

Assessing Compliance with Domestic Waste Disposal Practices: Insights from Cagayan de Oro City

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Article information	Abstract
<p>Article history:</p> <p>Received: March 05th, 2024 Revised: May 14th, 2024 Accepted: June 01st, 2024</p> <hr/> <p>Corresponding author:</p> <p>Name: Paolo B. Araune Address: 73 Corrales Ave, Cagayan de Oro, 9000 Misamis Oriental, Philippines E-mail: paraune@xu.edu.ph</p> <hr/> <p>International Journal of Nursing and Health Services (IJNHS), Volume 7, Issue 7, Issue 3, June 20th, 2024 DOI: 10.35654/ijnhs.v7i3.789 E-ISSN: 2654-6310</p>	<p>Background & Aim: Domestic waste, encompassing various types like food, recyclable, garden, and hazardous waste, poses significant challenges in rapidly urbanizing areas like Cagayan de Oro City. This study aimed to assess compliance with domestic waste disposal practices in a selected barangay, focusing on proper disposal, segregation, and reuse. Methods & Materials: A descriptive research design was employed to evaluate compliance with domestic waste disposal practices among Cagayan de Oro City barangay residents. Surveys were conducted with randomly selected respondents aged 20 to 65, covering waste disposal, segregation, and reuse. Stratified random sampling ensured proportional representation from various zones within the barangay, with a sample size of 349 respondents determined using Cochran's formula. Results: Significant differences were found in compliance based on age and gender, with middle-aged individuals and females showing higher levels, especially in reuse. Employment status significantly influenced compliance, with retirees and the unemployed exhibiting higher levels compared to employed. No significant differences were observed based on education, socio-economic status, or information source. Conclusion: Gender and employment significantly influenced compliance, with men showing greater disposal compliance and women demonstrating higher adherence to segregation and reuse. Age also played a notable role, particularly in influencing reuse practices. Targeted interventions considering these factors are essential for enhancing waste management strategies. Recommendation: Clinical practitioners should focus on tailored waste disposal programs to improve compliance with domestic waste disposal practices, emphasizing the importance of proper segregation, reuse, and disposal techniques to foster cleaner and healthier communities in rapidly urbanizing areas.</p> <p>Keywords: Compliance, health promotion, employment, behavior</p> <p>This is an Open Access article distributed under the terms of the Creative Commons Attribution-Non-Commercial CC BY-NC 4.0</p>



INTRODUCTION

Ravenhall (1) defines domestic waste as any waste generated within the household environment, encompassing food, recyclable, garden, and hazardous waste. With the country experiencing population growth and urban development, there was a concurrent increase in waste accumulation. According to the National Solid Waste Management Commission (NSWMC), Cagayan de Oro City produced 1.25 million tons of waste annually, a figure projected to escalate yearly (2). This surge in waste production underscored the imperative to evaluate the management and disposal of household waste, considering that residential areas contributed 56.7% to the total waste, as Jeremias and Fellizar (2) indicated. Debrah et al. (3) noted that non-compliance with environmental practices contributed significantly to ecological concerns.

The World Health Organization highlighted improper waste disposal's adverse public health effects (4). Such practices contribute to pollution, increase the risk of vectors like mosquitoes, and pose health threats, especially to vulnerable groups. Compliance with domestic waste disposal practices is pivotal for the community to mitigate adverse health outcomes effectively. As elucidated in Bose's study (4), many respondents perceived waste management as a severe environmental issue.

The study focused on a highly urbanized and densely populated area as its target community. This choice rendered it more suitable to gauge the extent of compliance with proper waste disposal practices among its residents. The aim was to assist local government units in formulating more effective action plans to reduce and manage the community's waste, ultimately fostering better environmental conditions and preventing pollution and diseases.

