Frequency	Percent (%)
New hostel	40	43.5
Old hostel	28	30.4
Female hostel	24	26.1
Total	92	100

Source: Field Survey 2018

The table above shows that out of the 92 respondents, 40 of them were from new hostel, 28 from Old hostel, and 24 from female hostel, which constituted 43.5%, 30.4% and 26.1% respectively. This shows that majority of the respondents are in new hostel.

Question 3: Are you aware of solid waste management?**Table 3**

Option	Frequency	Percent (%)
Yes	75	81.5
No	17	18.5
Total	92	100

Source: Field Survey 2018

The table above shows that out of the 92 respondents, 75 (81.5%) responded that there are aware of the solid waste management while 17 (18.5%) responded that there are not aware of the solid waste management. This show that majority of the respondents are aware of the solid waste management.

Question 4: Major types of waste generated in the campus**Table 4**

Option	Frequency	Percent (%)
Paper/Cartons	25	27.1
Food residues/Vegetable residues	26	28.3
Polyethylene bag, Plastics, Bottles	31	33.7
Clinical/Construction	10	10.9
Total	92	100

Source: Field Survey 2018

From the above table, 25 (27.1%) responded that paper/cartons are the major waste generated in the campus, 26 (28.3%) responded that Food residues/Vegetable residues are the major waste generated in the campus, 31 (33.7%) responded that Polyethylene bag, Plastics, Bottle are the major waste generated in the campus, and 10 (10.9%) responded that Clinical/Construction are the major waste generated in the campus. This show that majority of the respondents responded that Polyethylene bag, Plastics, and Bottles are the major waste generated in the campus followed by Food residues/Vegetable residues and paper/cartons.

Question 5: How is waste management policy in campus?**Table 5**

Option	Frequency	Percent (%)
Excellent	30	32.6
Good	27	29.4
Fair	15	16.3
Poor	20	21.7
Total	92	100

Source: Field Survey 2018

Table 5 shows that 30 (32.6%) out of the 92 respondents responded that waste management policy in campus is excellent, 27 (29.4%) responded that waste management policy in campus is good, 15 (16.3%) responded that waste management policy in campus is fair, while 20 (21.7%) responded that waste management policy in campus is poor. This show that majority of the respondents responded that waste management policy in campus is excellent.

Question 6: Is waste disposal container available in the campus

Table 6

Option	Frequency	Percent (%)
Yes	57	62
No	35	38
Total	92	100

Source: Field Survey 2018

The table above show that out of the 92 respondents 57 (62%) responded that waste disposal container are available in the campus while 35 (38%) of the respondents responded that there is no waste disposal container available in the campus. This show that majority of the respondents responded that waste disposal container are available in the campus.

Question 7: Which method of solid management is adopted in the campus?

Table 7

Option	Frequency	Percent (%)
Open dumping	31	33.7
Burning	32	34.8
Composition	11	12
Land filling	13	14.10
Incineration	5	5.4
Total	92	100

Source: Field Survey 2018

Table 7 above shows that 31 (33.7%) of the respondents responded that open dumping, 32 (34.8%) of the respondents responded that burning is the method of solid management adopted in the campus, 11 (12%) of the respondents responded that composition is the method of solid management adopted in the campus, 13 (14.10%) of the respondents responded that land filling is the method of solid management adopted in the campus, and 5 (5.4%) of the respondents responded that incineration is the method of solid management adopted in the campus. This show that majority of the respondents responded that burning is the method of solid management adopted in the campus.

Question 8: Which method of waste transportation to final disposal site is adopted in the campus?

Table 8

Option	Frequency	Percent (%)
Hand carrying	27	29.3
Closed trucks	14	15.2
Open trucks	6	6.5
Wheelbarrow	38	41.4
Pick up	7	7.6
Total	92	100

Source: Field Survey 2018

The table above indicate that 27 (29.3%) out of 92 respondents responded that hand carrying is method of waste transportation to final disposal site adopted in the campus, 14 (15.2%) of the respondents responded that close trucks is the method of waste transportation to final disposal site adopted in the campus, 6 (6.5%) of the respondents responded that open trucks is the method of waste transportation to final disposal site adopted in the campus, 38 (41.4%) of the respondents responded that wheelbarrow is the method of waste transportation to final disposal site adopted in the campus, and 7 (7.6%) of the respondents responded that pick up is the method of waste transportation to final disposal site adopted in the campus. This show that majority of the respondents responded that wheelbarrow is the method of waste transportation to final disposal site adopted in the campus.

Question 9: Which method of waste collection is adopted in the campus?

Table 9

Option	Frequency	Percent (%)
Bags	24	26.1
Containers with cover	36	39.1
Containers without cover	32	34.8
Total	92	100

Source: Field Survey 2018

Table 9 above shows that, 24 (26.1%) of the respondents responded that bags method of waste collection is adopted in the campus, 36 (39.1%) of the respondents responded that containers with cover method of waste collection is adopted in the campus, and 32 (34.8%) of the respondents responded that containers without cover method of waste collection is adopted in the campus. This show that majority of the respondents responded that containers with cover method of waste collection is adopted in the campus.

