THE UTILIZATION OF WASTE DISPOSAL AND ENVIRONMENTAL LITERACY DURING PANDEMIC AMONG HOUSEHOLD IN THE SELECTED COMMUNITIES IN BULACAN

Lea M. Cerdena* Mylene Pekson*Jean Calutan Manlangit* Mila C Hererra* Marijane Anacito*

National University- Manila

Abstract

The usage of plastics has risen since the COVID-19 epidemic. Medical supplies are produced daily to prevent the infection from spreading. As individuals were forced to stay indoors, the production, consumption, and distribution of takeaway food containers and delivery bundles increased dramatically. Thus, the study examined the hazardous waste disposal habits and environmental literacy of the people of Barangay Tabang and Barangay Banga. This study utilized a multi-method research approach. The initial step was to employ cluster sampling to determine which barangays linked with the Municipality of Bulacan would participate in the study. Purposive sampling was then used to choose 324 households, with 162 per barangay. The selected barangays were chosen because to their environmental requirements. Data was obtained using a three-part survey questionnaire that was evaluated by experts before being sent to and consented by participants in accordance with ethical issues such as respect for person, beneficence, justice, secrecy, respect for autonomy, and truthfulness. The data was analysed using descriptive, correlational, and comparative statistics. The findings show that the participants are generally environmentally conscious, with rubbish collection being their most common method of disposal. However, waste disposal procedures vary significantly between Barangay Tabang and Barangay Banga. Participants in Barangay Tabang are far more ecologically concerned and engage in more trash collection than those in Barangay Banga. The data reveal that the participants' demographics and environmental knowledge had little influence on their rubbish disposal behaviours.

Keywords: Waste Disposal, Pandemic, Environmental Literacy

Introduction

Industrial plastic production has grown rapidly since the 1950s, reaching 368 million tonnes globally per year by 2019 (Plastic, Europe 2020). Over the previous decade, global plastic output has nearly quadrupled, and plastic use is predicted to rise in a variety of industries, including healthcare, automotive, construction, electrical and electronic, and packaging (Khoo et al., 2021). This is due to the advantages of plastic materials, which include great mechanical and thermal qualities, low production costs, adaptability, and lightweight. Plastic garbage accounts for a major portion of total waste generation in the Philippines. With the declaration of a public health emergency, a rising volume of COVID-19-related trash is generated not only by health care institutions and community quarantine units, but also by residents of the enlarged community quarantine regions. Several preventative rules have been established internationally as the government attempts to flatten the pandemic curve. Some examples include restrictions on social interaction and distance, as well as partial or whole city and regional lockdowns. Part of the objective was to flatten the curve during During the COVID-19 epidemic, plastic-based personal protective equipment (PPE) played an important role in keeping people safe. Plastic has a wide range of applications and since the start of the coronavirus epidemic there has been an unexpected increase in plastic waste, including gloves, protective medical suits, masks, hand sanitiser bottles, takeaway containers, meals, and delivery packages. According to the National Solid Waste Management Commission (NSWMC), the Philippines will generate 21.4 million metric tons of waste annually, with Metro Manila accounting for 26.7% of the total solid waste in 2020. As a result, long-term solutions are needed to mitigate environmental damage while meeting demand for pandemic essentials. Alternative methods such as reuse, remanufacturing and recycling had been promoted for several years prior to the epidemic. However, not every household understands or applies the usefulness and relevance of these alternative

Thus, a multi-method study design consisting of descriptive, correlational, and comparative studies was used to investigate how environmental knowledge influences the pandemic waste disposal habits of Barangay Tabang and Barangay Banga. Furthermore, the study reviewed waste disposal practices and environmental literacy in the selected Barangay. All activities to improve waste management in the chosen communities were proposed based on the research study's interpreted findings.

1.1 Methodology

Research Design

This study used a multi-method research design. This design uses multiple forms of qualitative data (e.g., interviews and observations) or various forms of quantitative data (e.g., survey data and experimental data) (Creswell, 2015). The researchers utilized multiple forms of quantitative data.

3.1.1. Descriptive

A descriptive research design is a type of study that tries to collect data by characterizing a phenomenon, condition, or population. This methodology delves into the "what" of the research subject rather than the "why" (Siedlecki, 2020). The data collected in this design were the demographic profile, the waste disposal practices, and the environmental knowledge of the community. For this research design, the researchers utilized a multiple-choice questionnaire. All questions are in the research instrument section of the study. The questions were close ended to draw concrete conclusions about the respondents.

