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Diarrhea Control Strategies in the Islands: Interpretative Structural Modeling Analysis

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ABSTRACT
Objectives: This research aims to determine the most dominant factors in the incidence of diarrhea, and design a diarrhea management strategy on Barrang Lompo Island.
Methods: The research applies interpretative structural modeling (ISM) to map the relationships between key elements affecting of diarrhea control. The research instrument used was a questionnaire with a sample size of 7 informants including Government Institutions, Community Health Center Officers, Universities using the Interpretative Structural Modeling (ISM) Analysis method.
Results: The research results showed that 7 elements analyzed, three were found to significantly impact diarrhea control : Food and drink sanitation, Personal hygiene (CTPS habits) and Availability of clean water. These insights can guide the development of health policies in island regions similar to the Barrang Lompo Islands. This study introduces a novel application of ISM to assess the factors affecting diarrhea management in an island context.
Conclusion: The approach highlights the interconnected elements influencing diarrhea control in geographically isolated communities. The findings provide practical guidance for developing targeted health policies to improve both financial and health outcomes in similar regions. This research is valuable for policymakers, healthcare providers, and communities aiming to optimize resource allocation and improve hypertension management in remote areas.

Keywords: Diarrhea Incidence, Strategy, Island, Interpretative Structural Modeling

INTRODUCTION

Diarrhea is an infectious disease with high cases in developing countries [1]. Diarrhea is experienced by almost everyone due to poor sanitation [2]. Diarrhea is an infectious disease with a frequency of defecation more often or three times per day or even more [3]. The form of stool with a semi-liquid or liquid consistency is the main symptom apart from the frequency of defecation. Based on its duration, diarrhea can be divided into three, namely acute lasting less than 14 days, persistent lasting 14 to 29 days, and chronic lasting 30 days or more [1].
The World Health Organization (WHO) states that in 2024, diarrheal disease will be the third cause of death in children under 5 years and causes the death of around 443,832 children every year. Diarrhea can last for several days and cause the body to lack the water and salt necessary for survival. Globally in 2016, unhealthy drinking water, poor sanitation and an unclean environment were the main factors in the deaths of 0.9 million people, including more than 470,000 infant deaths caused by diarrhea [4].
In the Household Health Survey, Mortality Study and Basic Health Research (Riskesdas), it is known that diarrhea is still the main cause of death for children under five in Indonesia. Diarrhea problems in Indonesia often occur in the form of extraordinary events. Diarrhea often occurs in areas where control of risk factors is still low. Low coverage of hygiene and sanitation behavior is a risk factor for diarrhea incidents [5].
Diarrhea is an environmental-based disease that still dominates health problems in developing countries, including Indonesia. In Indonesia, diarrhea is a public health problem with a high prevalence. Based on data from the Ministry of Health of the Republic of Indonesia (Kemenkes RI), the prevalence of diarrhea in 2018 was 37.88% or around 1,516,438 cases in toddlers. This prevalence increased in 2019 to 40% or around 1,591,944 cases in children under five [6].
Diarrhea is an endemic disease and a disease that has the potential to cause outbreaks which is often associated with death in Indonesia. In 2016, diarrhea sufferers in all age groups served in health facilities amounted to 3,176,079 people and in 2017 this increased to 4,274,790 people. In that year there were 21 outbreaks spread

across 12 provinces and 17 districts/cities. No different from the previous year, the incidence of diarrhea increased to 4,504,524 people recorded in health facilities and in 2019, diarrhea cases decreased slightly compared to the previous year to 4,485,513 people [4].

South Sulawesi is a province that has the second highest prevalence and incidence of period diarrhea after Papua. The under-five age group in Indonesia has a prevalence and incidence of 10.12%. The number of diarrhea cases in South Sulawesi in 2016 was the highest prevalence compared to other infectious diseases at 192,681 cases [7].

Barrang Lompo Island is one of the islands in the Spermonde Island group and is in the administrative area of Barrang Lompo Village, Ujung Tanah District, Makassar Municipality. The incidence of diarrhea is the 10th highest disease on Barrang Lompo Island. Based on data obtained from the Barrang Lompo Community Health Center, in 2021 there were 113 cases from all age groups.

The existence of clean water facilities, sanitation, latrines and waste water disposal channels (SPAL), bacteriological quality of water, and housing conditions are environmental risk factors that contribute to the occurrence of diarrhea. The presence of E. coli bacteria in clean water used by the community is mostly thought to be caused by improper sanitation practices [8]. Clean and Healthy Living Behavior (PHBS) is also included as a risk factor for diarrhea in toddlers and adults [9].

Basic sanitation factors and personal hygiene behavior are trigger factors but can also be the main key to controlling diarrheal disease. The results of a study from WHO in Jubaidi [10] stated that the incidence of diarrhea decreased along with increasing total sanitation in society. There was a decrease of 45% along with increased hand washing behavior with soap, decreased 39% with safe drinking water management behavior in households and decreased 32% along with increased community access to basic sanitation (defecation facilities, waste and waste management facilities household).

