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Relationship of Environmental Conditions to Health Events**Agung Waskito¹, Lenie Marlinae¹, Laily Khairiyati¹, Rahayu², Darma Nesty³, Dina Fitri⁴, Gusti Jauza Meydina⁴**¹ Environmental Health Department, School of Public Health, Faculty of Medicine, Lambung Mangkurat University, Banjarbaru, Indonesia.² Student of Health Policy Administration Department, School of Public Health, Faculty of Medicine, Lambung Mangkurat University, Banjarbaru, Indonesia.³ Student of Environmental Health Department, School of Public Health, Faculty of Medicine, Lambung Mangkurat University, Banjarbaru, Indonesia.⁴ Student of Occupational Health and Safety Department, School of Public Health, Faculty of Medicine, Lambung Mangkurat University, Banjarbaru, Indonesia.Corresponding author email: [agung.waskito\[at\]ulm\[dot\]ac\[dot\]id](mailto:agung.waskito[at]ulm[dot]ac[dot]id)**Corresponding Author***

Agung Waskito

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Abstract: Environmental health is an optimum environmental condition or condition so that it has a positive effect on the realization of optimum health, the environment, and individual health. Diarrhea is currently one of the main causes of morbidity and mortality. Almost all geographic areas of the world and all age groups are attacked by diarrhea, serious illness, and high mortality, especially in infants and children under five. The purpose of this study was to determine the relationship between environmental health and health events which included the characteristics of clean water and sanitation and personal hygiene variables. The method used to collect primary data (interviews using a questionnaire instrument, observation, and measurement), and secondary data (health data). The results of the study concluded that The characteristics of clean water that have a relationship with the incidence of diarrhea are in terms of processing drinking water before drinking (p-value = 0.021), while the characteristics of sanitation

and personal hygiene in terms of the availability of hand washing places (p-value = 0.073) and the method of disposal of toddler feces (0.772) indicates that there is no relationship to the incidence of diarrhea that occurs in Simpang Warga Village, RT.

Keywords: Diarrheal diseases; Clean water; Sanitation and Personal Hygiene**1. INTRODUCTION**

Health problems are very complex problems related to environmental health problems and individual health. Environmental health is essentially an optimum environmental condition or condition so that it has a positive effect on the realization of optimum health, both the environment and individual health. (Dini et al, 2015).

Infectious diseases are a major health problem in almost all developing countries including Indonesia because of the relatively high morbidity and mortality rates and in a short time. One of the infectious diseases is diarrhea which is still an important public health problem. Diarrhea is currently one of the main causes of morbidity and mortality. Almost all geographical areas of the world and all age groups are attacked by diarrhea, serious illness, and high mortality, especially in infants and children under five (Sky, 2016).

In Indonesia, it is reported that there are 1.6 to 2 cases of diarrhea per year in children under five so that overall it is estimated that the incidence of diarrhea in children under five is around 40 million a year with deaths of 200,000-400,000 children under five. In a survey conducted by the Directorate General of P2MPL of the Ministry of Health in 10 provinces, it was found that from 18,000 households surveyed a sample of 13,440 children under five was taken, and the incidence of diarrhea in children under five was 1.3 episodes of diarrhea per year. Diarrhea will cause dehydration which results in death, diarrhea is the number one killer cause of death by age in children under five or age group 7-59 months (Melvani, 2019).

Diarrhea is a disease that occurs when the stool consistency changes apart from the frequency of bowel movements. A person is said to have diarrhea if the stool is more watery than usual, or if he has had three or more bowel movements within 24 hours. Diarrhea is always included in the top 10 health problems and diseases that occur in all health centers in Indonesia. This problem is caused by people's ignorance and inability to maintain environmental health (Sky, 2016).

Environmental sanitation is an important factor that must be considered, especially clean water facilities, drinking water sources, latrine conditions, sewerage, and type of house floor. Diarrhea is watery or mushy defecation that occurs in toddlers and is excreted more than three times a day with or without blood or mucus in the stool. (Samiyati et al, 2019). This underlines the importance of the benefits of maintaining environmental cleanliness, because if the surrounding environment we live in is clean and far from environmental pollution, such as sources of clean water, types of household waste disposal sites, types of landfills. Then the incidence of diarrheal disease outbreaks will be reduced. This will help reduce morbidity and mortality for children under five. One example is by washing hands before eating and making a septic tank that is >10 meters from a clean water source. Judging from the scope of epidemiology in the field of public health, it includes environmental health/sanitation, eradication of infectious diseases (Yustati, 2021).

