

Exploring secondary school students' understanding and practices of waste management in Ogun State, Nigeria

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This study examined the level of awareness, knowledge and practices of secondary schools students with regard to waste management. Few studies have captured waste management problems in Nigerian educational institutions, particularly the views of students. Using a structured, self-administered questionnaire, 650 students were surveyed from six secondary schools in two of the four educational zones of Ogun State. Data collected were subjected to percentage, mean, standard deviation, t-test and chi-square statistical analyses. Findings revealed that secondary school students from the sampled zones were aware of waste problems on their school compounds, but possessed poor waste management practices. The study showed that propensity for waste management practices differ by sex, class and age of students. Significant relationships were observed between students' sex, age and class and their level of awareness, knowledge and practices of waste management.

Keywords: waste management, knowledge, understanding, practices, students

Introduction

One of the greatest challenges facing developing countries is the unhealthy disposal of solid waste which resulted from human activities of development and survival (Onibokun, 1999; Osinowo, 2001; Joseph, 2006; Longe & William, 2006; Kofoworola, 2007). It is a problem recognized by all nations at the 1992 Conference on Environment and Development, and regarded as a major barrier in the path towards sustainability (UNCED, 1992). 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 challenge. Thus, it comes as no surprise, that there existed an abundant literature on waste management attitudes and behaviour and on the limited use of recycling (Grodzinska-Jurczak, Agata, & Agata, 2003; Rahardyan, Matstuto, Kakuta, & Tanaka, 2004; Ehrampoush & Maghadam, 2005; Kofoworola, 2007; Ssenyondo, Naluwata, Namaganda & Namugenyi, 2008).

In Nigeria, available literature on waste management are not only few but also concentrated on identifying the composition and quantifying waste generated in urban cities (Agunwamba, 1998; Agunwamba, Ukpai & Onyebuanyi, 1998; Ogu 2000). 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 (consumption pattern). The negative attitude of the public towards the environment does not exclude the educational institution whose

problem has been aggravated by constant changes not just in curriculum content but also school subjects. For instance, school subjects such as hygiene where students were once taught sanitation of the environment has been replaced with health education, providing little or no opportunities through which students can be taught or learn the act of waste management and sanitation. Environmental education was integrated into the Nigerian school curriculum a cargo of toxic waste was dumped Koko, a Nigerian village in Delta State in 1988 by an Italian firm. The belated introduction of the programme was aimed at raising the awareness level of the people about environmental quality, is also moribund with on clear direction (Ogunyemi, 1994; Adara, 1997).

Theoretical Framework

The concept of attitude and associated relationship with human behaviour has been a topic of interest among researchers for years. Attitude toward a concept can be defined as an individual or group of individuals, general feeling of favourableness or unfavourableness for that concept (Ajzen & Fishbein, 1980). Many studies of knowledge and attitudes have found a positive and often significant relationship between the two variables. In a study of the effectiveness of a visitor education strategy in raising levels of knowledge and attitudes toward nature conservation, Olson, Bowman and Roth (1984) found a positive relationship between scores on the knowledge test and scores on the attitude test for all concepts measured. The programme was successful in raising both the levels of knowledge and improving attitudes toward environmental management. Similarly, Armstrong & Impara (1991) found that positive attitudes followed exposure to a K-7 environmental education publication on knowledge and attitudes about the environment. Many studies other have used the Theory of Reasoned Action (TRA) and its extension, the Theory Planned Behaviour (TPB), as a framework not only good for understanding, explaining and predicting behaviours, but also to provide a useful guide for designing intervention strategies to change or maintain behaviours. The theory is based on an assumption that individual behavioural intentions are directly related to their attitudes. The TRA views a person's intention to perform (or not perform) as the immediate determinant of the action. This behavioural intention, in turn, has two determinants. One is the attitude towards the behaviour—a person who believes that performing a given behaviour will lead to mostly positive outcomes will hold a favourable attitude toward performing the behaviour. The other is the subjective norm—a person believes that most referents with whom s/he is motivated to comply think s/he should perform the behaviour will perceive the social pressure to do so. The beliefs that underlie a person's attitude toward the behavior are termed behavioural beliefs, and those that underlie the subjective norm are termed normative beliefs (Ajzen & Fishbein, 1980).

