The Effect of Environmental Awareness Programs on Waste Disposal Practices in Secondary Schools.

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ABSTRACT

This study analyzes waste disposal practices after implementing the programs to increase awareness of the environment in secondary schools. This study was set to achieve these objectives: assess the awareness of both students and teachers about the environmental programs, determine the impact of the programs through the 3Rs (Reduce, Reuse, and Recycle) on students' waste disposal practices, and find the correlation between the environmental awareness programs and proper waste disposal. This study used a descriptive quantitative research design and the primary data was collected using structured questionnaires developed on Google Forms. The collected data was analyzed through descriptive statistics such as mean, standard deviation, and percentages. The respondents' mean scores revealed an improved self-perception on environmental programs. Therefore, it was concluded that both teachers and students have a significant participation in school programs leading to a greater awareness on the environment. Most significantly, the student's behavior in and out of school improved through the enhancement of the school awareness programs. This is also emphasized in the literature, which indicates the positive relationship between students' environmental education and students' responsible behavior toward the environment. This study finds that environmental awareness programs are successful in instilling proper waste disposal practices among secondary school children. It suggests that the school management, the teachers, the policymakers, the NGOs, and the children themselves have to work together to reinforce awareness campaigns, supply sufficient resources, and embed environmental education into the school curriculum. Further research could look into the sustainability of behavioral change and study other ways, like online campaigns, to advocate for sustainable practices in schools.

Keywords: Environmental awareness, waste disposal, recycling, secondary schools, sustainability.

INTRODUCTION

From the numerous barriers the world faces today, lack of proper waste management serves to be one of the most troubling issues in the current century. This is arguably attributed to the increase of urbanization, industrialization, and population growth, leading to the expansion of waste production globally (Bundhoo, 2018). The World Bank estimates that over two billion tons of waste is produced annually, with projections suggesting 3.4 billion tons of waste by the year 2050 if no economic and sustainable measures are put in place. The same global phenomena are present in schools, miniatures of macro society (Valavanidis, 2023). Schools today are major producers of paper, plastic and other forms of waste in addition to food. This reality signifies the urgent address and implementation of multiple waste management strategies, especially in schools. There are certain advocacy programs which 70 aim to promote sustainable waste management and its practices globally. These programs identify as promotion based education, directed especially towards the youth, the leaders of tomorrow (Nnonyelu & Niu, 2024). The United Nations, among other initiatives, Sustainable Development Goals (SDGs) provide education as a necessary component of the advocacy line, most notably

focusing on Goal 12 on Sustainable Consumption and Production. In the case of most developing regions of the world, including Nigeria, domestic waste management is still a major problem, especially, solid waste management at the municipal levels (Fallah Shayan 2022). Added to this problem is the abandonment of sanitary bins for feminine hygiene products at various disposal points. Nigeria generates around of 32 million tonnes of solid waste a year, including almost 2.5 million tonnes of plastic waste, which makes the waste production rate of Nigeria one of the highest in Africa (UNEP, 2021). Proper collection, storage, transportation, and disposal of waste are to a lesser extent exercised in Nigeria; in most cases, waste is dumped in open fields, onto streams, into stagnant waters, or directly onto the streets, which heightens the risk to the environment as well as to the health of the people. Schools in Nigeria are a microcosm of the society as a whole, facing the same problems of lackadaisical attitudes towards the management of solid waste. In school settings, the problem of waste management starts with littering and indiscriminate dumping of waste materials, which exacerbates the existing waste problem on the school grounds (Christian, 2025). The Ministry of Education at the Federal Level has worked on the inclusion of the environment in syllabus and collaborated with the Nigerian Conservation Foundation to promote conservation and a healthy ecosystem. The issue with the above is that these policies are easier to theorize than to implement, resulting in no policies being enacted or implemented on a nationwide scale (Bosah, 2013). In many Nigerian communities, secondary schools continue to confront challenges related to waste disposal and management. Insufficient infrastructure, absence of waste bins, irregular collection of waste, and a lack of programs on waste management combined with basic education on the environment often lead to the indiscriminate dumping of waste within the school premises. Such circumstances endanger the health of school-going children, block drains, and foster the spread of diseases and pests (Adebayo et al., 2024). More worrying is the absence of a positive, active environmental behavioral component to the students' environmental ethos. Although some schools have tried to implement initiatives like environmental clubs, sanitation days, and awareness programs, these initiatives tend to be poorly structured and lack longevity (Lotfi & Ibourk, 2023). More importantly, it is within such a context that the need to reinforce existing school-based programs on environmental education aimed at knowledge, attitudes, and practices on waste disposal becomes highly important. The focus of this study fits within the appreciation that schools have a central function in the development of students' environmental values and practices. The study aims to assess the impact of environmental awareness initiatives on the waste disposal practices of secondary schools to bridge the gap between awareness and action constructing the rationale for how it is in this context that schools can be supported with practical, and actionable, data concerning improving the environmental practices of the school for the better.

