

KNOWLEDGE, ATTITUDE AND PRACTICE OF WASTE MANAGEMENT AMONG SECONDARY SCHOOL STUDENTS IN UYO, AKWA IBOM STATE

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Author's contributions

This study was a collaborative effort of the author. The author reviewed and approved the final version of the manuscript for publication.

Article Information

DOI: <https://doi.org/10.60787/fpj.vol3no6.123>

EISSN 1596-0501E



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CITATION: Nwakile Chioma Goodness (2026). Knowledge, Attitude and Practice of Waste Management among Secondary School Students in Uyo, Akwa Ibom State. *Frontline Professionals Journal* 3(6), 139-147

ABSTRACT

The United Nations describes waste management as the process of handling, treating, controlling, and disposing of waste in ways that are socially, economically, and environmentally acceptable. Effective waste management is essential for environmental sustainability and public health. This study assessed the knowledge, attitude, and practices of waste management among secondary school students in Uyo, Akwa Ibom State. A cross-sectional quantitative study design was adopted for this study among 398 senior secondary school students (SS1–SS3) selected through a multistage sampling technique. Data were collected using structured questionnaires and analyzed using the Statistical Package for Social Sciences (SPSS). The mean age of the respondents was 15 years with a standard deviation of ± 1 year. Findings revealed that the majority of respondents (78.4%) demonstrated a high level of knowledge regarding waste management, while 75.2% reported having received prior enlightenment on solid waste management. The study also revealed a positive attitude toward waste management, with 79.3% expressing concern about the volume of waste within the school premises. However, the level of waste management practice was relatively low, as only 43.2% considered proper waste handling to be very important. Despite the high level of knowledge observed, the schools still practiced open dumping and burning of waste, with no evidence of collaboration with environmental agencies for waste collection and disposal. The study concludes that inadequate provision of proper waste management facilities in schools contributes significantly to environmental deterioration, particularly in developing countries such as Nigeria. It recommends the provision of waste management tools, regular student training, and sustained awareness campaigns to promote environmentally sustainable waste management practices among secondary school students.

Keywords: Waste management, knowledge, attitude, practice, urbanization, secondary school students

INTRODUCTION

Background of the Study

Waste management has become a major environmental and public health concern at national, regional, and global levels. The rapid pace of urbanization, industrial expansion, and continuous population growth has significantly increased both the quantity and complexity of solid waste generated worldwide. Additionally, hazardous waste generation continues to rise at an alarming rate (World Bank, 2020). This challenge is particularly severe in developing countries where inadequate infrastructure, weak regulatory enforcement, and low public awareness hinder effective waste management systems. According to global estimates, approximately 2.02 billion tonnes of municipal solid waste were generated worldwide in 2006, reflecting an annual growth rate of about 7% since 2003 (World Bank, 2020). Projections by the United Nations (2017) indicate that global waste generation will continue to increase substantially in the coming years. This growing trend poses serious threats to environmental sustainability, public health, natural resources, and socioeconomic development. In Nigeria, the effects of poor waste management have become increasingly evident. Akwa Ibom State, one of the major states in the Niger Delta region, faces significant waste management challenges. According to the Akwa Ibom State Environmental Protection and Waste Management Agency (2019) Akwa Ibom State continues to experience increasing waste generation due to rapid urbanization and population growth. The situation is particularly critical in rural and peri-urban communities where access to proper waste disposal systems remains limited. Consequently, residents often resort to open dumping and open burning of waste, practices that pose severe environmental and health hazards (Mbina, 2015). Improper waste disposal contributes to disease outbreaks, environmental pollution, and reduced quality of life. Public awareness of the relationship between waste management and health remains relatively low in many parts of Nigeria. This knowledge gap significantly influences waste disposal behavior and environmental practices. Improving awareness through educational interventions, school-based programs, and community engagement initiatives could promote healthier environmental practices and sustainable waste management behaviors.

Despite the importance of this issue, few studies in Nigeria have specifically examined students' knowledge, attitudes, and practices regarding solid waste management, particularly among secondary school students. Educational institutions play a vital role in shaping future behavioral patterns and promoting environmental responsibility among young people. Therefore, this study was conducted to assess the knowledge, attitude, and practices of waste management among students in three selected secondary schools in Uyo, Akwa Ibom State: Community Secondary School Four Towns, West Itam Secondary School, and Community Commercial Secondary School, Ikot Okubo. The findings are expected to provide useful insights for policymakers, educators, and environmental agencies in developing strategies that promote sustainable waste management practices among students.