The Theory of Planned Behaviour (TPB) states that what an individual does is determined by personal motivation which is determined by attitude, social support and perceived behavioural control. These factors are grounded by the persons' perception of social, personal, and situational consequences of the specified action (Ajzen, 1985; Maddan, Ellen & Ajzen, 1992; Ajzen & Driver, 1992). TPB allows for a better evaluation of human behavior when participation decisions are voluntary and under an individual control. The Theory of Planned Behaviour has been widely used in environmental behaviour research to predict a person's intent to participate in a specified behaviour (Gamba & Oskamp, 1994; Scott & Willets, 1994; Kuhlemier, Van den Berg, & Lagerweij, 1999; Grodzinska-Jurczak, Agata, & Agata, 2003). TPB has been used successfully empirically and conceptually by many researchers in environmental behaviour to explore attitudes that trace the correlation of beliefs to behaviour. Apart from the TRA/TPB

theories, the expectancy-value theory has also been identified in literature as capable of serving as framework for attitude-behaviour study of this nature (Van Der Pligt & De Vries, 1998).

Many studies in the last two decades on socio-demographic variables and environmental perception have helped in understanding people's views, and thinking about the environment. They have attempted to predict environmental awareness and attitudes of people based on their socio-demographic characteristics. For instance, Raudsepp (2001) reported that age, education and gender have shown strong and consistent relations with environmentalism. Other researchers (Mensah & Whitney, 1991; Gigliotti, 1992; Sheppard, 1995; Eagle & Demare, 1999; Tikka, Kuitunen, & Tyns, 2000) have attempted to ascertain the correlates of environmental knowledge and environmental quality awareness and concern. Some others have also explored the influence of education, income, age, and gender on public awareness and attitude toward environmental quality issues. Chanda (1999) reported that environmental concerns among residents of Gaborone vary according to education and income levels, while age and gender do not seem to have any significant influence on variation in concern.

Gender is a variable that has received consistent attention among researchers (Jones & Dunlap, 1992; Arcury & Christianson, 1993; Lyon & Breakwell, 1994; Petts, 1994). Raudsepp (2001) 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. However, in other studies such as Van Liere & Dunlap (1981) gender was not a significant predictor of environmental concerns and attitudes as other socio-demographic variables. Eagle & Demare's (1999) comparison of the mean attitude scores on the pretest with gender showed that girls scored significantly higher moral attitude scores than boys; there was no significant difference in the ecologic attitude scores of boys and girls. Kellert (1985) found no gender difference in these two attitudes for U.S. children in the 2nd grade. Eagles and Muffitt (1990), in a study of Canadian students in 6th, 7th, and 8th grade, found no attitude differences between the sexes.

There are studies that have examined public, households and students' knowledge and attitudes towards waste management (e.g. Barr, Gilg & Ford, 2001; Walling, Walston, Warren, Warshay & Wilhelm, 2004; Meyers, Glen & Anbarci, 2006; Sha'Ato, Aboho, Oketunde, Eneji, Unazi & Agwa, 2007; Ssenyondo, *et al.* 2008). Basseyy, Benka-Coker and Aluyi (2006) used both qualitative and quantitative methods to examine the types of and waste disposal techniques employed in the management of solid medical wastes in five selected hospitals in the Federal Capital Territory, Abuja and reported that an average of 2.78 kg of solid waste were generated per bed/daily. In addition, 26.5% of the total waste was found to be hazardous in nature. No separation of waste was practised by any of the hospitals surveyed. Similarly, 18.3% of the hospitals incinerated waste was traced to a locally built brick incinerator; 9.1% buried; 36.3% burnt waste in open pits while 36.3% disposed waste in municipal dumpsites. Sha'Ato, *et al.* (2007) also found that a substantial proportion of household waste consists of various organic materials (36-57%), while ash, dust and sand (combined) constitute between (21-41%). There was more paper from commercial and institutional premises (9-12%) than from household or small/medium scale industrial premises (2-4%). Glass (0.1-6.9%), metals (mostly cans and bottle taps, 0.7-3.4%) and textiles (0.3-6%) constitute minor proportion of the waste across the sampled areas. The study also reported that households daily generated 0.54 kg waste; 0.018 kg/m²/day by commercial outlets; while small and medium scale industries, generated 0.47 kg/m²/day.