Problem Statement

One of the most common challenges faced in secondary schools is the indiscriminate disposal of waste, which compromises the sanitation of the schools, creates clogs in the drainage, and increases the prevalence of diseases. The saying "if you teach them, they will come" remains relevant for managing sanitation campaigns, littering, open dumping, and waste disposal practices. Perhaps, open dumping, indiscriminate littering, and other waste phenomena should set alarms about the utility of education and its potential to cultivate environmentally responsible citizens. While such hygiene and environmental education programs provide responsible and effective solid waste management plans, the reality is that these initiatives have not been consistently and critically evaluated for the specific purposes of managing waste (Nnatu & Obioma, 2018). Nigeria is further highlighted as an example of grappling the most with the divide of acquired information and performance which is the inability to reduce waste and pollution. It is for these reasons that the need for scientifically assessing the impact of environmental education and awareness programs in secondary schools on waste disposal practices becomes essential.

LITERATURE REVIEW

Concept of Environmental Awareness Programs

Environmental awareness programs are designed educationally and advocated to increase understanding about issues pertinent to the environment and desired behavioral changes toward sustenance. They are vehicles for

fostering the practices, attitudes, and knowledge crucial for the conservation and sustainable use of the environment and natural resources (Hnatuyk et al., 2024). Environmental awareness, as defined by UNESCO (2019), is the first step toward understanding an issue of concern and taking action; it is the 'building block' of environmental education. It helps people by providing them the education and enthusiasm to do something constructive about the environment. Such programs, in their most simplified form, try to equip people with relevant knowledge and understanding of the major problem areas of the environment such as climate change, pollution, deforestation, conservation of energy, and waste disposal (Thor & Karlsudd, 2020). The objectives go beyond knowledge and are aimed at attitudinal and behavioral change for the sustenance of the environment. The awareness programs in the formal education system such as schools are at an advantageous position, particularly where the targeted group is children at school, because. Children form values during these years and behaviors are easier to alter. Below are **environmental awareness programs in practice:**

1. **School-Based Campaigns**: For instance, a high school could implement a "Waste-Free Week" wherein students must bring lunches in reusable containers and partake in community clean-up activities. This serves to not only raise awareness of the issue at hand, but also actively practice proper disposal methods (Goezet et al., 2021).
2. **Eco-Clubs and Student Participation**: The formation of eco-clubs provide pupils with the opportunity to spearhead the organization of environmental programming including, but not limited to, tree planting, recycling advocacy campaigns, and waste art constructions. Pupils merge creativity with the acquisition of ecological and civic responsibility (Ray et al., 2025).
3. **Integration into Curriculum**: The instruction of the environment can accompany lessons in science, geography, or even civics. For example, teachers can implement practical activities such as the use of waste segregation bins within the classroom as a way to complement theory with practice (Allen-Taylor, 2022).
4. **Use of Media and Technology**: In-school straggles along with posters, documentaries and social media together may be helpful. The illustrated posters with the statements "Keep Your School Clean, Keep Your Future Green" serve both as encouragement and a reminder for proper disposal as a part of disposal education.
5. **Community Engagement**: Organizations offering parental involvement initiatives may also expand this involvement to include such temporary programs as community environmental rallies and exhibits, thereby extending the environmental impact of the school to the wider community (Iyengar & Shin, 2020).

