

## Effect of Waste Facilities on Community Compliance in Benteng Medan

Nuri Jannaturrahmi Tambusai, Franklin Asido Rossevelt, Dara Aisyah, Nayla Rahmadia Sarif, Tasya Pratiwi,  
Jessica Patricia Br Manik  
University of North Sumatra, Medan, Indonesia

### ABSTRACT

This study aims to analyze the effect of the availability of waste facilities on community compliance in disposing of waste at Benteng Field, Medan. The method used is a quantitative method with data collection techniques through questionnaires. The data were analyzed using descriptive statistics, validity and reliability tests, Pearson correlation tests, and simple linear regression. The results showed that the availability of trash facilities had a positive and significant effect on the level of public compliance in disposing of trash in its proper place at Benteng Field, Medan, with a p-value < 0.05. These findings indicate that adequate facilities in terms of number, condition, and placement were proven to encourage visitors to be more disciplined in maintaining the cleanliness of public areas. This study provides empirical evidence to reinforce the importance of providing adequate sanitation facilities as an environmental management strategy, particularly in urban public spaces.

**Keywords:** Waste Bin Facilities, Public Compliance, Cleanliness Behavior, Benteng Medan Field

#### Corresponding author

**Name:** Nuri Jannaturrahmi Tambusai

**Email:** nuririri2005@gmail.com

## INTRODUCTION

Waste management remains a prominent environmental issue in Indonesia. Population growth and increasing consumption patterns are not matched by the capacity of the management system. Data from the Ministry of Environment and Forestry's National Waste Management Information System (SIPSN) for 2024 shows that Indonesia produces 27.74 million tons of waste per year, or around 76,000 tons per day. This figure confirms the existence of a large gap between the volume of waste and the capacity to manage it. This condition is also evident in the city of Medan, one of the largest centers of activity in North Sumatra. The volume of waste in this city can reach 2,000 tons per day (Tribun Medan, 2024). In fact, the Medan Deli District still lacks waste collection sites, causing waste to pile up in a number of public areas. The government, through the Medan City Environment Agency, has promoted the 3R concept (Reduce, Reuse, Recycle), but the high volume of waste indicates that public compliance with proper waste disposal is not yet optimal (MedanBisnisDaily, 2025). This situation is also evident at Benteng Field Medan, a

public space used for sports, recreation, community activities, and government events. Based on observations, this area still often faces poorly managed waste, especially during busy times. Some trash bins appear damaged, poorly maintained, or not strategically placed, thus failing to encourage visitors to dispose of their waste properly. Piles of trash and plastic bags found in inappropriate areas indicate that sanitation facilities are not functioning optimally. Reports also reveals that coordination of trash management in various public spaces in Medan City, including Benteng Field, is still not optimal, so the level of public compliance needs to be continuously improved (IDN Times Sumut, 2024).

Previous studies have explored the relationship between the availability of waste disposal facilities and public behavior in waste management. A study entitled "*Investigating the Determinants of Littering Behavior Among Young Adults in Yogyakarta, Indonesia*" found that littering behavior is influenced by internal factors (awareness, perception) and external factors such as the availability of waste disposal facilities and environmental conditions. The results of this study indicate that the availability of sanitation facilities is one of the factors that can reinforce the behavior of disposing of waste in its proper place (Mutmainah & Wardani, 2024). Similarly, a study titled "*Sight, Mind, and Action: The Effects of Visible Trash Bins on Students' Littering Behavior*," confirmed that the visibility, design, labeling, and strategic placement of trash bins have a significant effect on students' littering behavior. The easier it is to see and access trash bins, the higher the level of compliance with proper waste disposal (Cruz et al., 2025). A study titled "*Public Perception of Littering Behavior and Its Implications in Urban Green Spaces in Sarawak*" examined the behavior of visitors to green spaces and found that the availability of trash bins, the comfort of facilities, and visitor density are correlated with the tendency to litter. This study shows that facilities play an important role in cleanliness behavior in public spaces (Abdul et al., 2019). Through study "*Explaining Littering Prevention Among Park Visitors Using the Theory of Planned Behavior and Norm Activation Model*," shows that attitudes, personal norms, social norms, and physical environmental conditions, including cleanliness facilities, influence the intention and behavior of littering prevention. Although trash bins are not the main variable, this study still confirms that physical environmental factors contribute to the behavior of proper waste disposal (Laila, 2022). Furthermore, a study entitled "*Shaping and Maintaining Anti-Littering Behavior of the Community in Indonesia*" explains that shaping anti-littering behavior requires a combination of education, enforcement of rules, supervision, and the provision of adequate hygiene facilities. This study emphasizes that facilities, along with other factors, are important components in reducing littering in public spaces (Dhahir, 2020).

