



Research Article

Decoding Sanitation Practices: A Comparative Assessment of Knowledge, Attitudes, and Behaviours

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ABSTRACT

Adequate sanitation is a crucial factor in improving public health. Knowledge, practice, and behaviours play a key role in the success of sanitation programs. Fundamental aspects of sanitation are the availability of trash bins, which can reduce disease transmission risks. Moreover, in the Lumajang district, the villages of Tegalrandu and Ranupakis show an 80% trash bin ownership rate, aligning with national and global standards. However, differences in community knowledge, attitudes, and behaviours between the two villages remain unclear. This study aimed to decode sanitation practice by assessing and comparing the knowledge, attitudes, and behaviours of the communities in Tegalrandu and Ranupakis villages regarding environmental sanitation. An analytical study with a cross-sectional design was conducted from February to May 2023, involving 80 respondents selected through simple random sampling, with 40 participants from each village. The Mann-Whitney U statistical test was employed to analyze differences between the two groups. The results indicated that the significance values for knowledge (0,766), attitude (0,120), and behaviour (0,298) were all higher than the α value of 0,05, which suggests no statistically significant differences between the two communities. The findings reveal that despite geographical differences, both villages exhibit similar sanitation knowledge, attitudes, and behaviours. This implies that external factors such as economic conditions, socio-cultural aspects, government policies, and sanitation program interventions may have a greater influence on community sanitation practices. Future efforts should focus on enhancing public awareness and sustainability in sanitation programs to achieve long-term improvements in environmental health.

Keywords: Attitudes, Behaviours, Comparative Assessment, Knowledge, Sanitation Practices

INTRODUCTION

Adequate sanitation is a crucial factor in supporting public health. The fulfilment of basic sanitation facilities plays a fundamental role in improving community health. According to WHO data as of 2020, less than 80% of the global population had access to adequate sanitation (WHO,



2023). Similarly, Statistics Indonesia (BPS) reported that in 2022, the average sanitation access across all Indonesian provinces was approximately 80.92% (BPS, 2023). These figures highlight the need for additional efforts to ensure equitable access to sanitation.

Despite the national progress, regional disparities persist at the local level, where factors such as economic status, cultural practices, and local governance can impact sanitation outcomes. Poorly managed sanitation facilities can lead to pollution of water bodies such as lakes, which could increase the risk of waterborne diseases spreading, including diarrhoea, digestive issues, and skin infections in children due to declining water quality. The government has implemented various waste management initiatives to reduce waste generation, including waste banks (Indrianti, 2016), composting (Rastogi et al., 2020), TPS3R (Silva de Souza Lima Cano et al., 2022), thermal processing (Zabek & Morini, 2019), and landfill development using the sanitary landfill system (Hereher et al., 2020). In Lumajang District, the Lempeni landfill processes approximately 66,576 tons of waste annually (MenLHK, 2023). However, landfills have a maximum capacity, and exceeding this limit will result in unmanageable waste accumulation. Therefore, to enhance public knowledge, attitudes, and behaviours regarding waste and its management, particularly plastic waste requires efforts to overcome.

Preliminary interviews conducted in Tegalrandu and Ranupakis Villages revealed that, on average, 81% of households own trash bins, and approximately 67% have separate trash bins for waste segregation. Although these figures indicate high facility ownership, compared to national standards, the impact of this infrastructure on actual sanitation behaviours remains unclear. The urgency of this research lies in the need to understand the disparities in knowledge, attitudes, and behaviours regarding waste disposal, particularly in household waste management, which potentially affects the lake environment in Tegalrandu and Ranupakis Villages, where sanitation condition directly influences water quality and public health. Therefore, this study aims to assess whether the knowledge, attitudes, and behaviours of these communities align with established sanitation standards and contribute to sustainable public health outcomes.

MATERIAL AND METHODS

This study employed a cross-sectional design, conducted from February to May 2023, in Tegalrandu and Ranupakis Villages, Lumanjang District. This design aims to examine the dynamics and variations between independent and dependent variables by conducting simultaneous measurements.