Waste Disposal Practices in School Environments

Waste disposal policies and practices in school environments include the approaches, practices, and frameworks put in place in handling the solid waste produced in the school boundaries (Nnonyelu & Dongjie, 2024). Just like many other organizations, a school is a potential producer of solid waste in the form of papers, plastic, food leftovers, food cans, glass containers, and at times, other materials such as used laboratory chemicals, which can be classified as dangerous waste (Kofi et al., 2023). The importance of waste disposal systems in schools goes beyond the hygienic and safe learning atmosphere. It also extends to the impact systems have in reinforcing the cultural practices of students. It is noted that in most developed countries, the school waste management approach is usually centered around the 3Rs, which is, Reduce, Reuse, and Recycle (Wapwera et al., 2022). For instance, students shown bins to throw away different types of waste which is later used for recycling and or composting. Such practices instill waste management practices and develop the appreciation of environmental responsibility. These undertakings are often supported in school clubs and nature of programs, or supported with basic science to help in the purposeful daily practice of waste disposal (Debrah et al., 2021). A school in a developing country has to deal with the emerging issues without the systems. In addition, in a developing world country, the school has to deal with much lower levels of the waste management systems. This is shown in the lack of basic infrastructure, waste collection irregularities, and the practice of waste within the school boundaries without any form of discipline (Ferronato & Torretta, 2019). Playgrounds that tend to get ignored often end up haphazardly strewn with garbage and trash and tend to have

overfilled trashcans alongside clogged water drains, and those can lead to health issues like pestilence, illnesses, and odor. In such scenarios, how waste is disposed of is more of an offensive measure as there is little to no prevention that is organized. Tackling sanitation is treated as a unitary system, instead of a complex system that is organized is more system. In scientific contexts, the role of students and teachers is crucial. Teachers be role models, and their participation in fostering the behaviors of responsible disposal often determines the success of waste management (Sharma & Dr. Anamika, 2022). Students on the other hand, are as much and producers of waste and agents of change. Their participation in projects that involve waste sorting, recycling and clean up campaigns positively affects their personal and communal attitudes. For example in Nigeria, some schools have formed eco-clubs in collaboration with local NGOs to foster segregation and recycling. While others have spearheaded "Don't Litter, It Starts With You" campaigns (Aikowe & Mazancová, 2021). The aim of such tactics is to cultivate responsible littering and waste disposal. However, there are inadequate funds, poor monitoring, lack of commitment and other such factors lead to poor sustainability of the programs. In general, waste disposal activities within the school system demonstrate the general attitudes of the community to waste management (Kamanga et al., 2024). Improvement of waste disposal activities through purpose education, sufficient facilities, and the constructive involvement of the students is vital to fostering the disposal of better waste to reclaim and reprocess waste material and healthy school atmosphere (Kofi et al., 2023).

Figure 1: Diagram of waste management (Burelo et al, 2023).

METHODOLOGY

This research uses the descriptive survey method to assess the impact of environmental awareness programs on the waste disposal practices of secondary school students. This method suits the researcher's intentions to obtain first-hand data from the target group and assess their attitudes and practices toward waste disposal and practices. The research targets secondary school students and teachers. 200 participants comprising 150 students and 50 teachers was selected through stratified random sampling to guarantee inclusion of all gender, class and school type (public/private) categories. For the research, primary data was sourced through a structured questionnaire which will be sent via Google Forms to increase convenience, minimize paper waste,

and meet the goals of the study. The questionnaire will contain four sections revolving around the respondent's demographic data, knowledge and practice of waste management, and their participation in the environmental awareness program. The research participants will respond to both closed questions (Likert scale) and open questions to facilitate the collection of quantitative data. For the purpose of ensuring validity, the instrument was evaluated by experts in environmental education, while reliability was determined by way of a pilot study in one secondary school. The data gathered was subjected to descriptive statistical analysis (Mean(x), Standard deviation, Agreement (%)) to summarize the responses. Ethical safeguards such as informed consent, anonymity and voluntary participation will be maintained during the research.

