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Determinant of Sewerage Availability

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Abstract **Backround and Aims:** The existence of domestic waste that is not channeled properly to processing tanks, such as septic pliers and infiltration wells, will cause several health problems. **Objective**. This research aims to know the determinants of ownership of sewerage channels. **Materials & Methods:** This cross-sectional study involved 70 households in Tanjung Johor Village, Serving District, Jambi City, Indonesia, which was carried out in 2022. Variables were assessed using questionnaires and observation sheets. Data analysis used the Chi-Square test. **Finding:** The results showed that most of the households did not have sewerage with a total of 57 families (81%), a total of 55 families (79%) had less knowledge, a total of 41 families (59%) had a negative attitude, and 45 households (62%) had low income. Based on the results of inferential statistical bivariate analysis, the results showed that there was a strong significant relationship between knowledge and the availability of sewerage (0.001), attitude and availability of sewerage (0.001), income and availability of sewerage (0.001) in Tanjung Johor Village. **Conclusion:** The research concludes that sewerage ownership is associated with good knowledge, a positive attitude, and high household income.

Keywords Knowledge, Attitude, Income, Sewerage

1. Introduction

Life with proper sanitation is the dream of every human being [1,2]. An increase in population growth in a country means that the feasibility of living will be more expensive and difficult to obtain [3–5]. Nearly 50% of the population of developing countries, or around 2.5 billion of the world's population, do not have proper sanitation facilities [6]. According to data on Indonesia's Environmental Status for 2020, no less than 400,000 m^3/day of household waste is discharged directly into rivers and soil without prior processing [7,8]. These conditions will support the emergence of epidemic or endemic diseases through the intermediary of water [1,9,10].

The Community-Based Total Sanitation Movement (CBTSM) reported that the population with access to quality basic sanitation reaches 55.6%, still below the target of 67% in 2019, so hard work is needed to achieve the target of 75% in 2020, or 36% of the total target in 2025 [11].

Household water use ranges from 120 L/person/day to only 80 L/person/day for daily needs such as bathing, washing, toilet, and cooking. Nearly 80% of the water is wasted and becomes domestic waste. The existence of domestic waste that is not channeled properly to processing tanks, such as septic pliers and infiltration wells, will cause several health problems [12–14].

Tanjung Johor Village is a riverbank and swampy area, thus the availability of sewerage channels is still a problem. For people who live on riverbanks, the wastewater resulting from daily activities is discharged into the river. Out of 520 houses inspected, 275 houses did not meet the requirements, and 245 houses had sewerage that met the requirements. Meanwhile, the number of houses recorded in the Tanjung Johor Village Profile in 2021 is 544.

Based on this background, the authors are interested in conducting research that aims to determine the relationship between the level of knowledge, attitude, and income of the head of the family with the availability of sewerage channels in Tanjung Johor Village.

2. Materials and Methods

2.1. Study Design

This research is a quantitative study using a cross sectional design.

2.2. Population

This research was carried out in 2022 in Tanjung Johor Village, Pelayangan District, Jambi City, Indonesia, involving 70 households who had met inclusion criteria such as occupying their own house and not renting and being able to communicate well.

2.3. Instrument

The instrument used in this research is a questionnaire. The questionnaire for knowledge variables consists of 10 questions with interval scores between 0-10 and uses the Guttman Yes and No scale. The attitude variable questionnaire has ten questions with alternative answers: Strongly agree with gambling, with a score of 4, doubtful, with a score of 3, disagree with gambling with a score of 2, strongly disagree with gambling, with a score of 1. The range of the attitude variable is 1-40. The income questionnaire for the head of the family contains only three questions with alternative answers of yes and no. The sewerage ownership variable uses an observation sheet.

2.4. Statistical Analysis

Data were presented as numbers or percentages for categorical variables. Continuous data are expressed as the mean ± standard deviation (SD), or median with Interquartile Range (IQR). Chi-square test is used to analyze the correlation between variables. Statistical analysis was performed using the SPSS version 16.0 application. All tests with p-value (p) < 0.05 were considered significant.

3. Results

The frequency distribution of the characteristics of the respondents can be traced in table 1.

Table 1. Distribution of respondent's characteristic

Characteristics	N	%
Age		
25-31	16	22.9
32-39	26	37.1
40-47	24	34.3
48-56	4	5.7
Educational level		
Elementary	15	21.4
Junior school	32	45.7
High school	11	15.7
College	12	17.2
Types of work		
Farmer	16	22.9
Entrepreneurship	21	30
Government employees/police/army	6	8.5
Fisherman	27	38.6

Table 1 shows that the majority of respondents have an age range of 32-47 years, as much as 37.1%, most of them have junior school education as much as 45.7%, and the type of work is mostly fishermen as much as 38.6%.

Table 2. Frequency distribution of sewerage ownership, knowledge, attitudes and household income

Variables	N	%
Sewerage ownership		
Available	13	19
Not available	57	81
Knowledge		
Good	15	21
Poor	55	79
Attitude		
Positive	29	41
Negative	41	59
Household income		
High	25	38
Low	45	62

Table 2 shows that the majority of households have sewerage of 57 families (81%), lack of knowledge of 55 households (79%), negative attitudes of 41 households (59%), and low income of 45 households (62%).