The sample size was determined using Slovin's formula for a known population (Mayasari et al., 2021). According to data from the Lumajang District Government (lumajangkab.go.id, 2021), Tegalrandu Village had a total of 1,485 households. Using a standard error of 0.5, the required sample size was calculated as 37.52, which was rounded up to 40 respondents. With an average of 40 samples per village, the total sample size was 80 respondents. Samples were selected using simple random sampling, with the criterion that participants must be residents who had lived in the area for at least one year. Data analysis was conducted using the Mann-Whitney test, a non-parametric statistical method (Swarjana, 2023). The study location was deliberately chosen using simple random sampling, focusing on villages in Lumajang District where lakes serve as vital resources for daily life. For more details, the research location map can be seen in Figure 1 below:

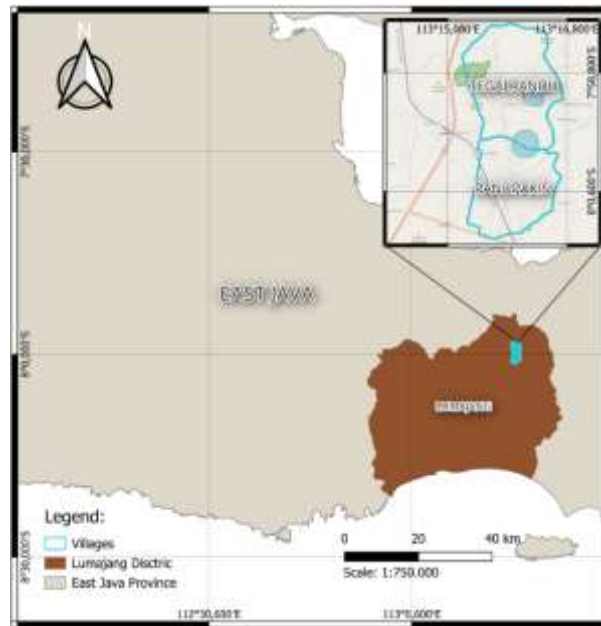


Figure 1. Maps of study location.

RESULTS AND DISCUSSION

Result

Frequency Distribution of Respondents

The distribution of respondents in Tegalrandu and Ranupakis Villages was categorized based on general demographic characteristics, including age, gender, education level, and occupation. This analysis aimed to understand the demographic profile of both communities and their potential impact on their sanitation knowledge, attitudes, and behaviours.

Table 1. Distribution Based on Respondent Characteristics in Tegalrandu Village and Ranupakis Village, Lumajang Regency.

Characteristics	n	%
Sex		
Male	54	67,5
Women	26	32,5
Age		
20-29	9	11,2
30-39	18	22,5
40-49	33	41,25
50-59	15	18,75
>60	5	6,25
Educational Status		
Elementary School	41	51,25
Junior High School	18	22,5
Senior High School	5	6,25
Collage	1	1,25
Never Went to School*	6	7,5
Work Status		
Civil Servant	1	1,25
Private Job	15	18,75
Self-employed	61	76,25
Not Working	3	3,75

According to data presented in Table 1, the majority of respondents were male (67.5%), indicating a predominantly male population in the study. Age distribution revealed that most respondents were in the productive age range of 40–49 years (41.25%), signifying that they were still actively working. However, 5% of respondents were over 60 years old, possibly retired but still engaged in certain activities. Educational status showed that more than half (51.25%) had only completed elementary school, while only 1.25% had attained a bachelor's degree, reflecting potential educational limitations. Regarding occupation, most respondents were self-employed, while only 1.25% were employed in government or formal sectors.

Table 2. Respondents' Sanitation Access

Sanitation Access	Tegalrandu		Ranupakis	
	n	%	n	%
Clean Water Access				
Protected	32	80	30	75
Unprotected	8	20	10	25
Household Toilet				
Owned	40	100	39	97,5
Not Owned	0	0	1	2,5
Trash Bin				
Owned	25	62,5	40	100
Not Owned	15	37,5	0	0

Table 2 shows that in Tegalrandu, 80% of respondents had access to protected clean water, indicating good sanitation standards. Additionally, 100% owned household toilets reduce environmental contamination and the spread of waterborne diseases. Meanwhile, in Ranupakis Village, 100% of respondents owned household trash bins, signifying an organized waste disposal system. Although sanitation facilities in both villages align with Sustainable Development Goals (SDGs), Meshi et al. (2022) noted that availability alone is insufficient to protect against infectious diseases. Proper utilization and maintenance of these facilities are essential to maximizing their public health benefits.

Table 3. Distribution of respondent's knowledge, attitudes, and behaviors.

Variables	Tegalrandu		Ranupakis	
	n	%	n	%
Knowledge				
Waste Bank				
Yes	38	95	33	82,5
No	0	0	1	2,5
Do Not Know	2	5	6	15
Waste Hazard				
Yes	22	55	16	40
No	18	45	24	60
Attitudes				
Hazardous plastic waste				
Strongly Agree	22	55	29	72,5
Agree	14	35	4	1
Neutral	3	7,5	6	15
Disagree	1	2,5	1	2,5
Strongly Disagree	0	0	0	0
Waste Segregation				
Strongly Agree	18	45	28	70
Agree	13	32,5	4	10
Neutral	8	20	5	12,5

