
Influence of Household Awareness on Effective Plastic Waste Handling Projects in Eldoret City, Kenya

¹*Mercy Jepkosgei Kemboi, ²Dr. Fred K. Wamalwa and ³Dr. Esther Chepsiror

¹*Scholar, The Catholic University of Eastern Africa

²Faculty of Arts and Social Sciences, The Catholic University of Eastern Africa

³Faculty of Arts and Social Sciences, The Catholic University of Eastern Africa

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Abstract

The challenge of plastic waste management is still relevant in urbanising communities like Eldoret City, Kenya. Household awareness is of particular importance, as they are directly engaged with the segregation, recycling and disposal of plastic waste. This study evaluated the effect of household awareness on successful plastic waste management projects in Eldoret City, Kenya. The study was a cross-sectional descriptive research using a mixed-methods approach. The target population was 121,795 households, of which 399 households were sampled using stratified and systematic sampling. Structured questionnaires and interview schedules were used for data collection. A total of 399 questionnaires were given out, of which 353 questionnaires were recovered, giving a recovery ratio of 88.47%. Quantitative data was analysed through descriptive, Pearson correlation and regression analysis and qualitative data through thematic analysis. It revealed that overall, the awareness of the households was good ($M = 3.75$, $SD = 1.25$). The respondents had fairly good knowledge of plastic waste management. There was a positive and statistically significant correlation between the awareness of households and effective plastic waste handling ($p < 0.01$, $r = 0.566$). Additionally, the regression analysis found household awareness to be a positive and statistically significant contributor to effective plastic waste handling ($Beta = 0.566$, $p < 0.001$; $B = 0.516$). These findings were also confirmed by the qualitative findings, which revealed that environmental education and public sensitisation are important pillars of responsible plastic waste management, but that there are some areas that still lack proper information access. The study results show that there is a significant and positive relationship between household awareness and handling of plastic waste in Eldoret City. It is, therefore, essential to have continuous environmental education, sensitisation to the public and follow-up to turn knowledge into consistent practice in the household.

Keywords: *Household Awareness, Plastic Waste Handling, Environmental Education, Waste Segregation, Eldoret City, Kenya*

INTRODUCTION

In recent years, plastic waste handling projects have gained significant importance in tackling plastic pollution and fostering environmental sustainability. These include collecting, segregating, and recycling, reusing and environmentally responsible disposal of plastic waste.

Plastic waste is still piling up due to high consumption and waste management system inadequacies despite the improvement of waste management practices. Therefore, the active involvement of the households is required to implement plastic waste handling, because the households are the key producers, and they are directly involved in plastic waste handling.

Household awareness is defined as the knowledge, understanding and exposure of the household members on environmental issues and plastic waste management practices. It includes awareness of waste segregation, recycling, the environmental impact of waste disposal, and relevant legislation. The thesis reviewed previous studies showing that environmental awareness is correlated with responsible waste management, such as waste sorting and recycling (Zhang et al., 2022). Household involvement in sustainable waste management practices has also been cited as a tool of EE, which can help improve waste management practices (Mwanthi & Nyabuti, 2023).

The issues of population growth, urban expansion, evolving consumption habits and waste collection, segregation and recycling facilities are also affecting plastic waste management in Eldoret City. The study focused on the Eldoret Waste Pickers Association (EWPA) project, which is a plastic waste handling project which operates around the Kipkenyo dumpsite, where waste pickers are involved in collecting, sorting, recovering and recycling plastic waste. The broader research question identified household involvement as a contextual issue, along with the inequities in access to environmental information, that relate to plastic waste management.

This was the specific objective of the study, which aimed at evaluating the effect of household awareness on successful plastic waste handling projects in Eldoret City, Kenya. The null hypothesis for this study was that there was no correlation between awareness raised by the household and the effectiveness of the plastic waste handling projects in Eldoret City, Kenya.

LITERATURE REVIEW

Household awareness is an important basis for the adoption of environmentally responsible behaviour. Household awareness was operationalized as awareness of proper plastic waste management practices, understanding of the importance of plastic waste segregation, awareness of environmental impacts of plastic waste mismanagement, exposure to environmental education/training, awareness of government regulations, knowledge of the benefits of recycling, influence of public awareness campaigns, and awareness of members of the household.

Households with greater environmental awareness tend to be more responsible in waste management, such as sorting waste and recycling (Kumar et al., 2021). Similarly, Zhang et al. (2022) concluded that environmental awareness has a positive impact on household behavior in waste separation and reducing non-discriminatory waste dumping in urban areas. Mwanthi and Nyabuti (2023) noted that EE programmes enhance participation in sustainable waste management by households.