3.1.2. Correlational

Correlational research is a non-experimental, quantitative design where researchers use correlational statistics to evaluate and analyze the relationship between two or more variables. This would include formulating questions that revolve around the variables under observation and allowing the respondents to answer these questions. This is the most functional design for the researchers to correlate the waste disposal practices and the respondents' demographic profile of households in Barangay Banga and Barangay Tabang. The data collected in this design will be the demographic and waste disposal practices. The researchers used a multiple-choice questionnaire to analyze the significant relationship between waste disposal practices and demographic profiles in the selected communities. The questions mentioned above will be in the first and second parts of the questionnaire.

3.1.1. Comparative

A comparative research design is a way for analysing phenomena. In this approach, data on garbage disposal practices and environmental literacy are collected from both Barangay Tabang and Barangay Banga. The data will be sorted to discover points of difference and resemblance (Mokhtarian-Pour, 2016).

The researchers used a multiple-choice and a 5-part Likert scale questionnaire that compared and analyzed the significant relationship between the waste disposal practices and environmental literacy of the selected barangays. The questions related to the mentioned variables are in the questionnaire's second and third part of the questionnaire.

3.2. Population, Sample Size, and Sampling Technique

The participants in this research were residents of the Municipality of Plaridel Bulacan, namely Barangays Tabang and Banga. To acquire such data, the researchers worked with the Plaridel, Bulacan Waste Management Department and the focal person from each barangay.

To get the projected sample size, the researchers contacted the Bulacan Capitol for information on the number of homes in the chosen localities. Barangay Tabang has an estimated 5,201 homes. Barangay Banga has an estimated 3,522 homes.

The researchers used Cochran's method to get the anticipated sample size per home. The researchers

chose a 0.08 margin of error, a 95% confidence level, and a Z-score of 1.96. According to the Zoho Survey, the acceptable margin of error at 95% confidence is often between 4% and 8%. The findings suggested that a sample size of at least 150 households for each target demographic, totaling 300 households, would be sufficient to provide the researchers with the needed degree of confidence. The researchers collected a total of 324 responses, 162 from each barangay.

Cochran's Formula:

$$n0 = \frac{Z^2 pq}{e^2}$$

$$n0 = \frac{(1.96)^2(0.5)(0.5)}{(0.08)^2}$$

$$n0 = 150$$

The researchers used clustered and purposive sampling techniques. Clustered sampling is where population subgroups are used as the sampling unit. The researchers' target populations were community members in Bulacan. Consequently, clustered or divided by communities partnered with Plaridel Municipality. From these communities, the researchers chose two communities that participated in the study, in which the researchers used purposive sampling techniques. Through this method, the participants were selected based on the inclusion criteria made by the researchers.

Inclusion Criteria:

- The respondents must be more than 18 years old but less than 59 years old.
- The respondents must be a resident of the selected barangays for at least 5 years.

Criteria for the Target Population:

- The community selected has numerous issues with its current waste disposal practices and environment.
    - Research Locale

The community of Bulacan was chosen to be the setting of this study. There are 143 communities in Bulacan. These are Barangay Lumang Bayan, Barangay Tabang , Barangay Banga 1st, Barangay Agnaya, and Barangay Sta. Ines. Among these communities, Barangay Tabang and Barangay Banga 1st and 2nd was considered in this study because of its environmental needs. According to the data gathered by Plaridel waste management, Barangay Tabang needs further assessment of irresponsible waste handling, clogged sewage systems that cause a flood, and lack of discipline towards cleanliness. On the other hand, Barangay Banga needs further assessment on reckless waste handling, frequent flooding, clogged sewage systems, unclean surroundings, and, more recently, waste management, primarily on animal waste.

3.4.Research Instrument

The researchers carried out the study online, although the data were collected on-site by the designated focal persons in each community. The focus persons printed out the questionnaire and distributed it to the respondents. Before getting an informed consent form, the researchers had a group discussion to explain the purpose of the study. .All surveys were completed by persons who agreed to participate in the study. The questionnaire was broken down into three sections: the first and second were multiple-choice questions, and the third was a five-part Likert scale. The first portion contained demographic information about the respondents, including their name, age, gender, barangay, family size, educational attainment, and work status. The second part focused on trash disposal processes, while the last piece addressed environmental literacy.

3.5 Result and discussion

Table 1. *Demographic Profile of the Household Representatives in Terms of Family Size*

Family Size (Laki ng Pamilya)	**Frequency**	**Percentage**
3-5	221	68.2 %
6-8	86	26.5%
9 or more (9 o higit pa)	17	5.2%
Total	324	100%

Note. Most of the respondents' family sizes are composed of 3-5.

