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Assessment on the use of sorting method practice of solid waste management in public secondary schools in north eastern states of Nigeria

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Abstract
This study investigated used of sorting practice method of solid waste management practices in public secondary schools in North Eastern States of Nigeria. The overall objective of this study was to find out the used of sorting method of solid waste management practices in public secondary schools in North Eastern States of Nigeria. One research question, one Hypothesis were formulated. A descriptive survey research design method was used in this study. The population for the study comprised the entire public secondary schools in North Eastern States of Nigeria with a population of eighteen thousand, five hundred and ninety five (18,595). The sample size used for this study was three hundred and seventy seven (377) respondents. The researcher used simple random sampling technique to select three states in North Eastern States of Nigeria .Six public secondary schools were selected from the three (3) selected states North Eastern States of Nigeria. Data collection instrument was researcher developed questionnaire; duly validated by the expert of Health Education and a reliability index of 0.84.Out of three hundred and seventy seven questionnaires that were administered, three hundred and forty nine were duly completed and returned for analysis. Percentage/count was used to organize and described the demographic characteristics of the respondents; chi-square was used to test the Hypothesis at significant level of 0.05. The findings for this study revealed that, public secondary schools North Eastern States of Nigeria significantly practiced the used of dustbin method of solid waste management in their schools. The implication of this findings is that there are proper used of dustbin method of solid waste management practices in public secondary schools North Eastern States of Nigeria. Therefore, public schools environment is free from anything capable of causing harm which would hinder the promotion of health status of students living in the schools. It was recommended among other things that, North Eastern States of Nigeria and pubic secondary school administrators should collaborate with NGOs and Ministries of Health to double their effort on awareness on value of used of dustbin practice as reduces the dangers of hazards of solid waste like sharp objects dispose in to the dustbin before final disposal.

Keywords: waste, sorting, public schools, practices

Introduction

According to Wikipedia, solid waste sorting is the process by which solid waste is separated into different s elements. Solid waste sorting can occur manually at the schools, house hold and collected through curbside collection schemes, or automatically separated in materials recovery facilities or medical biological treatment system. In every aspect of life, several unwanted solid waste materials (newspapers, broken bottles, aluminum cans, flower trimmings, etc) are generated. These materials are discarded simply because they are considered solid waste to that effect. The total stream of waste generated within a schools communities are often categorized into municipal solid waste, industrial solid waste, constructional and demolition solid waste (Adeolu, Enesi,. & Adolu. (2014) [1].

In Africa, Municipals solid waste Management constitutes one the most crucial health and environmental problems of African cities (Achankeng, 2014). This is because, even though these cities are using 20-50% of their budget in solid waste management, only 20-80% of the waste is collected. The uncollected or illegally dumped wastes constitute a disaster for human health and environmental degradation (Achankeng, 2013). The amounts of solid waste generated also vary within countries, according to the income group from which it originates. The high and middle income groups in many countries have adopted westernized consumption patterns. The reaches the citizen the more waste generated, as the case of Nigeria, high incomes groups generate 0.7kg/capita/day, and low income groups generate 0.3kg/capita/day (Dabo, 2015). Waste management occupies a vital place in the economics of both developing and developed countries. Public secondary schools in North Eastern states of Nigeria has made solid waste sorting very crucial in the areas of public health and environment, especially in the schools and the communities, since these areas serve as the gateways to the country developments and progress (Babbaji, 2015).

Sorting and recycling solid waste have numerous advantages and is also environmentally friendly compared to the other methods of waste disposal. Sorting and separation of schools municipals solid waste is gaining importance in various

sectors. According to Henry *et al*, (2015), with the increasing cost of raw materials, recycling provides cheaper source of raw materials for manufacturing industries. Challenges to solid waste sorting North Eastern States of Nigeria by examine the methods of solid waste management, as well as the practices of sorting method of solid waste management formed this study.

Methodology

Descriptive research survey design was used for the study; the design is suitable to gather information for the study, for the purpose of describing study variables. The population for this study comprises all public secondary schools in North Eastern States of Nigeria Nigeria. with an estimated population of 18,595 in thirty six (36) schools of the seven (7) North Eastern States of Nigeria.

The sample was selected using Krejcie and Morgan in their table for "Determining Sample Size for Research Activities." the selected sample size for the purpose of this study was three Hundred and seventy seven (377). Since the population of this study was 18, 595.Simple random sampling method was used to select three (3) states out of the six (6) states in the study area. This means that two secondary schools were selected randomly from state, one from rural and another from urban locality. This was achieved through using slips of paper and the representative of the state were asked to pick the pieces of paper, those that pick 'yes' were part of the sampled schools and those that picked 'no' were not part of the schools conducting the research. To achieve the purpose of the study, a researcher developed questionnaire was used to find out the solid waste management practices in Public Secondary Schools in North Eastern States of Nigeria.