It is also argued in the literature that awareness is best achieved when households are provided with opportunities and support to put knowledge into practice. According to Sahoo et al. (2022), awareness creation, social support and convenient waste management are factors that give rise to the segregation of household waste. According to Paquibut et al. (2023), positive attitudes and skills alongside increased awareness and knowledge of plastic pollution helps to encourage adoption of plastic waste management practices. Similarly, Anokye et al (2024) noted that informed awareness of the environment can lead to better community involvement in appropriate waste management practices and promote behaviour that is good for the environment.

The reviewed evidence supports the expectation that awareness should be positively related to effective plastic waste handling. Although extensive literature reviewed for waste management or awareness per se, limited evidence focusing on the role of plastic waste handling projects in

Eldoret City and how household awareness contributes to plastic waste management was found. The present study aimed at bridging this gap by using both quantitative and qualitative evidence.

METHODOLOGY

The study was a mixed-methods study with a cross-sectional descriptive research design. The target population for the study was 121,795 households in Eldoret City. The study was conducted in the following wards: Langas, Kapsoya, Kimumu, Racecourse, Huruma and Kipkenyo. The sample was obtained by Yamane's formula and distributed proportionately in the selected areas, for a total of 399 households. As respondents, household heads or adult members in the household responsible for making decisions about waste management were targeted.

Quantitative data was collected using structured questionnaires, while qualitative data was collected from key informants involved in plastic waste management with the use of interview schedules. Household awareness was assessed by eight items on the Likert scale (knowledge, segregation awareness, environmental impacts, environmental education, and regulatory awareness, recycling benefits, public awareness campaigns and household information). Responses were given on a 5 point scale ranging from strongly disagree (1) to strongly agree (5). A total of 399 questionnaires were distributed, with 88.47% (353) being accepted. Descriptive statistics included frequencies, percentages, means and standard deviations. Pearson's product-moment correlation was employed to assess the direction and level of association between awareness and effective plastic waste handling, and simple linear regression was conducted to assess the predictive role of awareness. The qualitative interview data was analysed thematically and combined with the quantitative data. The study followed the principles of voluntary participation and informed consent, confidentiality and anonymity and secure handling of data.

RESULTS

Descriptive Findings on Household Awareness

The aim was to determine the effect of household awareness on effective plastic waste handling projects in Eldoret City. The study employed a 5 point Likert scale, with a mean score of 3.5-4.5 considered as agreement. The overall mean of household awareness was 3.75 (SD = 1.25), suggesting that overall, the households were aware of plastic waste management.

Table 1: Household Awareness

Household awareness indicator	Agree/Strongly agree	Mean	SD
Adequate knowledge of proper plastic waste management	254 (71.9%)	3.69	1.28
Understand the importance of segregating plastic waste	263 (74.5%)	3.76	1.26
Aware of environmental effects of improper disposal	251 (71.1%)	3.68	1.26
Received environmental education/training	250 (70.9%)	3.69	1.26
Aware of government regulations	257 (72.8%)	3.71	1.25
Know benefits of recycling plastic waste	275 (77.9%)	3.87	1.18
Public awareness campaigns improved knowledge	267 (75.6%)	3.84	1.21
Household members adequately informed	259 (73.4%)	3.78	1.29

The highest mean score was recorded for knowledge of the benefits of recycling plastic waste (M = 3.87, SD = 1.18), followed by the view that public awareness campaigns had improved knowledge of plastic waste management (M = 3.84, SD = 1.21). The lowest mean was for awareness of the environmental effects of improper plastic waste disposal (M = 3.68, SD = 1.26). Overall, the findings show that awareness was relatively high across all eight indicators.

Correlation Analysis

Table 2: Correlation between Household Awareness and Effective Plastic Waste Handling

Variable	r	r ²	p-value	Strength	Direction
Household awareness	0.566	0.320	< 0.01	Moderate to strong	Positive

Pearson's product-moment correlation analysis showed a positive and statistically significant relationship between household awareness and effective plastic waste handling ($r = 0.566$, $p < 0.01$). The coefficient indicates that higher household awareness was associated with more effective plastic waste handling. The coefficient of determination ($r^2 = 0.320$) indicates that 32.0% of the variation in effective plastic waste handling was explained by household awareness in this bivariate relationship, while the remaining variation was associated with other factors.

Regression Analysis

Table 3: Regression Coefficients for Household Awareness

Model	B	Std. Error	Beta	t	Sig.	95% CI for B
Constant	1.348	0.110	—	12.294	< 0.001	1.132–1.563
Household awareness	0.516	0.040	0.566	12.852	< 0.001	0.437–0.594

Household awareness showed a statistically significant positive contribution towards effective plastic waste handling with a $\beta = 0.566$, $t = 12.852$ and $p < 0.001$. Unstandardized coefficient (B = 0.516): For each unit increase in household awareness, plastic waste handling increased by 0.516 units. A 95% confidence interval for B was (0.437, 0.594). The null hypothesis was thus rejected, as the awareness of the household has a statistically significant effect on effective plastic waste handling.