This study assessed the extent of compliance with domestic waste disposal practices among the residents of a selected barangay in Cagayan de Oro City, focusing on proper waste disposal, segregation of domestic

waste, and reuse. The objective was to provide information for future waste disposal projects and programs tailored to residents' compliance levels. The researchers presented valuable data to enhance proper waste disposal practices, promote community cleanliness, and reduce waste generation. Consequently, residents of the selected barangay would be better equipped to participate in future programs on domestic waste disposal practices, leading to improved living conditions free from garbage litter and enhanced sanitation.

The research utilized Dr. Nola Pender's health promotion model (5), originally conceived as a complement to existing health protection models. It redefines health as a dynamic state emphasizing well-being rather than mere absence of illness. This model acknowledges the multifaceted nature of individuals as they engage with their environment to pursue health, with the ultimate goal of enhancing overall well-being.

The key components of the health promotion model include individual characteristics and experiences, previous behaviors, historical context, and the consistency of similar behaviors over time (5). Together, these factors facilitate a comprehensive understanding and application of the health promotion model.

The three types of personal factors outlined in the model are biological, psychological, and socio-cultural (5). These variables, such as age and sex for biological factors, self-motivation and personal competence for psychological factors, and highest educational attainment, socio-economic status, and access to information for socio-cultural factors, play a crucial role in influencing specific behaviors. They are shaped by the characteristics of the behavior under consideration.

Practical waste management demands increased attention and diligence to avert adverse health outcomes from poor practices. Therefore, behavioral patterns related to health-seeking behavior are essential in waste management (6). According to the model (5),

individual characteristics and experiences directly impact behavioral outcomes, illustrating how individuals' distinct personalities interact with their environment and contribute to health-related actions. Everyone possesses unique characteristics and experiences that shape their behavior. Furthermore, by Shahzadi et al. (7), individuals' behavior and knowledge hold motivational significance, improving people's knowledge, attitudes, and practices. This study encompasses assessing people's understanding of various waste types, increasing awareness, altering attitudes and thought processes, and enhancing waste disposal techniques.

The study investigated whether a significant difference existed in the extent of compliance with domestic waste disposal practices among the respondents, considering various factors such as age, gender, educational attainment, socio-economic status (based on combined monthly income), employment status, and access to information. The hypothesis was formulated and tested at a 0.05 significance level. The null hypothesis posited that there was no significant difference in the extent of compliance with domestic waste disposal practices based on age, gender, educational attainment, socio-economic status, employment status, and access to information. This study addresses a gap in existing research by specifically examining how these demographic factors influence waste management behaviors, which has not been comprehensively explored in previous studies.

METHODS

Design

This study employed a descriptive research design to collect data on the extent of compliance with domestic waste disposal practices among residents of a selected barangay in Cagayan de Oro City. Descriptive studies systematically and accurately describe the characteristics of a phenomenon, observing, describing, and documenting aspects of a situation. This study examined social phenomena without directly manipulating the conditions experienced by the subjects. Additionally, quantitative research, which

investigates phenomena suitable for precise measurement and quantification, involves a rigorous and controlled design and statistical data analysis (8).

Sample, sample size & sampling technique

The respondents in this study were residents of a specific barangay in Cagayan de Oro City. The inclusion criteria encompassed residents of any gender aged 20 to 65, irrespective of socio-economic status, and participants physically capable of tasks promoting household cleanliness. Conversely, the exclusion criteria involved individuals below 20 or above 65 years old, mentally challenged participants, and those physically unable to perform waste disposal practices, such as being bedridden.

The sampling technique employed was stratified random sampling, dividing the total population into smaller strata based on common characteristics and randomly selecting the sample proportionally. The strata in this study were the three zones of the barangay. Cochran's formula was also utilized to calculate the sample size, considering the provided barangay profile with a total population of 3,829 residents. Using the formula, the researchers determined a sample size of 349 respondents.

