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Pre-Procurement Electronic Waste Management Practices in Public Offices: The Case of Hawassa City, Ethiopia

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Abstract

This study aims to assess the electronic waste (e-waste) management practices in governmental offices in Hawassa City, Ethiopia, with a particular focus on the pre-procurement stages. The study seeks to identify how these offices handle e-waste and the challenges they encounter in managing it effectively. A cross-sectional study design was used to gather and evaluate data on e-waste management practices in public offices. The study was conducted in governmental offices located in Hawassa City, Ethiopia. The data collection period spanned from June to July 2024. Data were gathered from 75 organizations using a structured questionnaire. Descriptive statistics were applied to analyze the gathered data, with statistical analysis conducted using SPSS version 26. The study revealed that governmental offices in Hawassa City generate substantial amounts of e-waste, particularly from computer-related devices, printers, power supplies, telecommunications equipment, displays, and cooling machines. However, few organizations have dedicated storage spaces for e-waste, and those that do often mix e-waste with general solid waste, lacking proper segregation. The absence of specialized employee training and limited budgetary provisions were identified as significant barriers to effective e-waste management. The study highlights the critical challenges facing e-waste management in public offices, including the lack of specific e-waste legislation, awareness, national guidelines, treatment mechanisms, and proper disposal sites. It recommends segregating e-waste at the point of generation and establishing training programs for e-waste collectors, handlers, and organizational staff. The formation of an e-waste management committee and the development of operational standards are also essential to improve segregation practices and raise awareness.

Keywords: Waste management, pre-procurement, environment, challenges, public offices

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INTRODUCTION

Electronic waste, or e-waste, refers to discarded electrical or electronic devices that are either non-functional or no longer needed. This includes a broad range of products, from household appliances to personal electronics and computers. Globally, e-waste is one of the fastest-growing waste streams, with the United Nations estimating between 20 and 50 million tons generated annually [1, 2]. This rapid increase is primarily due to improper waste management practices, leading to environmental and health issues [3]. E-waste often ends up being mishandled, causing valuable raw materials to be lost and hazardous materials to pose risks to human health [4].

In many countries, particularly developing ones, less than 20% of e-waste is recycled through formal processes. The rest is either managed informally or discarded improperly [5]. This inefficiency is compounded by the complex recycling technologies required to process e-waste [6]. Ethiopia, in particular, struggles with e-waste management due to challenges such as low-quality imports, illegal markets for expired products, and inadequate recycling facilities [7]. As a result, e-waste accumulates in various sectors, including governmental offices.

Governmental offices in Hawassa City, Ethiopia, have been observed to mismanage e-waste. This mismanagement contributes to the broader issue of e-waste accumulation and improper disposal [8]. Effective e-waste management is crucial to avoid health problems linked to hazardous materials, such as cancer and respiratory issues [9]. Despite this, there is a notable lack of research focusing specifically on e-waste management practices within governmental offices in Hawassa City [10].

This study aims to fill the gap by investigating the pre-procurement electronic waste management practices in governmental offices in Hawassa City. It seeks to identify the factors influencing these practices and address the environmental challenges associated with them [11]. By focusing on the specific context of public offices, the research will propose actionable solutions to enhance e-waste management, improve disposal and recycling practices, and contribute to better environmental outcomes in the region [12].

LITERATURE REVIEW OR MATERIALS AND METHODS

We will discuss the design, data sources, sampling, data analysis, and other related aspects in this paper.

METHODOLOGY OF THE STUDY

Study Design

The study employed a cross-sectional study design to investigate electronic waste management practices in public offices in Hawassa, Ethiopia. This design allowed for the collection and analysis of data at a single point in time, providing a snapshot of current practices and challenges related to electronic waste management. By focusing on a specific period, the study aimed to capture a comprehensive overview of how electronic waste is managed across various public offices, including the practices in place, the barriers encountered, and the effectiveness of current strategies. The cross-sectional approach facilitated the examination of relationships between different variables, such as the presence of segregation practices, training levels, and the availability of disposal facilities, enabling a thorough assessment of the environmental challenges associated with electronic waste management in the study area.