Based on previous studies, research on waste disposal behavior and the influence of sanitation facilities has been conducted in various contexts, such as campuses and tourist areas. However, no study has specifically examined the influence of the availability of waste disposal facilities on public compliance in urban public spaces with high activity, such as fields or town squares. The conditions at Benteng Field, Medan City, show a phenomenon that differs from theory. Although previous studies emphasize the importance of strategic placement and suitability of trash facilities, at Benteng Field these facilities are still

inadequate in terms of number, condition, and placement. This location is a public space that is frequently visited for various activities. The difference between theory and field conditions illustrates a *research gap* that forms the basis for this study.

The findings obtained in this study are more representative of the specific conditions at Benteng Field and do not reflect the behavior of people in other public spaces. In addition, the time available to the researchers to collect data was limited, meaning that the observations only covered a certain period, so it is possible that there were variations in behavior at other times that were not fully accommodated. This study specifically aims to answer the question: *Does the availability of trash facilities affect the level of public compliance in disposing of trash in its proper place at Benteng Field, Medan?* The purpose of this study is to analyze the influence of trash facilities on public compliance in disposing of trash in its proper place. Thus, this study makes a new contribution by examining public hygiene behavior in urban public spaces with high activity, a location context that has not been widely researched before. In addition to enriching the literature on littering behavior in public spaces, the findings of this study can also serve as a basis for local governments in designing strategies for the provision and placement of more effective hygiene facilities.

## **METHOD**

### **Research Design**

This study uses a quantitative research method, which is an approach based on associative description. Quantitative research is a research method based on positivism philosophy used to study a specific population or sample by collecting data through research instruments (Sugiyono, 2019). The data obtained is then analyzed quantitatively/statistically so that the results can be used to test the established hypothesis. This approach is used to determine the relationship between the variable of the availability of waste facilities (X) and community compliance in disposing of waste in its proper place (Y).

### **Population and Sample**

The population in this study was the community visiting Benteng Field, Medan. Population is a collection of individuals, groups, or objects that are the subject of a study (Wahyudi et al., 2023). In this study, the population includes all people or visitors who have used or been around the waste management facilities at Benteng Field. This population was chosen because it is directly related to the focus of the study, which is to determine the effect of the availability of waste facilities on the level of public compliance in maintaining cleanliness. However, the population size cannot be determined with certainty because there is no official data on the number of visitors to Benteng Field each day. This condition makes the population an unknown population. Therefore, sampling was carried out using the accidental sampling technique, which is a technique for determining samples based on visitors who happen to be at the research location and are willing to provide information (Wahyudi et al., 2023). This technique is considered appropriate because it is in accordance with the characteristics of the population, which cannot be measured in terms of number,

and involves direct interaction between the community and waste facilities at the research location.

To determine the representative sample size, this study used the Cochran formula with a margin of error of 10%. The Cochran formula is used when the population size is unknown, so that it can provide an estimate of the minimum sample size required (Sugiyono, 2019).