The results of a preliminary study carried out by Birawida et al [1] based on the results of univariate analysis showed that the incidence of diarrhea in the community on Barrang Lompo Island was 65.0%. The basic sanitation conditions of the community, namely the provision of clean water, ownership of healthy latrines, SPAL, waste management, and hand washing with soap (CTPS) do not meet the requirements for the majority. Meanwhile, according to Pitri [8] shows that behavioral and environmental sanitation variables that are related to the incidence of diarrhea are the use/facilities of clean water, latrine facilities, waste management and waste management.

Apart from the two factors, namely basic sanitation and personal hygiene behavior, food sanitation is also very important to pay attention to because food is one of the basic human needs to be able to survive apart from the need for clothing and housing. Food that is safe to consume must meet the criteria of not endangering health or causing disease, and the product not endangering health or causing disease, and the product not being damaged or contaminated with dangerous substances. Contamination that occurs in food and drinks can cause the food to become a medium for disease. The disease that most often arises due to unhygienic snacks consumed is diarrhea, which is the number one cause of death for toddlers and children throughout the world [11]. This is in line with research conducted by Tuang [12] which showed that food sanitation was proven to have a significant relationship with the incidence of diarrhea.

The variety of variables that cause diarrhea gives rise to many intervention scenario options that will be carried out. To draw conclusions from complex situations and develop appropriate actions to solve problems, the appropriate recommendation is Interpretative Structural Modeling (ISM) [13]. ISM has been used worldwide by many prestigious organizations, including the National Aeronautics and Space Administration [14].

Understanding the process behind ISM will help decision makers to simplify the process and gain more synergy with the system. A brief description of the use of the ISM methodology: (a) ISM starts with an issue or problem with identified elements; (b) pairs of elements are compared graphically or in a matrix, using arrows to show that "this element contributes more than that element" and drawing a graphic representation in the form of a digraph [15].

In relation to the high incidence of diarrhea in island communities, this study proposes a new approach by developing the best strategy model in reducing the occurrence of diarrhea on small islands using ISM (Interpretive Structural Modelling).

Table 1. Prevalence of study Analyzed Interpretative Structural Modelling

No	Name	Methods	Result
1.	Asmi [16]	Interpretative Structural Modelling (ISM).	The dominant factors that play a role are (1) Exclusive breastfeeding, (2) Storage of foodstuffs, (3) Serving food and strategies for dealing with diarrhea incidents, namely (1) Implementation of health services (2) Implementation of programs to prevent and eradicate diarrheal diseases, (3) Development early alert system, (4) finding and treating sufferers.

2.	Nur [17]	Interpretative Structural Modelling (ISM)	There are 3 key elements in efforts to fulfill clean water needs on Barrang Caddi Island, namely water recycling technology, clean water sanitation experts and water quality inspection facilities and infrastructure.
3.	Ariyan to [18]	Research and Development (R&D) andInterpretative Structural Modelling (ISM)	The most effective scenario used to reduce the incidence of occupational diseases at instant noodle companies in Makassar is a combined scenario. With the combined scenario, the incidence of occupational diseases can be reduced by an average of 46.71% per year.
4.	Salam [19]	Research and Development (R&D) andInterpretive Structural Modelling (ISM).	The research results show that the key elements for preventing dengue fever are the jumantik program, 3M Plus, early warning systems and education
5.	Jain [20]	Model Struktural Interpretasi Total (TISM).	The structural model for measuring innovation developed in this research revealed that the innovation process in academic engineering colleges takes place in four different stages or levels.