Data Source

For this study, primary data collection methods were employed to gather relevant information from the target population. Data were collected through structured questionnaires distributed to the sampled respondents. Identifying the target population was a crucial step in conducting the study. The target population consisted of government offices in Hawassa City, which provided a focused context for examining electronic waste management practices.

Sampling

To ensure comprehensive coverage of the subject matter, the study encompassed all government offices within the city. Specifically, there were 75 public offices included in the study. Rather than sampling a subset of these offices, the study adopted a census approach, meaning that data were collected from all 75 offices. This approach allowed for an exhaustive assessment of electronic waste management practices across the entire population of government offices in Hawassa City, ensuring that the findings accurately reflect the current practices and challenges faced by these offices in managing electronic waste.

Data Analysis

In this study, descriptive statistics were used to provide a clear and comprehensive summary of the findings. The analysis was conducted using SPSS version 26, a widely recognized software tool for statistical analysis. Descriptive statistics, including frequency and percentage, were utilized to summarize and interpret the data effectively. These statistical measures helped to quantify the occurrence and distribution of various responses related to electronic waste management practices. To present the results visually and facilitate a better understanding, the findings were illustrated using graphs. This approach ensured that the data were not only analyzed rigorously but also communicated clearly, enabling straightforward interpretation of the study's outcomes.

RESULTS AND INTERPRETATION

The survey indicates weak electronic waste management across organizations. Only 22.7% have a formal e-waste plan, 14.7% provide designated storage, and just 13.3% offer specialized training. Budget allocation is minimal, with only 8% dedicating resources to e-waste management. Although 46.7% have staff overseeing waste practices, the absence of comprehensive strategies, infrastructure, and training hampers effective and sustainable e-waste management (Figure 1).

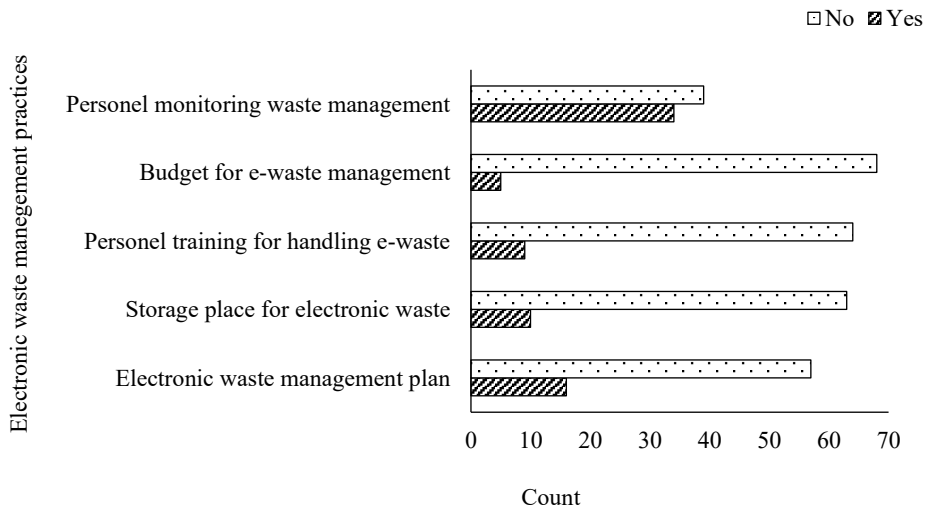

Figure 1. Electronic waste temporary storage practice.