The instrument of data collection

The construction of a comprehensive study protocol assessment was the researchers' initial step before the data gathering. This document delineated the study's scope and limitations, guiding it throughout the data collection period. Essential information for the study was systematically obtained and consolidated in the study protocol assessment, categorized into three main sections: scientific design, conduct of the study, and ethical considerations. Additionally, the specific page and paragraph placement of information were indicated for efficient assessment.

Questionnaires were distributed to the respondents for data collection. The researchers analyzed data collected from respondents who met the inclusion criteria. Survey responses constituted the sole source of information for

this study. Participants contributed to community betterment by gaining insights into enhancing environmental sustainability, improving neighborhood cleanliness, and reducing domestic waste production.

Data collection process

In anticipation of the site survey, an approved letter of request to conduct the study was dispatched to the authorities of the selected barangay. This letter included relevant details such as the researchers' background, the study's purpose and methodology, a concise summary of objectives, participant selection guidelines, procedures for both respondents and researchers, duration of participation, benefits, and the proposed date of the site survey. Once approved by the barangay leaders, the researchers executed the site survey on the agreed-upon date.

Data analysis

In assessing whether a significant difference existed between the extent of compliance with domestic waste disposal practices among the respondents, an f-test was employed for all variables. A significance level of 0.05 was utilized in the f-test to evaluate the probability of detecting a significant difference in the respondents' level of compliance with domestic waste disposal practices.

Ethical consideration

The researchers adhered to the regulatory standards outlined in the Data Privacy Act of 2012, also known as Republic Act No. 10173, to ensure the security and privacy of respondents throughout the study. Informed consent, a crucial aspect of the study, was obtained from the respondents, and both the questionnaire and the informed consent were administered during home visits. The informed consent form included the title of the study and the background information of the researchers. It further detailed the study's objectives, participant selection guidelines, procedures to be followed by respondents and researchers, participation duration, risks, benefits, termination or withdrawal process, respondents' right to ask questions, and consent

certification. Participation in the study was entirely voluntary, and participants were free to withdraw at any point.

Additionally, the researchers submitted a study proposal to the College of Nursing for review. Before forwarding their work to the Xavier University Research Ethics Board, the researchers ensured compliance with fundamental criteria. The study commenced only after obtaining ethics clearance approval from the ethics board (XU REC Package No. NSG-2023001285).

Results

Table 1 illustrates the extent of compliance with domestic waste disposal practices among respondents when categorized by age. In this context, the null hypothesis was rejected. It suggested a noteworthy difference in compliance among respondents concerning waste reuse, whereas no significant difference was observed in proper waste disposal and segregation when respondents were grouped by age.

Table 1 also showcased the extent of compliance with domestic waste disposal practices among respondents when classified by gender. In this analysis, the null hypothesis was refuted. The statistical insignificance of the LGBTQIA+ community (lesbian, gay, and transgender) was evident due to their limited representation in the data. The findings indicated a highly significant difference in the extent of compliance with domestic waste disposal practices among respondents when stratified by gender.

Table 1 also presented the extent of compliance among respondents regarding domestic waste disposal practices when categorized by educational level. In this analysis, the null hypothesis was upheld. Elementary graduates and individuals with an elementary level of education were statistically negligible due to their limited representation in the dataset. The results indicated no significant difference in the extent of compliance among respondents concerning domestic waste disposal practices when stratified by educational attainment.

Table 1 also presented the extent of compliance among respondents with domestic waste disposal practices when grouped by socio-economic status. In this analysis, the null hypothesis was not rejected. In summary, no

significant difference was observed in the extent of compliance among respondents with domestic waste disposal practices when categorized by socio-economic status.