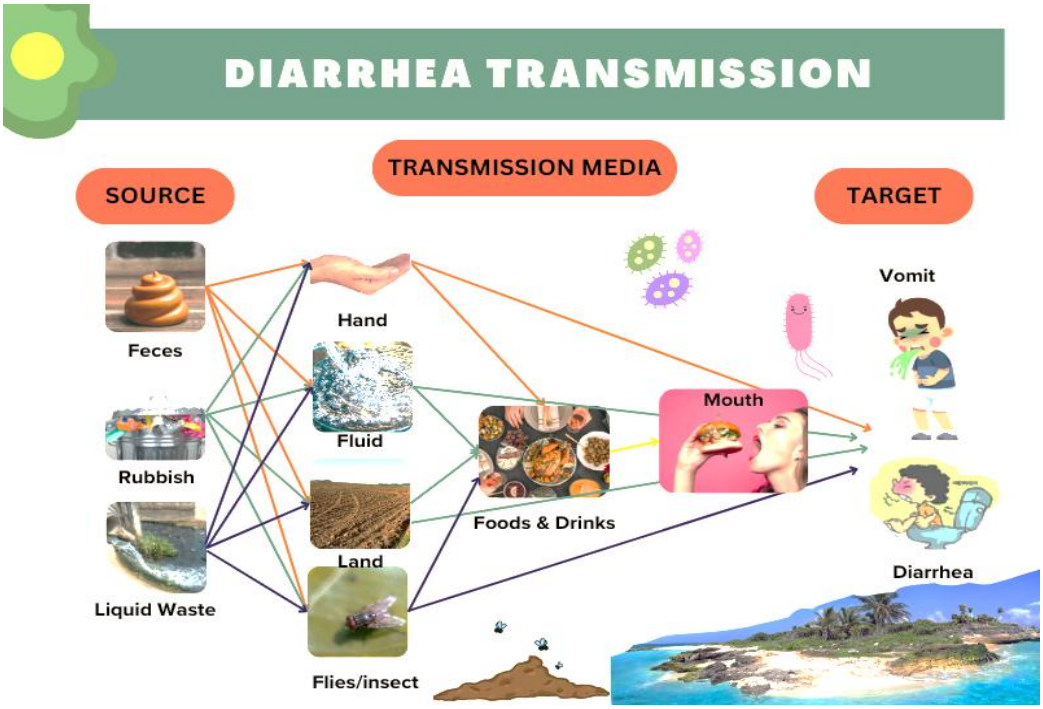


Figure 1. Diarrhea Transmission

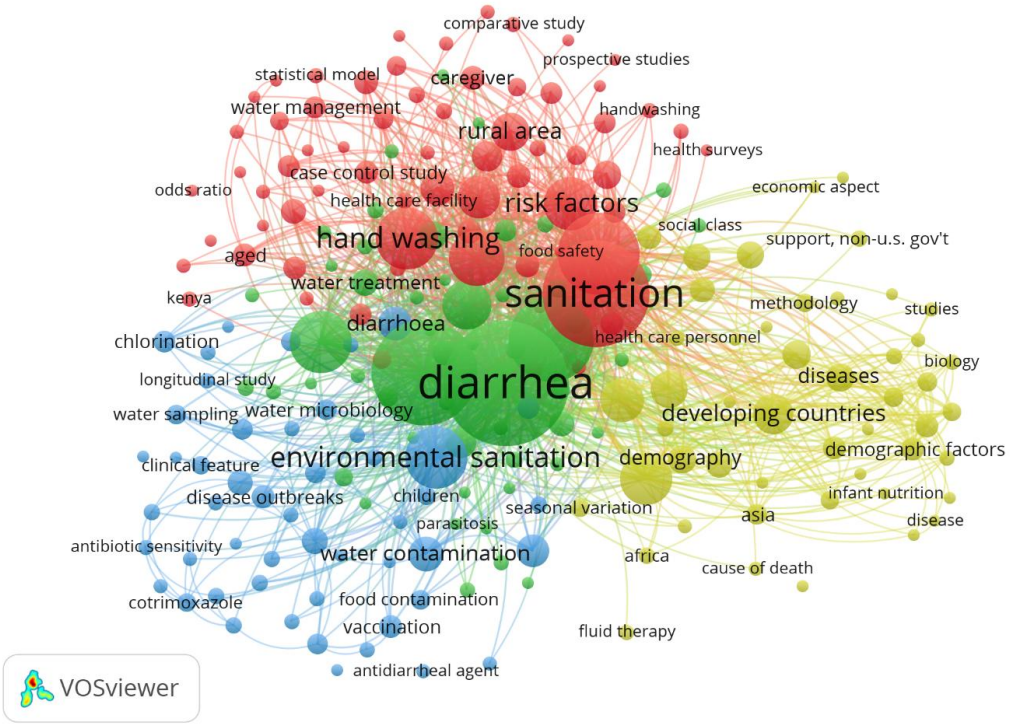
Figure 1 explains that the spread of germs that cause diarrhea is usually spread via fecal or oral route, including through food and drink contaminated with feces and/or direct contact with the sufferer's feces. The route of entry for viruses, bacteria or germs that cause diarrhea into the human body. The stages start with contamination originating from human waste (feces) which contaminates hands, water, soil and flies, then the contamination moves to food which is then eaten by humans.

To ensure that this research has a strong and relevant theoretical foundation, VOSviewer is used as a tool to analyze the existing literature. This software allows researchers to map and understand the relationships among the factors influencing hypertension control, with a focus on cost-effectiveness in island regions. With the help of VOSviewer, this study can identify patterns and trends in the literature that support arguments and findings, thereby providing deeper and more contextual insights for policymakers and health practitioners.

VOSviewer

VOSviewer is software developed to build and visualize bibliometric networks. VOSviewer is useful for analyzing and mapping the relationships among keywords, authors, or publications based on data extracted from scientific literature databases such as Scopus or Web of Science. The data analyzed through this software can produce co-occurrence visualizations of various relevant factors.

Co-occurrence visualization is used to show the relationships between different keywords or terms that frequently appear together in a dataset. The purpose of co-occurrence visualization is to identify the main topics and how these topics are interconnected.



Co-occurrence visualization shows that 'hypertension' is a central topic that has strong relationships with several other factors such as 'health care cost,' 'economics,' and 'antihypertensive agent.' Below is the interpretation of several key clusters:

- Red Cluster (Sanitation and Hygiene):

This cluster emphasizes the importance of sanitation and hygiene practices, such as "hand washing" and "sanitation." Strategic programs that can be implemented in Barrang Lompo Island include raising community awareness about the importance of hand washing and providing adequate sanitation facilities. This can reduce the risk of diarrheal disease transmission.

- Green Cluster (Diarrhea and Risk Factors):

This cluster focuses on the terms "diarrhea" and "risk factors." In the context of programs, it is important to identify the risk factors contributing to the high incidence of diarrhea, such as dietary patterns and access to clean water. Strategies that can be undertaken include conducting health surveys to gain a deeper understanding of these factors.

- Blue Cluster (Environmental Sanitation):

This cluster includes terms such as "environmental sanitation" and "water contamination." Programs that can be implemented involve better management of water and environmental sanitation, including water quality testing and waste treatment. This is crucial to prevent contamination that can lead to diarrhea.