METHODOLOGY

Study Design

This study adopted a cross-sectional mixed-method design to assess the knowledge, attitude, and practices of waste management among secondary school students in Uyo, Akwa Ibom State.

Study Area

The study was conducted in three public secondary schools in Uyo Local Government Area of Akwa Ibom State: West Itam Secondary School, Uyo: Located along Ikot Ekpene Road opposite NNPC, with an estimated student population of 1,500 and 24 teachers. The school was established in the early 1950s as a Catholic mission convent school and accommodates both male and female students from JSS1 to SS3.

Community Commercial Secondary School, Ikot Okubo, Uyo: Located along Abak Road near the Federal Secretariat, with approximately 200 students and 18 teachers. It is a mixed secondary school offering classes from JSS1 to SS3.

Community Secondary School, Four Towns, Uyo: Located opposite Apico House along Abak Road, with an estimated student population of 2,300 and 20 teachers. The school is mixed and runs classes from JSS1 to SS3.

All selected schools are public secondary schools within Uyo Local Government Area.

Inclusion Criteria

The study included: Public secondary schools, Schools with at least 100 students in senior secondary classes and Schools located within the Uyo Local Government Area

Exclusion Criteria

The study excluded: Private secondary schools and Public secondary schools with fewer than 100 students in senior secondary classes

Sampling Technique

A multistage sampling technique was used for school and class selection. The first stage was the selection of three secondary schools from the list of seven public secondary schools in Uyo using simple random sampling by balloting. The second phase was the selection of senior classes from the three schools. Thereafter, simple random sampling was employed to select respondents from each class. Balloting was conducted by placing folded papers labelled "Yes" and "No" in a basket. Students who selected "Yes" were recruited as study participants. This process was carried out daily for five consecutive days in each school until the required sample size was achieved.

Study Instrument

The instruments were divided into 5 sections. Section A deals with the socio-demographic information like: Age of respondents, Sex, and class. Sections B to G were composed of related objectives of the study. The questionnaire comprises items, both closed-ended and multiple-choice questions.

Sample size determination

The minimum sample size of patients required for the study was calculated using the Cochran formula for calculating the required sample size when the population is < 10, 000 by Taofeek (2009).

$$n = Z^2 \frac{pq(1-p)}{e^2}$$

$$nf = \frac{n}{1 + (\frac{n}{N})}$$

Where:

n = the desired sample size

Z = the Z score of 1.96 which corresponds to 95% confidence level

P = proportion of students with knowledge of waste management is at 63% (Adetosun, 2014)

q=1-p, q=1.0-0.54=0.46, e=degree of accuracy desired=0.05

The sample size was calculated using the single population proportion formula at a 95% confidence interval. The minimum calculated sample size was 363 with an addition of 10% non-response rate making it approximately 400 respondents.

Data Collection and Analysis

Data were collected using structured questionnaires administered to selected respondents. Data analysis was performed using the Statistical Package for Social Sciences (SPSS) version 21. Categorical variables were presented using frequencies and percentages, while results were displayed using tables and charts.

Ethical consideration

Ethical approval for this study was obtained from the Research Ethics Committee of the University of Port Harcourt. Permission was also obtained from the selected schools, and informed consent was obtained from all participants

Validity and Reliability of the Questionnaire

The questionnaire was reviewed by experts in public health and Environmental management for content validity. A pilot study was conducted, and the instrument demonstrated acceptable reliability (Cronbach's alpha = 0.78)

Research gap

This study offers an opportunity to find out the knowledge and attitude of secondary school students towards waste management in community areas which has been the focus of other research work, thereby filling the knowledge gap.

RESULTS

A total of 398 students completed and returned the questionnaire, giving a response rate of 99.5%. All analyses were based on 398 respondents. Of the respondents, 66.3% were female, while 33.7% were male. In terms of class distribution, 53.5% were in SS1, 12.8% were in SS2, and 33.7% were in SS3. The age distribution of the respondents was analysed using the mean and standard deviation. The mean age of the study population was 15 years, with a standard deviation of ± 1 year. The findings revealed that 78.4% of respondents correctly identified waste as any form of refuse. However, 10.8% described waste simply as "rubbish," while 9.2% regarded it as "useless." A small proportion (1.6%) indicated uncertainty regarding the meaning of waste, reflecting a minor knowledge gap that may require targeted educational interventions. Furthermore, 75.2% of respondents reported that they had previously received education on solid waste management, while 24.8% had not received such information. Among those who had received an education, schools were the major source of information (38.7%), followed by television (20.0%), radio (12.4%), social media (11.4%), religious centres (6.7%), homes (6.7%), markets (3.2%), and other sources (1.0%).