Based on the theoretical framework and empirical evidence, the present study explored three hypotheses: (i) Students will possess high level of awareness and positive environmental practices towards waste management. (ii) There will be no significant difference in students' awareness, knowledge and practices according to their sex, age and class. (iii) There is no significant relationship between students' background variables (sex, age and class) and their awareness, knowledge and practices of waste management practices.

Methods of Study

Based on reviewed literature, a questionnaire was designed on students' knowledge and practices of waste management in schools. It was made up of three parts. The first part consisted of five items, 4-point Likert scale seeking information on "awareness of waste management", the knowledge component consisted of seven questions also on a 4-point Likert scale "Not often" "Sometime" "Often" and "Very often", while the practices consisted of thirteen items on a 3-point scale of "Yes" "No" and "Not sure". The instrument was validated with the assistance of three experts in research and environmental management/education in the Faculty of Education, Olabisi Onabanjo University, Nigeria and was pilot tested using 60 students from a secondary which was not part of those used in the main study. Coefficient of internal consistency of the instrument was calculated using the Kuder Richardson (Kr 21) formula. The reliability coefficient of the research instrument obtained was 0.82. A total of nine hundred students were surveyed from six secondary schools from two of the four educational zones of the State. One hundred and fifty (150) students each were randomly selected from each secondary school. However, only six hundred and fifty of the returned questionnaires (that is 72. 2 percent) were found to be properly completed and were used for the analysis.

Data Analysis

The statistical methods used in this research consisted of descriptive statistics of frequency count, percentage, mean and standard deviation. Other statistical methods employed included Chi-square, t-test and Pearson product moment correlation in order to determine the significant difference or relationship between some students background variables and their knowledge and practices of waste management. Responses to the questionnaire were pooled, edited and scored. Nominal values were assigned to the items according to scales. Questions on knowledge and awareness had an assigned score of 1-4 for "Not sure", "Not Worried" "Worried" "Very Worried". The items on common environmental problems were scored as follows: 4 – "Very Often", 3 – "Often", 2 – "Sometime" and 1 – "Not Often". The practice statements were scored based on negative or positive wording of the items. For every positively worded questionnaire, the respondents progressed from 3 through 2 and 1. The scoring pattern was reversed for the negatively worded items. In order to statistically determine the level of knowledge, binary partitions for knowledge (low/high) and behaviour index (negative/positive) were used. To determine the partitioning value of items, the maximum of each of the nominal values was divided by N. Thus, the upper limit of knowledge/awareness was put at 2.50, while for practices was put at 1.50. For purposes of data interpretation, mean values of 2.50 and above were deemed to indicate high knowledge/awareness and below 2.50 were regarded as implying low. Mean values of 1.50 and above were considered for positive practice. A standard deviation greater than 1.00 was taken to indicate high variability among respondents.

Results

The sample (n= 650) consisted of 267 (41%) male and 383 (59%) female students. There were 303 (46.6%) from Junior Secondary (JSS) and 347 (53.4%) from Senior Secondary Schools (SSS) across the State. They had an average age of 15.5 years. A four-point scale was used as a self measure of students’ awareness. The data in Table 1 shows that all the mean scores for the items that measure awareness were above the midpoint (2.50) set. The findings reveal that secondary school students in Ogun State are aware of waste problems on their school compounds.

Table 1. Mean and standard deviation of students’ level of awareness

	Not Sure	Not Worried	Worried	Very Worried	Mean	SD
To what extent do you worry about waste around your school premises?	5 (0.8)	170 (26.2)	187 (28.8)	288 (44.3)	3.17	0.84
How interested would you say you are in wastes around your school premise?	Not Sure	Interested	Interested	Interested		
How important do you regard the way students do away with wastes?	37 (5.7)	235 (36.2)	141 (21.7)	237 (3.5)	2.89	0.97
Are you satisfied with the way students’ dispose of their waste?	Not Sure	Important	Important	Important		
How satisfied are you with the way the wastes are handled by your School management?	104 (16.0)	160 (24.6)	165 (25.4)	221 (34.0)	2.77	1.08
	Very Dissatisfied	Dissatisfied	Satisfied	Very Satisfied		
	-	363 (55.8)	216 (33.2)	71 (10.9)	2.55	0.68
	11 (1.7)	323 (49.7)	185 (28.5)	131 (20.2)	2.67	0.81