- Yellow Cluster (Demographics and Social Factors):

This cluster highlights demographic and social aspects, with terms such as "developing countries" and "demography." When designing programs, it is important to consider the social and economic factors that influence public health. Strategies that can be undertaken include involving the community in educational and training programs to enhance knowledge about health.

METHODS

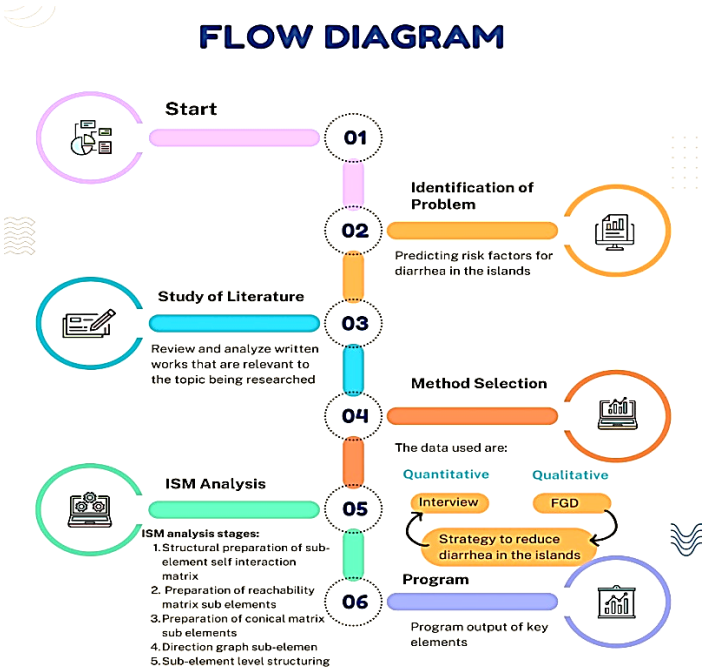


Figure 2. Flow Diagram

The research method used is descriptive qualitative research and uses the Interpretive Structural Modeling (ISM) method. The instrument used in the research was a questionnaire. Data processing techniques in research are editing, coding and processing. ISM is a group learning process where structural models are produced to describe the complex aspects of the system, through carefully designed patterns using graphical sentences. The ISM technique is intended for research by a team, but can also be used by a researcher.This research was conducted in accordance with ethical recommendations and with approval, with financial support number: [649/UN4.14.1/TP.01.02/2024].

RESULT

Overview of Research Locations

Based figure 3 shows Barrang Lompo Island which is one of the islands in the Spermonde Island group and is in the administrative area of Barrang Lompo Village, Ujung Tanah District, Makassar Municipality. There are seven sub-elements of strategy in an effort to reduce the incidence of diarrhea among the people of Barrang Lompo Island. This is based on the results of the FGD with experts.

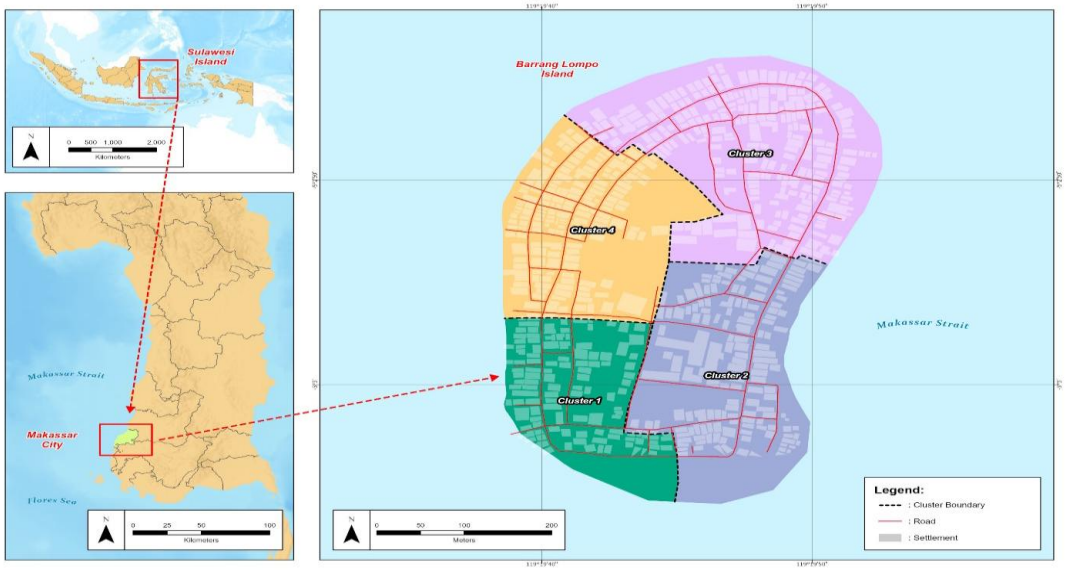


Figure 3. Research Location

Based on Figure 3, it shows Barrang Lompo Island, which is one of the islands in the Spermonde Island group and is in the administrative area of Barrang Lompo Village, Ujung Tanah District, Makassar Municipality.
Sub-elements of Diarrhea Reduction Strategy on Barrang Lompo Island
There are seven sub-elements of strategy in an effort to reduce the incidence of diarrhea among the people of Barrang Lompo Island. This is based on the results of the FGD with experts. Based on the results of the FGD, it can be concluded in Table 2 that the strategy sub-elements in an effort to reduce the incidence of diarrhea on Barrang Lompo Island obtained the following results

