Analysis Of Water Quality Of The Babura River And Its Users By The Community With Skin Health Complaints In Medan

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Abstract.
The water quality of the Babura River is increasingly worrying because of the pollution of domestic waste that occurs. The water condition of the Babura River is physically cloudy in color, looks oily and the river contains human feces. The use of polluted Babura River water can cause health complaints, including skin health problems. The purpose of this study was to determine the water quality of the Babura River, as well as the relationship between water use and skin health complaints in the community in the watershed. This research is an analytic survey using a Cross-Sectional design. There was 592 population in this study, living in the Babura River watershed in Petisah Hulu Village. The number of samples in this study was 86 households determined by the Slovin Formula where sampling was carried out by accidental sampling. Data analysis used Chi-square Test (α=95%). Sampling points were carried out at 3 locations namely Station 1, Station 2, and Station 3. The results showed that water quality had decreased in quality where the Dissolved Oxygen (DO), fecal coli, and total coliform parameters did not meet the river water quality standards according to Government Regulation of the Republic of Indonesia Number 22 of 2021 concerning the Implementation of Environmental Protection and Management. The statistical test showed that there was a relationship between the use of Babura River water and skin health complaints in the community in the watershed with a p-value of 0.000 (α<0.05). Of all respondents, 17 people experienced skin health complaints in the form of itching and dry, scaly, and peeling skin. It is recommended to the public to avoid using Babura River water directly for daily needs, to neutralize water before using it, and to related parties to try to prevent further pollution in the Babura River.

Keywords: *River water quality, disturbance complaints.*

I. INTRODUCTION

The utilization of aquatic resources can cause changes in ecosystems on a certain scale. Utilization without considering ecological principles can reduce ecological quality (river water) and continue damage to water ecosystems. Due to the influence of increased human activities that utilize the waters, it can produce uncontrolled waste so that the waters will experience stress, which tends to lead to a decrease in the quality of the aquatic environment because its natural balance is disturbed (Yulistia, 2020).The function of the river which was once a source of surface water that provides benefits to human life recently has had an adverse impact on humans. The quality of rivers in urban areas has experienced a lot of declines. The decline in river quality is influenced by various activities and human life. Some river pollution is of course caused by the presence of factories or industrial, and agricultural areas and it is certain that waste channels will be seen leading to the river body. So that if it is accumulated from several outlets, it will create a fairly high discharge in the river body (Mardhia and Abdullah, 2018).Based on the performance report that has been achieved by the Ministry of Environment and Forestry (KLHK) during the 2015-2019 period, it is known that from 2018 to 2019, the value of the National Environmental Quality Index has again decreased, which in water quality indicators has fallen drastically. The decline in river water quality in Indonesia is caused by the chemical industry, oil, and gas, plantations, settlements, mining, agriculture, animal husbandry, the tourism industry, the burden of liquid waste and B3 waste from lodging facilities and hospitals, limited defecation facilities, and the generation of polluting waste. river bodies (Kemenlhk, 2020).

Water quality indicators used in monitoring river water quality are TSS, DO, BOD, COD, Total Phosphate, Fecal Coli and Total Coliform parameters (Kemenlkh, 2017). Based on the 2019 Ministry of Environment and Forestry report, the water quality of North Sumatra Province is in the poor category. The decline in water quality is caused by the Crude Palm Oil Industry, wood processing, food and beverage waste, plantations, settlements, mining, agriculture, animal husbandry, the tourism industry, the burden of liquid waste and B3 waste from lodging facilities and hospitals, limited defecation facilities, waste generation (Kemenlhk, 2020).

Research conducted by Fatmalia and Efendi (2021) regarding the Feasibility Study of the Rea River Basin, Taliwang District, West Sumbawa Regency in Ecotourism Development, showed that the results of the Rea River Water Quality Test on the COD (Chemical Oxygen Demand) and Total Coliform parameters exceeded the quality standards based on the Regulations. Government of the Republic of Indonesia Number 22 of 2021 Appendix VI Class 2, COD levels at all sampling points ranged from 50-60 mg/L with a quality standard of 25 mg/L, and Total Coliform at all sampling points ranged from 1,100-24,000 MPN/100 ml with a quality standard of 5,000 MPN/100 ml. This is caused by activities around the watershed such as sand mining, activities that generate domestic waste, and fish ponds.Research conducted by Ewin (2021) regarding the Study of Water Quality Analysis of the Bah Biak River in Pematang Siantar City shows that the quality of river water has decreased its designation quality standards, namely BOD and ammonia parameters in the Bah Biak River.