The Cochran formula is as follows:

$$n = \frac{z^2 \cdot p (1 - p)}{d^2}$$

with  $Z = 1.96$  (95% confidence level)

$p = 0.5$  (maximum proportion because it is not yet known)

$d = 0.10$  (10% error rate)

Calculation:

$$n = \frac{(1,96)^2 \cdot 0,5 (1 - 0,5)}{(0,10)^2} = \frac{3,8416 \cdot 0,25}{0,01} = \frac{0,9604}{0,01} = 96,04 \approx 96$$

Thus, the number of respondents in the sample is 96 respondents.

### Data Collection Procedure

The data collection procedure in this study was carried out using a questionnaire instrument compiled based on the research variable indicators, namely *the availability of trash facilities* (variable X) and *community compliance in disposing of trash in its proper place* (variable Y). The questionnaire was distributed online through the Google Form platform and given to respondents who were visitors to Benteng Field, Medan, who were encountered through accidental sampling techniques.

The research questionnaire used a 4-point Likert scale to describe the level of agreement of respondents to the statements provided. The answer options were: 4 = Strongly Agree, 3 = Agree, 2 = Disagree, and 1 = Strongly Disagree. This scale was used to measure respondents' tendencies towards the research variables, where variable X consisted of indicators of trash bin placement, physical condition, and visual marker design, while variable Y consisted of indicators of awareness, trash disposal behavior, and social responsibility. Before answering the questionnaire statements, respondents were asked to fill in their identity details, including age, gender, highest level of education, occupation, and frequency of visits to Benteng Field. This identity information was used as supporting data to determine the characteristics of the respondents involved in the study. The entire data collection process was carried out within a predetermined time frame, and respondents were given a brief explanation of the purpose of the study before filling out the questionnaire.

### Data Analysis

Data analysis in this study was conducted through several statistical stages using a quantitative approach. The first stage was descriptive statistics, which included calculating the mean, median, mode, and standard deviation to describe the trends and distribution of

data for each research variable (Sugiyono, 2019). Next, a validity test was conducted on each statement item in the questionnaire using Pearson Product Moment correlation. An item was declared valid if the *calculated r* value was greater than *the table r* at a significance level of 5%. After that, a reliability test was conducted using Cronbach's Alpha coefficient. The instrument was declared reliable if the Cronbach's Alpha value was > 0.70, which indicated the internal consistency of the statements in the questionnaire (Ghozali, 2018).

To determine the relationship between variables, this study used Pearson's correlation test, which aims to see the strength and direction of the relationship between the availability of trash facilities (X) and community compliance in disposing of trash (Y). Correlation values range from -1 to +1, where values close to +1 indicate a strong positive relationship (Santoso, 2017). Furthermore, to test the effect of variable X on variable Y, a simple linear regression analysis was used. This regression was used to determine the extent of the contribution of waste disposal facilities to the level of public compliance. The regression model produces regression coefficient values ( $\beta$ ), significance values (*p-values*), and determination coefficients ( $R^2$ ). Meanwhile, ANOVA analysis is used to test the feasibility of the regression model (F-test). The ANOVA test aims to see whether the constructed regression model is statistically significant. The model is declared significant if the *F-count* value is greater than *the F-table* or the *p-value* < 0.05 (Sugiyono, 2019). All of these analysis techniques were carried out to ensure that the instruments used were feasible, the relationship between variables could be statistically confirmed, and the resulting model was able to explain the influence between independent and dependent variables in the study.

## FINDINGS AND DISCUSSION

### RESEARCH RESULT

#### Descriptive Results

This study involved 96 respondents who were visitors to Benteng Field, Medan City. Based on age distribution, 68.75% of respondents were in the 15–20 age range, 29.17% were in the 21–30 age range, and 2.08% were in the 31–40 age range. Based on gender, the respondents consisted of 78 females (81.25%) and 18 males (18.75%). The frequency of visits to Benteng Field showed that 62.50% of respondents were in the rarely visit category, 28.13% in the sometimes visit category, and 9.38% in the often visit category.