Table 2: Sub-elements of Strategy to Reduce Diarrhea Incidents on Barrang Lompo Island

No.	Sub-element
1	Food and Drink Sanitation
2	Reducing Snack Consumption
3	Personal Hygiene (CTPS Habits)
4	Availability of Clean Water Facilities
5	Availability of Waste Water Disposal Facilities
6	Availability of Waste Disposal Facilities
7	Availability of toilet facilities

Source: Primary Data, 2024

Based on table 2 above, it shows that there are seven sub-elements which are strategies in an effort to reduce the incidence of diarrhea on Barrang Lompo Island. The experts' responses regarding sub-elements were then analyzed using ISM expressed in matrix form starting from the Structural Self Interaction Matrix (SSIM) to see the aggregation of answers from experts based on frequency. There are four standard symbols used to describe the relationship between these sub-elements, such as:
V: sub-element i influences sub-element j;
A: sub-element j influences sub-element i;
X: sub-elements i and j influence each other;
O: sub-elements i and j are not related.
Based on these contextual relationships, SSIM was formed as shown in Table 3.

Table 3. Structural Self Interaction Matrix (SSIM)

(i,j)	A1	A2	A3	A4	A5	A6	A7
A1		V	X	X	V	V	X
A2			A	A	A	V	A
A3				X	V	V	V
A4					V	V	X
A5						A	X

Based on table 3, the next stage is to convert the SSIM into a binary matrix, or also called the Reachability Matrix. The symbols V, A, X, and O are replaced with binary numbers 1 and 0 for each contextual relationship between sub-elements of the diarrhea reduction strategy. Convert SSIM to binary numbers, following these rules:
• If the relationship (i,j) in SSIM is V, then the relationship (i,j) in the reachability matrix is 1 and (j,i) is 0,
• If the relationship (i,j) in SSIM is A, then the relationship (i,j) in the reachability matrix is 0 and (j,i) is 1,
• If the relationship (i,j) in SSIM is X, then the relationship (i,j) in the reachability matrix is 1 and (j,i) is also 1,
• If the relationship (i,j) in SSIM is O, then the relationship (i,j) in the reachability matrix is 0 and (j,i) is also 0,
By following these rules, the reachability matrix for the sub-elements of the diarrhea reduction strategy can be seen as shown in Table 4. After that, in Table 5, the driver prower and dependency begin to be calculated, which is the number of binary numbers 1 in each variable, based on the order of rows and columns. . Driver power describes the strength of variable i in influencing variable j, while dependency describes how strongly variable j is influenced by variable i.

Table 4. Reachability First Matrix

(i,j)	A1	A2	A3	A4	A5	A6	A7
A1	1	1	1	1	1	1	1
A2	0	1	0	0	0	1	0
A3	0	1	1	1	1	1	1
A4	1	1	1	1	1	1	1
A5	1	1	0	0	1	0	1

A6	0	0	0	0	1	1	0
A7	1	1	0	1	1	1	1

Then the SSIM whose contents are in the form of the letters VAXO is converted into a matrix form to produce a Final Reachability Matrix which meets the law of transitivity between its sub-elements. The law of transitivity indicates whether or not there is a relationship or indirect influence between the sub-elements. Based on the Final Reachability Matrix, the Driver Power and Dependence of each sub-element are calculated so that the results of the ISM method can be seen which are expressed in directional graphs and level structuring.

Table 5. Reachability last matrix

(i,j)	A1	A2	A3	A4	A5	A6	A7	DP	R
A1	1	1	1	1	1	1	1	7	1
A2	0	1	0	0	0	1	0	2	4
A3	0	1	1	1	1	1	1	7	1
A4	1	1	1	1	1	1	1	7	1
A5	1	1	0	0	1	0	1	3	3
A6	0	0	0	0	1	1	0	2	4

The reachability and antecedent set for each barrier is found out from final reachability matrix. The reachability set for aparticular sub-elements consists of the sub-elements it self and the other sub-elements, which it may help achieve. The antecedent set consists of the sub-elements itself and the other sub-elements, which may help in achieving them. Subsequently, the intersectionof these sets is derived for all sub-elements. The sub-elements for which the reachability and the intersection sets are thesame is given the top-level sub-elements in the ISM hierarchy, which would not help achieve any other sub-elements above their own level. After the identification of the top-level element, it is discarded from the other remaining sub-elements. From Table 6, it is seen that lack of performance metrics sub-elements is found at Level I. Thus, it would be positioned at the top of the ISM model. This iteration is continued till the levels of each sub-elements are found out. The identified levels aids in building the digraph and the final model of ISM.The sub-elements, a long with their reachability set, antecedent set, intersection set and the levels, are shown in Tables 6–10

Table 6. Determination of Diarrhea Reduction Strategy Level (Iteration 1)

Sub-elemen	Reachability	Antecedent	Intersection	Level
1	1,2,3,4,5,6,7	1	1	0
2	2,6	1,2	2	0
3	3,4,5,6,7	1,3	3	0
4	4,5,6,7	1,3,4	4	0
5	5,7	1,3,4,5	5	0
6	6	1,2,3,4,5,6	6	1
7	7	1,3,4,5,7	7	1