Disagree	1	2,5	2	5
Strongly Disagree	0	0	1	2,5
Plastic Recycled				
Strongly Agree	16	40	26	65
Agree	17	42,5	5	12,5
Neutral	6	15	5	12,5
Disagree	0	0	4	10
Strongly Disagree	1	2,5	0	0
Plastic Reused				
Strongly Agree	14	35	25	62,5
Agree	22	55	8	20
Neutral	4	10	4	10
Disagree	0	0	3	7,5
Strongly Disagree	0	0	0	0
Penalty for Littering				
Strongly Agree	16	40	27	67,5
Agree	21	52,5	4	10
Neutral	0	0	3	7,5
Disagree	3	7,5	5	12,5
Strongly Disagree	0	0	1	2,5
Behaviours				
Had Separated Waste Bin				
Yes	14	35	13	32,5
No	26	65	27	67,5
Practiced Waste Recycling				
Yes	0	0	1	2,5
No	40	100	36	90
Sometime	0	0	3	7,5
Practiced Waste Segregation				
Yes	30	75	19	47,5
No	8	20	22	55
Sometime	2	5	9	22,5

Table 3 indicates notable differences in waste management knowledge between the two villages. In Tegalrandu, 95% of respondents were aware of the waste bank concept, indicating the need for active educational programs. Conversely, 60% of Ranupakis respondents were unaware of waste hazards, highlighting an information gap that may hinder sustainable waste management. Knowledge sharing in healthcare relies on factors like awareness, motivation, access to technology, and opportunities for collaboration (Wubante et al., 2022). To promote health knowledge, policymakers should focus on raising awareness, creating supportive programs, and improving digital tools, making it easier for health professionals to share their expertise and enhance the quality of care.

In terms of attitudes, respondents from Ranupakis Village demonstrated strong environmental awareness. A majority agreed that plastic waste is hazardous (72.5%), should be separated (70%), recycled (65%), and reused (62.5%). Additionally, 67.5% supported fines for littering, indicating strong community engagement in environmental policies. Community engagement often faces hurdles, including limited funding, low energy awareness, and burnout from reported outreach efforts. To overcome these challenges, it is important to take a flexible approach, investing time and resources (Tahir et al., 2024).

Regarding sanitation behaviours, both villages showed positive practices. In Ranupakis, 67% of respondents had separate waste bins, while in Tegalrandu, 75% practised waste segregation,

and 100% engaged in recycling. Despite knowledge gaps, tangible waste management actions were well implemented. A person's attitude significantly influences their intention to recycle, while both intention and trust in the recycling system are essential for actually separating waste. Moreover, highlighting the need for tailored approaches to promote recycling among people with different lifestyles in large cities can vary widely (Leknoi et al., 2024).

Overall, while knowledge levels differed, attitudes toward waste management were generally positive, particularly regarding plastic waste. However, further education is needed to enhance public awareness, particularly in Ranupakis. Environmental campaigns and awareness programs could serve as practical strategies to bridge knowledge gaps and promote sustainable waste management.

Statistical Analysis

A normality test was conducted using the Kolmogorov-Smirnov test to determine whether the data followed a normal distribution before preceeding with further statistical analysis. This test was selected due to its effectiveness in assessing data distribution in samples larger than 50. If the significance value (p-value) was greater than 0.05, the data were considered normally distributed; otherwise, they were not.

Table 4. Kolmogorov-Smirnov Normality Test.

Parameters	Villages	Kolmogorov-Smirnov ^a		
		Statistic	df	Sig.
Knowledge	Tegalrandu	0,281	40	0,000
	Ranupakis	0,273	40	0,000
Attitudes	Tegalrandu	0,189	40	0,001
	Ranupakis	0,285	40	0,000
Behaviours	Tegalrandu	0,181	40	0,002
	Ranupakis	0,203	40	0,000

The results in Table 4 showed a significance value of <0.05, indicating that the data did not follow a normal distribution, necessitating the use of non-parametric statistical tests. Therefore, the Mann-Whitney U test was applied to compare sanitation behaviours between the two villages.

Table 5. The Mann-Whitney U test results

Parameters	Knowledge	Attitude	Behaviors
Mann-Whitney U	772,000	644,500	694,500
Wilcoxon W	1592,000	1464,500	1514,500
Z	-0,298	-1,556	-1,041
Asymp. Sig. (2-tailed)	0,766	0,120	0,298

The Mann-Whitney U test results showed that the significance values for knowledge (0,766), attitudes (0,120), and behaviours (0,298) were all $p > 0,05$. This confirms that there were no statistically significant differences between the two villages in terms of sanitation knowledge, attitudes, or behaviours.

Discussion

Differences in Knowledge

Knowledge in this study was defined as respondents' understanding of waste banks and waste hazards. The findings indicated no significant differences in knowledge between Tegalrandu and Ranupakis Villages.