#### Validity Test

**Table 1: Validity Test Results**

NO	Variable	Item	Calculated r	Table r	Description
1	Availability of Waste	X1.1	0.639	0.2006	Valid
2	Disposal Facilities	X1.2	0.648	0.2006	Valid
3		X1.3	0.589	0.2006	Valid
4		X1.4	0.713	0.2006	Valid
5		X1.5	0.700	0.2006	Valid
6		X1.6	0.630	0.2006	Valid

<b>7</b>		X1.7	0.672	0.2006	Valid
<b>8</b>		X1.8	0.692	0.2006	Valid
<b>9</b>		X1.9	0.618	0.2006	Valid
<b>10</b>		X1.10	0.660	0.2006	Valid
<b>11</b>		X1.11	0.709	0.2006	Valid
<b>12</b>		X1.12	0.712	0.2006	Valid
<b>13</b>		X1.13	0.711	0.2006	Valid
<b>14</b>	Community	Y1.1	0.704	0.2006	Valid
<b>15</b>	Compliance in	Y1.2	0.720	0.2006	Valid
<b>16</b>	Disposing Waste in	Y1.3	0.685	0.2006	Valid
<b>17</b>	the Right Place	Y1.4	0.617	0.2006	Valid
<b>18</b>		Y1.5	0.809	0.2006	Valid
<b>19</b>		Y1.6	0.731	0.2006	Valid
<b>20</b>		Y1.7	0.724	0.2006	Valid
<b>21</b>		Y1.8	0.671	0.2006	Valid
<b>22</b>		Y1.9	0.748	0.2006	Valid
<b>23</b>		Y1.10	0.780	0.2006	Valid
<b>24</b>		Y1.11	0.652	0.2006	Valid
<b>25</b>		Y1.12	0.195	0.2006	Not Valid

Source: Processed by the researcher (2025)

Validity testing was conducted to determine the suitability of each statement item in the questionnaire. The testing was conducted by comparing the *calculated r* value with the *r table* value of 0.2006 at a significance level of 5%. A statement item was declared valid if the *calculated r* value was greater than the *r table value*. Based on the validity test results presented in Table 2, all items in the Waste Bin Availability (X) variable obtained *calculated r* values between 0.589 and 0.713, all of which were above the *table r* value of 0.2006. Thus, all 13 items in variable X were declared valid. In the Community Compliance in Disposing of Waste in Its Place (Y) variable, most items showed a *calculated r* value greater than the *table r*, ranging from 0.617 to 0.809, so these items were declared valid. However, there is one item, Y1.12, which has a *calculated r* value of 0.195, lower than the *table r* value of 0.2006. Therefore, item Y1.12 is declared invalid. Overall, of the 25 statement items tested, 24 items were declared valid and 1 item was declared invalid, so they can be used in the next stage of analysis by excluding invalid items.

## Reliability Test

**Table 2: Reliability Test Results**

NO	Variable	Cronbach's Alpha	Description
1	Availability of Waste Disposal Facilities	0.911	Reliable
2	Community Compliance in Disposing Waste in the Right Place	0.921	Reliable

Source: Processed by Researchers (2025)

Reliability testing was conducted to determine the level of consistency of the research instrument. Reliability testing used *Cronbach's Alpha* values, whereby a variable was deemed reliable if it had a *Cronbach's Alpha* value > 0.70. Based on the data processing results shown in Table 2, the variable Availability of Waste Facilities (X) obtained a *Cronbach's Alpha* value of 0.911, indicating that the instrument for this variable met the reliability criteria. Furthermore, the variable Community Compliance in Disposing of Waste in Its Place (Y) also showed a *Cronbach's Alpha* value of 0.921, so that the instrument on variable Y was declared reliable. Thus, both variables in this study have a good level of internal consistency and can be used for further analysis.