Table 1 shows the demographic profile of the respondents based on family size. According to the findings, 221 (68.2%) of the 324 respondents are from families with 3-5 members. 86, or 26.5%, are from families with six to eight children, while 17, or 5.2%, come from families with nine or more children.

Family size plays an important role in influencing the quantity of household garbage. Family size is the total number of people living in the same residence (Noufal et al., 2020). According to the Philippine Statistics Authority's most recent study (2022), the average household size would have reduced to 4.1 persons by 2020. NCR is one of the three areas with the smallest average household size, with an average of 3.8 people per home. According to the findings of this study, 221 come from families with 3-5 children, 86 from families with 6-8 children, and 17 from families with 9 or more children, which corresponds to the average household size recorded by the Philippine Statistics Authority.

IV.1.a. Educational Attainment

In this section, the researchers will present the educational attainment of the household representatives in Barangay Tabang and Barangay Banga.

Table 2. *Demographic Profile of the Household Representatives in Terms of Educational Attainment*

Educational Attainment (Edukasyon)	**Frequency**	**Percentage**
Masteral Degree (Nakapag masteral o higit pa)	2	0.6%
College Degree (Tapos ng kolehiyo)	34	10.5%

Undergraduate College (Nakapag Kolehiyo ngunit hindi nakapagtapos)	51	15.7%
High school degree (Tapos ng sekondarya)	129	39.8%
High school undergraduate (Nakapag sekondarya ngunit hindi nakapagtapos)	56	17.3%
Elementary degree (Tapos ng elementarya)	22	6.8%
Elementary undergraduate (Nakapag-elementarya ngunit hindi nakapagtapos)	9	2.8%
No grade completed (Walang natapos)	21	6.5%
Total	324	100%

The table above depicts the demographic profile of the respondents according to educational attainment. The result showed that with the total of 324 respondents, 129 or 39.8% are high school graduates, 56 or 17.3% are high school undergraduates, 51 or 15.7% are college undergraduates, 34 or 10.5% are college graduates, 22 or 6.8% are elementary school graduates, 21 or 6.5% did not have any grade completed, 9 or 2.8% are elementary school undergraduates, and 2 or 0.6% are post-baccalaureate.

According to the Philippine Statistics Authority (2018), net intake rates of 96% completion rates of 93% for primary school students are positive baseline indicators. However, intake and graduation rates drop as younger age, with just 74% net secondary intake and 82% completion rates. Male are 1.35 times less likely than females to be in high school, and 13 percent of girls graduate from college as contrast to 9.5 percent of males (Alampay, L. P., & Garcia, A. S., 2019). The following studies and statistics support the researcher's gathered data, as 129 respondents are Secondary or High School Graduates.

IV.1.e Employment Status

In this section, the researchers will present the employment status of the household representatives in Barangay Tabang and Barangay Banga.

Table 3. *Demographic Profile of the Household Representatives in Terms of Employment Status*

Employment Status	Frequency	Percentage
Unemployed (Walang trabaho)	146	45.1%

Employed (May trabaho)	112	34.6%
Self-Employed (May sariling negosyo)	66	20.4%
Total	324	100%

Table 3 above depicts the demographic profile of the respondents according to employment status. The result showed that with a total of 324 respondents, 146 or 45.1% are unemployed, 112 or 34.6% are employed, and 66 or 20.4% of respondents are self- employed.

According to data from the International Labour Organization (2020), the Philippines hardest unemployment rate in April 2020. Its most current estimate was 17.7%, unlike to the 2.3 million unemployed in April 2019. It is equivalent to almost 7.3 million people, a more than threefold rise. According to investigation, COVID-19 will might harm 25% of all employees through decrease work hours and salary or overall lost their job. This equates to estimation 10.9 million workers, nearly 2/5 of whom are female. People who managing in the informal economy or corporate jobs, such as casual employees, temporary workers, or those hourly or with daily salary, were already particularly vulnerable to labor shocks even before the pandemic. They typically receive lower pay, have little to no labor protection, and are more likely to be exposed to workplace dangers. According to estimates, three-tenths of the workforce in the Philippines works "vulnerably," either at their own expense or contributing members of their families (ILO, 2020). For unorganized and unstable employees working in "non-essential sectors," lockdowns may have ruined their chances of earning a living (ILO, 2020).

