Analysis of People's Behavior in Managing Domestic Solid Waste in Alam Barajo District, Jambi City

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ABSTRACT

Sampah merupakan masalah faktual yang dihadapi oleh masyarakat khususnya di kawasan permukiman perkotaan. Hal tersebut juga dialami oleh masyarakat di Kecamatan Alam Barajo Kota Jambi dimana produksi sampah rumah tangga lebih dari 68.567 kg/hari. Penelitian ini bertujuan untuk mengetahui perilaku warga Kecamatan Alam Barajo dalam mengelola sampah padat rumah tangga dan pengaruh variabel jenis kelamin, usia, tingkat pendidikan, pengetahuan, dan sikap terhadap perilaku masyarakat. Penelitian ini merupakan penelitian survei analitik dengan pendekatan cross sectional dengan 100 responden. Teknik pengambilan sampel menggunakan stratified random sampling dengan instrumen kuesioner. Data yang dikumpulkan adalah jenis kelamin, umur, tingkat pendidikan, pengetahuan dan sikap. Data dianalisis menggunakan uji chi-square dengan derajat kepercayaan 95%. Hasil penelitian menunjukkan bahwa ada hubungan antara jenis kelamin (0,017), usia (0,006), tingkat pendidikan (0,002), pengetahuan (0,002) dan sikap (0,000) terhadap perilaku warga dalam pengelolaan sampah padat rumah tangga. Disimpulkan bahwa perilaku warga Kecamatan Alam Barajo Kota Jambi dalam mengelola sampah rumah tangga tergolong baik dimana yang paling banyak bertugas membuang sampah dalam rumah tangga adalah pemuda (usia dibawah 60 tahun) yang berpendidikan dengan tingkat pengetahuan yang cukup. Terdapat hubungan yang signifikan antara jenis kelamin, usia, tingkat pendidikan, pengetahuan dan sikap warga terhadap perilaku warga dalam mengelola limbah padat rumah tangga

Kata kuci: Sikap, Kecamatan Alam Barajo, Pendidikan, Pengetahuan, Tingkah Laku

ABSTRAK

The problem of solid waste is a fact problem faced by the community, especially in urban residential areas. It is also faced by the community in Alam Barajo District, Jambi City, where household waste production is more than 68.567 kg/day. This study was aimed to determine the behavior of the Alam Barajo District residents in managing solid household waste and the effect of gender, age, level of education, knowledge, and attitude variables on community behavior. This study was an analytic survey using a cross-sectional approach with 100 respondents. The sampling technique used stratified random sampling with a questionnaire as an instrument. The data collected were gender, age, level of education, knowledge, and attitude. Data were analyzed using a chi-square test with a 95% confidence degree. The results showed that there was a relationship between gender (0.017), age (0.006), level of education (0.002), knowledge (0.002), and attitude (0.000) towards the behavior of residents in solid households waste management. It was concluded that the behavior of the residents of Alam Barajo District, Jambi City in managing household solid waste was categorized as good where the most tasked with disposing of waste in the household were youth male (under 60 years of age) who were educated with a sufficient level of knowledge. There was a significant relationship between gender, age, level of education, knowledge, and attitudes of residents towards residents' behavior in managing solid household waste.

Keywords: Alam Barajo District, Attitude, Behavior, Education

1. Introduction

The rapid advancement of science and technology and high world population growth has caused massive exploitation of natural resources to satiate human's complex needs. As the human's necessities remarkably increase, their living consumption reasonably inclines. When these necessities keep remarkably increasing for years, many living problems emerge such as solid waste. Solid waste disposals become a major problem faced by residents of big cities in Indonesia. Therefore, proper management of waste disposals is crucial to creating a conducive city climate. Jambi City and other cities in Indonesia also face many waste disposal problems. These problems have happened in many cities in Indonesia for decades. Cities are known as the center of economic activities, people's residences,

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educational practices, etc. the cities are expected to function as the center of development and propel surrounding rural areas to develop significantly. Villages can gradually transform into cities when their development in many sectors remarkably increases (Sinulingga, 1999). Cities as the center of development for their hinterland aim to minimize high population density in big cities.