Using the percentages, the item-by-item analysis further reveals that only 26.2% of the students claimed not worried about the waste around their school premises, 44.3% and 28.8% gave very worried and worried responses respectively. More than 59.4% acknowledged their interest in waste management on their compound, while 36.2%. Students also reported that they placed great importance on the way colleagues dispose of waste, (34.0%) of the respondents stated “very important”, (33.2%) “important”, 24.6% “not important”, while 16.0% were not sure. More than half (55.8%) of the respondents expresses dissatisfaction in the way waste are disposed within schools’, 33.2% said they are satisfied, while only 10.9% expresses very satisfied with the way wastes are disposed within their schools. On how satisfied they are with the way

wastes are handled by their school management, 20.2% responded very satisfied, 28.5% satisfied and 49.7% and 1.7% dissatisfied and very dissatisfied respectively.

Table 2 shows that open burning (61.8%) is the most common method in use for disposing waste in secondary schools in Ogun State. A total of 23.4% claimed to use landfill site, while 6.9% each identified composting and incinerators respectively. This result indicates that recycling is not being practised as clearly evidence in Table 2. It should also be noted that what is referred to as landfill site in most schools is an open dump site.

Table 2. Percentages analysis of currently used waste disposal methods

Current waste disposal method	F	%
Open burning of waste	402	61.8
Landfill site	152	23.4
Composting waste	45	6.9
Incinerator	45	6.9
Recycling	3	0.5
Don't know	3	0.5

When asked if they had opportunity to reuse or recycle items in their schools, majority, i.e. (77.3%) of the respondents gave negative responses. Although, 15.8 said "Yes" while 6.8% gave "Don't Know" responses. It is not surprising therefore that only 27.7% preferred recycling when the question of preference for disposing of wastes in their school compound was asked (see Table 3). This is an indication that recycling is not a common method of waste management not just in schools but also in the students' households. Students are not aware and knowledgeable about this alternative environment friendly method.

Table 3. Preferred method for waste disposal

Which of these methods of waste disposal would you like to be put into use in your school	F	%
Burying wastes in landfill sites	119	18.3
Burning/incinerating wastes	277	42.6
Composting	41	6.3
Recycling	180	27.7
Open dumping	33	5.1

On the composition of waste generation on school compound, the study revealed unexpectedly that a large percentage (62%) is biodegradeables consisting of food remains, fruits, vegetables etc. with less paper waste. Table 4 reports the means, standard deviation and percentages of responses to the question on the type of waste problems commonly seen on school compounds. Of the seven identified problems, only two - i.e. indiscriminate littering (2.60) and burning of waste openly (2.76) have mean scores above the midpoint (2.50). This suggests that these are the common waste problems found on school compounds across the study areas and by

Table 4. Common environmental problems on school compound

	Not Often	Sometime	Often	Very Often	Mean	SD	Rank
Indiscriminate littering	117 (18.0)	224 (34.5)	114 (17.5)	195 (30.0)	2.60*	1.10	2nd
Solid waste	269 (41.4)	134 (20.6)	121 (18.6)	126 (19.4)	2.16	1.16	4th
Public urination	187 (28.8)	169 (26.0)	138 (21.2)	156 (24.0)	2.44	1.42	3rd
Burning of waste openly	140 (21.5)	128 (19.7)	127 (19.5)	255 (39.2)	2.76*	1.18	1st
Unkempt grass and hedge	286 (44.0)	149 (22.9)	115 (17.7)	100 (15.4)	2.04	1.11	5th
Pasting and fallen off posters	327 (50.3)	153 (23.5)	81 (12.5)	89 (13.7)	1.90	1.08	6th
Burst pipe of water	402 (61.8)	133 (20.5)	47 (7.2)	68 (10.5)	1.66	1.00	7th

extension, the State. In rank order, pasting and fallen off poster and burst water pipes were the least waste problems.

