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ANALYSIS OF CLEAN WATER USE AND PERCENTAGE OF DIARRHEA DISEASE IN COMMUNITIES IN INDRA JAYA DISTRICT, ACEH JAYA DISTRICT, 2023

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Abstract

This research aims to analyze the relationship between clean water usage and the percentage of diarrhea incidence in the community of Indra Jaya, Aceh Jaya Sub-district, Surabaya. The study focuses on the primary water sources used by residents, environmental sanitation conditions, and household water treatment practices. The research employed data collection through questionnaires and observations, alongside statistical analysis to assess the relationship between water sources and the incidence of diarrhea. The results indicate that the majority of respondents use river and well water as their main water source, with a 53.3% incidence of diarrhea. Statistical analysis reveals a significant correlation between poor water sources and a high percentage of diarrhea incidence. Environmental sanitation conditions, particularly the practice of personal hygiene (bathing, washing, toileting), also influence the risk of diarrhea, especially for those using river water. The importance of household water treatment, such as boiling, as an effective measure to prevent diarrhea, is highlighted in this research. Additionally, the study underscores the role of increasing community awareness regarding the cleanliness of water sources and environmental sanitation in reducing the risk of diarrhea. To decrease the incidence of diarrhea, preventive measures involving the government and healthcare professionals are recommended, including improving community access to safety water and conducting routine sanitation inspections to ensure the safety of water sources.

Keywords: ***Clean Water, Diarrhea, and Society.***

1. INTRODUCTION

The role of water is very important to maintain the continuity of life, so humans try to obtain enough water for themselves (World Health Organization, 2017). However, in many cases the water used does not always comply with health requirements. It is often found that this water contains germs or certain substances that can cause diseases that actually endanger human survival. According to Minister of Health Regulation No. 492/Menkes/PerIV/2010 concerning Health Requirements for Drinking Water, the permissible level in 100 ml of water sample is 0 with the physical requirements being odorless, tasteless and the color not more than 15 mg/l (Supadno & Junarto, 2022).

According to the findings of the 2019 Riskesdas survey, there was a decrease in the percentage of households using less than 20 liters of water per person per day, which stood at 14%. This is a decline compared to the data from 2018. On the other hand, the percentage of households with 'good' physical drinking water quality saw an increase from 86% in 2018 to 90% in 2019 (Nasution & Samosir, 2019). It is worth noting that not all primary water sources for household use are utilized as drinking water sources. For instance, although

19.7% of tap water/PAM is used as the main water source for households, only 14.4% is consumed as drinking water. This means that approximately 27.0% of tap water/PAM is not utilized as a drinking water source.

There is a shift in the pattern of use of drinking water sources, especially in urban areas, where the use of bottled water as drinking water increased from 6% in 2010 to 7.2% in 2018. Meanwhile, more households used drinking water depots as a source of drinking water. high (13.8%). Household access to protected drinking water sources according to MDGs criteria is 45.1% (Alam & Sarker, 2018). There is a decline in household access to protected drinking water sources, especially in urban areas, so that the MDGs achievements are on the wrong track. If you take into account bottled water and water from drinking water depots, the percentage of households with access to protected drinking water sources is 66.7%. Access to 'quality' drinking water sources that consider the type of protected water source (including bottled water and drinking water depots), distance to drinking water sources, ease of obtaining drinking water and physical quality of drinking water is 67.5% with the highest percentage in the Province DKI Jakarta (87.0%) and the lowest in West Kalimantan Province (35.9%).

Data from the Ministry of Health of the Republic of Indonesia states that Aceh Province is one of the regions that is below national health standards, such as population problems with access to adequate basic sanitation 38.43% (national coverage 51.19%), healthy homes 53.35% (national coverage 63.49%), babies exclusively breastfed 55.1 (national coverage 61.39%) (Elysia, 2018). Diarrhea is a disease of the digestive tract in which sufferers experience the condition of having to defecate continuously with a frequency of three or more times a day and the feces excreted contain excessive fluid, so that diarrhea patients will experience loss of body fluids which can cause dehydration and can cause death (Jones & Rubin, 2019). Clinically, diarrhea can be caused by infection (bacterial, viral and parasitic infections), malabsorption, allergies, food poisoning (Candra et al., 2022).