## Descriptive Statistics of Research Variables

### 1. Variable X (Availability of Waste Disposal Facilities)

**Table 3: Descriptive Statistics Results for Variable X (Availability of Waste Disposal Facilities)**

	X1.1	X1.2	X1.3	X1.4	X1.5	X1.6	X1.7
N	Valid	96	96	96	96	96	96
	Missing	13	13	13	13	13	13
Mean	3.20	3.07	3.18	3.09	3.00	3.04	3.06
Median	3.00	3.00	3.00	3.00	3.00	3.00	3.00
Standard Deviation	0.763	0.976	0.821	0.782	0.781	0.832	0.818
Range	3	3	3	3	3	3	3
	X1.8	X1.9	X1.10	X1.11	X1.12	X1.13	Total X1
N	Valid	96	96	96	96	96	96
	Missing	13	13	13	13	13	13
Mean	3.20	3.08	3.17	3.29	3.22	3.28	40.89
Median	3.00	3:00	3.00	3.00	3.00	3.00	42.00
Standard Deviation	0.790	0.804	0.829	0.794	0.797	0.706	7.322
Range	3	3	3	3	3	3	39

Source: Processed by Researchers (2025)

Descriptive statistics show that all items in variable X have a total of 96 valid data points. The *mean* value ranges from 3.00 to 3.29, while the *median* value of all items is 3.00. The *standard deviation* value ranges from 0.706 to 0.976, with a *range* value of 3.

The total score for variable X has a *mean* value of 40.89, a *median* value of 42.00, a *standard deviation* value of 7.322, and a *range* value of 39.

2. Variable Y (Community Compliance in Disposing of Waste in Its Place)

**Table 4: Descriptive Statistics Results for Variable Y (Community Compliance in Disposing of Waste in Its Place)**

	Y1.1	Y1.2	Y1.3	Y1.4	Y1.5	Y1.6
<b>N Valid</b>	96	96	96	96	96	96
<b>Missing</b>	13	13	13	13	13	13
<b>Mean</b>	3.26	3.24	3.21	3.23	3.21	3.32
<b>Median</b>	3.00	3.00	3.00	3.00	3.00	3.00
<b>Standard Deviation</b>	0.798	0.750	0.753	0.774	0.794	0.775
<b>Range</b>	3	3	3	3	3	3
	Y1.7	Y1.8	Y1.9	Y1.10	Y1.11	Total Y1
<b>N Valid</b>	96	96	96	96	96	96
<b>Missing</b>	13	13	13	13	13	13
<b>Mean</b>	3.13	3.19	3.14	3.15	3.05	38.54
<b>Median</b>	3.00	3.00	3.00	3.00	3.00	39.00
<b>Standard Deviation</b>	0.785	0.786	0.841	0.858	0.863	6.720
<b>Range</b>	3	3	3	3	3	33

Source: Processed by Researchers (2025)

All items in variable Y have a total of 96 valid data points. The *mean* value ranges from 3.05 to 3.32, while the *median* of all items is 3.00. The *standard deviation* values range from 0.750 to 0.863, with a *range* value of 3. The total score for variable Y has a *mean* value of 38.54, a *median* value of 39.00, a *standard deviation* value of 6.720, and a *range* value of 33.

**Pearson Correlation Test**

**Table 5: Pearson Correlation Test Results**

	Availability of Waste Disposal Facilities	Community Compliance in Disposing of Waste in the Right Place
<b>Availability of Waste Disposal Facilities</b>	Pearson Correlation	1
	Sig. (2-tailed)	.648**
	N	96

<b>Community Compliance in Disposing Waste in the Right Place</b>	Pearson Correlation	.648**	1
	Sig. (2-tailed)	0.000	
	N	96	96

Source: Processed by Researchers (2025)

The *Pearson Correlation* test results show that the correlation coefficient between variables X and Y is 0.648, with a significance value of 0.000. The amount of data used in the analysis is 96 respondents.

### Simple Linear Regression Test

#### 1. Model Summary (R, R Square, Adjusted R Square)

**Table 6: Model Summary Results**

Model	R	R Square	Adjusted R-Square	Standard Error of the Estimate	Change Statistics				
					R Square Change	F Change	df 1	df 2	Sig. F Change
1	.648 <sup>a</sup>	0.420	0.414	5.143	0.420	68,186	1	94	0.000

#### a. Predictors: (Constant), Total X1

Source: Processed by the Researcher (2025)

The model summary results show that the *R* value is 0.648, the *R Square* value is 0.420, and the *Adjusted R Square* value is 0.414. The *Standard Error of the Estimate* value is recorded at 5.143. The *F Change* value is recorded at 68.186, with a significance level of 0.000.