High levels of ammonia can indicate the presence of waste discharged into the waters either from domestic waste or agricultural waste runoff. This is also evidenced by the many community activities that come from agricultural land and also settlements.The decrease in the quality of river water can cause complaints of skin diseases in the people who use it. Chemical parameters of Dissolved Oxygen, Chemical Oxygen Demand, and Biological Oxygen Demand that exceed the environmental quality standard threshold is a factors in the occurrence of skin disorders complaints. The length of exposure and length of contact with river water that is not in accordance with environmental quality standards will increase the risk of the community experiencing complaints of skin disorders (Marici et al., 2018).North Sumatra has several rivers that are not in good condition. One of the rivers in Medan City is the Babura River. Based on the initial survey conducted by researchers, the researchers found that the lack of public awareness of the sustainability of Babura River water resulted in people throwing away household domestic waste. This resulted in the contamination of Babura River water in Petisah Hulu, Medan Baru. Based on observations, the researchers found that the river water was not clear and cloudy in color, the river water also smelled foul, looked oily, and contained human feces. Seeing the physical condition of the water that has decreased in quality, of course, will have an impact on the decline in the chemical and biological quality of the river water. The decline in the water quality of the Babura River can cause complaints of skin disorders in people who use the river water for their daily needs.Based on the description above, the researcher is interested in conducting research on the water quality of the Babura River and the purpose of this study was to determine the water quality of the Babura River with physical, chemical, and biological parameters and its use by people with skin health complaints on Jalan S. Parman, Petisah Hulu, Medan Baru.

II. METHODS

This type of research is an analytical survey with a cross-sectional study design that aims to determine the relationship between river water quality and river water use with complaints of skin disorders by measuring and observing at the same time on individuals from a population between factors/exposure to complaints of skin disorders (Sugiyono, 2017).This research was conducted in January 2022 in the Babura River Basin on Jalan S. Parman, Petisah Hulu Medan Baru Village. The population in this study was 592 families living in the Babura River watershed, Petisah Hulu Village. Samples were taken using the Slovin formula to obtain respondents as many as 86 families. Meanwhile, there are three water sampling points, namely station 1, station 2, and station 3.River water quality is measured by comparing the measurement results with river water quality standards PP No. 2 of 2021 concerning the Implementation of Environmental Protection and Management. The parameters measured were TSS, DO, BOD, Fecal Coli, and Total Coliform. There are three water sampling points, namely Station 1, Station 2, and Station 3. Station 1 is located on the river in Neighborhood 9 Gang Pasir, Station 2 is in Gang Sawo, and Station 3 is located in Neighborhood 7 which is upstream to the downstream point in the settlement.Water sampling was carried out at 3 points, namely Stations 1, 2, and 3 using a water sampler, from each station 2 samples were taken, then the water was put into 6 plastic bottles with a volume of 1 liter and had a lid.

The water sample container was rinsed with water to be taken three times. Each sample was tested for field parameters in the form of Dissolved Oxygen (DO) which can change quickly and cannot be

preserved then the results of field parameter testing are recorded in a worksheet.Samples that have been taken and stored in containers must be treated properly starting from the sampling location until the sample is analyzed in the laboratory. Labeled or marked on the bottle, preserved in an icebox, filled out the Chain of Custody form, and safeguarded the sample.The use of river water was measured using a questionnaire and divided into 2 categories, namely "behavior of using river water", if the river water is used for daily purposes (code 1), and "behavior of not using river water" if the river water is not used for drinking purposes. daily necessities (code 0).Health complaints of skin diseases were measured using a questionnaire tool in two categories, namely "there are complaints" if there are more than 2 types of complaints on the skin (code 0), and "no complaints" points if there are no complaints on the skin (code 1).

III. RESULT AND DISCUSSION

The results of data collection on respondents, namely the community in the Babura River Basin, Petisah Hulu Village, obtained the response characteristics presented in the following table.

Table 1. Frequency Distribution of Respondents' Characteristics by Gender, Age, Education, and Occupation of Respondents

Variable		Nominal	Percentage (%)
Gender	Male	22	25,6
	Female	64	74,4
Age	17 - 25 years old	28	32,6
	26 - 35 years old	31	36,0
	36 - 45 years old	21	24,4
	> 45 years old	6	7,0
Education	Elementary School	6	7,0
	Junior High School	18	20,9
	Senior High School	55	64,0
	Bachelor	7	8,1
Profession	Government-employees	7	8,1
	Self-employed	51	59,3
	Housewife	22	25,6
	Trader	6	7,0
Total		**86**	**100**

The table above shows that most of the respondents' gender is female, as many as 64 people (74.4%), with the age of most respondents ranging from 26-35 years, namely 31 people (36.0%) and high school education, namely 55 people (64. 0%), while most of the occupations are self-employed, as many as 51 people (59.3%).A sampling of Babura River water was taken at 3 (three) stations to determine the description of water pollutant parameters in the river. The results of the measurement of these parameters can be seen in the following table.