As the city areas expand geographically and their population rate keeps rising, citizens' activities considerably increase. The citizens necessitate public services and basic infrastructure like clean water, water disposal, drainage, waste disposal, and so on. The discrepancy between city development and citizens' living necessity rates can alleviate services for city infrastructure (Nurmandi, 1999). The increase of society's activities in cities causes waste disposals to increase in quantity and quality. Consequently, when waste disposals are improperly managed, the quality of the environment considerably decreases.

The population rate in Jambi City grows rapidly. The number of residents in Jambi City reached 379,168 persons in 2000. These numbers raised to 529,118 persons in 2010 and 569,331 persons in 2013. The population census reported a 7.6 % rise in the number of populations in three years. The total land area of Jambi City is reported 205 km2, however, it is only 175 km2 or approximately 17,500 acres. This means that the land area of Tanah Pilih Pusako Betuah in Jambi City has greatly reduced. The population density in Jambi City reached 2,576 persons/ km2. The highest population density occurred in Alam Barajo District which was 97,953 persons or 3.28 % (Badan Pusat Statistik Provinsi Jambi, 2021).

Known as one of the big cities in Indonesia, Jambi City faces a variety of complicated living problems, including environmental problems. For instance, waste disposal problems in this city were caused by poor disposal management. These disposal management problems must be prioritized to solve because population density and waste disposal rates in this city keep complicatedly increasing. Alam Barajo District, out of 11 districts in this city, has the largest population which reached 97,954 persons in 2020 (Badan Pusat Statistik Provinsi Jambi, 2021). Jambi City Environmental Office reported that Alam Barajo District disposes of the highest number of wastes among other districts which reached 68,567.9 kg/day. These waste disposal problems occurred because of some factors, such as residents' bad behavior and attitude towards waste disposal, the paucity of human resources in waste disposal management, funding insufficiency, and small numbers of waste dump trucks (Dinas Lingkungan hidup Kota Jambi, 2021). The total production of waste in Jambi City is described in Table 1.

Waste refers to any forms of rubbish disposed of inhuman activities and animal excrement. Solid waste disposal continually increases as people litter. It is impossible to stop humans from disposing of solid wastes, but the wastes can be properly managed through 3R –reduce, reuse, and recycle. The increase of society's living consumption has caused the continual increase of waste disposals in Indonesia. The consumption rate of manufactured and retailed goods, as well as plastic packed foods and beverages, have significantly caused plastic waste problems in residences and the environmental ecosystem.

The environment and forestry ministry of the Indonesian Republic reported that total waste disposals or waste production reached 67.8 tons or 0.68 kg/person/day in 2019. The composition of waste in Indonesia included mostly organic waste for 60 %, plastic waste for 14 %, and other wastes for 36 % (Kementerian Lingkungan Hidup dan Kehutanan RI, 2019).

The daily production of individual waste and household waste is inseparable from human activities. Jambi City Regulation No. 5 of 2020 states that household wastes account for rubbish thrown after daily household activities, excluding fecal materials and specific waste. Office of Sanitary, Park, and Cemetery in Jambi City reported that total waste disposed from residents' households in Jambi City to final landfill (TPA) reached 75-91 %, 1-7 % was dumped to 3-R temporary landfill (TPS3R/BS), 0.05-0.1 % of wastes was plastic packed before disposed to landfill, and 2.8-28.95 % waste was littered (Dinas Kebersihan Pertamanan dan Pemakaman Kota Jambi, 2021). Meanwhile, solid wastes in Alam Barajo District were disposed to final landfills about 75 % of total waste, 0.1 % was dumped to 3-R temporary landfill (TPS3R/BS) inside plastic bags, and 19.9 % was littered (Dinas Lingkungan Hidup Kota Jambi, 2021).

A survey done in Alam Barajo District reported that the residents were slightly concerned about waste disposal management in their environment. Both organic and inorganic solid waste were littered unhealthily and deteriorated the environmental cleanliness. Some waste litter was commonly found on the streets and pedestrian areas in Alam Barajo District. Those wastes were littered by riders, pedestrians, and street vendors. Those wastes not only caused troubles for pedestrians and riders but also downgraded the image of Jambi City as the center of local government.