Several studies state that the main factors that influence the occurrence of diarrhea are the health of the surrounding environment, including the use of clean water facilities, waste and waste management, clean living behavior and the most dominant factor is the source of drinking water consumed (Rosyada et al., 2018). Based on WHO data, diarrhea is the second leading cause of death in children under the age of five in the world with a death rate of around 525,000 children in 2020 (World Health Organization, 2017). Based on the results of the 2019 Riskesdas, it is known that the prevalence of diarrhea based on the diagnosis of health workers in Indonesia is 6.8%. This is of course an increase compared to the 2019 Riskesdas results, which were only 4.5%. Meanwhile, the prevalence of diarrhea based on the diagnosis of health workers for Gorontalo Province is 8.83% with a prevalence of diarrhea in toddlers of 12.60% (Riskesdas Gorontalo, 2019). Water is a source of disease due to disease vectors, especially diarrheal disease which is transmitted through water that is of poor quality (Biantoro HFRSWHS, 2019) (Putu Rosmadewi et al., 2020).

Research conducted by Sumolang et al (2019), states that there is a relationship between the quality of drinking water sources and the incidence of diarrhea. In 2019, Feby Victiani and Salamah said that good sanitation and drinking water sources influence the incidence of diarrhea (Ayuningrum & Salamah, 2016). Research conducted by Rahman et al (2020) related to the type of drinking water source on the incidence of diarrhea using the Chi-Square

Test obtained results with a p value < 0.005, which means there is a relationship between the incidence of diarrhea and the source of drinking water consumed.

States that the source of drinking water is an important factor related to the incidence of diarrhea (Surya, 2019). This is because most of the infectious germs that cause diarrhea come from water. Water is one of the natural resources needed by all living creatures, the availability of water can balance development in all sectors of life (Zarkasih, 2019). The water source itself is obtained from ground water and surface water. For groundwater itself, since 1970-2020, groundwater levels have decreased by 80 percent. Meanwhile, clean surface water can be obtained from rivers, seas and lakes (Suryani, 2021). From the description above, the author is interested in discussing "Analysis of Clean Water Use and the Percentage of Diarrhea Diseases in the Community in Indra Jaya District, Aceh Jaya Regency in 2023".

2. RESEARCH METHOD

This type of research is observational analytical research, with a cross sectional approach. The independent variable is the water source and the dependent variable is the incidence of diarrhea (Angeliana et al., 2019). This research is located in Indra Jaya District, Aceh Jaya Regency in 2023. The population is the entire community of Indra Jaya District Village, totaling 300 people. With a sample size of 75 people taken using a simple random sampling technique. Data was collected using a questionnaire and then processed and analyzed using the Spearman Rank correlation test with a significance level of 0.1. Ho is rejected if the probability value is smaller than the significance level ($\rho < \alpha$). This research is located in Indra Jaya District, Aceh Jaya Regency in 2023.

Primary data is data obtained by researchers from original sources. This primary data is the main data that will be processed and researched in collecting data in this research (Indra & Cahyaningrum, 2019). This primary data source was obtained from accurate data originating from Indra Jaya District as a place for research and research implementation. Secondary data is data obtained indirectly or data that is previously available, so researchers use this data as supporting material for research (Situmorang & Helmi, 2018). This secondary data source is obtained through media intermediaries (obtained and recorded by other parties), documents, files, book literature, and archives or direct news. This data is used to complete primary data.

3. RESULT AND DISCUSSION

3.1. Result Research

3.1.1. Descriptive Analysis of Respondents and Water Sources in Indra Jaya District

Table 1 Frequency Distribution of Diarrhea Incidents in the Community of Indra Jaya District, Aceh Jaya Regency:

Table 1. Frequency Distribution of Diarrhea Incidents

Diarrhea Occurrence	Frequency	Percentage (%)
Diarrhea	40	53.3
Not Diarrhea	35	46.7
Amount	75	100.0

Based on table 1, the results obtained from 75 respondents, 40 people (53.3%) experienced diarrhea and 35 people (46.7%) did not experience diarrhea. There are more people who experience diarrhea compared to people who do not experience diarrhea. The condition of the water source in this research is the physical condition of clean water facilities in the homes where people live. Meanwhile, the source of water facilities is the water source used by respondents for MCK (bathing, washing, toileting) and cooking purposes.

Table 2. Distribution of Water Sources Used by the Community of Indra Jaya District, Aceh Jaya Regency

Water sources	Frequency	Percentage (%)
River	39	52
Well	36	48
PDAM	0	0
Amount	75	100.0

From table 2, it is known that 39 respondents (52%) only used clean water from rivers and 36 respondents (48%) from wells.

Table 3. Distribution of Conditions of Water Source Facilities Used by the Community of Indra Jaya District, Aceh Jaya Regency

Condition of Water Source Facilities	Frequency	40 Percentage (%)
Good	30	40
Bad	45	60
Amount	75	100

Based on the results in table 3, the condition of clean water source facilities is categorized into good and bad. It is known that the majority of respondents have poor water source conditions, namely 45 respondents (60%). Meanwhile, 30 respondents (40%) had good water source conditions.