Table 2. Parameter Measurement of Babura River Water Pollutants

Parameter	Environmental Quality Standards (Government Regulation of the Republic of Indonesia Number 22 of 2021)	Station 1	Station 2	Station 3
Total Suspended Solid (mg/L)	40	7,1	6,4	6,2
Dissolved Oxygen (mg/L)	6	6,07	6,51	6,71
Biological Oxygen Demand (mg/L)	2	1,4	1,4	1,2

Fecal Coli (MPN/100 mL)	100	78	140	150
Total Coliform (MPN/100 mL)	1000	3600	3600	3600

Based on the table above, it can be seen that the parameters that do not meet the requirements are the DO and total coliform parameters, where the measurement results at Stations 1, 2, and 3 show values that exceed the river water quality standards according to Government Regulation of the Republic of Indonesia Number 22 of 2021 concerning the Implementation of Environmental Protection and Management concerning the Implementation of Environmental Protection and Management, then the fecal coli parameter appears to exceed the quality standard in water sampling at Stations 2 and 3.

Table 3. Frequency Distribution of Respondents Based on Respondents' Behavior and Complaints of Skin Disorders

Variable	Nominal	Percentage (%)
– Using rivers water	15	17,4
– Do not use rivers water	71	82,6
– There is a skin disorder	33	38,4
– No skin irritation	53	61,6
Total	**86**	**100**

Table 3 shows that most of the respondents did not use river water as many as 71 people (82.6%) and 53 respondents (61.6%) did not experience complaints of skin disorders.

Table 4. Relationship of River Water Use with Complaints of Skin Disorders

Behavior	Skin Disorders				Total		P-Value
	Case		Control				
	N	%	N	%	N	%	
Using rivers water	12	80	3	20	15	100	0,000
Do not use rivers water	21	29,6	50	70,4	71	100	

Based on table 4 shows that of the 15 people who used river water, most of them experienced complaints of skin disorders as many as 12 people (80.0%), and among respondents who did not experience complaints of skin disorders as many as 3 people (20.0%). Of the 71 people who did not use river water, most of the respondents did not experience complaints of skin disorders as many 50 people (70.4%), and among respondents who experienced complaints of skin disorders as many as 21 people (29.6%).The results of the chi-square statistical test obtained $p < (0.000 < 0.05)$, thus it can be concluded that Ho is rejected and Ha is accepted, which means that there is a relationship between the use of river water and complaints of skin disorders.

Water Quality Analysis of Babura Petisah River Hulu Medan Baru

1. Total Suspended Solids (TSS)

Total Suspended Solids (TSS) or suspended solids are suspended materials (diameter > 1 m) retained on a millipore sieve with a pore diameter of 0.45 m. Based on the research results, the water quality of the Babura River for TSS levels at Station 1 is 7.1 mg/L, Station 2 is 6.4 mg/L, and Station 3 is 6.2 mg/L. TSS levels at each sampling point at the three stations still meet the requirements of river water quality standards in accordance with Government Regulation of the Republic of Indonesia Number 22 of 2021 concerning the Implementation of Environmental Protection and Management concerning the Implementation of Environmental Protection and Management.TSS consists of mud and fine sand and micro-organisms. The main cause of TSS in waters is soil erosion or soil erosion carried into water bodies. Particles carried by the flow of water bodies affect the amount of TSS in the body. If the TSS is high, it will block the entry of sunlight into the water so that it will interfere with the photosynthesis process (Jiyah et al, 2017).

2. Dissolved oxygen (DO)

Dissolved oxygen (DO) or the amount of dissolved oxygen is a good indicator to determine water quality. The oxygen content in river water above 4 ppm can support the life of plants, fish, and living things in the water. Based on the measurement results for the Dissolved Oxygen (DO) parameter at Station 1 which is 6.07 mg/L, Station 2 is 6.51, and Station 3 is 6.71. However, the maximum limit for dissolved oxygen (DO) in river water quality standards is Government Regulation of the Republic of Indonesia Number 22 of 2021 concerning the Implementation of Environmental Protection and Management is 4 mg/L. Dissolved oxygen (DO) of Babura River water at the sampling point does not meet the requirements of river water quality standards in accordance with PP RI Number 22 in the year 2021.

