



Full Length Research Paper

Evaluation of students' knowledge in secondary school, character and application towards waste management in Ibadan, Oyo State, Nigeria

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ABSTRACT

Inappropriate solid waste management practices in schools in developing countries constitute one of the major factors leading to declining environmental health conditions. A proper waste management is needed to ensure the protection of the environment and human health. Few studies have captured waste management problems in Nigerian educational institutions, particularly the views of students. This study was designed to assess the knowledge, attitude and practices of Secondary school students towards waste management in Ibadan, Nigeria. Using a structured, self-administered questionnaire, eight (8) schools were randomly sampled from which fifty (50) students were selected from each school. A total of four hundred (400) students were surveyed however, only three hundred and fifty eight (358) of the returned questionnaires were found to be completely filled and were used for the analysis. Data collected were subjected to percentage; mean, standard deviation, correlation and chi-square statistical analyses. Findings revealed the level of knowledge, attitude and practice of waste management was relatively moderate in secondary schools in Ibadan, the percentage of those who used indiscriminate solid waste disposal methods like open dumping and open burning was higher. Educational status, age and gender, among others, were factors influencing solid waste management in secondary schools in Ibadan. Significant relationships were observed between students' sex, age and class and their level of awareness, knowledge and practices of waste management.

Keywords: Solid Waste Management, Knowledge, Attitudes, Practices, Secondary School Student

INTRODUCTION

One of the greatest problems facing developing countries is the unhealthy disposal of solid wastes which resulted from human activities for survival (Osinowo, 2001; Joseph, 2006). The poor state of waste management in the country is caused by inadequate facilities, poor funding, and poor implementation of policies as well as wrong lifestyle. Economic development, urbanisation, improved living standards in cities, and increase in enrolments of school children due to government policies in developing countries increase the quantity and complexity of generated solid waste in schools. If this waste is accumulated, it may lead to degradation of the urban environment, stresses on limited natural resources, and various health issues. Globally, most public schools

are facing a high level of pollution.

The situation in less-developing countries such as Nigeria is more acute, partly because of the lack of adequate solid waste disposal facilities and people's negative attitude towards the environment. There is strong evidence which suggests that individual or group awareness and attitudes towards waste generation and management is critical in the effort to respond to the waste management challenges (Kofoworola, 2007). The negative attitude of the society towards the environment also affected the educational institution whose problem has been aggravated by constant changes, not just in curriculum content but also school subjects. For example, health education as school subject as replaced hygiene

where students were once taught sanitation of the environment, which provide opportunity through which the act of waste management and sanitation can be learnt (Ogunyemi, 1994; Adara, 1997; Ifegbesan, 2010). The awareness, attitudes and behaviours of people in the community are crucial to the management of waste. Reasons for individual participation in management of waste are related to environmental motivation, social pressures, attitudes and economic incentives (Bartlett, 2005). Problems with waste management have arisen recently in developing countries where there is a little history of environmental awareness education (Ojeda et al., 2000) and where many members of the community are illiterate and unaware of the problem of solid waste accumulation (Li, 2003).

Environmental attitude of young people appears to be crucial as they ultimately play a direct role in providing knowledge-based solutions to in- coming environmental problems (Bradly et al., 1999; Eagles and Demare, 1999). School environmental programs, although addressed to students if properly channel can also influence the environmental knowledge, attitude and behaviour of adults (parents, teachers and local community members) through the process of intergenerational influence (Evans et al., 1996; Ballantyne, 1998; Gallagher et al., 2000). Every school generates waste arising from routine activities such as classwork, sweeping, serving of food, and bush cutting. The common types of solid wastes found in various schools in less-developed countries include paper, grass, nylon (pure water bags and biscuits), lollipops, ice cream, and sweet or candy wrappers), sugar cane, maize cobs, and groundnut shells. Other forms of wastes may also be found on school premises, and these may not have even been generated directly by pupils and teachers. Age, gender, educational status, and amount charged for waste collection services had been identified as factors influencing solid waste management in highly populated cities like Ibadan and Lagos (Ajani, 2007).

