

Analysis of Knowledge and Awareness of Community Behavior in Waste Management in the City of Banda Aceh

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Abstract— Introduction: Poor waste management will make waste a breeding ground for disease vectors, such as flies, mice, insects and fungi. Dengue fever is caused by the *Aedes aegypti* vector which lives and breeds in the environment, poor waste management, lots of cans, used tires and plastic in standing water. From 2018 to 2022 the average waste production in Banda Aceh City continues to increase every year. This increase is very significant, where in 2018 the amount of waste production was around 66,323.92 tonnes, moving up to 87,377.19 at the end of 2022. **Objective:** The aim of the research is to analyze the relationship between knowledge and awareness of community behavior in waste management in Banda Aceh City. **Methodology:** The type of research that will be used is quantitative research using analytical research methods with a cross sectional design. The target population in this research is Heads of Families in Banda Aceh City, numbering 70,183, while the sample that will be studied using the Isaac and Michael formula is 334 samples. Data was processed univariately, bivariately and multivariately. **Results:** The research results showed that there was a relationship between education (P value = 0.019), knowledge (P value = 0.001), awareness (P value = 0.001), and community behavior in waste management, while gender, age and occupation had no relationship to community behavior in waste management. Multivariately, the most dominant variables related to community behavior in waste management are awareness (0.001, OR: 2.201) and knowledge (0.014, OR: 1.856). **Recommendation:** The results of this study show that the most dominant factors related to community behavior in waste management are awareness and knowledge.

Keywords—Knowledge, Awareness, Behavior, Waste Management.

I. INTRODUCTION

In efforts to increase the Human Development Index (HDI), of course health status is an important element for the Indonesian nation. Improving the quality of health is not only determined by health services, but what is more dominant is environmental conditions and community behavior. A good and healthy environment is very important in supporting human survival (Setyowati et al., 2020).

When maintaining health, people need a clean and free environment which can come from waste. This clean environment is certainly created by people's awareness of the environment around where they live. The main problem with environmental cleanliness is waste that is not properly organized. A clean environment will be very visible when it is free from existing waste (Agung, 2018).

Environmental cleanliness is not only created by humans' ability to keep their environment clean but also by how humans are able to manage waste so that it does not pollute the environment itself. (Zitri et al., 2022). Human life with all its routines can cause environmental pollution both on a small and large scale.

Waste production in daily life is a factor in environmental pollution. Poor waste management will make waste a breeding ground for disease vectors, such as flies, mice, insects and fungi. Dengue fever is caused by the *Aedes aegypti* vector which lives and breeds in the environment, poor waste management, lots of cans, used tires and plastic in standing water. Shortness of breath and eye diseases are caused by the strong smell of garbage which contains ammonia hydrogen, sulphide and methylmercaptan.

Apart from that, inaccurate waste management can also cause digestive tract diseases (diarrhea, cholera and typhus) due to the large number of flies that live and breed in the environment where waste is accumulated. (Catur Puspawati, 2019) Waste management is a public service that will provide benefits to every human being. Even though the presence of waste will cause huge public costs in handling it, waste services cannot be limited only to people who pay waste fees. Waste management requires community involvement/participation in all aspects (Sri Wahyuni 2018).

Based on the World Bank report "What a waste: A global review of solid waste management" shows that waste will increase by 70% in 2025, which is an increase of 0.9 billion tonnes or 2.2 billion tonnes from the initial 1, 3 billion tonnes annually. With a population of 237 million people, Indonesia is the fourth most populous country in the world. Every day, the waste produced reaches 130,000 tons because the population continues to increase. Indonesia has a population of 72,500,000 people with poor sanitation, of which 240 cities have waste management problems. (Azizah 2023).

At the end of February 2023, the city of Banda Aceh again received the highest award in the environmental sector, namely the Adipura trophy for the 10th time. However, until now the city of Banda Aceh still has problems with the environment, including a lack of handling of waste problems and problems with the disposal of both solid and liquid waste, such as those found in Kampong Jawa. Garbage from street vendors around the two roads entering the port can be seen piled up on the road, as well as in other coastal areas where a lot of rubbish accumulates because Banda Aceh is the capital of Aceh province, which of course has densely populated settlements,

which has an impact on increasing production. waste, especially household waste.