Table 5 displays the frequent, percentages, means and standard deviations of the fourteen (14) waste management practices put on three-point scale of “Yes” “No” and “Not sure”. Evidence from the analysis suggests that the secondary school students are highly involved in waste management practice with about 49.1% giving an affirmative answer. Also, the overall means score (2.79) is above the midpoint of 2.00 set.

Seven of the items had mean score of 2.00 or higher; indicating a relatively high degree of positive waste management practices among the students. The item-by-item analysis reveals that sixty-nine percent of the students are willing to change their ways in order to reduce waste generated in schools, while 21.7% would not be willing to. A little above average (54.2%) would be willing to participate in waste and waste management activities in their schools. It is however, interesting to observe that 84.3% of the students claimed that they would be willing to support the development of environmental policy for their schools. More than half (60.8%) had not attended any training, seminar or workshop on environmental education/management. Nearly half of the students (41.8%) stated that they always decide to reuse/recycle something rather than throw it away, while 35.4% did not reuse/ recycle. More students answered “No” (44.5%) to the item on whether they reduced their water consumption for environmental reasons than those who responded “Yes” (32.3%) and “Not sure” (23.2%). About one-third (32.9%) of the students responded that they attended meeting and signed letter/petition to protect the environment, while just over half of the students (51.4%) said “No”. Again, only (38.9%) of students said, “Yes” to the item on “contributed to an organisation that works to protect the environment” as against the 40.5% that said “No”. Almost equal proportion of the students (39.8%) and (39.1%) responded “Yes” and “No” respectively to the statement of reporting burst pipe to authority. Majority of the students (88.6%) claimed to be involved in clearing of refuse site around their schools. This is the true picture of what goes on in the Nigerian public 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. In the same vein, 60.5% responded in affirmative to the statement

Table 5. Mean responses to items on practices

Which, if any, of these things have you done in the last 6 months, out of concern for the environment?	No	Not Sure	Yes	Mean	SD
Change your ways in order to reduce the amount of waste generated in school?	141 (21.7)	57 (8.8)	452 (69.5)	2.48	0.83
Participate in waste and waste management activities in your school?	204 (31.4)	94 (14.5)	352 (54.2)	2.25	0.99
Support the development of Environmental policy for your school?	53 (8.2)	49 (7.5)	548 (84.3)	2.76	0.59
Attended any training, seminar, or workshop on environmental education/ management?	395 (60.8)	71 (10.9)	184 (28.3)	1.68	0.89
Household products that you think are better for the environment.	231 (35.5)	257 (39.5)	162 (24.9)	1.89	0.77
Decided to reuse or recycle something rather than throw it away?	230 (35.4)	148 (22.8)	272 (41.8)	2.06	0.88
Reduced water consumption for environmental reasons.	289 (44.5)	151 (23.2)	210 (32.3)	1.92	1.43
Attended a meeting or signed a letter/petition to protect environment.	334 (51.4)	102 (15.7)	214 (32.9)	1.82	0.90
Contributed to an organization that works to protect the environment.	263 (40.5)	134 (20.6)	253 (38.9)	1.98	0.89
Reported a burst pipe to authority.	259 (39.8)	137 (21.1)	254 (39.1)	1.99	0.89
Participated in a monthly sanitation programme.	207 (31.8)	50 (7.7)	393 (60.5)	2.29	0.92
Discouraged burning of refuse.	267 (41.1)	105 (16.2)	278 (42.8)	2.02	0.92
Cleared a refuse site around your school and home.	34 (5.2)	40 (6.2)	576 (88.6)	2.83	0.49
Total	2907 (34.4)	1395 (16.5)	4148 (49.1)	2.79	0.46

on “participated in monthly sanitation programme”. Despite the fact that the National monthly sanitation exercise has been cancelled, some local governments, communities and individuals or groups on streets have come to imbibe the idea and still voluntarily engage in the cleaning exercise monthly.

T-test was calculated to test the hypothesis of no significant difference in student knowledge, awareness and practices of waste management by their background variables. We found significant difference in the awareness and practices of respondents based on their sex and age of students. However, no significant differences were observed in their knowledge (see Table 6).