This study aimed to identify residents' behavior about solid household waste management in Alam Barajo District. Therefore, this study proposed two research questions; how was residents' behavior in managing solid household waste in Alam Barajo District in terms of attitude, gender, level of education, age, and knowledge about waste management and was residents' behavior in solid household waste management in Alam Barajo district correlated with their gender, age, level of education, knowledge about waste management, and attitude?

Table 1. Total Waste Production in Jambi City in 2020

No	District	Total Population (person)	Waste volume (Kg/person/day)	Total Waste (Kg/day)
1	2	3	4	5 = 3*4
1	Kota Baru	78,048	0.70	54,633.47
2	Alam Barajo	97,954	0.70	68,567.90
3	Jambi Selatan	63,173	0.70	44,221.11
4	Pal Merah	91,779	0.70	64,245.09
5	Jelutung	65,018	0.70	45.512,64
6	Pasar Jambi	12,979	0.70	9,085.36
7	Telanaipura	51,648	0.70	36.153,51
8	Danau Sipin	49,340	0.70	34,537.86
9	Danau Teluk	12,440	0.70	8,708.05
10	Pelayangan	13,921	0.70	9,744.96
11	Jambi Timur	68,623	0.70	48,036.13
	Jumlah	**604,923**		**423,446.09**

Source: Dinas Lingkungan Hidup Kota Jambi, 2021

2. Method

2.1. Data Source

This study collected both primary data and secondary data to answer the research question(s). Primary data were gathered directly from residents of Alam Barajo District in Jambi City. Secondary data were obtained from relevant agencies or government offices, such as Jambi City Office of Sanitary, Park, and Cemetery, and BPS-Statistics Indonesia in Jambi Province.

2.2. Sampling Procedure

This study employed stratified random sampling for residents in Alam Barajo District. Samples were 30,321 heads of households inhabiting five sub-districts in Alam Barajo District. Those samples were taken from 212 neighborhood units in the district and the sample size was determined under calculation proposed by Sugiono (2006) with 10 % accuracy. The total samples were 100 family heads.

3. Result and Discussion

3.1. Univariate Analysis

Univariate analysis administered in this study showed the distribution of residents' attitudes in managing solid household wastes in Alam Barajo District (see Table 2). The result of the analysis showed that 62 % of family heads had good behavior and managed the solid waste properly by disposing waste separately in either organic waste or inorganic waste and putting those wastes in the assigned temporary landfills between 6 P.M. and 6 A.M daily as instructed by Jambi City government. On the contrary, 38 % of family heads showed bad behavior, behaved improperly in disposing the waste usually performed these characteristics: littered the waste, threw the waste into the river or drainage nearby, and fired the waste near home. They were not providing rubbish bins at home, littering the wastes, and putting those wastes anytime in the temporary landfills. Those who these bad characteristics have caused many health problems related to air pollution and respiratory problems.

The frequency distribution of residents' attitudes in managing solid waste based on gender, level of eduaction, age, and knowledge level is shown in Table 3. The Table showed that out of total samples, 67 % of participants were male and the other 33 % were female. Most residents earned university degrees (bachelor, master, and doctoral degrees) which was 85 person (85 %), whereas 15 % of residents graduated from secondary education or less. According to age group, residents' age was categorized adult (51 %) and elders (49%). Mostly, the residents had sufficient knowledge (66 %), whereas 34 % belonged to residents with deficient knowledge in solid waste management.

Table 2. The Distribution of residents' attitude in managing solid household waste in Alam Barajo District

Attitude	Frequency (family heads)	Percentage
Bad (careless)	38	38
Good	62	62
Total	100	100

Table 3. Frequency of samples in managing solid household wastes in Alam Barajo District by gender, level of eduaction, age, and knowledge level

	Frequency (family heads)	Percentage
Gender		
Male	67	67
Female	33	33
Total	100	100
Level of education		
High (≥ bachelor)	85	85
Low (≤ secondary school)	15	15
Total	100	100
Age group		
Adults (≤ 60 years old)	51	51
Elders (> 60 years old)	49	49
Total	100	100
Knowledge level		
Deficient	34	34
Sufficient	66	66
Total	100	100