Based on data obtained from DLHK3 (Banda Aceh City Environment, Hygiene and Beautification Service), the population in 2022 in Banda Aceh City will be 276,304 people, producing an average of 0.9 kg of waste per person per day. The daily volume of waste generated by the city of Banda Aceh is 248,673.6 tonnes/day, while that which goes to the Kampung Jawa landfill is only 239,389.5 tonnes. The waste consists of organic waste 17.4 tons/day, plastic waste 7.7 tons/day, paper waste 1.7 tons/day, and metal waste 5.9 tons/day.

The difference in waste that is not covered by DLH3K is 9,284 tons per day. The monthly volume of waste generated is 7,563,822 tons, while the volume produced from year to year is of course increasing. From 2018 to 2022, the average waste production in Banda Aceh City continues to increase every year. This increase is very significant, where in 2018 the amount of waste production was around 66,323.92 tons, moving up to 87,377.19 at the end of 2022.

To reduce the amount of waste, policy makers have implemented Banda Aceh Mayor Regulation Number 111 of 2020 concerning Restrictions on the Use of Plastic Bags in Supermarkets, Supermarkets and Malls. Furthermore, implementing this rule is strengthened by the appeal to shop without plastic bags every Monday, where on that day the people of Banda Aceh bring their own containers when shopping. This regulation has gradually encouraged people's behavior in managing waste, but even so, it has not been able to answer the waste problem in Banda Aceh City.

This policy certainly will not succeed without support from the government public awareness in waste management. Apart from that, community participation in waste management cannot be separated from individual characteristics or the influence of the individual's external environment. There are various factors that influence the community in their participation in waste management, including the following: level of education, knowledge, income, role of government/community figures, facilities and infrastructure.(Findy et al. 2022)

Public awareness of environmental sanitation is very important, Most people think in partial terms and only want to benefit themselves. Environmental sanitation problems not only cause various diseases, they can also result in detrimental conditions such as large amounts of rubbish piling up at certain points and water channels which can cause flooding due to overflowing water that cannot be accommodated, for this reason community concern is really needed, not only the local government which must bear it.

In previous research conducted by(Arifatul 2022)Concerning Analysis of Knowledge, Attitudes and Availability of Facilities with Household Waste Management Actions and Their Impact on Society in Indonesia in 2022. The results of this research concluded that there is a relationship between attitudes and the availability of facilities and household waste management actions.

From the description of the background to the problem above and previous research, the author is interested and will then carry out further research to study in more depth the

"Analysis of Knowledge and Awareness of Community Behavior in Waste Management in the City of Banda Aceh".

II. METHOD

The type of research that will be used is quantitative research using analytical research methods with a cross sectional design. Measurements were carried out simultaneously and then the correlation of the two variables was analyzed

A. Location

The research location will be carried out in Banda Aceh City, Aceh Province in 2023.

B. Time of Research

The research period starts from 02 to 30 October 2023.

C. The Sample in This Research

The number of samples in this study consisted of 2 glasses; Meuraxa sub-district as many as 207 samples and in Kuta Raja sub-district there are 127 samples with a total sample of 334 community samples in Banda Aceh City.

III. RESEARCH RESULTS

Based on table 1, it can be seen that of the 334 respondents in the interview, 39 (32.5%) were male respondents who had good behavior in waste management. Meanwhile, 65 (30.4%) male respondents had poor behavior in waste management.

TABLE 1. Frequency Distribution of Respondents' Gender.

No	Gender	Frequency	%
1	Man	104	31.1
2	Woman	230	68.9
	Amount	334	100
No	Age	Frequency	%
1	> 30	261	78.1
2	< 30	73	21.9
	Amount	334	100
No	Education	Frequency	%
1	Higher Education (S1, S2, S3)	101	30.2
2	Elementary, middle school, high school education	233	69.8
	Amount	334	100
No	Work	Frequency	%
1	Employee	130	38.9
2	Self-employed	204	61.1
	Amount	334	100
No	Marital status	Frequency	%
1	Marry	334	100
2	Single	0	0
	Amount	334	100
No	Knowledge	Frequency	%
1	Good	128	38.3
2	Not good	206	61.7
	Amount	334	100
No	Awareness	Frequency	%
1	Good	119	35.6
2	Not good	215	64.4
	Amount	334	100
No	Behavior	Frequency	%
1	Good	123	36.8
2	Not good	211	63.2
	Amount	334	100

Based on table 2, it can be seen that of the 334 respondents

in the interview, 93 people (77.5%) of respondents aged over 30 years had good behavior in waste management.