Unarguably, one of the main problems facing Ibadan City and which has become an intractable nuisance is open and indiscriminate dumping of refuse, human and animal faeces. Piles of decaying garbage which are substantially domestic in nature dominate strategic locations in the heart of the city. Wastes in such dump sites obviously are sources of air and water pollution, land contamination, health hazards and environmental degradation (Omoleka, 2004). Regrettably, this condition characterises environmental culture in Ibadan. It is important to note that endangered public health situation can exert excessive pressure on the health budget, curtails productivity and worsens urban condition of health. This ugly situation persisted for decades because of the high rate of illiteracy, ignorance, uncivil culture of indiscriminate waste littering and other factors. Keeping all this in view, the present study was designed to assess the knowledge, attitude and practices of Secondary

school students towards waste management in Ibadan, Nigeria.

METHODOLOGY

Study area and design

A cross-sectional study design was used to assess the knowledge, attitude and practice of waste management among secondary school students' in Ibadan, Oyo state.

Sampling method

Random sampling technique was used. Eight (8) schools were randomly sampled from which fifty (50) students were selected from each school. A total of four hundred (400) students were surveyed however, only three hundred and fifty eight (358) of the returned questionnaires (89.5%) were found to be completely filled and were used for the analysis.

Instrument used

A questionnaire was used to elicit information on the socio-demographics, knowledge, attitude and practices of the respondents on waste management. The instrument was pre-tested using 40 students which were from a similar but not the main study group. The Cronbach's alpha reliability test coefficient obtained was 0.84.

Data analysis

The statistical methods used in this study were descriptive statistics of frequency, percentage, mean and standard deviation. Inferential statistics of Chi-square, polynomial and Spearman's rank correlation was used to estimate relationship between the students' socio-demographic characteristics and their knowledge, attitude and practices on waste management. Likert scale was used to measure the strength of the students' knowledge, attitude and practices on waste management by assigning nominal values to items according to scales. Questions on knowledge were assigned a score of 1 – 4 for 'very often', 'often', 'sometimes' and 'not often' respectively. Questions on attitude were scored based on negative or positive wording of the items. For every positively worded item, a score of 0 – 3 was assigned. The scoring pattern was reversed for the negatively worded items. Questions on practices were assigned a score 0 – 2 for 'not sure', 'no' and 'yes' respectively.

In order to statistically determine the levels of knowledge, attitude and practice, the scores for each dimension was partitioned. The mean value added to one standard deviation represented the upper limit while the mean value minus one standard deviation represented the lower limit. The mean values above the upper limit

Table 1. Current waste disposal methods in schools

Methods	Frequency	%
Open burning	272	78.6
Composting	15	4.3
Recycling	15	4.3
Landfill site	14	4.1
Don't know	30	8.7

Table 2. Preferred method for waste disposal

Which of these methods disposal would you like to put into use in your school	Frequency	%
Landfill site	12	3.4
Open burning	64	18.2
Recycling	118	33.6
Open dumping	28	8.0
Incinerating	129	36.8

Table 3. Common environmental problems on school compound

	Not often	Sometime	Often	Very often	Mean	SD	Rank
Indiscriminate littering	103 (29.3)*	133 (37.9)	70 (19.9)	45 (12.8)	2.16	0.99	2
Unkempt grass and hedge	185 (53.0)	97 (27.8)	45 (12.9)	22 (6.3)	1.72	0.92	5
Burning of waste openly	113 (32.9)	95 (27.7)	96 (28.0)	39 (11.4)	2.18	1.02	1
Solid waste	157 (45.6)	107 (31.1)	64 (18.6)	16 (4.7)	1.82	0.89	4
Public urination	176 (51.3)	54 (15.7)	58 (16.9)	55 (16.0)	1.98	1.15	3
Worn-out posters	208 (60.6)	88 (25.7)	32 (9.3)	15 (4.4)	1.57	0.83	7
Damaged water pipes	203 (58.3)	60 (17.2)	67 (19.3)	18 (5.2)	1.71	0.95	6

*Values on parenthesis are the percentages.

were considered as high/most favourable/good, values below the lower limit were considered as low/less favourable/poor while values the lie between the upper and lower limits were considered as medium/favourable/moderate.