Question 10: How often is solid waste collection in a week?

Table 10

Option	Frequency	Percent (%)
Once	30	32.6
Twice	31	33.7
More frequent	31	33.7
Total	92	100

Source: Field Survey 2018

The above table shows that out of the 92 respondents 30 (32.6%) responded that solid waste collection in a week is once, 31 (33.7%) responded that solid waste collection in a week is twice while 31 (33.7%) responded that solid waste collection in a week is more frequent. This shows that majority of the respondents responded that solid waste collection in a week is either twice or more frequent.

Question 11: How many people are involving in the collection?

Table 11

Option	Frequency	Percent (%)
1-10	37	40.2
10-20	42	45.7
20 and above	13	14.1
Total	92	100

Source: Field Survey 2018

Table 11 above shows that 37 (40.2%) of the respondents responded that 1 to 10 people are involving in the collection, 42 (45.7%) respondents responded that 10 to 20 people are involving in the collection, and 13 (14.1%) of the respondents responded that 20 people and above are involving in the collection. This show that majority of the respondents responded that 10 to 20 people are involving in the collection.

Question 12: Which method of final disposing of waste from immediate environment is adopted in the campus?

Table 12

Option	Frequency	Percent (%)
Burning	61	66.3
Burial	10	10.9
Taking to disposal point	21	22.8
Total	92	100

Source: Field Survey 2018

The table above indicate that 61 (66.3%) of the respondents responded that burning is the method of final disposing of waste from immediate environment adopted in the campus, 10 (10.9%) of the respondents responded that burial is the method of final disposing of waste from immediate environment adopted in the campus, 21 (22.8%) of the respondents responded that taking to disposal point is the method of final disposing of waste from immediate environment adopted in the campus. This show that majority of the respondents responded that burning is the method of final disposing of waste from immediate environment adopted in the campus.

Question 13: Ranking in the performance of cleaners in disposing solid waste in the campus

Table 13

Option	Frequency	Percent (%)
Excellent	17	18.5
Good	53	57.6
Fair	11	11.95
Poor	11	11.95
Total	92	100

Source: Field Survey 2018

Table 13 above shows that, 17 (18.5%) of the respondents responded that the performance of cleaners in disposing solid waste in the campus is excellent, 53 (57.6%) of the respondents responded that the performance of cleaners in disposing solid waste in the campus is good, 11 (11.95%) of the respondents responded that the performance of cleaners in disposing solid waste in the campus is either fair or poor. The majority of the respondents responded that the performance of cleaners in disposing solid waste in the campus is good.

Question 14: Which of the commonest method of solid and liquid waste disposal is adopted in the campus?

Table 14

Option	Frequency	Percent (%)
Open dumping	27	29.35
Water carriage	15	16.3
Water closet	14	15.22
Sewage	16	17.4
Bucket system	13	14.13
Pit	7	7.6
Total	92	100

Source: Field Survey 2018

Table 14 above shows that out of the 92 respondents, 27 (29.35%) responded that open dumping is the commonest method of solid and liquid waste disposal is adopted in the campus, 15 (16.3%) of the respondents responded that water carriage is the commonest method of solid and liquid waste disposal is adopted in the campus, 14 (15.22%) of the respondents responded that water closet is the commonest method of solid and liquid waste disposal is adopted in the campus, 16 (17.4%) of the respondents responded that sewage is the commonest method of solid and liquid waste disposal is adopted in the campus, 13 (14.13%) of the respondents responded that bucket system is the commonest method of solid and liquid waste disposal is adopted in the campus, and 7 (7.6%) of the respondents responded that pit is the commonest method of solid and liquid waste disposal is adopted in the campus. This show that majority of the respondents responded that open dumping is the commonest method of solid and liquid waste disposal is adopted in the campus.

Question 15: Which of the source of information on waste management is available in the campus?

Table 15

Option	Frequency	Percent (%)
Leaflets	29	31.52
Poster and banners	23	25
Waste disposal agencies	27	29.35
Seminar/Conference	13	14.13
Total	92	100

Source: Field Survey 2018

Table 15 above shows that 29 (31.52%) of the respondents responded that leaflets is the source of information on waste management is available in the campus, 23 (25%) of the respondents responded that poster and banners are the source of information on waste management is available in the campus, 27(29.35%) of the respondents responded that waste disposal agencies are the source of information on waste management is available in the campus, and 13 (14.13%) of the respondents responded that seminar/conference is source of information on waste management is available in the campus. This show that majority of the respondents responded that leaflets is the source of information on waste management is available in the campus.

Question 16: Do you think proper waste disposal is significant for our health?