Table 2. Frequency Distribution of Respondents' Age. Based on table, it can be explained that 27 respondents who were educated at universities behaved well in waste management, 22.5%. Meanwhile, 75 (35.0%) highly educated respondents had poor behavior in waste management. Based on table, there are 53 (44.2%) respondents who work as civil servants who have good behavior towards waste management, then there are 77 (36.0%) who have poor behavior in waste management. Based on table, it can be seen that of the 334 respondents studied, all respondents were married, namely 100% (334 people). Based on table, it can be seen that of the 334 respondents studied, 128 (38.3%) respondents had good knowledge about waste management. Meanwhile, most of the other respondents had poor knowledge with a total of 206 (61.7%). Based on table, it is known that of the 334 respondents studied, the majority of respondents had poor awareness of waste management, namely 64.4% (215 people). Based on table, it is known that of the 334 respondents studied, the majority of respondents had poor behavior towards waste management, namely 63.2% (211 people). Based on table, above, it can be seen that of the 334 respondents in the interview, 39 (32.5%) were male respondents who had good behavior in waste management. Meanwhile, 65 (30.4%) male respondents had poor behavior in waste management. Furthermore, for female respondents, there were 81 people (67%) who behaved well. Meanwhile, 149 people (69.9%) of female respondents behaved less well. And from the results of statistical tests, the P value = 0.713. So, H_0 is rejected, meaning there is no significant relationship between gender and waste management behavior.

TABLE 2. Relationship between Knowledge and Community Behavior in Waste Management

Knowledge	Waste Management Behavior				Total	%	P	OR
	Good		Not good					
	f	%	f	%				
Tall	55	45.8	67	31.3	122	36.5	0.001	1,856 (1,171-2,943)
Low	65	54.2	147	68.7	212	63.5		
Amount	120		214		334	100		

Based on table 2, above, it can be seen that of the 334 respondents in the interview, 93 people (77.5%) of respondents aged over 30 years had good behavior in waste management. Meanwhile, 168 (78.5%) respondents aged 30 years and over had poor behavior in waste management. Furthermore, for respondents aged under 30 years, there were 27 people (21.5%) with good behavior. Meanwhile, 46 people (21.5%) of respondents aged under 30 years behaved less well. And from the results of statistical tests, the value $P = 0.890$. So H_0 is rejected, meaning there is no significant relationship between gender and waste management behavior

Based on table 3, it is known that if we look at the significant values with a p value <0.05 , namely the variable awareness (0.001) with an OR value of (2.201) and knowledge (0.014) with an OR value of (1.856). So it can be interpreted that the independent variable that is most dominant and meaningful in influencing people's behavior in waste management is the awareness variable. Based on the Odd Ratio

(OR) value, it can be interpreted that the awareness variable has a 2,201 chance of causing people to behave poorly in waste management. Likewise, knowledge has a 1,856 times chance of causing people to behave less well in waste management.

TABLE 3. Relationship between Awareness and Community Behavior in Waste Management

Awareness	Waste Management Behavior				Total	%	P	OR
	Good		Not good					
	f	%	F	%				
Tall	54	45.0	58	27.1	112	33.5	0.001	2,201 (1,376-3,518)
Low	66	55.0	156	72.9	222	66.5		
Amount	120		214		334	100		

TABLE 4. Multiple Logistic Regression Test

No	Independent Variable	B	Wald	Sig	OR	CI 95%
1	Knowledge	,606	6,082	,014	1,856	1,132-2,966
2	Awareness	,861	11,636	,001	2,201	1,442-3,880

IV. DISCUSSION

The Relationship between Knowledge and Community Behavior in Waste Management in Banda Aceh City

Based on table 9 above, it can be seen that there are 55 (45.8%) well-informed respondents who have good behavior in waste management and 67 people (31%) have poor behavior in waste management. Then there are respondents with poor knowledge, 83.6% (61 people) have good behavior in waste management. Furthermore, there were also 147 people (68%) in the category of having poor knowledge and poor behavior in waste management.

And from the results of statistical tests, the P value = 0.001. So H_0 accepted. This means that there is a relationship between knowledge and community behavior in waste management. The results of the Chi-Square test showed an Odds Ratio (OR) value of 1.856, meaning that respondents who had low knowledge had a 1.856 chance of behaving less well in waste management compared to respondents who had high knowledge.