Table 1. ANOVA Results of Respondent's Level of Compliance on Domestic Waste Disposal Practices When Grouped according to age, gender, educational attainment, and socio-economic status

Variables		Level of Compliance of the Respondents on Domestic Waste Disposal Practices							
		Proper Waste Disposal		Segregation of Domestic Waste		Reuse		Total	
		Mean	p-value	Mean	p-value	Mean	p-value	Mean	p-value
Age	20-29	3.60	0.994 ns	3.88	0.361 ns	3.83	0.043*	3.77	0.369 ns
	30-39	3.60		4.06		4.18		3.94	
	40-49	3.57		3.90		4.17		3.88	
	50 and above	3.60		4.10		4.06		3.92	
Gender	Male	3.65	<0.01**	3.95	0.002**	4.03	<0.01**	3.88	<0.01**
	Female	3.55		4.05		4.07		3.89	
	Lesbian	1.40		1.00		1.00		1.13	
	Gay Transgender	4.10 4.20		3.35 4.20		4.70 4.80		4.05 4.40	
Educational Attainment	College Graduate	3.64	0.365 ns	4.11	0.587 ns	4.12	0.247 ns	3.96	
	College Level	3.51		3.87		3.88		3.75	
	High School Graduate	3.60		3.95		4.05		3.87	
	High School Level	3.62		4.03		4.23		3.96	
	Elementary Graduate	3.58		4.30		4.30		4.06	
	Elementary Level	4.50		4.00		4.30		4.27	
Socio-economic Status	Below Php 10,957	3.61	0.537 ns	3.97	0.549 ns	4.05	0.442 ns	3.88	0.470 ns
	Php 10,957 - Php 21,914	3.59		3.95		4.02		3.85	
	Php 21,914 - Php 43,828	3.65		4.32		4.33		4.10	
	Php 43,828 and above	3.39		4.00		3.86		3.75	

Legend: ns = Not Significant *=Significant **=Highly Significant

Table 2 showcased the extent of compliance with domestic waste disposal practices among respondents when classified by employment status. In this analysis, the null hypothesis was rejected. When categorized by employment status, there was a highly

significant difference in the extent of compliance among respondents with domestic waste disposal practices, particularly in the reuse category

Table 2. ANOVA Results of Respondent's Level of Compliance on Domestic Waste Disposal Practices When Grouped According to EMPLOYMENT STATUS

Profile	Level of Compliance of the Respondents on Domestic Waste Disposal Practices							
	Proper Waste Disposal		Segregation of Domestic Waste		Reuse		Total	
Employment Status	Mean	p-value	Mean	p-value	Mean	p-value	Mean	p-value
Unemployed	3.60	0.196 ns	4.04	0.075 ns	4.18	<0.01**	3.94	0.001 **
Full-time Employment	3.65		4.11		4.20		3.99	
Part-time Employment	3.67		4.12		4.06		3.95	

Self-employed	3.59	3.92	4.07	3.86
Student	3.34	3.58	3.39	3.44
Retired	3.68	4.22	4.26	4.05

Legend: ns = Not Significant *=Significant **=Highly Significant

Table 3 depicts the extent of compliance among respondents with domestic waste disposal practices when organized by their source of influence. In this examination, the null hypothesis was not rejected. According to the

table, there was no significant difference in the extent of compliance among respondents with domestic waste disposal practices when categorized based on their source of influence

Table 3. ANOVA Results of Respondent's Level of Compliance on Domestic Waste Disposal Practices When Grouped According to SOURCE OF INFLUENCE

Profile Source of Influence	Level of Compliance of the Respondents on Domestic Waste Disposal Practices							
	Proper Waste Disposal		Segregation of Domestic Waste		Reuse		Total	
	Mean	p-value	Mean	p-value	Mean	p-value	Mean	p-value
School	3.70	0.506 ns	4.14	0.187 ns	4.28	0.281 ns	4.04	0.433 ns
Barangay	3.52		4.07		4.12		3.90	
Television	3.39		3.39		3.81		3.53	
Facebook	3.50		3.43		4.30		3.74	
Family and Friends	3.56		4.01		4.21		3.93	
Multiple Sources	3.65		3.98		3.95		3.86	

Legend: ns = Not Significant *=Significant **=Highly Significant

Table 4 showcased the extent of compliance exhibited by the respondents in domestic waste disposal practices when classified by their source of information. In this analysis, the null hypothesis was not rejected.