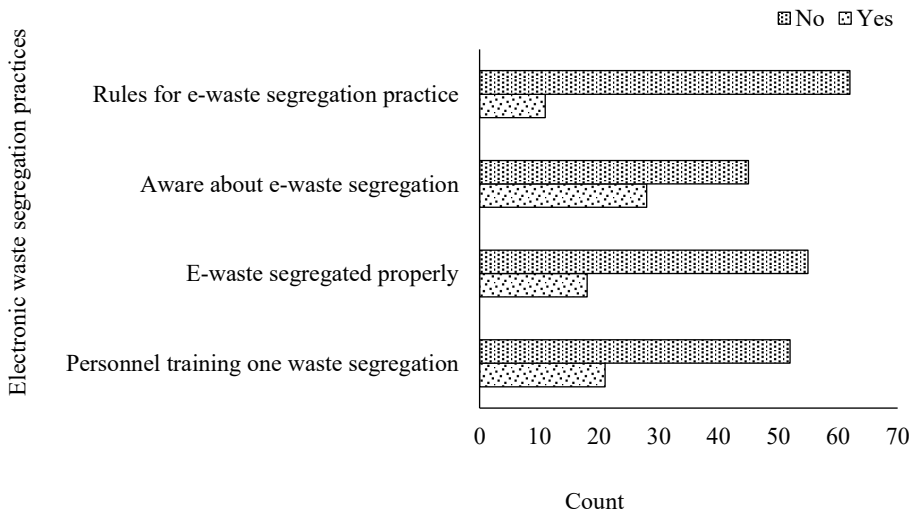

Figure 2. Electronic waste segregation practice.

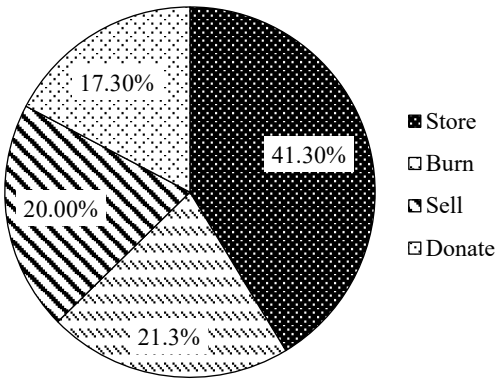

Figure 3. Electronic waste treatment and disposal practice.

Effective electronic waste management hinges on the proper segregation of waste generated by organizations. However, Figure 2 reveals that 74.7% of respondents reported inadequate segregation of waste. Additionally, 70.7% of organizations lacked personal training on e-waste segregation, and 61.3% were unaware of proper practices. Furthermore, 84% of organizations noted the absence of rules and regulations for e-waste segregation in the study area. These findings highlight significant limitations in the proper segregation of electronic waste within organizations.

In this study, respondents were asked about their electronic waste disposal practices. Figure 3 reveals that 41.33% of organizations store their electronic waste, while 21.33% dispose of it by burning it with other solid waste. Additionally, 20% sell their e-waste to second-hand dealers, and 17.33% donate it. Key informants noted that due to a lack of designated disposal sites and inadequate e-waste collection systems, many government employees are compelled to dispose of waste improperly. They also highlighted that employees have limited awareness of e-waste issues and that waste collectors are poorly managed. The results suggest that inadequate collection services and the absence of a responsible body contribute to the improper storage of e-waste.

Challenges for Electronic Waste Management Practice

Effective management of electronic waste (e-waste) poses significant challenges, particularly in organizational settings. This section explores the key difficulties faced in electronic waste management practices within the study area. It highlights issues such as inadequate segregation of e-waste, lack of comprehensive data, insufficient training, and the absence of proper supervision and national guidelines.