RESULTS

Table 1: Demographic Characteristics of Respondents

Variable	Category	Frequency (n)	Percentage (%)
Gender	Male Female	90 110	45.0 55.0
Age Group	10–13 years 14–16 years 17–19 years 20 years and above	60 80 40 20	30.0 40.0 20.0 10.0
Respondent Type	Students Teachers	150 50	75.0 25.0
School Type	Public Private	120 80	60.0 40.0
Class Level	Junior Secondary Senior Secondary Teachers	70 80 50	35.0 40.0 25.0

As shown in Table 1, the respondents' demographic characteristics reveal that out of the 200 respondents, the proportion of females 55% and males 45% tends toward, but is not equal to, gender parity, suggesting some imbalance. Most respondents fall in the age group of 14 - 16 years (40%), followed by 10 - 13 years (30%), signifying that mid adolescents are more prominent in secondary school education. The respondents are predominantly students (75%), while the respondents classified as teachers make up 25% of the sample, which provides some balance. By school type, public schools (60%) are more represented than private schools (40%). The distribution of classes shows that senior secondary students (40%) have a slight majority over junior students (35%) in addition to the teachers who make up 25% of the sample.

Research Question 1

What is the level of students and teachers' awareness of environmental awareness programs in secondary schools?

Table 2: Level of Awareness of Environmental Awareness Programs among Students and Teachers.

S/N	Statement	Mean (x)	Standard Deviation (S.D)	Agreement (%)	Remark
1.	Does your school organizes environmental awareness programs?	3.85	0.92	77%	Agreed
2.	Have you participated in at least one school-based environmental campaign?	3.60	1.05	72%	Agreed

3.	Is Environmental awareness included in classroom teaching or school clubs in your school?	3.95	0.88	79%	Strongly Agreed
4.	I know the importance of Reduce, Reuse, and Recycle in waste management	4.10	0.81	82%	Strongly Agreed
5.	Does your school regularly sensitizes students and teachers on proper waste disposal?	3.55	1.12	71.0%	Agreed