The table indicated that the extent of compliance among respondents in domestic waste disposal practices was similar when grouped based on their source of information.

Table 4. ANOVA Results of Respondent's Level of Compliance on Domestic Waste Disposal Practices When Grouped According to SOURCE OF INFORMATION

Profile Source of Information	Level of Compliance of the Respondents on Domestic Waste Disposal Practices							
	Proper Waste Disposal		Segregation of Domestic Waste		Reuse		Total	
	Mean	p-value	Mean	p-value	Mean	p-value	Mean	p-value
School	3.69	0.187 ns	3.97	0.190 ns	4.06	0.107 ns	3.91	0.107 ns
Barangay	3.64		4.14		4.26		4.01	
Television	3.25		3.52		3.73		3.50	
Facebook	3.53		3.43		4.13		3.70	
Family and Friends	3.45		4.00		4.13		3.86	
Multiple Sources	3.61		3.98		3.95		3.85	

Legend: ns = Not Significant *=Significant **=Highly Significant

Discussion

Regarding proper waste disposal, respondents aged 40-49 demonstrated the lowest level of compliance among the age groups. In contrast, the others showed similar values, indicating consistent compliance with proper waste disposal. Regarding segregation, the 50-year-old and above age group exhibited

the highest level of compliance, whereas the 20-29-year-old age group displayed the least compliance. Furthermore, concerning reuse, the most compliant respondents belonged to the 30-39-year-old age group, while those in the 20-29-year-old age group were the most minor compliant regarding reusing. This finding is

supported by the observation that older adults tend to engage in more reuse activities due to lifestyle adjustments. As individuals age, their priorities shift, and they become less materialistic. Spending more time at home than other household members provides them with increased opportunities to assess and identify items that can be reused.

Debrah et al. (3) also reported that more than 62.5 percent of older adults prioritize sustainability, especially in waste segregation. This report is evident in the study's findings, where respondents aged 50 and above achieved the highest mean in segregation. Jeremias and Fellizar (2) also supported this, suggesting that older individuals are more active in waste management practices than those in the younger age bracket.

In terms of proper waste disposal, males exhibited higher compliance than females. However, regarding segregation and reuse, females displayed greater compliance. Women were noted for their high compliance in domestic waste disposal due to their inclination to handle waste-related tasks. According to Ocean Conservancy (9), women primarily manage household waste, involving sorting, separating, and sifting through waste for reuse. Conversely, men are predominantly responsible for physically disposing of waste, such as taking out garbage bins for garbage truck collection, as Era (10) noted. These findings align with the established roles attributed to genders in waste management practices. Mothers, or females in general, embody the 'motherhood effect,' as Elliott (11) stated, assuming nurturing roles in the household that extend to environmental concerns. Many cultures until now expect women to manage household waste, considering it a part of their daily responsibilities. Consequently, men might resist engaging in these practices, associating them with femininity and viewing them as exclusively women's responsibilities.

Regarding proper waste disposal and segregation, respondents who had completed college as their highest educational attainment exhibited high compliance. This finding indicates that attaining this level of education

correlates with a more remarkable ability to adhere to such practices. The maturity and knowledge acquired during their educational journey contribute to a heightened understanding of the importance of these practices in real-life scenarios and the potential consequences of neglecting them. Limon et al. (12) and Bedural (13) have affirmed that individuals with higher education levels tend to exhibit positive behaviors in domestic waste disposal practices. Lastly, the most compliant respondents in terms of reuse had the highest high school-level educational attainment. This educational level provides a significant opportunity to learn about the significance of reusing and develop habits that contribute to long-term environmental protection. This phase is crucial for establishing environmental behaviors that persist into adulthood. According to Chauhan et al. (14), individuals at this level are prepared to address various issues related to domestic waste disposal practices and understand their positive and negative effects.