RESULT

Demographic characteristics of the respondents

The result analysed shows that respondents used for this study possess the following demographic characteristics; the total number of respondents is three hundred and fifty eight (n=358). The males are 55% and females are 45%. 22.7% are junior secondary students (JSS) while 77.3% are senior secondary students (SSS). Their age ranges are 14.9% for age 10-12yrs, 56.5% for 13-15yrs and 28.6% for 16-19yrs. 70.6% of the respondents are Christians, 29.1% are Muslims while 0.3% is other types of religion. 84.8% are Yorubas, 11% Igbos and 4.2% are other tribes. On the types of waste generated in their

schools, the study revealed that a large percentage (92.1%) is organic consisting of paper, leaves, wood and other biodegradables while the others are inorganic. Paper and paper products represent a huge number component of solid waste due to academic and research activities.

The waste management indicators

The data in Table 1 shows that open burning (78.6%) is the commonest method in use for disposing wastes in Secondary Schools in Ibadan, Oyo State. A few (4.1%) claimed to use landfill site, while 4.3% each identified composting and recycling respectively. It should be noted that what is referred to as landfill site in most schools is an open dump site, composting and recycling are not being practised as claimed by the students.

When asked if they carry out any environmental sanitation work in their schools, majority, i.e (92.1%) of the students said yes responses. Although, 6.2% said – No while 1.7% gave – Don't know responses. On the opportunity to reuse or recycle their waste within the

Table 4. Level of students' attitudes to waste management

	Not sure	Not worried	Worried	Very worried	Mean	SD
To what extent do you worry about waste around your school premises	30 (8.5)*	79 (22.4)	127 (36.0)	117 (33.1)	2.94	0.95
How comfortable are you having waste around your school premises	Not sure	Not comfortable	Comfortable	Very comfortable		
	16 (4.5)	258 (72.9)	39 (11.0)	41 (11.6)	2.30	0.73
Are you satisfied with the way students disposes their wastes	Not sure	Not satisfied	Satisfied	Very satisfied		
	22 (6.2)	250 (70.8)	48 (13.6)	33 (9.3)	2.26	0.71
Are you satisfied with the way the waste are handled by your school management	Not sure	Not satisfied	Satisfied	Very satisfied		
	26 (7.3)	107 (30.1)	122 (34.4)	100 (28.2)	2.83	0.92

*Values on parenthesis are the percentages.

school environment, 63.4% of the students gave negative responses, 27.4% said – Yes while 9.2% gave – Don't know responses. Whether wastes can be converted to wealth, most of the respondents (66.1%) gave positive responses, 20.1% said – No while 13.8% gave – Don't know responses. It is amazing to note that majority of the respondents preferred incinerating (36.8%) and recycling (33.6%) as viable methods of waste disposal, although the respondents are aware of these alternative environmental friendly methods but they are not being practised in their schools (Table 2).

Of the seven identified problems, burning of waste openly and indiscriminate littering are the prevailing environmental problems found on school compounds across the study areas and by extension, the State. Others are public urination, disposal of solid waste while burst water pipes and worn out posters were the least. When their responses were pooled and scored, it was discovered that (19.4%) of the respondents could be classified as possessing low knowledge while (63.4%) respondents were having average level of knowledge regarding waste management.