In another study from the COVID-19 Low Income HOPE Survey (2021), households suffered a significant employment shock and income loss during the strict ECQ. From 56 to 31%, the employment ratio decreased by roughly 45%. Particularly noticeable was the reduction in employment in urban and Luzon areas. Urban areas saw a decrease in the employment ratio from 60% to 26%. Similarly, employment in Luzon dropped from 59 to 24%, whereas other island groupings could keep employment at 60 percent of its pre-ECQ level. (Cho, 2021). Despite having a minimal market share, household manufacturing and food services businesses were particularly affected. Respectively, 14 to 38% of them were still operating after COVID-19. The closure rate was higher in urban Barangays (52%) and highly urbanized cities, similar to how COVID- 19 affected employment (56%). Households that owned businesses that remained open saw a 65% decline in business revenues (Cho, 2021).

The demographic profile section of the questionnaire consists of the following: age, sex, family size, educational attainment, and employment status. For the first section (age), the study showed that the sum of both Barangays' respondents comprised 250 or 77.2% of 31-59 years old and 74 or 22.8% of 18–30-year-old. From the data gathered, respondents from the age group of 31- 59 had the highest number of participants. As for the next section (sex), the study showed that 221 or 68.2% of the respondents are females, while 103 or 31.8% are males. This concludes that there are more female respondents who participated in the study. For the third segment (family size), the result showed that of 324 respondents, 221 or 68.2% had a family size of 3-5, 86 or 26.5%, 86 belong to a family size of 6-8 members, and 17 or 5.2% had nine or more family members in the household. The report showed that most respondents belong to a household with 3-5 members. The fourth section (educational attainment) unraveled that 129 or 39.8% of respondents are high school graduates, 56 or 17.3% are high school undergraduates, 51 or 15.7% are college undergraduates, 34 or 10.5% are college graduates, 21 or 6.5% did not have any grade completed, 22 or 6.8% are elementary graduates, 9 or 2.8% are elementary undergraduates, and 2 or 0.6% are post- baccalaureate. The result garnered that 303, or 93.5% of the respondents have an educational

background. The fifth and final segment (employment status) depicted that 146 or 45.1% are unemployed, 112 or 34.6% are employed, and 66 or 20.4% of respondents are self-employed. From this data, the researchers inferred that 178 or 54.9% of respondents have the means to earn a living.

IV.2. Waste Disposal Practices of the Respondents

This section shows the frequency and percentage of the common method of waste disposal practiced by the respondents. The waste disposal practices include collecting, burying, burning, composting, and littering waste anywhere.

Table 4. *Common Method of Waste Disposal Practiced by the Respondents*

Waste Disposal Practices (Pamamaraan ng Pagtatapon ng Basura)	**Frequency**	**Percentage**
Collecting (Pangongolekta)	303	93.5%
Composting (Pagkokompost)	15	4.6%
Burying (Paglilibing)	5	1.5%
Throwing in the river (Pagtatapon sa ilog)	1	0.3%
Total	324	100%

Note. Most of the respondents practiced collecting waste.

Table 4 shows that, out of 324 respondents, 303 or 93.5% collect waste, considering that the respondents relied on the garbage-collection services of their city, making it their standard method of waste disposal. 15 or 4.6% compost waste and 5 or 1.5% bury waste, considering the respondents' geographical location, being surrounded by soil, or there is soil nearby. 1 or 0.3% throw waste in the river, which also considers the respondents' geographical location, that is, living nearby a river.

According to RA 9003, also known as the "Ecological Solid Waste Management Act of 2000," only segregated garbage will be collected. Containers should be labeled as compostable, recyclable, non-recyclable, and special waste. People are encouraged to have their compost for compostable waste, which can be used as fertilizers in the future. In effect, people who segregated property were able to set apart recyclables, among others. The Japan International Cooperation Agency survey, as mentioned in Coracero's (2021) analysis, found that Metro Manila placed a high value on municipal garbage collectors for disposal, with percentages ranging from 47.25% to 74.85%. This is convergent evidence for this study because the findings demonstrate that collecting rubbish is the most prevalent method of trash disposal used by respondents.

Furthermore, collecting rubbish demonstrates effective waste disposal and diversion. The gathered garbage is transported to open dumping sites and sanitary landfills to prevent inappropriate waste disposal and management practices such as littering and burning. Reusable garbage may be diverted using the 3Rs (Reuse, Reduce, Recycle, and Compost).

However, there is disagreement on the issue of conventional garbage disposal techniques. According to Garcia (2019), disadvantaged communities in cities, towns, and rural areas are underserved, with garbage not being collected on a regular basis. This is one possible reason why residents with surplus garbage choose to dispose of it improperly by littering in the streets, burning, or open dumping. According to experts, these waste disposal practices can cause pollution and fire that harm people's health and lives. Moreover, accumulating litter in the environment can alter

ecosystem processes, pose a danger to the community, and contribute to climate change.