Table 7. Determining Diarrhea Reduction Strategy Level (Iteration 2)

Sub-elemen	Reachability	Antecedent	Intersection	Level
1	1,2,3,4,5	1	1	0
2	2,	1,2	2	0
3	3,4,5	1,3	3	0
4	4,5	1,3,4	4	0
5	5	1,3,4,5	5	1

Table 8. Determination of Diarrhea Reduction Strategy Level (Iteration 3**)**

Sub-elemen	Reachability	Antecedent	Intersection	Level
1	1,2,3,4	1	1	0
3	3,4	1,3	3	0
4	4	1,3,4	4	1

Table 9. Determining Diarrhea Reduction Strategy Level (Iteration 4)

Sub-	Reachability	Antecedent	Intersection	Level

elemen				
1	1,3	1	1	0
3	3	1,3	3	1

Table 10. Determining Diarrhea Reduction Strategy Level (Iteration 5)

Sub-elemen	Reachability	Antecedent	Intersection	Level
1	1	1	1	1

One of the outputs of ISM is a graph that divides sub-elements of need into quadrants along with their coordinates. There are four quadrant positions consisting of quadrant I (independent), quadrant II (linkage), quadrant III (dependent), and quadrant IV (autonomous). The linkage quadrant classification is a quadrant that has less stable relationships between variables and every action on these changes will have an impact on other sub-elements and the feedback effect can magnify the impact, so this sub-element must be studied carefully. The dependent quadrant classification is the sub elements that are bound [21].

Based on the output of the quadrant graphic analysis in Figure 3, the ten sub-elements are divided into three quadrants, namely independent, linkage, and dependent. There are no sub-elements in the autonomous quadrant. The quadrant division is in accordance with the results of the ISM analysis.

DriverPower								
	7			A3	A1, A4			
	6					A7		
	5							
	4		Independent		Linkage			
	3		Autonomous		Dependent		A5	
	2						A6,A2	
	1							
		1	2	3	4	5	6	7
		Dependence						

Figure 3. Directional Graph of Strategies for Reducing the Incidence of Diarrhea

There is one sub-element in the independent quadrant, namely; Personal Hygiene (CTPS Habits) (A3). The sub-elements in this sector are in this quadrant and have high driver power while low dependence. The linkage quadrant contains three sub-elements, namely Availability of Clean Water Facilities (A4); Availability of Food and Drink Sanitation (A1); and Availability of Toilet Facilities (A7).

Then in the dependent quadrant there are three sub-elements, namely Reducing Snack Consumption (A2); Availability of Waste Water Disposal Facilities (A5); and Availability of Waste Disposal Facilities (A6). These three sub-elements have low driver power and high dependence. These three sub-elements are actually no more prioritized than other sub-elements, however these three sub-elements are still needed even though they are not urgent, these three sub-elements can be added if the more prioritized sub-elements have been achieved. Snack Consumption Reduction Spot (A2); and Availability of Waste Disposal Facilities (A6) occupies the lowest position or level in this quadrant because it has the lowest driver power, which means it has no more influence than the sub-elements above it.

The level structuring model is one of the ISM outputs that can be used as reference material to determine the expected strategy in an effort to reduce the incidence of diarrhea among the people of Barrang Lompo Island. The results of this research show that there are four levels of strategy that are expected in an effort to reduce the incidence of diarrhea on Barrang Lompo Island, where needs at level one are key elements or can be said to be sub-elements of needs with the highest driver power, while needs at level four is a sub-element requirement with the lowest driver power and has the highest dependence.