3.1.2. The relationship between water sources (rivers and wells) and the incidence of diarrhea in the community of Indra Jaya District, Aceh Jaya Regency

Table 4. Cross Tabulation of the Relationship between water sources (Rivers and Wells) and Diarrhea Incidence in the Community of Indra Jaya District, Aceh Jaya Regency

Water sources	Diarrhea Occurrence				Amount	
	Diarrhea		No diarrhea			
	f	%	f	%	f	%
River Water	23	58.9	16	41.1	39	100
Well water	17	47.2	19	52.8	36	100
Amount	40	53.3	35	46.7	75	100

Based on table 4, it is known that 23 respondents (58.9%) used river water sources and experienced diarrhea.

3.1.3. The relationship between the condition of water sources and the incidence of diarrhea in the community of Indra Jaya District, Aceh Jaya Regency

Table 5 Cross Tabulation of the Relationship between Water Source Conditions and the Incidence of Diarrhea in the Community of Indra Jaya District, Aceh Jaya Regency.

Table 5. Cross Tabulation of the Relationship

Water sources	Diarrhea Occurrence				Amount	
	Diarrhea		No diarrhea			
	∑	%	∑	%	∑	%
Good	12	44.4	15	55.7	27	100
Bad	28	58.3	20	41.7	48	100
Amount	40	53.3	35	46.7	75	100

From table 5, it is known that 28 respondents with poor water source conditions experienced diarrhea incidents, while 12 respondents with good water source conditions experienced diarrhea incidents as many as 12 people (44.4%).

3.1.4. Data analysis

Based on the results of statistical tests using the Spearman Rank test, the following values were obtained that, In the correlation test, the Sig value. (2-tailed) obtained by researchers was 0.087, or the Sig value. (2-tailed) is smaller than 0.1, then a relationship is considered to exist (Ho is rejected, H1 is accepted). This means that there is a relationship between water sources and the incidence of diarrhea in the community of Indra Jaya District, Aceh Jaya Regency. In determining the strength of the relationship by looking at the Correlation Coefficient (r). The relationship strength coefficient is as follows:

0.00-0.19 = Very Low
0.20-0.39 = Low
0.40-0.599 = Moderate
0.60-0.599 = Strong
0-80-1,000 = Very strong

Meanwhile, the rho (r) value obtained by the researchers was 0.463, which means it has a moderate relationship strength. In determining the direction of the relationship by looking at the Correlation Coefficient (r), a positive sign is obtained which indicates that the correlation that occurs is a correlation in the same direction.

3.2. Discussion

3.2.1. Discussion on Analysis of Clean Water Use and the Percentage of Diarrhea Diseases in the Community in Indra Jaya District

According to Government Regulation Number 82 of 2001 concerning Water Quality Management and Water Pollution Control, what is called a water source is a water container located above and below the surface of the land, including the meaning of aquifers, springs, rivers, lakes, lakes, reservoirs and estuaries. In this research, the emphasis is on water sourced from rivers, wells and PDAMs used by local communities (Sardjana, 2022).

The research results in table 2 show that the majority of respondents used river water as a water source, namely 39 respondents (52%) and other respondents used river water as a water source, namely 36 respondents (48%). In Indra Jaya District Village, there are no people who use water sources from PDAM because the village area does not receive water flow from PDAM, plus the location of Indra Jaya District Village which is directly adjacent to the community prefers to use river water or well water. In the cross tabulation results, it was found that 58.9% of respondents used river water and got diarrhea, while 47.2% of respondents used well water and got diarrhea.

The availability of clean water sources is one of the efforts to improve the level of public health. Environmental health is carried out to create a healthy environment, namely a condition that is free from risks that endanger the health and safety of human life. Environmental health includes water sanitation, namely securing and determining water quality for various needs and human life. Thus, water used for daily needs, apart from fulfilling or covering the quantity, must also meet the specified quality. The importance of good quality water needs to be provided to meet basic needs in preventing the spread of infectious diseases through water (Ginanjar, 2019).

Diarrhea is defined as a disease characterized by changes in the shape and concentration of feces and an increase in the frequency of defecation more than usual (more than 3 times) (Sardjana, 2022). According to Suharyono (1991), diarrhea is defecation with abnormal frequency (increased) and a stool consistency that is softer or more liquid. The incidence of diarrhea in this study was measured using a questionnaire containing questions related to the definition of diarrheal disease. From the research results in table 1, it is known that the majority of people in Indra Jaya District Village have experienced or often experience diarrhea, namely 53.3% or 40 respondents. Based on the results of the questionnaire scoring conducted by researchers, which are described in table 3, it shows that the majority of

respondents had poor water sources, namely 45 respondents (60%) and 30 respondents with good water sources (40%).