The findings also showed that 79.3% of respondents expressed concern about the volume of waste within the school premises, indicating a generally positive attitude toward environmental cleanliness. Conversely, 20.7% appeared less concerned, suggesting variations in environmental sensitivity among the students. Regarding waste handling practices, 66.9% of respondents believed that waste was adequately managed by students, while 33.1% felt that waste management practices within their schools were inadequate.

This indicates that although many students perceive waste disposal efforts as satisfactory, a significant proportion believes improvement is necessary. Additionally, 85.5% of respondents agreed that school management handled waste management effectively, while 14.5% disagreed. This reflects a generally positive perception of institutional efforts in maintaining environmental sanitation. In all, 43.2% of respondents considered proper waste handling to be very important. Observational findings further revealed that the selected schools predominantly practised open dumping and open burning of waste, with little or no evidence of formal collaboration with environmental waste management agencies for waste collection and disposal.

Demographic variables

Table 1: Sociodemographic variables -N = 398

Variables	Values	N	%	Mean	Range	Standard Deviation
Gender	Male	134	33.7%			
	Female	264	66.3%			
Age				14.86	12 - 19	1.40
Class	SS1	213	53.5%			
	SS2	51	12.8%			
	SS3	134	33.7%			

Table 2: What is the level of knowledge of students towards waste management?

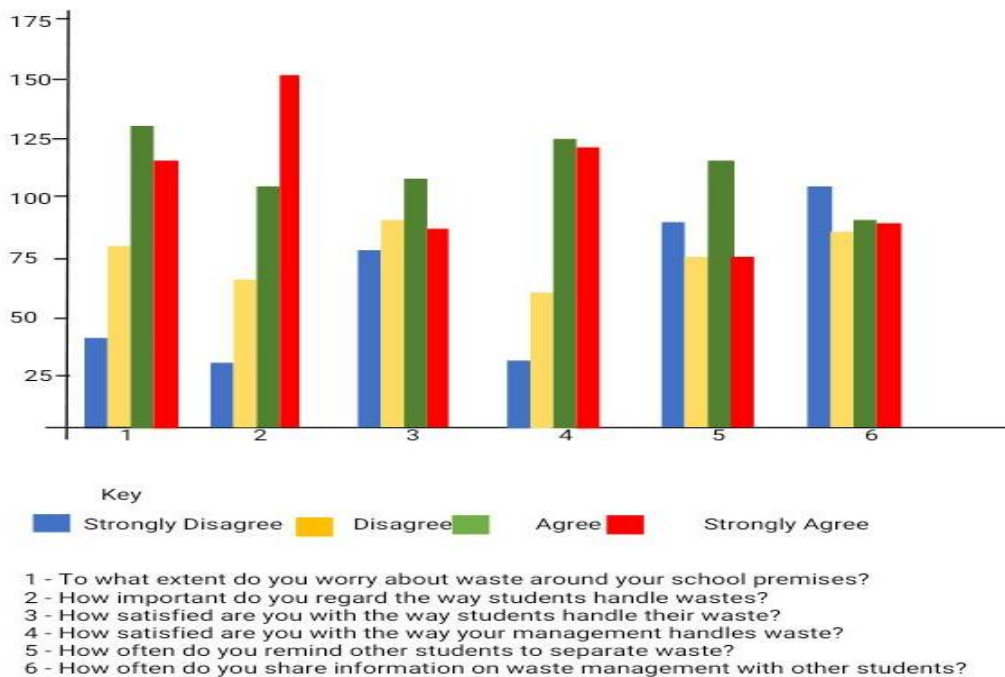
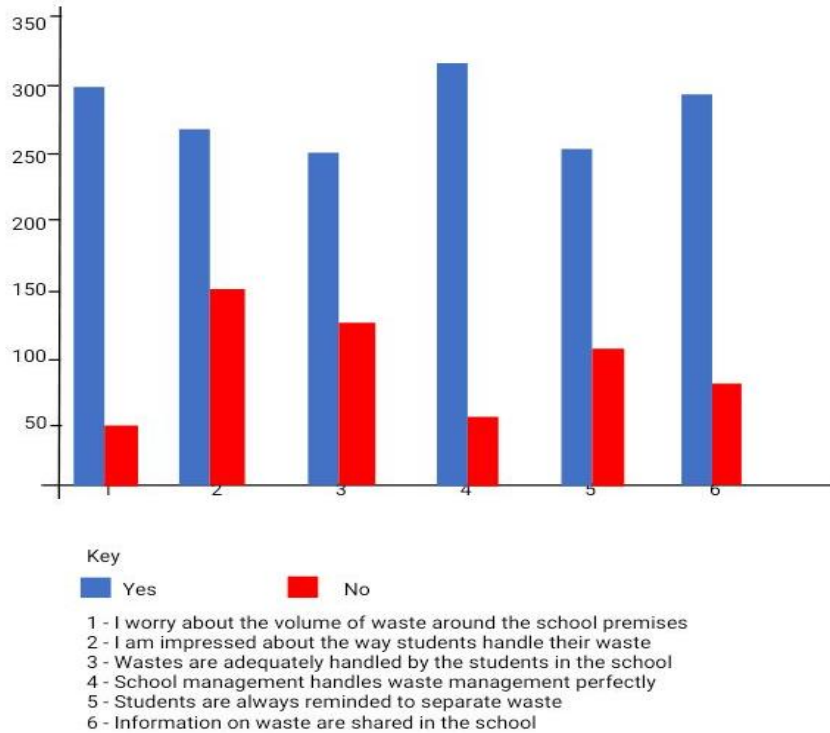
N=398