There are still many people who have low knowledge about waste management in Kuta Raja and Meuraxa sub-districts due to educational factors, because there are more people with less than tertiary education compared to those with tertiary education, because the lower a person's level of education, the lower the knowledge they have. Research conducted by Mutiara (2016) states that human knowledge can be obtained from formal education or personal experience, this means that at a high level of education, knowledge about waste management will be better.

This is in line with the opinion of Notoatmodjo (2010) who states that a person's knowledge is influenced by several factors such as education, information and culture. Apart from that, Slamet (2010) also confirmed that from the educational aspect, the higher a person's level of education, the easier it will be for him to accept new things so that it will be easier for him to complete these new things.

The Relationship between Awareness and Community Behavior in Waste Management in Banda Aceh City

From the research results, it can be explained that of the 122 respondents who had good awareness, 54 (45.0%) had good behavior. Meanwhile, 58 (27.1%) had bad behavior in waste management. Furthermore, of the 222 respondents with poor awareness, 66 people (55.0%) had good behavior in waste management, while 156 people (72.9%) had poor behavior in waste management. From the statistical test results, the value $P=0.001$ is obtained, so H_a is accepted. This means that there is a relationship between awareness and community behavior in waste management. The results of the Chi-Square test showed an Odds Ratio (OR) value of 2.201, meaning that respondents who had low awareness had a 2.201 chance of behaving less well in waste management compared to respondents who had high awareness.

The results of this study are not in line with research conducted by (Salewangeng 2021) From the data obtained, the relationship between awareness and attitudes in waste management at Malang State University is not correlated or in other words there is no relationship between awareness and attitudes in environmental management. Differently stated by Rogers (1994) in Susanto (2015) that before a person adopts a new behavior, within the person a sequential process occurs, namely: awareness that the person is aware in the sense of knowing the stimulus (object) first; interest (feeling interested) that people begin to be interested in the stimulus or object. Here the subject's attitude has begun to emerge; evaluation (considering whether or not the stimulus is good for him). This means that the respondent's attitude has improved; adoption, the subject has behaved in a new way in accordance with his knowledge, awareness and attitude towards the stimulus; trial, where the subject starts trying to do something according to what the stimulus wants.

According to Feist, (2013), awareness has the same meaning as awareness. Awareness can also be interpreted as a condition where an individual has complete control over internal and external stimuli. However, awareness also includes perceptions and thoughts that the individual is vaguely aware of so that his attention is finally focused. Ashley, (2012) added that awareness is an inner-focused evaluation process where individuals create self-standards/comparison with the aim of better self-knowledge and improvement.

Multivariate analysis of the dominant factors related to community behavior in waste management in Banda Aceh City

In this study, a multivariate analysis was carried out using a multiple logistic regression test, namely to determine the relationship between factors (education, knowledge and awareness) with community behavior in waste management, where it was found that the most dominant and significant factor related to community behavior in waste management was awareness and p value 0.001 (OR:2,201) and knowledge p value 0.014 (OR:1,856).

Based on the Odd Ratio (OR) value, it can be interpreted that the influence of awareness has a 2,201 times chance of causing people to behave less well in waste management. Likewise, knowledge has a 1.856 times chance of causing people to behave less well in waste management.

The lack of public awareness in waste management is caused by a lack of public concern for environmental health. On

the other hand, the lack of awareness is also caused by the situation of people who have never directly experienced the impact of losses caused by waste. This situation means that people do not need to worry about the waste problem.

According to (Feist, 2019), awareness has the same meaning as awareness. Awareness can also be interpreted as a condition where an individual has complete control over internal and external stimuli. However, awareness also includes perceptions and thoughts that the individual is vaguely aware of so that ultimately his attention is focused. In a different quote according to (Ashley, 2020) added awareness is an inner focused evaluative process where individuals create self-standards/comparison with the aim of better self-knowledge and improvement.

V. CONCLUSION

The conclusions in this research are:

1. There is no relationship between work and community behavior in waste management with a p value of 0.161.
2. There is a relationship between knowledge and community behavior in waste management, p value 0.001 and OR value 1.856.
3. There is a relationship between awareness and community behavior in waste management with a p value of 0.001 and OR= OR 2.201

Ethics Research

Research ethics have been issued by the Chair of the Health Research Ethics Committee (KEPPKN) of the Faculty of Medical Sciences, Syiah Kuala University (USK) with registration number: 1171012P. Ethical Exempted with letter number: 150/EA/FK/2023.

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