Using the percentage to analyse the students' responses itemised in table 4, only 22.4% of the students were not worried about the waste around their school premises, 36.0% and 33.1% gave worried and very worried responses respectively. At least, 72.9% of students were not comfortable, 11.0% are comfortable and 11.6% were very comfortable having waste around their school premises. Whether being satisfied with the

way students dispose their waste, 70.8% were not satisfied, 13.6% were satisfied and 9.3 were very satisfied. On the issue of satisfaction with way the waste were being handled by their school management, 30.1% were not satisfied, 34.4% were satisfied and 28.2% were very satisfied. When their responses were being scored, it was discovered that (52.4%) of the students had moderate attitude towards waste management and only (19.7%) were found to have less favourable attitude.

Table 5 revealed that the respondents' practices about waste management in their respective schools are positive except in item 5 and 9. Responses to item 2 and 4 show that 70.6% of the respondents used to participate in waste management activities in their schools, while act on re-use or recycle of waste rather than throw it away did not show much differences. Respondent responses to item 6 and 7 reveal that 65.2% attended a youth environmental scout club in their schools while 65.6% did participate in a weekly sanitation programme in their school premises. Item 10 and 11, show that 53.6% of the respondents act to discourage burning of refuse in the school premises and majority of them (78.1%) cleared a refuse site around their school compound. This is the true picture of what goes on in the Nigerian schools. It is the students that do the weeding of grasses on playground (a day in a week is designated labour period) as well as clear and burn refuse on/around their schools. When their responses were scored, those who had good practices were assumed to be managing the waste in proper manner and be able to protect the members of the school

Table 5. Showed the waste management practices in their schools.

		Yes	No	Not sure	Mean	SD
1	Change your ways in order to reduce the amount of waste generated in school	250 (75.1) *	46 (13.8)	37 (11.1)	1.97	0.50
2	Participate in waste management activities in your school	250 (70.6)	84 (23.7)	20 (5.6)	1.82	0.51
3	Support the development of environmental policy for your school	272 (77.9)	49 (14.0)	28 (8.0)	1.94	0.47
4	Decide to re-use or recycle the waste rather than throw it away	158 (44.9)	146 (41.5)	48 (13.6)	1.72	0.69
5	Attended any training, seminar workshop on waste management	141 (40.2)	166 (47.3)	44 (12.5)	1.65	0.69
6	Attend a youth environmental scout club in your school	229 (65.2)	103 (29.3)	19 (5.4)	1.76	0.54
7	Participate in a weekly sanitation programme	227 (65.6)	89 (25.7)	30 (8.7)	1.83	0.56
8	Contribute to an organisation that works to protect the environment	217 (62.9)	87 (25.2)	41 (11.9)	1.87	0.60
9	Reduced water consumption for environmental reasons	122 (35.4)	156 (45.2)	67 (19.4)	1.74	0.76
10	Discourage burning of refuse	184 (53.6)	124 (36.2)	35 (10.2)	1.74	0.63
11	Cleared a refuse site around your school premises.	268 (78.1)	40 (11.7)	35 (10.2)	1.99	0.47

*Values on parenthesis are the percentages.

community from the negative impact of the waste. It was found that only 18.3% of the respondents could be classified as having good practices, while more than half (67.9) of the respondents had moderate practices and the rest were found to have poor practices towards waste management.

Relationship between students' background variables and their knowledge, attitude and practices of waste management

Chi-square analysis was done to test the significant difference in student knowledge, awareness and practices of waste management by their background variables. Analysis in Table 6 suggests that no significant differences between male and female in knowledge score but female students had significantly higher attitude and practice than the male. Female students could be said to have positive waste management attitude and practices than their male counterpart. This is plausible when one considers the fact that in most households and schools in developing countries girls do most of the cleaning and sweeping activities. There are significant differences observed in students' knowledge and practices according to class of study. However, there is no significant difference in their attitude. With respect to age, students differ significantly in knowledge and practices only.