Variables	Values	N	%
Definition of waste	It is rubbish	43	10.8%
	It is useless	37	9.2%
	I am not sure	6	1.6%
	It is any refuse	312	78.4%
Have you received any education about solid waste management?	Yes	299	75.2%
	No	99	24.8%
If yes, indicate where you got the education from	Television	80	20.0%
	Radio	49	12.3%
	Religious centres	27	6.7%
	Social media	45	11.4%
	School	154	38.7%
	At home	27	6.7%
	Market	13	3.2%
others	3	1.0%	

Source Field work; 2025.



KEY	RESPONSE
1	It is rubbish
2	It is useless
3	I'm not sure
4	It is any refuse



DISCUSSIONS OF FINDINGS

This study aimed to investigate the knowledge, attitude, and practices of waste management among secondary school students in Uyo, Akwa Ibom State. Waste management has become an increasingly significant issue both globally and nationally, primarily due to the rise in urbanization and economic expansion. This, in turn, has led to an increase in the volume and diversity of solid and hazardous waste, creating immense challenges for waste management systems (World Bank, 2020). The findings of this study reveal that most of the students possess a

strong understanding of waste management. This conclusion is consistent with similar studies conducted in Ibadan, where students also demonstrated substantial knowledge of waste management (Adedotun, 2014). Furthermore, the findings are in alignment with a study conducted in Malaysia, where students exhibited commendable knowledge regarding waste management practices (Hassan, 2022).

However, this study's findings contrast with those of a study by Dung *et al.* (2017), conducted in the North Central zone of Nigeria among students at a College of Education. Dung *et al.*'s study found that most students had limited knowledge of waste management. These differences in findings may be attributed to varying levels of exposure to educational campaigns and waste management awareness across different regions. The current study indicates that students in Uyo, Akwa Ibom State, have had considerable access to waste management education, primarily through school-based programs and electronic media. In contrast, Dung *et al.*'s study did not emphasize the role of enlightenment in shaping students' knowledge of waste management. The increased awareness in Uyo suggests that well-structured educational interventions can significantly enhance students' understanding of waste management practices.

The positive relationship between education and knowledge of waste management observed in this study has important implications. Students' good knowledge of waste management practices, especially when combined with proper enlightenment, could greatly improve their ability to manage waste effectively if such knowledge is applied in practice. This highlights the critical role of consistent education and outreach programs in fostering proper waste management behaviours among secondary school students.

Regarding students' attitudes toward waste management, the study found that most students held a positive attitude toward waste management. This finding is consistent with the results of the study conducted in Malaysia (Hassan 2022), where students exhibited positive attitudes toward waste management practices. Similarly, a study by Barloa (2016) that assessed the effect of attitudes, knowledge, and practices on waste management in a polytechnic university found that students showed positive attitudes toward waste management. This positive attitude is a crucial factor in encouraging the adoption of proper waste management practices, as it is often a precursor to behavioural change.