Figure 4 reveals several key challenges in electronic waste management based on the responses from the study organizations. Most respondents (82.7%) agreed that there is a lack of segregation of electronic waste, with only 9.4% disagreeing. Similarly, 69.4% agreed that there is insufficient data on electronic waste, while 14.7% disagreed. The lack of regular training in waste management was acknowledged by 74.7% of respondents, with 9.4% disagreeing. Regarding supervision, 62.7% agreed there was a deficiency, and 14.7% disagreed. A significant 69.4% also noted the absence of national guidelines, with 12% disagreeing. Furthermore, 62.6% agreed that there are no organized committees, and 16% disagreed. The lack of specific electronic waste legislation was highlighted by 78.6% of respondents, with 13.4% disagreeing. Additionally, 77.3% noted the lack of a treatment mechanism, while 9.3% disagreed. The absence of awareness was agreed upon by 82.7% of respondents, with 8% disagreeing. A notable 80% agreed that there is no designated disposal site for electronic waste, while 12% disagreed. Lastly, 66.7% agreed that there is a lack of electronic waste collectors, with 22.7% disagreeing. Overall, these responses indicate a consensus on several significant barriers to effective electronic waste management.

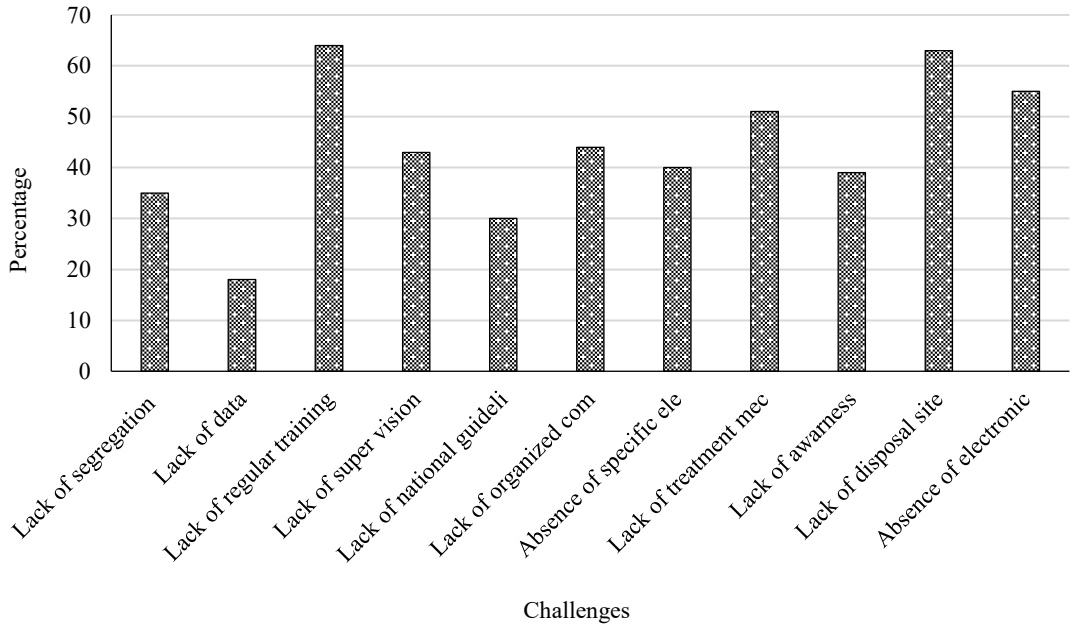

Figure 4. Challenges related to electronic waste management practice.

CONCLUSION

The study highlights that governmental offices in Hawassa City produce significant amounts of electronic waste from devices like computers, printers, and cooling machines. Challenges include inadequate storage facilities where e-waste is mixed with general waste, a lack of specialized training for employees, and limited budgets for management. Barriers to efficient e-waste management are the absence of specific legislation, insufficient awareness, and inadequate national guidelines and disposal mechanisms. To address these issues, the study recommends implementing e-waste segregation at the source, developing targeted training programs, establishing an e-waste management committee, and creating detailed operational standards to enhance awareness, enforce effective practices, and close legislative and procedural gaps.

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Competing Interests

There is no competing interest.

Authors' Contributions

Kassahun Mitiku Yizengaw conducted the research, including the data collection, study design, analysis, and interpretation. Dr. Joe Christy provided guidance and supervision throughout the research process, offering valuable feedback and support.

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