Table 3. Relationship between Variables and Sewerage Ownership

Independent variable	Sewerage ownership				Total		P value
	Available		Not available				
	N	%	N	%	N	%	
Knowledge							
Good	10	14	5	7	15	21	0,001
Poor	3	5	52	74	55	79	
Attitude							
Positive	11	16	18	25	29	41	0,001
Negative	2	3	39	56	41	59	
Household income							0,001
High	12	17	13	21	25	38	
Low	1	2	44	60	45	62	

Table 3 shows that all knowledge, attitude and household income variables have a correlation with sewerage ownership with a p-value of 0.05.

4. Discussion

Sewerage reduces domestic waste pollution and provides aesthetic value to the environment [15,16]. Based on the table in this study, most of the communities have no sewerage, with a total of 67 people (81%).

The level of community knowledge about sewerage is known by asking several questions. All the answers given are used to determine the level of knowledge. The results showed that the highest community knowledge could have been better, with 55 people (79%).

Attitude can also be interpreted as a community perspective or assessment of sewerage in the Tanjung Johor Village. The results showed that the attitude of most people was unfavorable, with a total of 41 people (59%).

The income of the people in Tanjung Johor is obtained from their work. Some are casual fishermen, and a few factory employees and civil servants. The results showed that the highest income for the community was income below the minimum wage or not good, with a total of 45 people (62%).

Knowledge is important in forming open behavior [17,18]. Knowledge results from a person's sensing of an object through his five senses. Community knowledge about sewerage is inseparable from the existence of sewerage itself. In a place that already has sewerage in several houses, it will be a question mark for each individual what building it is, what it is used for, how to make it, and so on. Curiosity makes people's knowledge gradually increase. On the other hand, if there is no sewerage in one area, they may think that it is an unnecessary building.

Increased knowledge can be done in various ways and methods. Formal education is one way to increase knowledge, especially sewerage knowledge for school children. Sometimes children can be a good influence on both parents. They can advise their parents to build sewerage as a way to protect water bodies from domestic waste pollution [19].

Increasing knowledge through online mass media, where almost everyone has a communication tool like a cell phone, can include education and knowledge about sewerage [20–22]. However, the best way to increase knowledge is by conducting counseling by health workers and supervision by government officials at the RT level by giving advice and giving leaflets about sewerage and conveying that every house must be equipped with sewerage. Building sewerage is an application of what housewives know and understand about the sewerage itself.

This research is in line with Aminah et al. [23], who states that there is a significant relationship between knowledge and domestic wastewater management in Bontoa District, Maros Regency. Of the ten questions regarding knowledge, the most that the community did not know was that having sewerage was an obligation (80%), that SPAL was closed and watertight (75%), and that before being channeled into SPAL domestic waste should pass through a weak trapping device (grastrap) as much as 70%.

When people express their attitude, they tend to behave and act like the attitude they show. Attitude is the reaction of someone still close to a certain stimulus or object that involves the opinion and emotional factors concerned. Attitude is not an act of a person but is a tendency to act from behavior [15,24,25].

In this study, it was also seen that not all people with a good attitude immediately behaved by having sewerage in their homes. The community agrees that the water used by household activities includes wastewater. They generally agree that building sewerage is expensive and that every house must have sewerage. 65% of the community disagrees. Based on this, the role of community leaders should be needed so that this attitude changes because the one that influences attitudes is the influence of other people, such as community leaders and local religious leaders. The change in attitude towards a positive attitude towards sewerage ownership will facilitate the realization of sewerage development in every household in Tanjung Johor Village.

Per capita income is the total income of an area divided by the number of residents in that area for the same year. The figures used should be the total regional income divided by the population. However, this figure is often not obtained, so it is replaced by the total GRDP based on market prices divided by the population. Per capita income figures can be expressed in current or constant prices depending on needs [26,27].

For workers, the income level in the new place is higher

than what they get from their place of origin. With a higher income, they will get a better standard of living. They can also provide education, job opportunities, and a better future for their children. Income is the remuneration received by the owner of the factors of production for his sacrifice in the production process [28–30].

Building a wastewater disposal facility that meets health requirements in every house depends on the economic condition of the head of the family concerned, even though other factors are not a problem; what if the economic conditions are not supportive, and the family cannot build a sewerage that meets health requirements.

The research results reported that income is related to sewerage ownership with a value (p=0.001). The existence of a moderate relationship indicates that family income affects residential sanitation facilities, one of which is sewerage. The factor of income level influences human life, both the fulfillment of clothing, food, and boards, in this case, healthy housing. The lower the income level of a family, the more difficult it is to have housing sanitation facilities, including sewerage [31].

People with good or high incomes tend to have sewerage because sewerage construction requires money. However, compared to health, the value of sewerage development could be more valuable.

5. Conclusions

Present study found a strong significant relationship between knowledge and the availability of sewerage (0.001), attitude and availability of sewerage (0.001), income and availability of sewerage (0.001) in Tanjung Johor Village. The findings provide critical information for those responsible for environmental management and public health, especially in areas with middle to lower-income levels. Awareness of environmental conditions related to waste disposal can improve public health, which has implications for reducing the burden on families for health care due to irregular waste disposal. This study can also contribute positively to developing future health innovations concerning sewerage.

Conflict of Interests

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper.

Ethical Approval

No economic incentives were offered or provided for participation in this study. Before carrying out data collection, the researcher first took care of ethical permission. The authors state that this study followed all ethical clearance processes and was approved by the health research ethics committee of the Ministry of Health, Jambi and registration number: LB.03.02./3.5/110/2022.

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Authors' Contribution

All authors equally contributed to preparing this article.

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