However, the findings of this study differ from those of a study conducted by Eneji *et al.* (2016), which investigated the attitudes of residents of Calabar South, Nigeria, and found that the participants held negative attitudes toward waste management. It is worth noting that Eneji *et al.*'s study focused on workers, not students, which may explain the discrepancy. Workers, who are often engaged in busy, time-constrained environments, may have fewer opportunities to receive education on waste management compared to students, who benefit from structured educational programs and are more likely to engage with waste management topics during their school years. Therefore, the differences in attitude between students and workers could be attributed to the varying levels of exposure to waste management education. This finding implies that positive attitudes toward waste management, especially among students, can facilitate the practice of proper waste management. If students have a positive attitude, the likelihood of them engaging in good waste management practices increases significantly.

When examining the practices of students regarding waste management, the study found that the majority of students considered waste management, particularly the handling and separation of waste, to be important or very important. Most students also reported that they frequently remind their peers to separate waste, which suggests a high level of peer influence in reinforcing waste management practices. This finding is consistent with the results of a study by Dirk (2020), which found that students in higher education institutions exhibited moderate practices in handling solid waste. However, the findings of this study contrast with a study conducted in China by Siyuan Liu *et al.* (2019), which found that, despite holding positive attitudes, students had poor practices in waste management. This discrepancy may be due to cultural, educational, or institutional differences. The contrast between Uyo, Akwa Ibom, and China could indicate that positive attitudes do not always translate into effective practices unless there is a strong system in place to support and encourage these behaviours.

CONCLUSION

This study assessed the knowledge, attitudes, and practices of waste management among secondary school students in Uyo, Akwa Ibom State. The findings showed that students demonstrated a relatively high level of knowledge (78.4%) and generally positive attitudes (79.3%) toward waste management. However, practical waste management behaviors remained inadequate, with only 43.2% of respondents regarding proper waste handling as very important. Environmental challenges such as inadequate waste bins, poor waste disposal infrastructure, bushy surroundings, and weak collaboration between schools and environmental waste management agencies negatively influenced effective waste management practices. Although students possess the knowledge and awareness required for responsible environmental behaviour, external institutional and infrastructural limitations significantly hinder practical implementation. The study therefore concludes that improving waste management practices among secondary school students requires not only awareness creation but also the provision of adequate waste disposal facilities, institutional support systems, and active collaboration with environmental agencies. Comprehensive environmental education programs, regular sensitization campaigns, and strategic waste management interventions are essential for promoting sustainable environmental sanitation practices among students in Akwa Ibom State.

Recommendations

Based on the findings of this study, the following recommendations are made to improve waste management practices in secondary schools in Uyo, Akwa Ibom State, and similar regions:

1. **Provision of Waste Management Tools:** The government should equip schools with the necessary waste management tools, including waste bins for classrooms and strategic areas within school compounds. This will ensure that students have the infrastructure they need to practice waste segregation and disposal effectively.
2. **Training and Awareness Education Campaigns:** Continuous training and public awareness initiatives on sustainable waste management should be organised in both primary and secondary schools. These campaigns should aim to instil a sense of responsibility among students and encourage them to adopt best practices for waste management in their daily lives.
3. **Collaboration with Waste Management Agencies:** There is a need for collaboration between schools and government or private waste management agencies. This partnership will help ensure that waste generated in schools is properly evacuated and disposed of in a way that minimises environmental and health risks. Schools should also establish regular waste evacuation schedules to prevent waste from accumulating on school premises.
4. **Introduction of Waste Bins in Strategic Locations:** Schools should provide waste bins in every classroom and at key points within the school to encourage proper waste disposal. These bins should be clearly labelled for waste separation (e.g., recyclable, biodegradable, and non-recyclable) to facilitate waste management practices.
5. **Reintroduction of Monthly Environmental Exercises:** To reinforce the importance of waste management, schools should reintroduce monthly environmental sanitation exercises. These activities will serve as a practical opportunity for students to engage in proper waste management practices while fostering a sense of responsibility and environmental stewardship.

By implementing these recommendations, it is believed that waste management practices in secondary schools can be significantly improved, leading to a cleaner, healthier, and more sustainable school environment.

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