In order to establish the demographic correlates of the waste management variables of students, some demographic characteristics of the students presumed to possibly have a measure of influence on the awareness, knowledge and practices of waste management, using Pearson correlation (r). In Table 7, there is a negative

relationship between sex and student's knowledge about waste management while a positive relationship exist between their age, class and knowledge. There is a positive relationship between age and knowledge, attitude and practice but negative relationship exist between class of study and attitude about waste management. The level of knowledge of student translated to their positive practice of waste management.

DISCUSSION

The findings of the study have made it clear that waste management is a serious environmental problem in schools, and students are aware of it. The results are supported by Chanda's (1999) report that people's environmental knowledge was highly specific to issue and geographic scale. This study confirmed Raudsepp's work in 2001, who found that women were significantly more likely than men to be concerned with environmental problems. Females have been consistently shown to have higher environmentally conscious attitudes than men. The common reason advanced for gender differences is the different socialization patterns between boys and girls (Raudsepp, 2001; Diamontopoulos, Schlegelmilch, Sinkovics, & Bohlen, 2003). More often than not, girls are made to carry out most of all the sweeping and cleaning activities; they are called upon more than their male counterparts to perform maintenance tasks at home or in schools.

Also, Duan and Fortner in 2005 found that students possessed high environmental awareness and

Table 6. Test of significant relationship between students' knowledge, attitude and practice of waste management

		Knowledge			X ²
Variables		Low	Average	High	
Sex	Male	18 (9.3%)	126 (64.9%)	50 (25.8%)	2.818
	Female	22(13.8%)	105 (66.0%)	32 (20.1%)	
Class	JSS	9 (11.5%)	61 (78.2%)	8 (10.3%)	8.796 *
	SSS	30 (11.3%)	167 (62.8%)	69 (25.9%)	
Age	10-12	12 (24.0%)	35 (70.0%)	3 (6.0%)	22.951 **
	13-15	18 (9.5%)	131 (68.9%)	41 (21.6%)	
	15-19	8 (8.3%)	54 (56.2%)	34 (35.4%)	
		Attitude			X ²
		Less favourable	Favourable	Most favourable	
Sex	Male	33 (17.0%)	117 (60.3%)	44 (22.7%)	10.781 **
	Female	39 (24.5%)	68 (42.8%)	52 (32.7%)	
Class	JSS	13 (16.7%)	42 (53.8%)	23 (29.5%)	0.647
	SSS	55 (20.7%)	139 (52.3%)	72 (27.1%)	
Age	10-12	13 (26.0%)	27 (54.0%)	10 (20.0%)	3.732
	13-15	35 (18.4%)	105 (55.3%)	50 (26.3%)	
	15-19	19 (19.8%)	46 (47.9%)	31 (32.3%)	
		Practice			X ²
		Poor Practice	Moderate Practice	Good Practice	
Sex	Male	16 (8.2%)	151 (77.8%)	27 (13.9%)	6.195 *
	Female	9 (5.7%)	112 (70.4%)	38 (23.9%)	
Class	JSS	11 (14.1%)	58 (74.4%)	9 (11.5%)	8.070 *
	SSS	15 (5.6%)	198 (74.4%)	53 (19.9%)	
Age	10-12	9 (18.0%)	33 (66.0%)	8 (16.0%)	14.244 **
	13-15	13 (6.8%)	145 (76.3%)	32 (16.8%)	
	15-19	2 (2.1%)	71 (74.0%)	23 (24.0%)	

* significant at the 0.05

Table 7. Correlate between students' background variables and knowledge, attitude and practice of waste management

	Sex	Age	Class	Knowledge	Attitude	Practice
Sex	1					
Age	-0.102	1				
Class	-0.022	0.472	1			
Knowledge	-0.088	0.237	0.117	1		
Attitude	0.018	0.079	-0.039	0.176	1	
Practice	0.127	0.155	0.143	0.122	0.033	1

** Correlation is significant at the 0.01 level (2-tailed). * Correlation is significant at the 0.05 level (2 tailed).

knowledge of local environmental issues than global environmental issues. The positive attitude and practice of female towards waste management confirmed the findings of Pacey (1990) that formal education for women in particular is a prerequisite for change in sanitation behaviour. The findings indicate that most respondents understand waste management as a major environmental problem in their schools. Findings also indicated that the propensity for waste management practices to differ by sex, class and age of students. Significant relationships were observed between students' sex, age and class and their level of attitude, knowledge and practices of waste management.