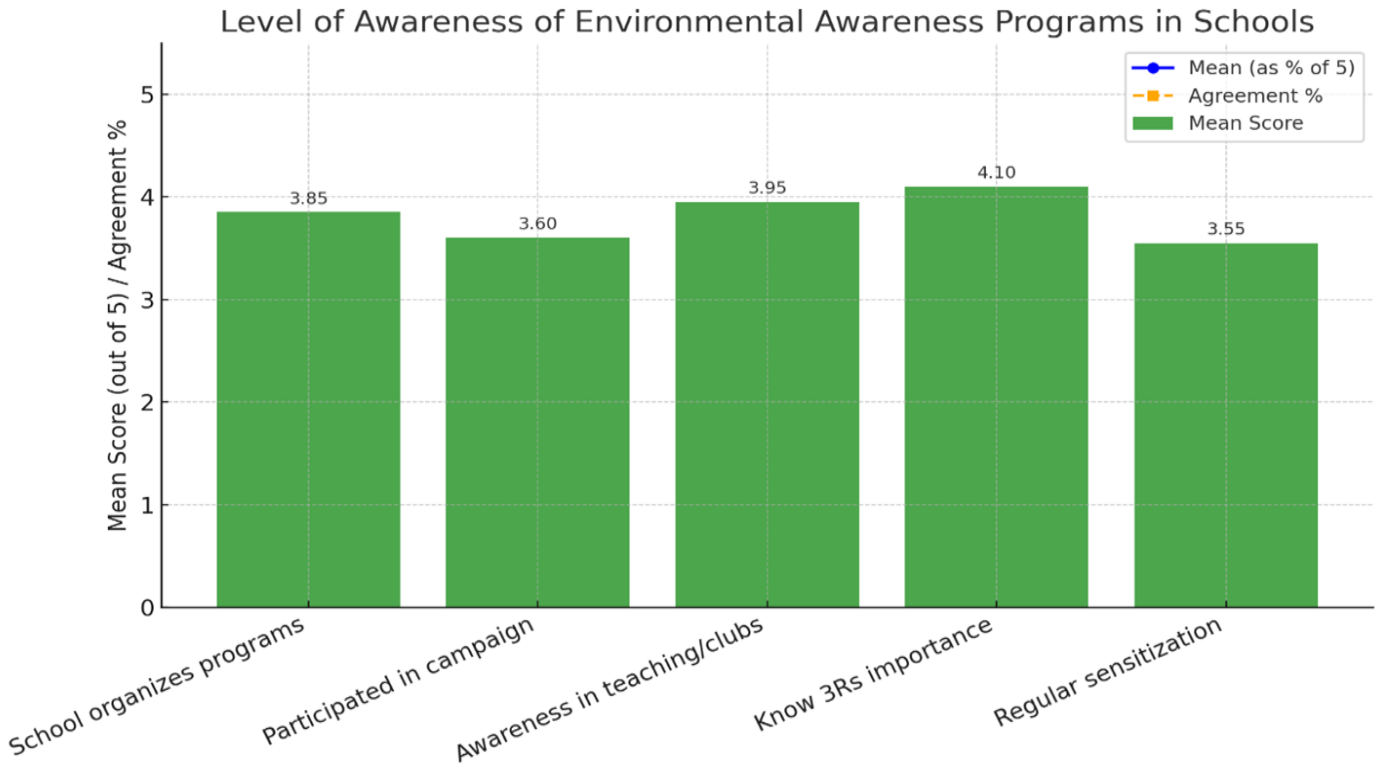

Figure 1: Level of Awareness of Environmental Awareness Programs in schools.

Figure 1 shows how students and teachers of secondary schools understand the environmental awareness programs. The average scores, which are between 3.55 and 4.10 on a 5-point scale, suggest that awareness is indeed quite high. Participants' understanding of the importance and the 3 Rs (Reduce, Reuse, Recycle) awareness programs was the highest, attaining a mean of 4.10 and 82% agreement. Participants' awareness of regular sensitization programs was the least (mean = 3.55; 71% agreement). The results, in this case, demonstrate that while there is awareness, the efforts of sensitization are lacking and need to be strengthened in order to reinforce sustainable practices.

Research question 2

How do environmental awareness programs influence students' waste disposal practices (reduce, reuse, recycle) in secondary schools?

Table 3: Influence of Environmental Awareness Programs on Students' Waste Disposal Practices.

S/N	Statement	Mean (x)	Standard Deviation (S.D)	Agreement (%)	Remark
1.	I consciously reduce waste after participating in awareness programs.	3.95	0.78	79%	Agreed
2.	I practice reusing materials (e.g., bottles, books, bags) due to programs.	3.70	0.82	74%	Agreed

3.	Awareness programs increased my commitment to recycling waste in school.	4.05	0.75	81%	Strongly Agreed.
4.	I influence my peers to adopt the 3Rs because of environmental campaigns.	3.85	0.80	77%	Agreed
5.	Environmental programs improved my responsibility towards waste disposal.	4.00	0.73	80%	Strongly Agreed