2. Methods

The data collection needed as material for writing this report uses 2 methods, namely: primary and secondary data collection methods, in which primary and secondary data collection is obtained through:

a. Primary data

Primary data is data obtained directly from the source. The primary data collection used in this activity is interviews and observations/measurements. The interview technique was carried out in order to make it easier for respondents to understand the questions from the questionnaire instrument used. While the observation/measurement technique is carried out to obtain quantitative data (Safitri and Ade, 2017). The following are primary data sampling techniques:

1. Interview

Interview is a meeting of two people in exchanging information and ideas through question and answer, so that meaning can be constructed in a particular topic. Information exchange is carried out by 2 parties, namely the interviewer (interviewer) who asks questions and the interviewee (interviewee) who provides answers to the questions asked.(Agustin et al, 2019).

The data collection technique was carried out by conducting direct interviews with respondents, who were household heads, and household members in Simpang Warga Village, RT 04, Aluh-Aluh District, Banjar Regency using a questionnaire instrument.

2. Observation and measurement

Observation is a complex process, a process composed of various biological and psychological processes. The two most important things in observation are the processes of observation and memory(Agustin et al, 2019).

The data collection technique was by observing activities in Simpang Warga Village, RT 04, related to health problems in respondents by measuring height, weight, LILA, as well as body image and observing environmental conditions, namely water reservoirs and container index (CI).

b. Secondary Data

Secondary data is data that has been processed and published by certain agencies. Secondary data is also data obtained or collected by the person conducting the research. The data was obtained in the form of data relating to population data from the village secretary, toddler data from the village midwife, and data related to diseases from the Puskesmas. This data is used to support the preparation of this report(Wahyudi, 2017).

3. Results and Discussion

Table 1. Distribution and frequency of respondents in Simpang Warga Village RT 04

No.	Characteristics	Amount	Percentage
1.	male ART	110	55.6%
2.	Female ART	88	44.4%
3.	Number of toddlers	22	42.3%
4.	Number of pregnant women	2	3.8%

Based on table 1, it is known that the sample of this study consisted of 52 heads of families (KK) in which there were 198 household members (ART) consisting of 110 men and 88 women. The number of toddlers 0-60 months is 22 toddlers, while mothers who are pregnant in Simpang Warga Village RT 04 are 2 respondents.

Table 2. Distribution and frequency of ART education in Simpang Warga Village RT 04

Education	Amount	Percentage
Low	186	93.93%
Tall	2	6.07%
Total	198	100%

Based on table 2, it is known that the education level of the Simpang Warga Village RT 04 has low education as many as 186 people (93.93%) consisting of people who have /not attended school, have not graduated from elementary school, graduated from elementary school, and junior high school/equivalent. Meanwhile, in the community with higher education, there are 12 people (6.07%) consisting of people who take education at the high school/equivalent and Diploma/S1/equivalent levels.

Table 3. Characteristics of Clean Water in Simpang Warga Village RT 04

Characteristics	Well		Not good	
	Frequency	Percentage	Frequency	Percentage
Source of drinking water	47	90.4%	5	9.6%
Treatment of drinking water before drinking	21	40.4%	31	59.6%
Physical quality of drinking water	42	80.8%	10	19.2%
latrine condition	9	17.3%	43	82.7%
The distance between the well and the septic tank	5	9.6%	47	90.4%

Based on table 3, it can be seen that the source of drinking water for the people of Simpang Warga Village RT 04 in the good category is 47 (90.4%) and not good is 5 (9.6%); drinking water treatment before drinking in the good category as many as 21 (40.4%) and not good as many as 31 (59.6%); the physical quality of drinking water in the good category was 42 (80.8%) and not good as much as 10 (19.2%); the condition of community latrines is in the good category as many as 9 (17.3%) and not good as many as 43 (82.7%), and the distance between the well and the septic tank in the good category is 5 (9.6%) and the bad category is 47 (90.4%).

Table 4. Characteristics of Sanitation and Personal Hygiene in Simpang Warga Village RT 04

Characteristics	Well		Not good	
	Frequency	Percentage	Frequency	Percentage
Availability of hand washing facilities	41	78.8%	11	21.2%
How to dispose of toddler feces	25	48.1%	27	51.9%

Characteristics of community sanitation and personal hygiene in Simpang Warga Village RT 04 can be seen in table 4, it can be seen that in 1 house there are 29 (55.8%) family members who smoke and 23 (44.2) family members who smoke. %. In addition, there were 41 (78.8%) hand washing facilities in their homes and 11 (21.2%). % and not good category as much as 27 (51.9%).