The findings from this study have great implications for waste management practices in schools and the need to increase students' knowledge, attitude and practice of waste management issues. The study also revealed the need for behavioural and attitudinal change which is essential effective participation in waste reduction, reuse and recycling. These findings found enormous support with previous studies (Jones and Dunlap, 1992; Scott and Willet, 1994; McKenzie-Mohr et al., 1995; Bradley et al., 1999; Fransson and Garling, 1999; Eero et al., 2001), who has documented some relationship between some socio-demographic variables such as sex, age, and education and environmental behaviour/practices. The

problem of solid waste management and people's attitude and perceptions in the society can be linked to the levels of formal education. Improved teaching and learning of issues on sanitation in all levels of education could help improve the general sanitation in the schools and communities by extension.

This supports the suggestion of Agbola (1993) that perceptions and attitudes are learned response sets and can therefore be modified or changed through education. Hence, seminars, talk show and continuous public education on sanitation could be organised by the government or school management for students, teachers and administrators to sensitise and educate them to waste problems and their consequences on the students. When stakeholders are made aware of their environment unfriendly practices/ behaviour and provided with strategies to address them, they are better able to promote environment friendly practices. It is expected that waste management activities in schools involve the students as part of their learning process. The particular skills and knowledge gained from environmental education would help in changing human behaviour towards the environment. Students with some knowledge and skills on environmental education are more motivated to take part in environmental protection activities and plans, thus would generate new ideas for the solution of environmental problems. Sharing new information from their activities with families, other adults, and community probably will have some positive implications on solid waste management practices.

Students' awareness about environmental problems and solutions can be increased through education as suggested by Maddox *et al.*, (2011). The introduction or integration of waste management concepts and themes through environmental education and school curriculum at all levels will not only improve students' understanding of waste management but more likely to change their seemingly unfriendly waste management attitude and practices. We must note that the Nigerian curricula need adjustments to allow for the inclusion of standard environmental education and training at both formal and informal levels. In so doing, the residents would prospectively thwart the on-going environmental damage which is a threat to human survival and sustenance both now and in the future due to the lack of proper management of solid waste.

Environmental education in the school sector should provide opportunities for students and teachers to engage in actions and behaviour that impact positively towards achieving a more sustainable school environment. Another aspect that is important to pay special attention to because of its practical consequences on environmental education is teacher training and sensitivity about environmental matters. For example, where the environmental education nowadays is included in some way in most of the basic education curricula, but teachers are not qualified to teach it. The teacher's

interest in environmental issues seems to affect children's learning processes. Private waste collection organisation should be employed to cart away waste from the school company after the biodegradables ones might be composted and non-biodegradable ones recycled.

CONCLUSION

Though the level of knowledge, attitude and practice of waste management was relatively moderate in secondary schools in Ibadan, the percentage of those who used indiscriminate solid waste disposal methods like open dumping and open burning was higher. Educational status, age and gender, among others, were factors influencing solid waste management in secondary schools in Ibadan. The knowledge of the current status of waste disposal options and level of awareness of solid waste management will help the government and sectors involved to take action to establish sound environmental education and awareness on waste management. Nigeria has a long way to go in the area of environmental education and awareness for the citizens to put off the long-acquired habit of indiscriminate waste disposal. There is the need to enlighten the students and the populace by extension on the wealth inherent in their organic, plastic and paper wastes. Solid waste management policies and enforcement of sanitation laws in various Nigerian schools should be energized, and various environmental organizations and societies to do more until the dreamed clean environment in Nigeria becomes a reality.

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