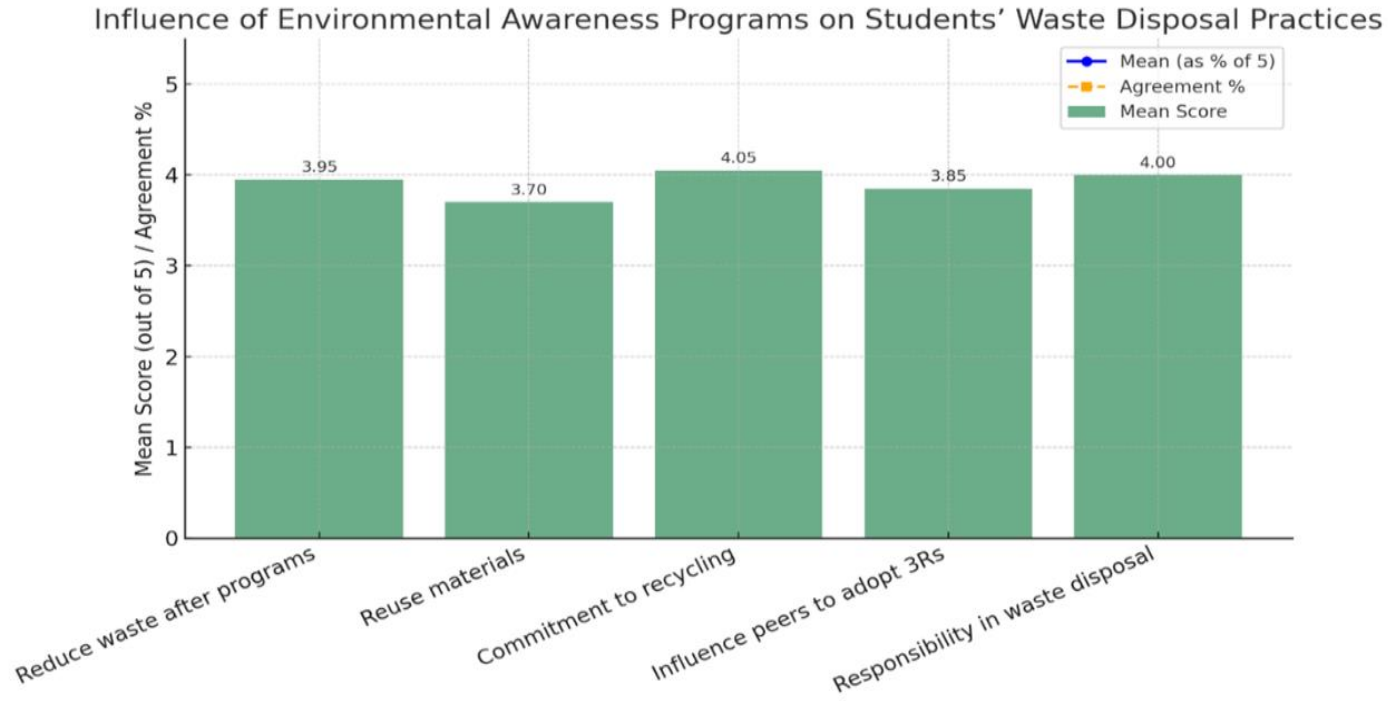

Figure 2: Influence of Environmental Awareness Programs on Students' Waste Disposal Practices.

Figure 2 reveals that students in secondary schools are influenced positively by programs designed to increase environmental awareness in relation to waste disposal practices. Students were most enthusiastic about recycling after such programs, which is why they recorded the highest mean score, 4.05, which translates to 81% agreement. Waste disposal responsibility also enjoyed a high position (mean = 4.00, 80% agreement), which suggests a positive shift in concern towards the environment. We can see the strongly held positions on the practices of reduction, which fwans waste disposal (3.95; 79%); and peers in the 3R movement (3.85; 77%). The practice of reusing materials registered more strongly than the mean score of the materials (3.3; 71%). Participants in the study were confident that sustainable waste management behavior spoon sored by educational programs is a critical factor in the long-term protection and care of the environment.

Research Question 3

Is there a significant relationship between exposure to environmental awareness programs and proper waste disposal practices among secondary school students?

Table 4: Relationship between Environmental Awareness Programs and Proper Waste Disposal Practices.