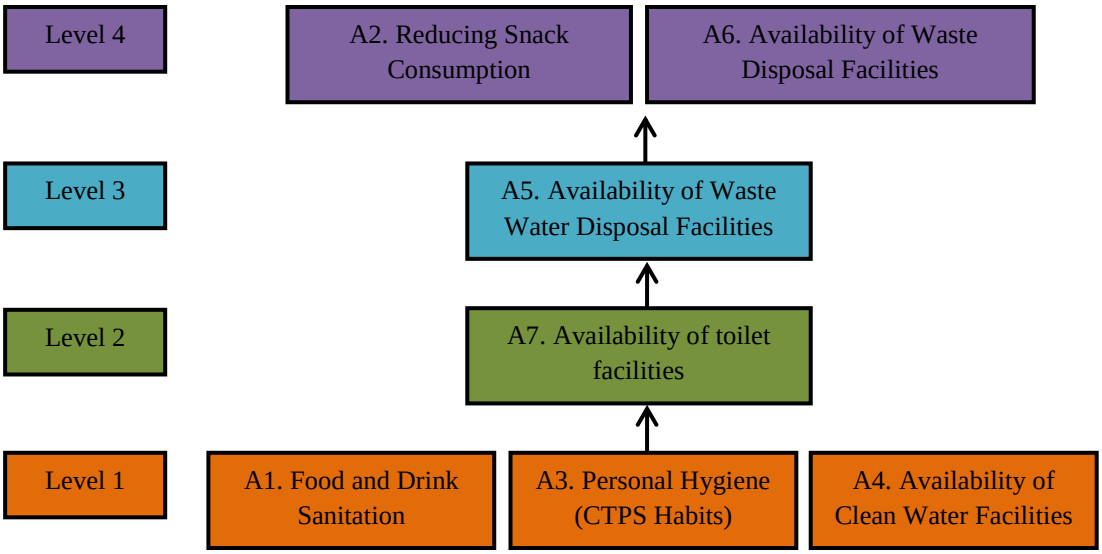


Figure 4. Strategy level structuring to reduce the incidence of diarrhea

Based on figure 4, the needs at level 1 are Food and Drink Sanitation; Personal Hygiene (CTPS Habits); and Availability of Clean Water Facilities, because these three things are key elements in fulfilling the Strategy for Reducing the Incidence of Diarrhea on Barrang Lompo Island. Meanwhile, at level 4, namely Reducing Snack Consumption and Availability of Waste Disposal Facilities, are strategies that are at the basis of level structuring.

DISCUSSION

Strategy for Reducing the Incidence of Diarrhea on Barrang Lompo Island

The results of the Interpretative Structural Modeling (ISM) analysis regarding strategies for dealing with diarrhea incidents show that of the 7 elements, these strategies play an important role in reducing the number of diarrhea incidents. There is 1 of them as a priority (key), namely personal hygiene (CTPS habits). This strategy has a large driver power for the strategy in reducing the incidence of diarrhea and has little dependence on other strategies.

Table 8 shows strategies that have a very weak role in reducing the incidence of diarrhea, namely Reducing Snack Consumption (A2); Availability of Waste Water Disposal Facilities (A5); and Availability of Waste Disposal Facilities (A6). These three sub-elements have low driver power and high dependence, which indicates that the program has a very weak role. However, one thing that needs to be noted in this finding does not mean that this strategy has no role at all, but rather that its role is very weak in reducing the incidence of diarrhea on Barrang Lompo Island.

Strategy in an Independent Position

The results of the Interpretative Structural Modeling (ISM) analysis show that in the Independent position there are strategies that have quite large potential in reducing the incidence of diarrhea, 1 of which is a priority (key), namely personal hygiene (CTPS habits). Washing your hands with soap is a preventive measure to protect yourself from various infectious diseases, including diarrhea, because it is more effective in removing dirt and reducing the number of disease-causing microorganisms such as viruses, bacteria and other parasites. Based on Minister of Health Regulation no. 3 of 2014, good hand washing behavior with soap can be carried out at important times and carried out in facilities with clean running water, soap, and safe wastewater reservoirs or channels [22].

According to the Ministry of Health [23], the activity of washing hands with soap is carried out with the aim of reducing child mortality rates, especially those related to lack of access to sanitation and health education. According to World Health Organization researchers, washing hands with soap and clean water reduces the risk of diarrhea by up to 50%. Washing your hands with soap (CTPS), if practiced correctly and correctly, is also the easiest and most effective way to prevent outbreaks of diseases such as ISPA, cholera, worms, flu, hepatitis A and diarrhea.

Diarrhea incidents can be prevented by implementing correct hand washing behavior using soap and implementing complete hand washing steps. So in this case the habit of washing hands using soap should be taught from an early age to reduce the incidence of diarrhea cases in school children [24].

There are 6 steps in washing hands properly and correctly, with a procedure duration of 20-30 seconds. Before starting, first wet your palms using running water then add enough soap. First step: spread the soap with both

palms; Second step: right palm on the back of the left hand and rub the back of the left hand and between the fingers of the left hand, and vice versa; Step three: rub the palms of the hands together and finger them together; Step four: the fingers on the inside of both hands interlock; Fifth step: rub the left thumb rotating in the grip of the right hand and do vice versa; Sixth step: rub by rotating the tips of the fingers of the right hand on the palm of the left hand and vice versa. Next, rinse your hands using running water, then dry them with a towel. After that, close the water tap using your hand covered with a towel to avoid direct hand contact with the tap [25].

Strategy in Linkage Position

The linkage sector is a hook sector, where all the sub-elements within it have large power and dependent drivers. So, besides having a big driving force for strategies in reducing the incidence of diarrhea, it also has a large level of dependence on other sub-elements. The strategies included in this sector are; Availability of Clean Water Facilities (A4); Availability of Food and Drink Sanitation (A1); and Availability of Toilet Facilities (A7). Based on the results of the Interpretative Structural Modeling (ISM) analysis, these three sub-elements are in the linkage position.

In the sub-element of clean water facilities, providing good clean water will support the improvement of people's welfare and can reduce the death rate and reduce the risk of diarrheal disease. There are three conditions for providing clean water that are said to be good or suitable for the community, namely: (1) availability of water in sufficient quantities to meet daily needs, (2) water quality that meets standards (in this case Minister of Health Regulation No. 416 /PerMenKes/IX.1990 concerning water quality guidelines, as well as (3) continuity in the sense that water is always available when needed. The aim of providing clean water is to help provide it in accordance with health requirements and control water quality for all people living in urban and rural areas as well. increasing the community's ability to provide and utilize clean water if the provision of clean water is not optimal, it can affect the level of public health. The availability of 96 clean water facilities that do not meet the requirements will have an adverse impact on health and can cause various kinds of infectious diseases, especially diarrhea [26]. .