From the results of the relationship analysis, it is known that respondents who experienced more diarrhea were those with a poor percentage of water source conditions, namely 28 respondents (58.3%). Meanwhile, only 12 respondents (44.4%) had good water source conditions and suffered from diarrhea. It can be concluded that there is no significant level or gap between the percentage of people suffering from diarrhea in good or bad water source conditions. The Spearman Rank test produced a rho value of 0.463, with a significance level of 10%. Put differently, the p-value of 0.087 is below 0.1, resulting in the rejection of Ho and the acceptance of H1. This indicates a connection between water sources and the occurrence of diarrhea in the community of Indra Jaya District, Aceh Jaya Regency.

Water can play a role in transmitting disease through microorganisms that are transmitted via water (water-borne disease) or equipment that is washed with water (water-washed disease). Most diarrhea is caused by bacterial infections that are transmitted via the fecal-oral route. Diarrhea can be transmitted through fluids or materials contaminated by feces such as drinking water, hands or fingers, food prepared in a pan that has been washed with contaminated water (Suhardiman, 2021). When conducting interviews, the researcher also made observations and obtained the following data: For MCK activities (bathing, washing, toileting), the local community mostly uses water sourced from rivers and wells. People who use river water as a water source for their daily needs can increase the risk of diarrhea due to direct contact with organisms in the water (water contact disease) Shetty (2019) in (Harsa, 2019).

Some people who use wells and have a latrine (family latrine) at home do not meet environmental health requirements, because to avoid microbiological pollution, the safe distance between the well wall and the source of pollution is 10 meters, whereas on average, the latrine is located directly next to the well. So it can pollute well water which is used as a water source. According to Yuni Puspitasari (2021), clean water sources greatly influence the cleanliness of the eating and drinking utensils used. If the clean water source used is contaminated with pathogenic bacteria such as E.coli, then eating and drinking utensils are at risk of being contaminated, especially if washing behavior is not good. As a result, a chain of transmission of diarrheal disease occurs (Bain et al., 2014). Meanwhile, the source of drinking water used by the community is refill water (per gallon) or purchased PDAM water (per liter). People who buy PDAM water usually undergo treatment before consuming it.

According to the Indonesian Ministry of Health (2022), processing household drinking water, one of which is boiling, is efficient in killing microorganisms so that it does not cause diarrhea. Water that is not managed according to household drinking water management standards can cause disease (Anzani, B & Saftarina, 2019). Treatment of household drinking water can improve the microbiological quality of household drinking water with simple and affordable methods and reduce the incidence and death rates caused by water-borne diseases such as diarrhea (Clasen & Cairncross, 2004). Meanwhile, refill water has basically been processed through filtration and disinfection. The filtration process is intended not only to separate suspended matter, but also to separate mixtures in colloidal form including microorganisms from the water, while disinfection is intended to kill microorganisms that are not filtered by the previous process. So that the pathogenic bacteria in drinking water die before consumption.

According to Simatupang (2019), improving water sources (quality and quantity) and individual success will reduce the possibility of being infected by pathogenic bacteria. People who are provided with clean water have a lower risk of suffering from diarrhea compared to people who do not get clean water. People can reduce the risk of diarrhea attacks by using clean water and water that is protected from contamination from source to storage. Therefore, it is necessary to increase the supervision of health workers to carry out sanitation inspections of clean water facilities and educate the public to pay attention to the water sources used (Samiyati et al., 2019). Clean water is used to protect it from contamination, namely maintaining the cleanliness of the well by improving the construction and keeping the well building, distribution pipes and storage areas clean (Wulandari P Anjar, 2019).

4. CONCLUSION

In conclusion, based on the aforementioned explanation, it can be inferred that the majority of individuals residing in Indra Jaya District, Aceh Jaya Regency, rely on river water and wells as their primary water sources, with no utilization of PDAM in the village. There exists a significant correlation between inadequate water sources and the high prevalence of diarrheal diseases within the community of Indra Jaya District. The hygienic conditions of the environment, particularly in terms of bathing, washing, and toilet practices, can impact the risk of contracting diarrheal diseases, especially for those who depend on river water as their water source. Employing household water treatment methods, such as boiling, can serve as an effective measure to prevent diarrhea, particularly in areas where access to clean water is limited.

Raising public awareness regarding the significance of clean water sources, environmental sanitation, and water treatment practices can contribute to mitigating the risk of diarrheal diseases. It is imperative for the government and health authorities to prioritize community access to safe and clean water by taking necessary actions. Regular sanitation inspections should also be conducted to ensure the safety of water sources. By implementing preventive measures and enhancing the quality of water sources, the incidence of diarrheal diseases within the community of Indra Jaya District can potentially be reduced.

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