#### 2. ANOVA (F Test)

**Table 7: ANOVA Results <sup>a</sup>(F Test)**

	Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	1803.529	1	1803.529	68,186	.000 <sup>b</sup>
	Residual	2486.304	94	26,450		
	Total	4,289,833	95			

#### a. Dependent Variable: Total Y1

#### b. Predictors: (Constant), Total X1

Source: Processed by the Researcher (2025)

The ANOVA results show that the *Regression Sum of Squares* value is 1803.529, the *Residual Sum of Squares* value is 2486.304, and the total value is 4289.833. The

degrees of freedom consist of 1 for regression and 94 for residual. The *calculated F* value is 68.186, with a significance value of 0.000.

a. Coefficients (Regression Coefficients, t-value, Significance)

**Table 8: Coefficients Results<sup>a</sup>**

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.	95.0% Confidence Interval for B	
	B	Std. Error	Beta			Lower Bound	Upper Bound
1 (Constant)	14.213	2,993		4,750	0	8,271	
Availability of Waste Disposal Facilities	0.595	0.072	0.648	8.257	0.000	0.452	0.648

a. Dependent Variable: Total Y1

Source: Processed by the Researcher (2025)

The coefficient analysis results show that the constant value is 14.213, with a *t-value* of 4.750 and a significance value of 0.000. Variable X has a regression coefficient value of 0.595, a *standard error* value of 0.072, a *t-value* of 8.257, and a significance value of 0.000. The 95% confidence interval is in the range of 0.452 to 0.648.

## DISCUSSION

### Interpretation of Findings

The regression analysis results show that the availability of trash facilities has a positive and significant effect on community compliance in disposing of trash in its proper place at Benteng Field Medan. The regression coefficient (B) = 0.595 illustrates that every improvement in the quality or completeness of trash facilities will be followed by a significant increase in community compliance. The *t-value* = 8.257 with a *p-value* = 0.000 confirms that this effect is truly significant and not coincidental. In other words, the better the facilities available, in terms of number, physical condition, placement, and ease of access, the more likely visitors are to comply with proper waste disposal. The *R<sup>2</sup> value* = 0.420 shows that the availability of trash facilities contributes 42% to the variation in public compliance. This percentage is quite large for social research, which generally involves many other factors. This indicates that the existence of physical facilities is one of the most important structural factors in shaping public hygiene behavior. Facilities that are easy to find, clearly visible, clean, and well-maintained make it easier for the community to act correctly, thereby reducing the likelihood of littering. These regression findings are also reinforced by the Pearson correlation results, which show a *coefficient* value of 0.648, with a significance level of 0.000. This value indicates a strong and positive relationship between the two variables. This means that the higher the quality of waste facilities, the higher the

level of community compliance. This significant relationship shows that hygiene behavior is not only influenced by personal awareness or norms, but also by environmental conditions that provide physical support to facilitate such actions.

Descriptive statistical results also provide additional context to these findings. The average respondent rating for the availability of waste disposal facilities ranged from 3.00 to 3.29, indicating that the facilities were considered quite good, although not yet optimal. Meanwhile, the average rating for community compliance ranged from 3.05 to 3.32, indicating that compliance behavior was also quite good. The consistent median value of 3 for both variables indicates that respondents' assessments tend to be homogeneous, thereby strengthening the validity of the relationship between the two variables. The majority of respondents aged 15–20 also tend to be responsive to visual factors such as the design and location of facilities, making the presence of visible and easily accessible trash bins increasingly relevant. On the other hand, the  $R^2$  value also shows that 58% of the variation in community compliance is influenced by factors outside this research model, such as social norms, supervision, the behavior of others around them, management policies, the level of crowding, and the overall design of the environment. This shows that trash facilities are an important factor, but not the only determinant of community behavior in the context of cleanliness.