The results show that there are no significant differences in knowledge between Tegalrandu and Ranupakis respondents. This could be attributed to cultural and historical similarities, equal educational access, and comparable economic conditions. A previous study by Abramovsky et al. (2023) found that knowledge improvement programs were most effective in communities with low income and limited access to information. Besides, the COVID-19 pandemic heightened public awareness of hygiene practices and indirectly enhanced sanitation knowledge (Poague et al., 2023). Furthermore, a good sanitation approach positively influences educational outcomes, as declared by Ahmed (2020), who found that in one country in Africa, water filtration systems improved drinking water quality, reduced waterborne diseases, and increased school attendance.

Differences in Attitudes

This study examined attitudes toward waste management by looking at people's views on waste separation, the hazards of plastic waste, recycling and reusing plastic, and penalties for littering. The findings showed no significant differences in attitudes between the two villages. Research suggests that shared experiences can help people identify sanitation facilities (Sutherland et al., 2021). The similarity in attitudes may be due to equal access to information, common social and educational background, and similar government leadership. Economic factors also play a role, as they influence perspectives on education and healthcare. In addition, cultural and geographical affinities might contribute to the way both communities approach water management and plastic waste disposal (Susilawati et al., 2022).

Differences in Behaviours

In this study, behaviour was defined as sanitation and waste management practices, including owning a separate trash bin, sorting waste, and participating in recycling. The findings showed no significant differences in waste management behaviours between the two villages. Certainly, people's values and beliefs often influence their daily habits, such as the habit of throwing rubbish. Variations in recycling habits may be linked to differences in attitudes and beliefs. Ayeleru et al. (2023) found that while 80% of respondents expressed willingness to participate in recycling programs, their actual involvement depended on their perspectives. Those with a positive outlook were more likely to recycle, whereas those who were indifferent showed lower participation rates. Additionally, factors such as education level, environmental awareness, and the availability of recycling facilities played a role in shaping waste management behaviours. Therefore, efforts to boost recycling should go beyond education and focus on fostering a more positive attitude toward environmental sustainability.

Plastic waste holds considerable economic value due to its durability and potential for reuse (Babaremu et al., 2022). Practical needs, such as food, clothing, work, and health, often influence daily actions. Achieving widespread community recycling can significantly contribute to the green economy (Nandy et al., 2022).

Strengths and Limitations

The study offers valuable insight into sanitation knowledge, attitudes, and behaviours in two neighbouring villages, revealing no significant differences despite similar community characteristics. According to data presented in Table 1, it can be inferred that the majority of respondents were male (67.5%), indicating that men played a dominant role in household sanitation practices. Regarding age distribution, most respondents were in the productive age group of 40–49 years (41.25%), indicating that the surveyed population consisted mainly of individuals actively engaged in work and economic activities. Educational attainment data revealed that more than half (51.25%) of respondents had only completed elementary school. Additional findings from Table 2 reveal that in Tegalrandu Village, 80% of respondents had access to protected clean water sources, indicating a relatively strong level of water security. It also notes effective waste management in Ranupakis, where all households reported having trash bins, supporting overall environmental health. However, the finding may not be generalizable to villages with different social, economic, and geographic conditions, limiting its broader applicability.

The widespread availability of sanitation facilities in both villages supports the Sustainable Development Goals (SDGs), particularly the goal of ensuring universal access to clean water and sanitation (WHO, 2016). However, as Meshi et al. (2022) point out, merely having these facilities is insufficient to protect communities from disease. To truly benefit from these resources, people need to use and maintain them properly, ensuring long-term health and hygiene improvements. Furthermore, the low level of formal education observed may impact the understanding and adoption of proper sanitation practices. At the same time, the majority of the sample's self-employed respondents may not fully capture the sanitation behaviours of more formally employed populations.

CONCLUSION AND SUGGESTION

To summarize, this study reveals that the residents of Tegalrandu and Ranupakis Villages share similar levels of knowledge, attitudes, and habits regarding sanitation. No major differences were found in how these communities understand and apply sanitation practices in their daily lives. Both villages have made significant progress in meeting national and global sanitation standards, reflecting the success of community-driven efforts to improve sanitation infrastructure. However, despite these positive developments, there is still a need to ensure that every household has access to proper sanitation, in line with the Sustainable Development Goals (SDGs). To achieve this, increasing awareness through education and community engagement will play a key role in promoting sustainable sanitation practices. Additionally, local governments could consider incentive-based policies for residents who actively maintain environmental cleanliness and sanitation facilities. Future studies should explore the impact of socioeconomic and geographical factors on sanitation behaviour in other regions to develop more comprehensive strategies for improving environmental health in Indonesia.

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CONFLICT OF INTEREST

There is no conflict of interest.

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