This questionnaire comprise two (2) sections namely: Section 'A' was designed to find out the demographic information of the respondents, and section' B' was also designed to determine solid waste management practices method. Similarly, a four points (4) modified Likert scale response mode was adopted to collect data for the study and the rating scores were as follows: Strongly agree = 4 points; Agree = 3points; Disagree= 2 points; strongly disagree=1poin**t** To ensure that the instrument measures what it is supposed to measure, face and content validity of the instrument was done by the experts in the field of health education, Department of Physical and Health Education, Bayero University Kano.

The necessary corrections, suggestions and comments by all these experts were taken care of before the administration of the instrument.The reliability of the developed questionnaire was tested using test re-test reliability method with the aid of Correlation coefficient statistics.A pilot study was conducted using 40 samples of both staff and students of Government College Secondary School, Birnin Kudu. North Western Part of Nigeria, other than the schools in focus. After two weeks of first administration, the same instrument was administered on the same participants again. Results obtained from the first and second tests were subjected to statistical analysis of correlation (r) using Pearson product Moment Correlation coefficient and a reliability (r)=0.84 was established. This shows that the developed questionnaire is 84% reliable to be used as data collection instrument to elicit information on the use of recycling method of Solid Waste Management Practice in Public Secondary Schools in North Eastern States of Nigeria.The researcher used frequency count and percentage to analyze the demographic data of the respondents while the inferential statistics of Chi-square was used to test the five (5) Hypotheses. The decision criteria were set at 0.05 alpha levels.

Results and Discussion

This contain presentation of results of analysis done on the data collected via questionnaire distributed to sampled respondents in Public Secondary Schools North Eastern States of Nigeria.

Table 1: Response Rate to the Study

School Name	Questionnaire Administered		Questionnaire Returned	
	Population	Percentage	Population	Percentage
	N	%	N	%
GSS Gamawa	86	22.8	76	21.5
GSS Toro	31	8.2	21	6
GSS Dukku	80	21.31	80	22.7
GSS Kwsmi	79	120.89	79	22.4
GGSS Potiskum	62	16.42	54	15.3
GSS Gashuwa	39	10.33	39	11.1
Total	377	100%	349	99%

It can be clearly observed from the statistics displayed in Table that, out of 377 questionnaires administered three hundred and seventy seven (377) 100% in six (6) public secondary schools in three (3) selected states of North Eastern States of Nigeria, Nigeria. Three hundred and fouty nine; (349: 92.57%) questionnaires were successfully completed and collected for further analysis

Ch-square Summary of Respondents on Sorting in Public Secondary Schools North Eastern States of Nigeria

Table 1

Sorting	Observed	Expected	df X^2 Value Sig.
Strongly Disagreed		34	87.3
Disagreed		56	87.3
Agreed	134	87.3	3 85.074 .000
Strongly Disagreed		125	87.3
Total			349

$\chi^2 cal$ = 85.074, df =3 (P < 0.05).χ^2tab = 7.82.

Table shows the chi-square (χ^2) value of 85.074 with degree of freedom (df) of 3. Then, the critical value of chi-square at 0.05 is 7.82. Sorting Method Practices Based on the decision rule stated for testing hypotheses is established that the chi-square value (85.074) is greater than the critical value (7.82); as such, the null hypothesis five that say Sorting of waste is not a significant Waste Management practice in the Public Secondary Schools North Eastern States of Nigeria is rejected. It is implied by this result that sorting is a significant waste management method practices in the secondary schools of North Eastern States of Nigeria.

Discussion

The finding of this study also indicated that, public secondary schools in North Eastern States of Nigeria significantly practiced sorting method of solid waste management in their schools. The findings are in line with the study conducted by Kofi and Richard (2012) on urban solid waste sorting in growing city of China. Finding revealed that, sorting practice is less economic and affordable to the community because it can be conducted manually and sort hazardous wastes even in house hold level or school community before final disposal. The finding is also consistent with the study carried out by Smyth and Sara (2014) on sorting practice of solid waste disposal in Bangladesh. It's corroborated with the study conducted by Amini (2012) on solid waste management practices among household in Gombe state, Nigeria, which indicated that, hazardous solid waste such as sharp objects like glass, needles; bottles are sorted before final disposal. The findings are in line with the research work of Tijani (2015) on schools environmental sanitation and solid waste management among students in selected local governments of Kano state, Nigeria. Where he reported that, schools practice sorting method of solid waste management which provides safe and healthier school environment that promotes well-being of the school population and accident prevention strategies.

Conclusion/Recommendation

Public secondary schools of North Eastern States of Nigeria practiced sorting method of solid waste management in their schools. North Eastern States of Nigeria Authorities precisely should provide the needed facilities for construction and maintenance of sorting practice in public secondary schools in their schools. The management of public secondary schools in of North Eastern States of Nigeria should sustain and promote the idea of used sorting method of solid waste management's in their schools. North Eastern States of Nigeria Government and its agencies should organize workshops and seminars where public secondary schools would be motivated to improve the knowledge on the value of using sorting as a method of solid waste management in their schools.

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