S/N	Statement	Mean (x)	Standard Deviation (S.D)	Agreement (%)	Remark
1.	Exposure to awareness programs improved my overall waste disposal habits.	4.05	0.72	81%	Strongly Agreed
2.	Students exposed to programs separate waste more effectively.	3.90	0.79	78%	Agreed

3.	Participation in programs reduces instances of littering in schools.	3.85	0.80	77%	Agreed
4.	Awareness programs motivate long-term commitment to proper waste disposal.	4.00	0.74	80%	Strongly Agreed
5.	Exposure to programs leads to greater peer influence in proper practices.	3.95	0.76	79%	Agreed

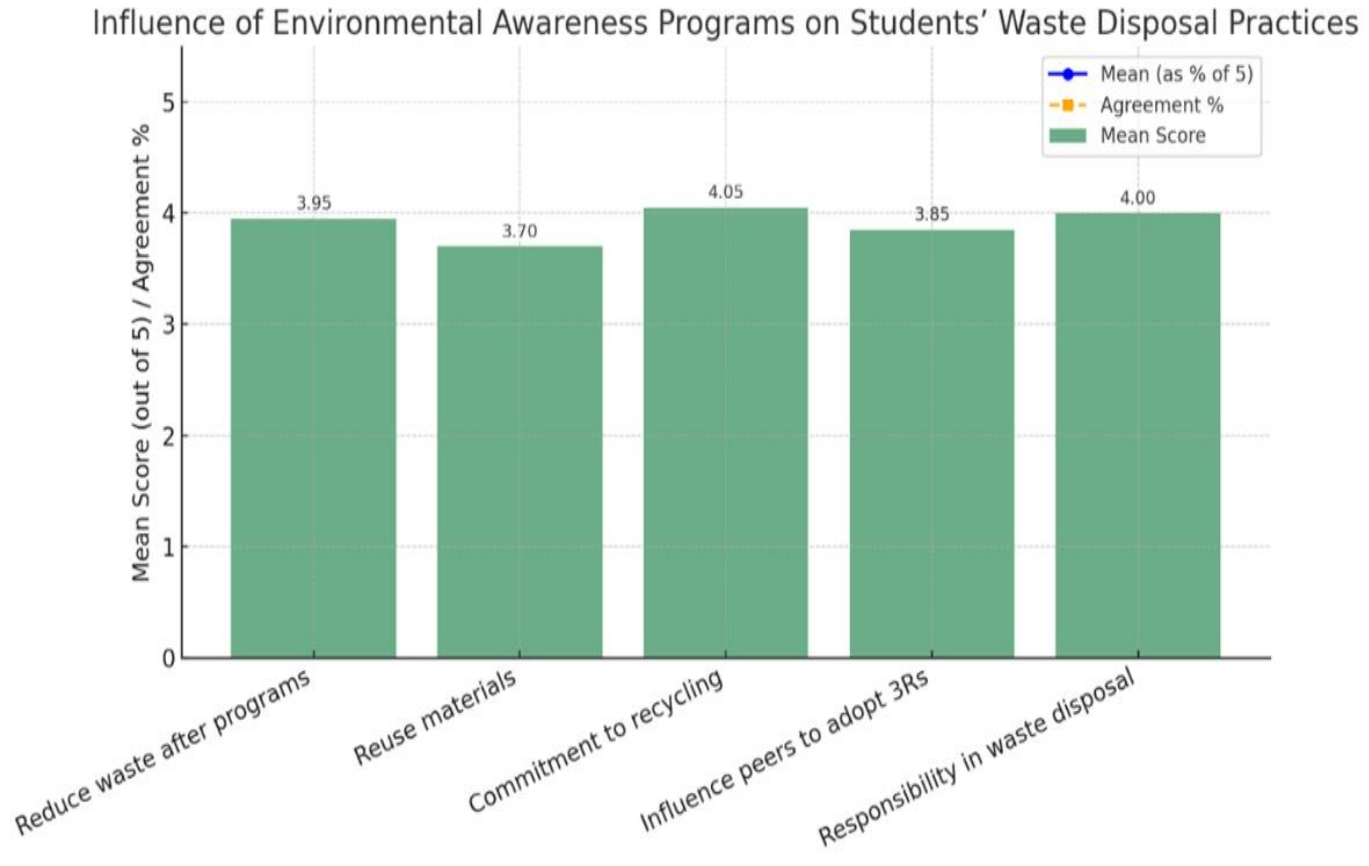

Figure 3: Relationship between Environmental Awareness Programs and Proper Waste Disposal Practices.