Under these conditions, collecting garbage is good waste management because it reduces not just pollution in the barangays but also the possibility of harm to people' health. Since the people of the chosen barangays have been practicing garbage collection as a means of disposal, the barangay can follow the standards for waste collection and container labeling outlined in the Ecological Solid garbage Management Act of 2000. Instead of just burying garbage, composting it might be a viable option to appropriate waste disposal. This approach can also function as a soil fertilizer for future usage. This can benefit residents who compost garbage and inspire others to do the same, particularly those who bury waste.

Finally, data revealed that 303 or 93.5% of respondents practice waste collection, 15 or 4.6% practice composting, 5 or 1.5% practice burying, and 1 or 0.3% practice throwing in the river.

IV.3. Level of Environmental Literacy of the Respondents

In this section, the researchers will show the result of the level of environmental literacy of the respondents from Barangay Tabang and Barangay Banga based on the conducted survey among 162 respondents.

Table 5. *Environmental Knowledge*

Environmental Knowledge (Kaalamang Pangkalikasan)	Mean	SD
1. **Poor solid waste management breeds mosquitoes, insects, and vermin.** (Nagpaparami ng mga peste, gaya ng lamok, insekto, at daga, ang hindi maayos na pagtatapon ng basura.)	3.90	1.395
2. **Poor solid waste management poses significant health risks, like the spread of diseases.** (Nagdudulot ng mga panganib sa kalusugan, gaya ng mga sakit, ang hindi maayos na pagtatapon ng basura.)	4.08	1.121
3. **Poor solid waste management, such as littering, blocks drains and contributes to flooding.** (Nagdudulot ng pagbabara at pagbabaha ang hindi maayos na pagtatapon ng basura.)	4.21	1.004
4. **Poor solid waste management contributes to the depletion of natural resources.** (Nakadaragdag sa pagkaubos ng mga likas na yaman ang hindi maayos na pagtatapon ng basura.)	4.04	1.174
5. **Poor solid waste management pollutes the environment and destroys the rivers, and other water bodies.** (Nakadurumi sa kalikasan at nakasisira ng mga anyong tubig, gaya ng Ilog, ang hindi maayos na pagtatapon ng basura.)	4.19	1.119
6. **Poor solid waste management provides an eye sore.** (Hindi kaaya-aya tingnan ang hindi maayos na pagtatapon ng basura.)	4.12	1.247

7. **Proper household waste segregation reduces government spending on garbage collection, transportation, and disposal.** (Nakatutulong sa pagbawas ng gastusin ng gobyerno sa pamamahala ng mga basura ang maayos na paghihiwalay ng mga basura sa ating tahanan.)	4.22	1.098
Knowledge	4.11	0.968

As indicated in table 5, the respondents' highest mean score for degree of knowledge was 4.22, showing that they are very knowledgeable about the statement "Proper household waste segregation reduces government spending on garbage collection, transportation, and disposal."

The second highest report, with a mean of 4.21, showed that respondents are likewise quite informed of the statement "Poor solid waste management, such as littering, blocks drain and contributes to flooding." In comparison, the two lowest means had a mean of 4.04 and 3.90, respectively. This revealed that respondents were only aware of two statements: "Poor solid waste management breeds mosquitoes, insects, and vermin" and "Poor solid waste management contributes to the depletion of natural resources."

In general, regarding Knowledge of Environmental Literacy, the mean was 4.11, meaning the respondents are knowledgeable about proper waste management.

Table 6. *Environmental Attitude*

Environmental Attitude (Saloobing Pangkalikasan)	Mean	SD
1. **Solid waste is not a serious problem in Bulacan. There are other more serious and urgent problems than this**. (Hindi seryosong problema ang basura sa Lungsod ng Bulacan. Mayroon pang mas seryosong problema kaysa rito.)	2.72	1.492
2. **Improper waste disposal has serious adverse consequences on public health and the environment.** (Mayroong masamang epekto sa kalusugang pampubliko at kalikasan ang hindi maayos na pagtatapon ng basura.)	4.26	1.097
3. **Households contribute to the waste problem.** (Nakadaragdag ang mga tahanan sa problema sa basura.)	3.86	1.351
4. **Households must segregate their waste.** (Dapat paghiwa-hiwalayin ng mga tahanan ang kani- kanilang mga basura.)	4.25	1.134