3.2. Bivariate Analysis

This study conducted bivariate test to find out if there is a relationship between independent variables (gender, age, level of education, and attitude) and dependent variables (the behavior of residents in managing solid household wastes in Alam Barajo District). This test use Chi Square with 95 % confidence degree. Bivariate analysis per independent variable was conducted respectively to found out the relationship between each independent variable and the dependent variable. The relationship between the independent and dependent variables is described in some Tables 4. Table 4 shows that there was a relationship between gender and residents' behavior in disposing solid household wastes. There were 47 male respondents (70.1 %) who managed the solid waste disposal well, whereas 18 female respondents (54.5 %) showed bad behavior in solid waste management. Given the P-value = 0.017 (≤ 0.05), this result indicated that there was a difference in proportion between good and bad behavior shown by male and female respondents in solid household waste. It means that there was significant relationship between gender and residents' behavior in managing solid household waste in Alam Barajo District, Jambi City). This finding contradicted with two previous studies. First, Beni *et al.* (2014) stated that gender did not correlate with residents' behavior in waste disposal management.

Table 4. The relationship between gender and resident's behavior in solid household waste management in Alam Barajo District

No		Behavior				Total		P- Value
		Bad		Good				
		Total	%	Total	%	Total	%	
1.	Female	18	54.5	15	45.5	33	100	
2.	Male	20	29.9	47	70.1	67	100	0.017
	Total	38	38.0	62	62.0	100	100	

Table 5. The relationship between age and residents' behavior in solid household waste disposal in Alam Barajo District.

No	Age	Behavior				Total		P-Value
		Bad		Good				
		Total	%	Total	%	Total	%	
1.	Adult	26	51.0	25	49.0	51	100	
2.	Elders	12	24.5	37	75.5	49	100	0.006
	Total	38	38.0	62	62.0	100	100	

Then, Lestari *et al.* (2018) found out that there was insignificant relationship between gender and behavior in solid waste disposal management although the test gained P-value = 0.078 (≥ 0.078) showing 100 % of female participants managed the waste well. This behavior shown as result of most participants were housewives who generally participated in a program of empowering family welfare (*PKK*) to organize environmental management in their neighborhood. On the contrary, this study found out that male respondents showed good behavior in solid household waste management. This means that male residents in Alam Barajo District realized the importance of waste management and have sufficient knowledge about waste management: definition, examples, and characteristics of wastes, waste disposal procedure, disease-transmitting animals, and compostable waste. Moreover, the role of men as the family head, who should disseminate the importance of waste disposal management in their family and other residents in the neighborhood, upgraded their own knowledge about waste. They also participated in neighboring events and community organization more than women contributed to the enhancement of their knowledge.

The relationship between age and residents' behavior in solid household waste management in Alam Barajo District is depicted in Table 5. It is shown in Table 5 that 37 elderly respondents (75.5%) showed good behavior in managing solid household wastes, whereas 26 adult respondents (51 %) showed bad behavior. Given the P-value = 0.006 (≤ 0.05), this result indicated that there was a difference in proportion between good and bad behavior shown by adult and elderly respondents in solid household waste management. It means that there was significant relationship between age and residents' behavior in managing solid household waste in Alam Barajo District, Jambi City. This finding contradicted with studies done by Sepdianti (2006) and Lestari *et al.* (2018) which reported that there was no significant relationship between age and residents' behavior in waste management. These contradicted findings were probably stemmed from respondents' differences in age, knowledge about waste, and daily activities. This study found out that when respondents got older, their knowledge about waste disposal was upgraded. As they realized the negative impacts of waste on their life, they attempted to manage waste disposal well to maintain a clean and healthy environment.

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The relationship between level of knowledge and residents' behavior in managing solid household waste in Alam Barajo District is described in Table 7. This Table indicated that 48 respondents (72.7 %) with sufficient knowledge about solid waste management showed good behavior, whereas 20 respondents (58.8%) with deficient knowledge showed bad behavior in managing solid household waste. Given the P-value = 0.002 (≤ 0.05), this result indicated that there was a difference in proportion between good and bad behavior shown by respondents with either deficient or sufficient knowledge in solid household waste management. It means that there was significant relationship between level of knowledge and residents' behavior in managing solid household waste in Alam Barajo District, Jambi City. This finding is aligned with several studies done by Notoadmojo (2011), Mulasari & Ririn (2013), Posmaningsih (2016), Saputra (2017), and Lestari *et al.* (2018). Those studies reported that level of knowledge in solid household waste management was significantly associated with their behavior in waste disposal. The extent to which knowledge about waste management is gained highly affects people's behavior about waste disposal (Notoatmodjo, 2011), as knowledge can be upgraded through experience, training, and information disseminating program. An information disseminating program held in Alam Barajo District aimed to disseminate knowledge about solid waste management and its impacts to environment.