Figure 3 shows that the actual practice of proper waste disposal has improved due to participation in the environmental awareness programs offered to the students. This is evidenced by the mean score of 4.05 (81% of respondents fully supported the claim), and the students continued to score above the mean (4.00, 80% of respondents) for the level of compliance. The other waste separation techniques (3.90, 78% and 3.95, 79%) combined with proper practice outcomes also showed positive outcomes. Even the reduction of littering (3.85, 77%) while considered the lowest score in this domain, showed positive results. Collectively the results from the evaluation demonstrate that awareness programs are effective in changing attitudes and behaviors for waste management, and encourage students to become active participants in the shared responsibility of waste management in the school.

DISCUSSION

The outcomes of this study demonstrate that the students of the secondary schools have changed their waste disposal practices responsibly due to the environmental awareness programs. With regards to the research questions, the analysis showed that both students and teachers had a great deal of knowledge and awareness on the subject, with mean scores consistently greater than 3.5, indicating that they had very great engagement with environmental education. The study also indicates that awareness programs enhance the students' practices of waste reduction, and responsible reuse and recycling, thus fostering environmental stewardship. In addition, a sizeable gap was found on the effect of awareness programs on proper waste disposal, which

indicates that environmental education influences proper disposal of wastes. These outcomes support the works of other authors, like Azuike (2020) and UNESCO (2021) which stated that the aim of such environmental education is to encourage young people to adopt practices that are friendly to the environment. The same is true for the works that have already mentioned that schools are very important for the embedding of environmental values for life. The slight gap that was observed with the consistent sensitization programs is also like other literature, which identified problems with the sustainability of awareness programs. The impact of these results are important for schools as well as educational policy. Pairing classroom instruction with tangible behavior can make the practice of environmental instruction more efficient. Education planners need to take into account the need to provide compulsory organized awareness and supporting resources like disposal containers, recycling bins, eco clubs and other facilities to facilitate active student engagement. More broadly, the study emphasizes the urgent need to integrate environmental learning into the formal education system in order to cultivate active environmentally responsible citizenship at a young age and resolve the more far-reaching issues of waste disposal in the community.

CONCLUSION

This study investigated the impact of the environment awareness programs on the disposal of waste in secondary schools. The results show that teachers and students along with teachers have considerable awareness of environmental issues, thanks to the awareness programs, school clubs, and sensitization programs. The programs targeted students' waste reduction, reuse, and recycling capabilities, and reinforced a sense of responsibility and peer pressure. There was a positive correlation between participation in environmental programs and the proper waste disposal, which underscores the importance of environmental programs in fostering sustainable practices in schools. The goals set for the project were achieved as the study determined the effectiveness of the programs designed for deficiency management. These programs elevate the students' knowledge, thereby improving their disposal techniques as well as aiding in the minimizing of the improper waste handling done in the schools. The waste management practices should be aligned with the developed organizational policies. Adequate environmental programs with the organizational policies of the institutions. The usage of the classroom should also be aligned with the Integration of the practices of sustainability in the daily practices of the classroom. The institutions as well as the non-governmental agencies should assist the schools with the proper resource management through the provision of targeted training, provision of the recycling facilities, and constant sensitization strategies. The eco-clubs integrated should provide the students with the practices of the 3Rs framework. Subsequent studies should compare and contrast the public and private institutions, include studies, which span over a long period of time to capture sustained changes in behavior, and examine the addition of web-based resources to the campaigns. These studies aim to develop sufficient understanding and enhance the policies to be practiced regarding the proper disposal of waste created in institutions.