Table 5. Distribution of Infectious Diseases Frequency in Simpang Warga Village RT 04

Characteristics	Yes		No	
	Frequency	Percentage	Frequency	Percentage
ARI	0	0%	198	100%
Pneumonia	1	0.5%	197	99.5%
Typhoid fever	1	0.5%	197	99.5%
Malaria	0	0%	198	100%
Diarrhea	9	4.5%	189	95.5%
Measles	0	0%	198	100%
Tuberculosis	0	0%	198	100%
DHF	0	0%	198	100%
Hepatitis	0	0%	198	100%
Filariasis	0	0%	198	100%

Table 5 shows the frequency distribution of infectious diseases in Simpang Warga Village, RT 04 and the highest frequency is diarrhea, then the second-highest is pneumonia and typhoid fever.

The results of the bivariate test analysis using the chi-square statistical test on SPSS will explain the relationship between clean water characteristics and sanitation and personal hygiene characteristics on the incidence of diarrhea in Simpang Warga Village, RT 04.

a. The Relationship Between Clean Water Characteristics and Diarrhea Incidence in Simpang Village Residents Outside RT 04

Table 6. Chi-square test of the characteristics of clean water on the incidence of diarrhea in Simpang Warga Village, RT 04

Characteristics	Chi-square	Information
Source of drinking water	0.241	Not related
Treatment of drinking water before drinking	0.021	Relate
Physical quality of drinking water	0.547	Not related
latrine condition	0.615	Not related
The distance between the well and the septic tank	0.379	Not related

Table 6 shows that the characteristics of clean water that have a relationship with the incidence of diarrhea are in terms of processing drinking water before drinking (p -value = 0.021). This is in line with research by Zulkifli et al (2017) which showed a significant relationship with p -value = 0.000 ($p < 0.05$), meaning that there was a significant relationship between processing actions and the incidence of diarrhea in Wawondula. (Zulkifli, Rahmat and Ruhban, 2018). Drinking water sources are said to be safe if they can be consumed directly without any prior processing (Oktariza, Suhartono and Dharmino, 2018). Munjed et al, explained that using a water source as drinking water without any treatment or treatment is a factor that greatly influences the occurrence of diarrhea. Until now, there are still people who consume drinking water without being boiled until it boils. They take water and store it in a special place and use it as drinking water. This fact can lead to diarrhea when the body is no longer strong enough to maintain its prime condition. Consuming water without cooking does not necessarily cause diarrhea (Zulkifli, Rahmat and Ruhban, 2018).

While the characteristics of clean water in terms of drinking water sources (p -value = 0.241), which mean that it has no relationship to the incidence of diarrhea that occurred in Simpang Warga Village, RT 04. This is in line with research by Oktariza et al (2018) which states that there is no relationship between drinking water sources and the incidence of diarrhea in children under five in the working area of the Buayan Public Health Center, Kebumen Regency, where the p -value (0.919) > (0.05). The RP value (95% Ci) is 1.119 (0.615-2.007)(Oktariza, Suhartono and Dharmino, 2018). However, this is not in line with the research of Marini et al (2020) who conducted an analysis of 8 sources of drinking water used by the community and had a strong relationship with the incidence of diarrhea.(Marini, Ofarimawan and Ambarita, 2020).

The characteristics of clean water in terms of water sources have a close relationship with sources of waste and waste pollution. Water sources that have a distance of <10 meters from sources of pollution, both from latrine disposal, household waste disposal, garbage disposal, animal cages, and other sources of pollution will affect the quality of water sources in the area. Water sources used by households must have a good level of security. Good safety is not only seen based on where the source of drinking water comes from, but must also pay attention to the recommended distance so that the water source can be free from sources of pollution, and water must be treated before consumption.(Oktariza, Suhartono and Dharmino, 2018).

On the characteristics of clean water in terms of physical water quality (p -value = 0.547), it has no relationship to the incidence of diarrhea that occurred in Simpang Warga Village, RT 04. This is not in line with the research by Rimbawati and Andre (2019) which showed p -value = 0.000 0.05 means that the conclusion drawn is that there is a relationship between the physical quality of clean water and the incidence of diarrhea in children under five. The results of the analysis of the OR value were obtained at 7.268 (95% CI 2.630-20.082), meaning that respondents who met the physical quality of water had an opportunity of 7.268 times to make efforts to prevent diarrhea compared to the physical quality of water that did not meet the requirements. So that the worse the physical quality of the water, the more germs that cause disease, especially infectious diarrhea. diarrhea-causing bacteria such as salmonella, shigella, E. Coli, and yersina.(Rimbawati and Andre, 2019).