Qualitative Findings

Interviews with key informants (environmental, public health, administrative and waste management stakeholders) were used to validate the quantitative results, which were analyzed thematically. Household awareness was a recurring theme among all informants as a prerequisite for responsible handling of plastic waste. They found that environmental education households were more likely to separate waste at source, to be part of recycling programmes, to use designated waste collection points and to obey environmental regulations. The interviews also showed that the environmental information was not well distributed in some households, especially in less served areas.

The qualitative results also suggested that there is a need for ongoing education and follow-up for the dissemination of knowledge to use in everyday work. Awareness was thus considered most effective if it was accompanied by an accessible waste management system and social support and opportunities for households to apply recommended practices.

DISCUSSION

The overall mean of the awareness of the households was a high level of awareness of 3.75 (SD = 1.25). The knowledge level of good plastic waste management, waste segregation, and environmental impacts of improper disposal, environmental education exposure, government regulation knowledge, and knowledge of the benefits of recycling and positive effects of public awareness campaigns were generally high among respondents. These conclusions suggest that awareness among households was not limited to general knowledge but extended to the practical aspects of handling plastic waste.

The findings on the inference were more compelling evidence on the role of awareness. The correlation value ($r = 0.566$) is positive and significant ($p < 0.01$), and the regression coefficient ($\beta = 0.566$) is significant ($p < 0.001$), which indicates that the higher the awareness, the more

effective the plastic waste handling. This finding resonates with the study by Kumar et al. (2021), Zhang et al. (2022) and Mwanthi and Nyabuti (2023), in which they found that environment awareness and education were significant factors that influenced waste separation in households and sustainable waste management.

The results are also aligned with those of Paquibut et al. (2023), which showed that awareness and knowledge of plastic pollution was correlated with the adoption of plastic waste management practices. The study by Sahoo et al. (2022) is of special interest as it highlighted awareness along with social support and convenient waste management opportunities. The qualitative evidence in this study also indicated that awareness programmes had a positive impact on the knowledge of the households, but there was still a need for sustained sensitisation and follow-up of some of the households.

The results also align with those of Anokye et al. (2024), who stated that raising environmental awareness can enhance participation in good waste management practices and promote environmentally friendly actions. The findings from the descriptive, inferential and qualitative parts of the study are thus congruent to provide evidence that household awareness is an influencing factor in effective plastic waste handling in Eldoret City.

However, the research revealed household variations in exposure to environmental information too. Other respondents voiced divergent opinions with regard to knowledge, EE, regulatory awareness and public awareness campaigns, and key informants indicated a lack of sensitisation in certain areas. This implies that inequalities in access to environmental information may be masked by a relatively high level of awareness. Awareness alone might therefore not ensure a consistent practice, but should be complemented with continuous education and follow-up, as well as an enabling waste management environment.

CONCLUSION

The study results indicate that household awareness has a positive and meaningful impact on successful plastic waste handling projects in Eldoret City, Kenya. Awareness of households on correct plastic waste management, segregation, effect of incorrect disposal, environmental education, regulations, and benefits of recycling, public awareness campaigns was generally high. The very high correlation and regression values along with the qualitative evidence, suggest that awareness plays an important role in the effective handling of plastic waste in households.

The results also indicate that the benefits of awareness are enhanced if the information and practical opportunities to use the knowledge gained are maintained, and that the information is not provided through only a single method, such as radio shows. Sustained sensitisation and environmental education are therefore critical to ensure that the awareness is translated to regular segregation, recycling, safe disposal and compliance.

RECOMMENDATIONS

Household Environmental Education and Public sensitisation programmes should be strengthened and sustained by the environmental stakeholders in Eldoret City. Awareness programmes should include practical information regarding waste segregation, waste recycling, safe waste disposal, environmental impacts of waste disposal, and relevant waste management laws.

The sensitisation should be extended to other communities that are not being reached, as well as ongoing follow-up, not one-off campaigns. Households need reliable and uniform information and this should be delivered by a combination of members of the County environmental officer team, community organisations, waste management providers and other relevant stakeholders.

Enabling conditions should also be put in place to enable the household to apply the knowledge gained at awareness programmes. Information campaigns in particular should be connected to easily accessible collection points, recycling opportunities and information on permitted disposal points. This would aid in converting awareness to a consistent practice at home.

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