Overall, the findings of this study show that the community of Benteng Field Medan responds positively to the sanitation facilities provided. A supportive physical environment, especially adequate and strategically located waste disposal facilities, serves not as a complement, but as a powerful behavioral instrument in encouraging the community to maintain cleanliness. Well-planned waste disposal facilities can improve compliance without having to rely on strict supervision or repressive enforcement of rules.

### **Relationship to Literature**

The findings of this study do not stand alone but are in line with a number of previous theories and studies that highlight the role of physical facilities in shaping cleanliness behavior. Conceptually, these findings are in line with the principle of *pragmatic behavior*, namely the human tendency to choose the easiest course of action. When trash bins are located far away, out of sight, or in poor condition, people tend to litter because it requires additional effort to find a suitable facility. However, when facilities are available within close proximity, clean, and well-maintained, people are more inclined to act according to the rules because doing so becomes the easiest and most logical choice.

The findings of this study are in line with the *Environmental Behavior Theory* proposed by (Hungerford & Volk, 1990), which explains that environmental behavior is influenced by a combination of knowledge (basic variables), a sense of responsibility (ownership variables), and the availability of support or opportunities from the environment (empowerment variables). In relation to this study, the availability of complete, well-maintained, and easily accessible waste disposal facilities is a form of physical environmental support that is a key factor in encouraging proper waste disposal behavior. Although the community's knowledge and awareness of the importance of

cleanliness already exist, this behavior is only consistently realized when the environment provides the means to facilitate such actions. The existence of adequate facilities provides *an opportunity to act* as described in the empowerment variable so that the community is more encouraged to engage in pro-environmental behavior. In line with this theory, previous research conducted by (Mutmainah & Wardani, 2024) also explains that waste disposal behavior is not only influenced by internal factors such as awareness and perception, but also by external factors, such as the availability of waste disposal facilities. This supports the findings of this study, which show that the more complete and accessible the waste disposal facilities are, the higher the community's compliance in disposing of waste in its proper place.

The findings of this study are also supported by Nudge Theory introduced by (Thaler & Sunstein, 2008), which explains that small changes in environmental design can encourage people to behave in certain ways without coercion. In this case, the placement of visible trash bins, attractive designs, and good accessibility are forms of nudges that serve as visual and physical cues to influence people's behavior. Research by (Cruz et al., 2025) also supports this theory and the findings of this study, which state that the visibility, design, and strategic placement of trash bins have a significant effect on the trash disposal behavior of students. These findings are consistent with the regression results in this study, which show that improving the quality of trash bin facilities at Benteng Field Medan can increase public compliance in disposing of trash. The research by (Abdul et al., 2019), which examined the behavior of visitors to green spaces in Sarawak, also showed that the availability of sanitation facilities, ease of use, and the condition of trash bins are closely related to the level of littering. This research reinforces the results of the current study that adequate and well-maintained facilities can reduce littering behavior.

### **Limitations of the Study**

Although this study produced consistent results and was supported by previous theories and research, there were still several limitations in conducting this study. These limitations serve as a benchmark for the transparency of the research conducted. First, this study faced limitations in the sampling method, which used *accidental sampling*, random sampling in a study because the population of visitors to Benteng Field was uncertain or not accurately known, making it impossible for researchers to ensure that the sample taken truly represented the entire population of visitors. Visitors who were willing to be respondents tended to be individuals who had time or interest in the topic being studied. In addition, visitor characteristics may vary depending on the time of visit. For example, visitors in the morning are generally people who exercise, while those who come during the day or at night are usually recreational visitors. These differences in characteristics are not fully covered in the sample design, so the research results must be generalized with caution.