Table 16

Option	Frequency	Percent (%)
Yes	69	75
No	23	25
Total	92	100

Source: Field Survey 2018

The table above shows that 69 (75%) of the respondents responded that proper waste disposal is significant to our health while 23 (25%) of the respondents responded that proper waste disposal is not significant to our health. This show that majority of the respondents responded that proper waste disposal is significant to our health.

Question 17: Is the practice of waste management of great importance?

Table 17

Option	Frequency	Percent (%)
Yes	69	75
No	23	25
Total	92	100

Source: Field Survey 2018

The table above show that 69 (75%) of the respondents responded that the practice of waste management is of great importance while 23 (25%) of the respondents responded that the practice of waste management is not of great importance. This show that majority of the respondents responded that the practice of waste management is of great importance.

Question 18: Is waste management promoting good health and healthy environment?

Table 18

Option	Frequency	Percent (%)
Yes	67	72.83
No	25	27.17
Total	92	100

Source: Field Survey 2018

The table above show that 67 (72.83%) of the respondents responded that waste management is promoting good health and healthy environment while 25 (27.17%) of the respondents responded that waste management is not promoting good health and healthy

environment. This show that majority of the respondents responded that waste management is promoting good health and healthy environment.

Question 19: How is student's level of awareness knowledge and attitude toward solid waste management in the campus?

Table 19

Option	Frequency	Percent (%)
Excellent	27	29.35
Good	41	44.57
Fair	12	13.04
Poor	12	13.04
Total	92	100

Source: Field Survey 2018

Table 19 above show that, 27 (29.35%) of the respondents responded that the student's level of awareness knowledge and attitude toward solid waste management in the campus is excellent, 41 (44.57%) of the respondents responded that the student's level of awareness knowledge and attitude toward solid waste management in the campus is good, 12 (13.04%) of the respondents responded that the student's level of awareness knowledge and attitude toward solid waste management in the campus is either fair or poor. The majority of the respondents responded that the student's level of awareness knowledge and attitude toward solid waste management in the campus is good.

Question 20: Is there presence of centralized dumping site in the campus?

Table 20

Option	Frequency	Percent (%)
Yes	62	67.2
No	30	32.6
Total	92	100

Source: Field Survey 2018

The table above shows that 62 (67.2%) of the respondents responded that there is presence of centralized dumping site in the campus while 30 (32.6%) of the respondents responded that there no presence of centralized dumping site in the campus. This show that majority of the respondents responded that there is presence of centralized dumping site in the campus

Question 21: The frequency of waste disposal in a week

Table 21

Option	Frequency	Percent (%)
Every day	10	10.9
Every alternate day	28	30.4
Once in a week	54	58.7
Total	92	100

Source: Field Survey 2018

Table 21 above shows that 10 (10.9%) of the respondents responded that the frequency of waste disposal in a week is ever day, 28 (30.4%) of the respondents responded that the frequency of waste disposal in a week is every alternate day, and 54 (58.7%) of the respondents responded that the frequency of waste disposal in a week is once in a week. This show that majority of the respondents responded that the frequency of waste disposal in a week is once in a week.

Question 22: Is there any need to improve the level of waste management awareness in the campus?

Table 22

Option	Frequency	Percent (%)
Yes	71	77.2
No	21	22.8
Total	92	100

Source: Field Survey 2018

The table above indicate that 71 (77.2%) of the respondents responded that there is need to improve the level of waste management awareness in the campus while 21 (22.8%) of the respondents responded that there is no need to improve the level of waste management awareness in the campus. This show that majority of the respondents responded that there is need to improve the level of waste management awareness in the campus.

CONCLUSION

The study was carried out in Yobe state University Damaturu, Yobe state and considered the waste management practices among the students. It looked at the level of awareness and knowledge, attitude towards waste management and the methods of waste disposal. The study found that large numbers of the students were aware of waste management and also knowledgeable about various methods of waste disposal. Majority of the students had a positive attitude towards proper waste management, even though there was evidence to the contrary

considering the discovery that the most prevalent methods of disposal were open dumping and burning. These are inappropriate as they pollute and constitute aesthetic blithe in the environment. Proper waste disposal management is essential to sustain healthy living conditions in any environment. Strict adherence to appropriate waste management practices in any campus will insulate the students from detrimental and hazardous environmental conditions and improve the living standard of the students.

RECOMMENDATION

Based on the findings of this research, the following recommendations were made:

- 1) Waste management policy in the campus; a proper waste management policy should be formulated and implemented. This policy should promote new healthy methods of waste disposal like recycling and incineration while phasing out the old and unhealthy methods like open dumping and burning which still predominates.
- 2) The management of Yobe state University should provide mediums either through seminars and incorporating health practices in the University that can improve the knowledge of waste management practiced among students in the campus.
- 3) The management of Yobe state University should also make adequate efforts to provide means of ferrying collected waste from the point of collection to the final dump site; this will help to reduce the common practices of open dumping by students.

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