Analysis in Table 6 further suggests that male students had significantly higher awareness scores for each of the item than the female, while female students could be said to have positive waste management 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. No significant differences are observed in students' knowledge and awareness according to class of study. However, there is significant difference in their practices. With respect to age, students differ significantly in knowledge and practices. Students in the age group of 10-15 years have significantly higher knowledge of waste management than did students in age group 16-20 years. On practice, the reverse is the case; students in age group 16-20 years had higher scores for each of the items than did students in age group 10-15 years.

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 Pearson correlation (r) and Chi-square (χ^2) were calculated. The results obtained are summarized in Table 7 and 8.

Table 6. Test of significant difference in students' awareness, knowledge and practices waste management

Sex	Awareness				Knowledge				Practices			
	Mean	SD	t	sig.	Mean	SD	t	sig.	Mean	SD	t	sig.
Male	20.70	2.63	3.73	.000s	15.50	4.05	.327	.744ns	27.23	4.40	3.84	.000s
Female	19.81	3.16			15.60	4.17			28.50	3.92		
Class												
JSS	20.07	2.80	.848	.397ns	15.90	4.00	1.98	.048	27.11	4.44	5.01	.000s
SSS	20.27	3.13			15.26	4.23			28.72	3.74		
Age												
10-15yrs	20.22	3.01	.521	.602ns	16.22	4.03	5.03	.000s	27.57	4.35	2.91	.004s
16-20yrs	20.10	2.92			14.60	4.07			28.53	3.79		

* significant at the 0.05

Table 7. Test of significant relationship between students' awareness, knowledge and practices waste management

	Awareness			Knowledge			Practices		
	χ^2	df	sig.	χ^2	df	Sig.	χ^2	df	sig.
Sex	100.67	15	.000s	106.62	21	.000s	74.56	23	.000s
Age	76.71	15	.000s	60.67	21	.000s	92.31	23	.000s
Class	69.24	15	.000s	86.09	21	.000s	83.67	23	.000s

* significant at the 0.05

The chi-square analysis presented in Table 7, demonstrates that significant relationship exists between all the students background variables and awareness, knowledge and practice. What this suggests is that student's awareness, knowledge and practices are related to their

personal characteristics. Data in Table 8 reveals that a positive and significant association exist between waste management practices and some of the students' background variables such as sex ($r = .149, p < 0.05$), age ($r = .114, p < 0.05$) and class of students ($r = .194, p < 0.05$).

Table 8. Correlate between students' background variables and awareness, knowledge and practices waste management level (2-tailed). In addition, the results further shows a negative correlation between awareness and practice ($r = -.088, p < 0.05$). A negative correlation is found between age and knowledge ($r = -.194, p < 0.05$); class of students shows negative correlation with knowledge ($r = -.078, p < 0.05$). There is negative correlation between sex and awareness ($r = -.145$).

Table 8. Correlate between students' background variables and awareness, knowledge and practices waste management

	Sex	Age	Class	Awareness	Knowledge	Practices
Sex	1					
Age	.018	1				
Class	.122(**)	.487(**)	1			
Awareness	-.145(**)	-.020	.033	1		
Knowledge	.013	-.194(**)	-.078(*)	.064	1	
Practices	.149(**)	.114(**)	.193(**)	-.088(*)	-.065	1

** Correlation is significant at the 0.01 level (2-tailed). * Correlation is significant at the 0.05 level (2-tailed). In addition, the results further shows a negative correlation between awareness and practice ($r = -.088, p < 0.05$). A negative correlation is found between age and knowledge ($r = -.194, p < 0.05$); class of students shows negative correlation with knowledge ($r = -.078, p < 0.05$). There is negative correlation between sex and awareness ($r = -.145$).