5. **Households must contribute to the construction and continuous operation of materials recovery facilities.** (Nararapat na makilahok ang mga tahanan sa pagbuo at patuloy na pagpapakilos sa mga pasilidad para sa pag-”recycle” ng mga kagamitan.)	4.25	1.068
6. **Anyone caught not segregating their waste should pay a fine and go to prison.** (Nararapat na pagmultahin at ikulong ang sino mang mahuling hindi naghihiwalay ng kanilang mga basura.)	4.11	1.146
7. **Waste materials are potential raw materials that could provide financial value.** (Maaaring magamit bilang hilaw na kasangkapan ang mga basura na makapagbibigay ng salapi.)	4.22	1.064
Attitude	3.95	0.742

As seen in table 6, the highest mean score was 4.26. The responders are particularly concerned with the phrase, "Poor solid waste management poses significant health risks, such as disease transmission."

The second highest mean received a score of 4.25, indicating that respondents are extremely concerned about statement 1. Poor solid waste management leads to the depletion of natural resources, and 2. Poor solid waste management pollutes the ecosystem and causes damage to rivers and other bodies of water.

On the other hand, the two lowest means garnered a score of 2.72 (moderately concerned) and 3.86 (concerned) for statement 1. "Solid waste is not a serious problem in

"There are other more serious and urgent problems than this" (statement 2). "Households contribute to the waste problem." This shows that the respondents are far more concerned with other problems besides waste disposal practices. Most of them are unemployed, so they have far more issues to address, such as financial struggles and the emergence of the COVID-19 pandemic. According to Kikuchi et al. 2021, the COVID-19 pandemic's impacts on health have been inconsistent throughout time, with persons from lower socioeconomic levels appearing to be more afflicted. The lower socioeconomic class was more financially exposed during the COVID-19 epidemic. This might explain why they had so many more concerns to worry about than the environment. In overall, respondents' attitudes toward the environment were 3.95, indicating that they are worried about their surroundings.

Table 7. *Environmental Literacy*

Environmental Literacy (Kalinangang Pangkalikasan)	Mean	SD
Knowledge	4.11	0.968
Attitude	3.95	0.742
Literacy	4.03	0.789

Environmental literacy is defined as the ability to notice and comprehend the health of environmental systems, as well as make appropriate decisions and activities to maintain, rest, and improve their health (Areola et al 2020). Furthermore, while knowledge and attitude can impact a person's environmental literacy, they must also be related to the happiness and benefit that a person might derive from being concerned about and devoted to environmental issues. Thus, understanding the need of efficient solid waste disposal must be linked with a person's excitement and willingness to do so for the sake of humanity and the environment (Madrigal & Oracion, 2018). According to table 7, the respondents' literacy level averaged 4.03, indicating that they are environmentally literate. They comprehend how people's perceptions of the environment influence small towns and the entire planet.

The researchers collected data from Barangay Tabang and Barangay Banga, which are both aware about efficient waste management. The calculated mean was 4.11. Meanwhile, respondents are concerned about their surroundings, with a score of 3.95. Furthermore, a mean score of 4.03 was obtained, indicating that the respondents are literate in their surroundings.

IV.4. Relationship between Waste Disposal Practices and the Demographic Profile of the Respondents

This section examines the association between trash disposal methods and the demographic profile of respondents from the selected barangays using Cramer's V test of correlation.

Table 8. *Significant Relationship between Waste Disposal Practices and the Demographic Profile of the Respondents*

	V	p-value	Interpretation
Sex and Waste Disposal Practice	0.0956	0.398	Not Significant
Age and Waste Disposal Practice	0.0767	0.592	Not Significant
Family Size and Waste Disposal Practice	0.0799	0.658	Not Significant
Educational Attainment and Waste Disposal Practice	0.152	0.543	Not Significant
Employment Status and Waste Disposal Practice	0.110	0.264	Not Significant

Table 8 shows the association between garbage disposal techniques and respondents' demographics. The results revealed a minor association between waste disposal procedures and sex, which is not significant (V= 0.0956, p=0.398). The findings also revealed that there is no significant link between age and family size and trash disposal methods (V=0.0767, p=0592 and V=0.0799, p=0.658, respectively). Furthermore, the findings revealed a modest link between waste disposal practices and the profile variables educational attainment and job status, although these correlations are likewise non-significant (V=0.152, p=0.543 and V=0.110, p=0.264, respectively).