Table 6. The relationship between level of education and residents' behavior in solid household waste management in Alam Barajo District

No	Level of education	Behavior				Total		P-Value
		Bad		Good				
		Total	%	Total	%	Total	%	
1.	Low	11	73.3	4	26.7	15	100	
2.	High	27	31.8	58	68.2	85	100	0.002
	Total	38	38.0	62	62.0	100	100	

Table 7. The relationship between level of knowledge and residents' behavior in solid household waste management in Alam Barajo District

No	Level of knowledge	Behavior				Total		P-Value
		Bad		Good				
		Total	%	Total	%	Total	%	
1.	Deficient	20	58.8	14	41.2	34	100	
2.	Sufficient	18	27.3	48	72.7	66	100	0.002
	Total	38	38.0	62	62.0	100	100	

Table 8. The relationship between attitude and residents' behavior in solid household waste management in Alam Barajo District

No	Attitude	Behavior				Total		P-Value
		Bad		Good				
		Total	%	Total	%	Total	%	
1.	Bad	14	73.7	5	26.3	19	100	
2.	Good	24	29.6	57	70.4	81	100	0.000
	Total	38	38.0	62	62.0	100	100	

This program was conducted to develop residents' awareness to maintain clean and healthy community. The knowledge included characteristics of solid waste, disease-transmitting animals, negative effects of waste litters, proper management in disposing solid waste, and available landfills. This program also trained the residents about compostable waste and waste recycle. After participating in this program, the residents' knowledge about waste management increased up to 72.7 %. However, some residents whose sufficient knowledge still managed solid waste untidily due to their low awareness about the importance of proper waste management and negative impacts of littering for their surroundings.

. The relationship between attitude and residents' behavior in solid household waste management in Alam Barajo District is shown in Table 8. The study found out that 57 respondents (70.4 %) showed good attitude about solid waste management, whereas 14 respondents (73.7) showed bad attitude. Given the P-value = 0.002 (≤ 0.05), this result indicated that there was a difference in proportion between good and bad attitude shown by respondents in solid household waste management. It means that there was significant relationship between attitude and residents' behavior in managing solid household waste in Alam Barajo District, Jambi City. This finding is aligned with some previous studies. First, Lestari (2018) reported that people's attitude was significantly correlated with their behavior in solid household waste management. Second, Kamal (2009) asserted that community's good attitude in managing solid waste is associated with their positive behavior. Then, studies conducted by Posmaningsih (2016) and Wildawati & Hasnita (2019) indicated that there was a relationship between attitude and residents' participation in waste management. In addition, Syam (2016) asserted that community's attitude was highly associated with their behavior in managing waste disposal in Loli Tasiburi Banawa village at Donggala regency. Last, Hutabarat *et al.* (2015) pointed out that people's sufficient knowledge about waste management affects their attitude about waste.

This study indicated that most residents in Alam Barajo District showed good attitude and managed solid household waste disposal well (70.4 %). These residents actively participated in community activities of cleaning the neighborhood because they realized the importance of healthy environment and the negative effects of waste littering for their surroundings. However, some residents were still unaware of waste impacts to their life. Therefore, it is necessary for community members, and stakeholders to actively disseminate information about proper waste management. The local government should enact regulations about waste management which enforces community's awareness about waste disposal and give strict sanction to anyone who does waste littering. One of the regulations is Local Government Regulation of Jambi City (PERDA) No. 5, 2020.

4. Conclusion

It was concluded that the behavior of the residents of Alam Barajo District, Jambi City in managing household solid waste was categorized as good where the most tasked with disposing of waste in the household were youth male (under 60 years of age) who were educated with a sufficient level of knowledge. There was a significant relationship between gender, age, level of education, knowledge, and attitudes of residents towards residents' behavior in managing solid household waste.

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