Discussion and Conclusion

This study sought to establish a baseline of descriptive information on students' knowledge, attitudes and practices concerning waste management. The findings of the present study have made it abundantly clear that waste management is a serious environmental problem in Ogun State secondary schools, and students are aware of it. The results are supported by Chan's (1999) report that people's environmental knowledge was highly specific to issue and geographic scale. Students' waste management practices depicted a negative practice. Duan and Fortner (2005) found that students possessed high environmental awareness and knowledge of local environmental issues than global environmental issues. We have reported several significant findings. Differences were observed in students' knowledge and practices of waste management. The findings of the present study are inconsistent with previous research (Van Liere & Dunlap 1981; Kellert 1985; Eagles & Muffitt, 1990; Hausbeck, Milbrath & Enright, 1992; Lyon & Breakwell 1994; Palmer, 1995; Raudsepp, 2001; Ebranpoush & Moghadam, 2005). According to Van Liere and Dunlap (1981) study, gender is not a significant predictor of environmental concerns and attitudes as other socio-demographic variables. Kellert (1985) found no gender difference in these two attitudes for U.S. children in the 2nd grade. Eagles and Muffitt (1990), in

a study of Canadian students in 6th, 7th, and 8th grade, found no attitude differences between the sexes.

This study also found correlation between students' knowledge and practices of waste management. These results found enormous support with previous studies (Jones & Dunlap 1992; Scott & Willet, 1994; McKenzie-Mohr, Nemeroff, Beers, & Desamrais, 1995; Bradley, Waliczek, & Zajicek, 1999; Fransson & Garling, 1999; Raudsepp, 2001; Eero, Grendstad, & Wollebak, 2001), who has documented some relationship between some socio-demographic variables such as sex, age, and education and environmental behavior/practices.

The research initiative aimed to understand the knowledge and practice of waste management of secondary school students in Ogun State. The findings indicate that most respondents understand waste management as a major environmental problem in their schools. The findings also indicate that there are poor waste management practices by both students and school management. 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 awareness, knowledge and practices of waste management.

The findings from this study have great implications for waste management practices in secondary schools in the State and the need to increase students' awareness of waste management issues and practices. The study has revealed the need for behavioural and attitudinal change which is essential effective participation in waste reduction, reuse and recycling. Therefore it is recommended that efforts should be made by government and school management to organize seminars and workshops for students, teachers and administrators to sensitise and consciencitise 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.

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 behavior and practices. Environmental education is an important element in raising awareness and understanding of sustainability and environmental issues within schools and in changing behaviours for a more sustainable future. 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. Private waste collection organisation should be employed to cart away waste from the school company. Institutional and policy framework should be put in place.

The limitation of this research is that the results cannot be generalized for private secondary schools in State. However, it provides insights on what a current group of secondary school students know and feel about waste management and practices, which is valuable for curriculum development for primary, secondary and teacher education programme. In the future, an extended study could be conducted to cover more schools and include privately owned secondary schools in State.

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Ogun eyaletinde (Nijerya) ortaöğretim öğrencilerinin atık yönetimine ilişkin anlama ve uygulamalarını keşfetme

Bu çalışmada ortaöğretim öğrencilerinin atık yönetimine ilişkin bilgi ve uygulamaları, farkındalık düzeyleri araştırılmıştır. Çok az çalışmada özellikle öğrencilere ile ilgili olarak Nijerya'daki eğitim kurumlarında atık yönetimi sorununa değinilmiştir. Yapılandırılmış, hususi uygulanabilir bir anket ile Ogun eyaletindeki dört eğitim bölgesinin ikisinde bulunan altı ortaöğretim düzeyindeki 650 öğrenci araştırmaya katılmıştır. Toplanan verilerden yüzde, standart sapma, t-testi ve chi-square istatistiksel analizleri yapılmıştır. Araştırma bulguları ortaöğretim öğrencilerinin okul yerleşkesinde atık sorunlarının farkında olduklarını fakat atık yönetimi uygulamaları konusunda yetersiz olduklarını göstermiştir. Çalışma atık yönetimi uygulamasının cinsiyet, sınıf düzeyi ve öğrencilerin yaşına bağlı olarak farklılaştığını göstermiştir. Öğrencilerin cinsiyeti, yaşı ve sınıf düzeyi ile onların farkındalık düzeyleri, bilgileri ve atık yönetimi uygulamaları arasında anlamlı ilişki tespit edilmiştir.

Anahtar kelimeler: Atık yönetimi, bilgi, anlama, uygulamalar, öğrenciler