Second, this study highlights one main factor, namely the availability of trash bins as an element that influences public compliance. However, public behavior is actually a complex issue and is influenced by various internal and external factors. Internal aspects such as norms, culture, rules, understanding, and level of environmental awareness were

not measured in this study. On the other hand, external factors such as legal regulations, the presence of sanitation officers, the level of crowding, the design of public areas, and social supervision also have the potential to have a significant impact. The  $R^2$  value of 0.420 indicates that there is still about 58% variation in compliance behavior explained by other factors not included in the research model. Therefore, this study cannot provide a comprehensive picture of the factors that determine public behavior as a whole.

Third, this study was conducted in one public space, namely the Benteng Medan area. Each public space has different physical, social, and cultural characteristics, so the impact of facilities on public compliance behavior may differ in other locations. Public spaces with modern designs, higher levels of supervision, or different community cultures are likely to exhibit varying patterns of behavior. Therefore, the results of this study cannot be widely applied to other urban public spaces without additional comparative research. Fourth, this study is *cross-sectional*, meaning that it only records conditions at a specific point in time. The community's attitude toward waste management may vary due to certain activities or changes in facilities in the environment. For example, during the study, certain events may have occurred that increased the number of visitors or increased cleaning activities by officers, which could have inadvertently influenced the behavior of respondents. Therefore, the results of this study cannot reflect changes in public behavior over a long period of time.

Recognizing these limitations, the researchers hope that future studies will expand the scope by using other methods, adding new variables, and combining quantitative and qualitative research approaches. Nevertheless, this study still makes a significant contribution based on data regarding the role of waste facilities in increasing public compliance, especially in the context of urban public spaces such as Benteng Field Medan.

## **Implications**

### **1. Theoretical Implications**

This study reinforces environmental behavior theory and Nudge Theory by showing that physical elements in public spaces, particularly waste facilities, have a significant effect on community hygiene behavior. These findings provide empirical support that simple interventions in the form of facility arrangement can improve pro-environmental behavior. In addition, this study adds empirical evidence that community compliance behavior is not only determined by internal factors, but is also greatly influenced by physical environmental conditions. This opens up opportunities for further research to develop a hygiene behavior model that combines internal and external factors more comprehensively.

### **2. Practical Implications**

The results of this study provide practical recommendations for the Medan City Government and public space managers, namely:

- a) Increasing the number of trash bins at points of intense activity, such as sports areas, culinary centers, and gathering zones.

- b) Improving the physical condition of trash bins, including cleanliness, materials, and capacity, to make them more convenient to use.
- c) Strategic placement and high visibility, such as on pedestrian paths, near entrances, and in recreational areas.
- d) Implementation of visual nudges, such as striking colors, educational labels, or directional signs to help the public locate facilities.

These interventions have the potential to increase public compliance without the need for intensive enforcement.

### 3. Implications for Future Research

Future research could add other variables such as social norms, awareness levels, enforcement, or public space design; compare multiple public spaces simultaneously to observe differences in behavioral patterns; use mixed-method approaches to explore the reasons behind behaviors in greater depth; and conduct longitudinal studies to observe behavioral changes over the long term.

## CONCLUSION

The results show that the availability of trash facilities has a positive effect on the level of public compliance in disposing of trash in its proper place at Benteng Field, Medan. Adequate facilities in terms of quantity, condition, and placement have been proven to encourage visitors to be more disciplined in maintaining the cleanliness of public areas. These findings explain that the low compliance observed previously was related to the suboptimal sanitation facilities available in the field. Overall, community compliance behavior is already in the fairly good category, although it is still influenced by other factors such as habits, social norms, and environmental supervision. Therefore, improving the quality of waste disposal facilities is an important step in supporting more consistent cleanliness behavior in public spaces.

Therefore, several suggestions can be made, including: improving the quality and number of trash bins in the Benteng Field area, Medan, especially in locations that are crowded, easily accessible, and not remote. Trash bin facilities should also be designed with an attractive and informative visual appearance to make it easier for visitors to dispose of trash according to its category. This effort is expected to be a form of government response in optimizing sanitation facilities in public spaces, thereby increasing public compliance in disposing of waste in its proper place and supporting the creation of clean and sustainable public spaces in Benteng Field, Medan.

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