On the characteristics of clean water in terms of latrine conditions (p -value = 0.615), there is no relationship to the incidence of diarrhea that occurred in Simpang Warga Village, RT 04. This is not in line with the research of Utama et al (2019) which showed that there was a relationship between latrine conditions and diarrhea incidence. According to Notoatmodjo (2014), the level of one's education can improve knowledge about health. One of the factors that affect knowledge in a person is the level of education. Education will provide knowledge so that there is a positive change in behavior which increases. According to Widyastuti (2005), people with higher education levels high is more action-oriented prevention, know more about health problems, and have status better health. View from the data above, the community should be given knowledge of the importance of the role of family latrines through effective counseling carried out by officers and environmental cadres in the Arosbaya area, and for those who already have a family latrine those who meet the requirements still need to get the motivation to always maintain and maintain the cleanliness of the latrine family(Utama, Aini and Sugiarto, 2019).

As well as the characteristics of clean water in terms of the distance between the well and the septic tank (p -value = 0.379) it shows that it has no relationship to the incidence of diarrhea that occurred in Simpang Warga Village, RT 04. This is in line with Setiyono's research (2019) which shows a p -value = 0.110 > alpha 0.05, it can be concluded that there is no relationship between the distance of the dug wells and the feces disposal site with the incidence of diarrhea in the people of Tasikmalaya City. The existence of environmental support in the form of rivers makes people's behavior to throw feces into the river. Disposal of feces into rivers will bring fecal material to follow the flow of river water so that it will minimize the chance of bacteria infiltrating into the dug wells. This is reinforced by the practice of the community to boil drinking water before consumption. As a result, the community can avoid the occurrence of diarrhea even though the distance of the dug well is close to the river. Disposal of feces into the pond will result in fish being contaminated by bacteria. As a result, a number of bacteria will be inhibited from infiltrating the dug wells. Environmental support in the form of rivers and ponds strengthens the culture of the people of the City of Tasikmalaya to throw their feces into the place. The efficiency of managing feces by throwing them into rivers or ponds is the reason why people continue to maintain this behavior (Setiyono, 2019).

b. The Relationship Between Characteristics of Sanitation and Personal Hygiene on the Incidence of Diarrhea in Simpang Village, Warga Luar RT 04

Table 7. Chi-square Test of Sanitation and Personal Hygiene Characteristics of Diarrhea in Simpang Warga Village RT 04

Characteristics	Chi-square	Information
Availability of hand washing facilities	0.073	Not related
How to dispose of toddler feces	0.772	Not related

Table 7 shows that the characteristics of sanitation and personal hygiene in terms of the availability of hand washing facilities (p -value = 0.073) show no relationship to the incidence of diarrhea that occurred in Simpang Warga Village, RT 04. This is not in line with the research of Irawan et al (2021). which shows a p -value of $0.000 < (\alpha = 0.05)$ This means that there is a significant relationship between hand washing and the incidence of diarrhea in Tarbiyatul Athfal Karanggondang 1 Mlonggo Kindergarten students. The high incidence of diarrhea in children is caused by factors that increase the risk of diarrhea such as poor sanitation, poor hygiene facilities, poor personal hygiene (not washing hands before, after eating, and after defecating). The results of observations made at the research site, it was found that there were no good facilities for washing hands such as the absence of soap, a sink, and clean water that did not always flow. In addition, there are sales of food and drinks around the school environment that are not hygienic and the use of drinking water that does not meet health requirements can be a factor causing diarrhea, especially in school children. (Irawan et al, 2021).

On the characteristics of sanitation and personal hygiene in terms of how to dispose of toddler feces (p -value = 0.772) there is no relationship to the incidence of diarrhea that occurred in Simpang Warga Village, RT 04. This is not in line with Setiyono's research (2019) which shows p -value = 0.008 < alpha 0.05, it can be concluded that there is a relationship between the place of feces disposal and the incidence of diarrhea in the people of Tasikmalaya City. More people throw their feces into rivers, ponds, gardens than people who throw their feces into cubluks and septic tanks. This shows that the disposal of feces

that do not meet health requirements is more at risk of diarrhea. The open disposal of feces provides an opportunity for bacteria in the fecal material to be spread through disease vehicles or vectors (Setiyono, 2019).

4. Conclusions

The conclusion obtained from the results of this study is that there is a relationship between the characteristics of clean water from in terms of drinking water treatment before drinking (p-value = 0.021) with diarrhea in Simpang Warga Village, RT 04 while there is no relationship between the characteristics of clean water in terms of drinking water sources (p-value = 0.241), physical quality of drinking water (p-value = 0.547), latrine conditions (p-value = 0.615), the distance between the well and the septic tank (p-value = 0.379) with diarrhea in Simpang Warga Village RT 04. The results showed that there was no relationship between characteristics of sanitation and personal hygiene in terms of the availability of hand washing facilities (p-value = 0.073) and the method of disposal of toddler feces (p-value = 0.772) on the incidence of diarrhea that occurred in Simpang Warga Village, RT 04.

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