Also, there are several contradictory findings regarding the respondents' demographic profile and waste disposal practices. A study by Tang et al. (2022) entitled, Influencing Factors on the Household-Waste-Classification Behavior of Urban Residents: A Case Study in Shanghai These negative relationships support previous research, such as a study by Lee and Paik (2011), cited by Cantaragiu (2019), which found that socioeconomic variables such as gender, number of family members, and educational level had no significant correlations with criterion variables.

is a similar study conducted by the researchers. The study showed that their sample's socio- demographic characteristics and waste-classification behavior suggested that females and people with higher education tend to be more willing to sort waste. It was identified that women were more likely to participate in household waste sorting than men, which may be related to the fact that women undertake more housework. Additionally, the higher the education level of residents, the higher the likelihood of their participation in waste sorting. Compared to the study conducted by the researchers, sex and educational attainment do not have a significant relationship with waste disposal practices of the household representatives in Bulacan.

Previous research found that family size correlates favourably with waste disposal rate. Suthar and Singh (2015), as cited by Noufal et al. (2020), discovered a significant relationship between rubbish disposal and family size. More family members create more trash. As Trang et al. (2017) reported, family size and household solid waste generation were identified to have a significant relationship except for glass and others. Furthermore, the number of family members increases the amount of plastic, PET, and paper produced. In contrast, multiple studies have demonstrated a negative association between family size and garbage disposal rate (Noufal et al., 2020). Some studies found the phenomenon of "group living" and "common consumption" among families, where the home operates as a unit and most items are shared. As a result, waste is reduced (Noufal et al., 2020).

Cramer's V test of correlation yields p-values of 0.398, 0.592, 0.658, 0.543, and 0.264 for the variables Sex, Age, Family Size, Educational Attainment, and Employment Status with Waste Disposal Practice, respectively. Finally, the findings show no significant association between respondents' demographics and garbage disposal behaviors.

IV.5. Relationship between Waste Disposal Practices and Environmental Literacy

Environmental literacy consists of three components: environmental knowledge, attitude, and conduct. Two factors, knowledge and attitude, were statistically evaluated to determine their link with waste disposal methods. This section examines the link between trash disposal practices and environmental literacy in Barangay Tabang and Barangay Banga.

Table 9. *Significant Relationship Between Waste Disposal Practices and Environmental Literacy*

	P-value
Waste Disposal Practice and Environmental Literacy	0.204

As illustrated in table 9 above, the p-value for the Multinomial Logistic Regression was 0.204, indicating no significant relationship between waste disposal practices and environmental literacy.

Environmental Literacy is known as the ability to perceive and analyze environmental systems' health and take appropriate decisions and actions to maintain, restore, and improve the health of thesesystems (Areola, et al 2020). Despite Bulacan initiative to implement the Solid Waste Management Plan as issuance to comply with the Republic Act 9003. Hungerford and Volk (1990) as cited in Nwankwo (2021) argue that knowledge and awareness alone are insufficient for actions and that a linear knowledge-behavioral relationship lacks specific justification. This report supports the view that knowledge alone is not necessary for decisions about adopting pro- environmental and sustainable behaviors and for initiating action. (Nwankwo, 2021). Additionally, while knowledge and attitude may affects a individual environmental activity, they must also be connected with the expectation and welfare that a person might obtain from being concerned about and committed to environmental projects.

The association between environmental literacy and trash disposal practices was investigated using a mean score of 4.03. A p-value of 0.204 indicated that there was no significant link between respondents' trash disposal habits and their environmental literacy.

IV.6. Difference in the Waste Disposal Practices of the Respondents of Barangay Tabang and Barangay Banga

This section shows the result of the difference in the waste disposal practices of the respondents of the selected barangays.

Table 10. *Significant Difference in the Waste Disposal Practices of the Respondents of Barangay Tabang and Barangay Banga*

	Waste Disposal Practices (Pamamaraan ng Pagtatapon ng Basura)				
Barangay	**Composting** (Pagkokom-post)	**Burying** (Pagli-libing)	**Throwing in the river** (Pagtatapon sa ilog)	**Collecting** (Pangongo-lekta)	**Total**
Tabang	3	1	1	157	162
Banga	12	4	0	146	162
Total	15	5	1	303	324