In the sub-element of food and drink sanitation, children whose families use drinking water by boiling it, processing it using chemicals or processing it by filtering it are known to have a lower chance of suffering from diarrhea compared to children whose families do not use water treatment. Water that has been stored can experience contamination during the collection, transportation and storage process which in turn can increase the risk of diarrhea [27].

This was also reinforced by Kazmi [28] who suggested that people should boil water for diarrhea before drinking, not only until it boils, but by paying attention to the time and temperature when cooking to avoid pathogenic bacteria. Research conducted on Barrang Lompo Island showed that diarrhea was caused by a lack of public awareness in managing drinking water. The water piping system often has problems due to a lack of monitoring and supervision by the government.

In the sub-element of availability of latrine facilities, there is one government program which aims to improve services and facilities for drinking water and sanitation as well as increasing the values and behavior of clean and healthy living in rural/suburban/coastal communities, namely the PAMSIMAT Program. In this government program, the components of Increasing Clean and Healthy Living Behavior and hygiene and sanitation services are the main components. Through this component, it is hoped that it can help local communities and institutions in preventing the impacts of poor sanitation and unclean water, which have the potential to result in water-based and environmental diseases, especially diarrhea. The aim of the health component itself is to increase the capacity and ability of the community and local government in planning and implementing sanitation coverage development programs through the development of family latrines and the construction of sanitation facilities in schools/places of worship as well as expanding the perceived health benefits through the development of clean water and sanitation facilities and behavior. live clean and healthy [29].

Strategy in Dependent Positions

The dependent sector is that all the sub-elements within it are non-independent sub-elements, their driving force for strategies in reducing the incidence of diarrhea tends to be weak, but their dependence on other sub-elements is generally strong. strategies included in this sector are Reducing Snack Consumption (A2); Availability of Waste Water Disposal Facilities (A5); and Availability of Waste Disposal Facilities (A6).

As a strategy that is in a dependent position, it shows that this strategy program has a very weak role in the strategy in reducing the incidence of diarrhea. Therefore, the strategy for reducing the incidence of diarrhea requires the need to improve the function of each program and the need for cooperation between the parties who play a role in the program.

In the sub-element of reducing snack consumption, children's habits in consuming snacks that are not good can affect children's nutrition. The cleanliness of snack foods can influence the incidence of diarrhea due to the use of dangerous substances and can result in food poisoning [30]. The supporting factor in choosing healthy snacks is knowledge, because respondents' knowledge is closely related to the nutritional quality of healthy food. For

this reason, knowledge about healthy snacks is needed to determine whether consumption of these snacks has an impact on children's nutritional status.

In the sub-element of availability of waste water disposal facilities, waste water that is not managed properly can pollute the environment and ground water, besides that it can become a breeding place for disease vectors. The principles for protecting household liquid waste are as follows: 1) Bathroom and kitchen waste water must not be mixed with water from latrines, 2) It must not become a breeding place for vectors, 3) It must not cause odors, 4) There must be no puddles that cause floors are slippery and prone to accidents, 5) Connected to public waste channels/sewers or absorption wells [31].

In the sub-element of availability of waste disposal facilities, waste management is very important, to prevent the spread of the disease. Trash bins must be provided, rubbish must be collected every day and taken out to temporary shelters. If waste disposal services cannot reach a final disposal site, waste can be destroyed by landfilling or burning [32]. Even though household waste management is not good, if there are waste management officers who are orderly in transporting waste to the final disposal site. Regularity in transporting waste from households will prevent the formation of vector breeding places [33].

Diarrhea Reduction Strategy Program

One of the government programs to provide drinking water, clean water and proper sanitation as well as increasing public awareness and willingness to care more about the environment and health is Community Based Total Sanitation (STBM) activities. It is hoped that the STBM approach will encourage people to feel ashamed and afraid of conditions in their environment [34].

The CTPS or Hand Washing with Soap program is a flagship program of STBM (Community Based Total Sanitation). The aim of the CTPS Program is to encourage people to get used to washing their hands and family members before eating and after urinating and defecating. In this program, not only are they willing to provide outreach regarding the importance of washing hands with soap before eating and after urinating and defecating, but also take the initiative and be creative to create a simple and cheap means of washing hands with soap, namely a service program. used that has been installed with a water tap that is easily purchased in stores [35].

Meanwhile, an effective household drinking water sanitation program is raw water management, drinking water management, drinking water storage containers, and important things in managing household drinking water and food (PAMM-RT). Effective household food management follows the 6 principles of food sanitation hygiene, namely, selecting food ingredients, storing food ingredients, processing food, storing cooked food, transporting food, and serving food. If the 6 principles of food and drink management are applied in the household, it can prevent diarrheal disease [34,35].

CONCLUSION

Based on the research results, it can be concluded that personal hygiene is a key factor in reducing the incidence of diarrhea on Barrang Lompo Island. The priority strategy is Food and Beverage Sanitation; Personal Hygiene (CTPS Habits); and Availability of Clean Water Facilities, because these three things are key elements in fulfilling the Strategy for Reducing the Incidence of Diarrhea on Barrang Lompo Island.

SUGGESTION

Personal hygiene needs to be implemented as much as possible to prevent diarrhea incidents by collaborating with cross-sectors, for example related health agencies to carry out education programs on clean and healthy living behavior or implementation and implementation of community-based total sanitation programs.

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