Based on the table presented for all domestic waste disposal practices, the respondents who earned between Php 21,914 and Php 43,828 per month were highly compliant. Additionally, those earning below Php 10,957 per month demonstrated compliance, particularly regarding reuse. These individuals, aiming to save money and avoid unnecessary expenses, chose to reuse items that still had utility. The Open University (15) highlighted the significant role of reuse, especially for economically disadvantaged individuals who may struggle to afford new goods such as clothing, building materials, and business equipment. Some respondents mentioned that if they found reusable items useless, they sold or gave them to junk shops or neighbors who might need them, giving them a new purpose. Reuse centers, collecting and distributing reusable goods, can contribute to community benefits by engaging in job-training programs for the long-term unemployed, disabled individuals, and young people. Reuse is an economical means for many people to obtain necessary items, often a more cost-effective option than buying new ones.

According to the findings, students demonstrated the lowest level of adherence to proper waste disposal, segregation, and reuse practices, indicating their overall lower compliance. Conversely, retired individuals exhibited the highest compliance across all aspects of domestic waste disposal, likely due to their increased time spent at home. With retirees often having more leisure time compared to working or studying household members, they were better equipped to identify reusable items within their homes. Eu's (16) study highlighted that in the Philippines, individuals often opt for early retirement around the age of 60, becoming eligible for mandatory retirement at 65. This observation is consistent with the demographic distribution outlined in Table 1, where 29.9 percent of respondents were aged 50 and above. Fadhullah et al. (17) underscored the growing environmental consciousness and the significance of enhancing the quality of life among aging household members.

Jeremias and Fellizar (2) study also indicated that older individuals, particularly retirees, actively participate in domestic waste disposal practices more than their younger counterparts. This responsibility stems from retired individuals caring for their homes, including waste management. Felisilda et al. (18) further supported the idea that older individuals have a greater understanding of waste management than other age groups. The elderly, aware of their possessions, are adept at maximizing and repurposing supposed wastes. Consequently, retired respondents demonstrated the highest compliance with ideal domestic waste disposal practices.

Respondents who selected school as their primary source of influence concerning domestic waste disposal practices demonstrated high compliance. This finding indicates that respondents typically depend on the school to provide essential information regarding domestic waste disposal practices. Moreover, the school effectively imparts timely and accurate information to empower learners to make informed decisions about domestic waste disposal practices. Knowledge is intricately linked to the individual

characteristics that shape every facet of decision-making processes. The values encompassed in sustainable development are directly integrated into the learning experience, fostering a sense of responsibility for sustainability in future generations (19, 20).

In the context of proper waste disposal, the most compliant respondents identified the school as their primary source of information. Concerning segregation and reuse, the respondents exhibiting the highest compliance regarded the barangay as their primary source of information. Choosing the barangay as the exclusive source of information about domestic waste disposal practices implies that respondents typically rely on their barangay officials for crucial information on matters such as waste disposal. This aspect was underscored by Nolasco et al. (21), who emphasized that inadequate information dissemination can result in suboptimal practices and reduced community participation.

The implications for clinical practice include the need for health practitioners to design targeted educational programs and collaborate with barangay officials for better information dissemination. Limitations of the study include its focus on a single barangay and reliance on self-reported data, which may affect generalizability and introduce bias. However, the study's strengths lie in its representative sampling, robust theoretical framework, and comprehensive examination of demographic factors, providing valuable insights for enhancing waste management strategies.

Conclusion

The conclusions were derived from the following findings: gender and employment emerged as variables that exerted a highly significant influence on an individual's extent of compliance with domestic waste disposal practices. Specifically, men demonstrated greater compliance with disposal, whereas women exhibited higher compliance with segregation and reuse. Additionally, age was identified as a variable significantly impacting an individual's extent of compliance with reuse. These results underscore the importance of considering these demographic factors when

formulating and implementing interventions and campaigns, ensuring a targeted approach to enhance further each household's extent of compliance with domestic waste disposal practices.

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