As indicated in table 10 above, the Chi-Squared Test revealed a significant variation in trash disposal methods among respondents from Barangay Tabang and Banga result is $\chi 2(3, 324) = 8.60$, $p = 0.035$. Tabang inhabitants were more likely to gather rubbish than Banga residents. However, the proportion of residents who practiced composting waste in Tabang was higher than Banga. Banga has a total population of 5,201 households, while Tabang has a total population of 3,522 households. It revealed that Banga has fewer households than Tabang, implying that Tabang has more land. Based on this data, it is possible that more residents in Barangay Banga would be able to compost their trash. The discrepancy in land area between Barangay Tabang and Barangay Banga supports the aforementioned reasoning. Barangay Tabang has a land size of 0.834 km2, whereas Barangay Banga has 0.9101 km2 (City Population,2021). As per Atienza (2011) cited in Coracero et al. (2021), the use of the 3R (Reduce,Reuse, Recycle) and composting can be deemed effective if there is a lack of sanitary landfills in the country. According to DENR, as cited by Martinez (2021), Bulacan does not belong to the top five regions with the most significant number of sanitary landfills in the country. Despite its vast geographical size, Bulacan lacks adequate landfill facilities, making it difficult for the community to carry out the aforementioned garbage disposal activities. Waste diversion refers to the act of implementing the 3Rs and composting in low-land-use communities. Finally, Atienza (2011), as referenced in Nguyen and Tan (2020), said that trash and waste management challenges are mostly dependent on the population. The Chi- Squared Test revealed significant variations in waste disposal methods across chosen barangay respondents, with a value of $\chi 2(3, 324) = 8.60$, $p = 0.035$. Tabang has greater rubbish collection rates than Banga. When comparing the two selected barangays, composting of waste was greater in Tabang than in Banga owing to the higher home population and bigger land area of Tabang, making it more probable that inhabitants can compost their trash.

IV.7. Difference in the Environmental Literacy of the Respondents of Barangay Tabang and Barangay Banga

Table 11. *Significant Difference in the Environmental Literacy of the Respondents of Barangay Tabang and Barangay Banga*

	Group	Mean	Median	p-value
Literacy	Tabang	4.19	4.50	< .001
	Banga	3.87	4.07	

Table 11 shows a substantial difference in environmental literacy between Barangay Tabang and Barangay Banga respondents (U=8904, p <.001). The respondents in Barangay Tabang had a mean literacy of 4.19 (Md = 4.50), which is considered literate. The mean literacy level among Barangay Banga respondents was 3.87 (Md = 4.07), which is likewise considered literate. This suggests that the respondents from Barangay Tabang are more environmentally aware than those from Barangay Banga.

According to Dunlap and Jones (2002), as cited in Li et al. (2021), concern for the environment is defined as "the degree to which people are aware of environmental problems, support attempts to address them, and express a willingness to directly contribute to those solutions." The findings revealed that all respondents, when viewed collectively and categorized as variables, are aware of the environment, as indicated by their means, which ranged from 8.50 to 10.23. The findings showed that respondents are ecologically literate, both collectively and by variable.

The researchers acquired data that revealed that respondents from Barangay Tabang are more ecologically aware than those from Barangay Banga. The mean literacy rate in Barangay Tabang was 4.19 (Md = 4.50), while the mean literacy rate in Barangay Banga was 3.87 (Md = 4.07), both indicating literacy. This suggests that the degrees of environmental literacy in the two populations varied greatly.

Conclusion

This study demonstrates that all respondents are informed and concerned about the importance of the environment. This demonstrates that both barangays are ecologically aware. There is no significant relationship between the respondents' demographic features and their waste disposal practices. Furthermore, there is no significant relationship between respondents' environmental literacy and their demographic features or waste disposal behaviours in both Barangay Tabang and Barangay Banga.

Despite the lack of a relationship, both Barangays are environmentally sensitive, meaning that Barangay Tabang and Barangay Banga are familiar with the community's waste collection and disposal practices. Furthermore, collecting trash is the most common method of garbage disposal in both barangays Although this is a widespread practice in both communities, there was a significant difference in waste disposal practices between residents of Barangay Tabang and Banga. Finally, the researchers discover that respondents' environmental literacy has minimal influence on or contribution to the waste disposal practices of the selected Bulacan neighbourhoods. The results of this study reveal that even if the respondents are environmentally knowledgeable, they still lack concern for their environment, causing the researchers to offer the following recommendations to the barangay.

Recommendations

Solid waste management (SWM) has long been a source of worry for the government and communities due to its vastness and complexity. According to Nguyen and Tan (2020), pollution degrades water quality in rivers and streams, which is worsened by urbanization and population growth. The municipal government's implementation of garbage collection services in Plaridel, Bulacan Municipal, as well as its refusal to collect non-segregated waste, were practical methods of encouraging householders to separate their waste.

Households were willing to cooperate since it was obligatory. According to Nguyen and Tan (2020), this was also used to prevent garbage-related issues such as pets and illnesses, particularly after typhoons and floods (Maskey et al., 2016). The study's findings show that, despite their environmental awareness, respondents are still unconcerned about their surroundings. This prompted the researchers to provide recommendations to Barangays Tabang and Banga.

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