The measurement results of dissolved oxygen DO indicate that all tested samples have levels above the quality standard according to Government Regulation of the Republic of Indonesia Number 22 of 2021 concerning the Implementation of Environmental Protection and Management which is 6 mg/L. This shows that the Babura River has been polluted by household waste. DO is needed by living things for respiration, metabolic processes, or the exchange of substances which then produces energy for growth and reproduction. In addition, DO is also needed for the oxidation of organic and inorganic materials in aerobic processes. The main source of oxygen in waters comes from the aeration process and the results of photosynthesis of organisms that live in these waters (Salmin, 2000).

3. Biological Oxygen Demand (BOD)

Based on the results of the research conducted, it is known that the BOD level at Station 1 is 7.1 mg/L, at Station 2 is 1.4 mg/L, and at Station 3 is 1.2 mg/L. So it can be concluded that Biological Oxygen Demand (BOD) meets the requirements of river water quality standards in accordance with PP RI No. 22 the year 2021.Biological Oxygen Demand (BOD) is one of the parameters used in determining river pollution because the higher the BOD value in a water body, it indicates that the water body has generally been polluted by residential and industrial waste (Rahmawati, 2011).A high BOD value indicates a low dissolved oxygen content in river water bodies it can cause pollution and lack of oxygen. On the other hand, the lower the BOD value, the better the water quality or the cleaner. Biological oxygen demand (BOD) is the amount of oxygen needed by organisms when decomposing organic matter under aerobic conditions. Waters can be said to be polluted with BOD parameters according to Effendi (2003) if the BOD value in these waters has exceeded 10 mg/L, while based on PP RI No. 22 the year 2021 is 3 mg/L.

4. Fecal Coliform And Total Coliform

Based on Government Regulation of the Republic of Indonesia No. 22 of 2021, the river water quality standard for Fecal Coli parameters is 100 MPN/100 mL and Total coliform is 1000 MPN/100 mL. Based on the results of the research conducted, it is known that the results of the measurement of the category of biological parameters, namely Fecal Coli above 100 MPN/100 mL and Total coliform above 5000 MPN/100 mL, it can be said that the biological parameters, namely Fecal Coli and Total coliform do not meet the quality standard requirements. river water in accordance with PP RI No. 2 years 2021.Microbiological pollution is a water quality problem that affects aquatic environmental conditions. The aquatic environment is very easily polluted by microorganisms from settlements, livestock, and agriculture. Coliform bacteria are usually used as the main indicator of potential disease (Aqielatunnisa, 2015). Bacteria are one of the ideal markers of microbial contamination of surface waters because they can respond quickly to environmental changes. Total coliform, fecal coliform, and Escherichia coli from different polluted sites in tropical environments were determined to test their indicative ability for fecal contamination (Byamukama et al, 2000).

Relationship between Babura River Water Usage Behavior and Skin Health Complaints on Jl. S Parman, Petisah Hulu, Medan Baru.

Based on the results of statistical tests with chi-square, it was found that the p-value was 0.000 < (0.05), thus it can be concluded that Ho is rejected and Ha is accepted, which means that there is a relationship between the use of river water and complaints of skin disorders.This research is supported by research conducted by Rambe (2017), it is known that the results of the study showed that there were 17 people (53.1%) who experienced complaints of skin disorders in the form of itching and dry/scaly and

peeling skin. Some samples have values above the quality standard, namely the highest sample value at Point I has a BOD value of 19.52 mg/l, a COD value of 61.00 mg/l, a detergent value of 500 g/l, and a total coliform value of 16,000 MPN/100 ml (Rambe, 2017) This research is also supported by research conducted by Manalu and Putri (2019) using the chi-square statistical test with a 95% confidence level so that the p-value (0.001) < (0.05) can be concluded that there is a relationship between utilization of river water with the incidence of dermatitis symptoms. Research shows that the majority of people around the river use river water for washing, this is a trigger factor for the incidence of skin disorders (Manalu and Putri, 2019).

According to Notoatmodjo (2017) that the behavior of a person or society regarding health is determined by the knowledge, attitudes, beliefs, traditions and so on of the person or society concerned. In addition, the availability of facilities will also support and strengthen the formation of behavior. The formation of behavior needs to be realized by knowledge, awareness, and a positive attitude so that the behavior can last a long time. On the other hand, if the behavior is not realized with knowledge and awareness, it will not last long.Based on the results of the study, it was found that of the 15 people who used river water, the majority of respondents experienced complaints of skin disorders many as 12 people (80.0%) and the minority of respondents did not experience complaints of skin disorders as many as 3 people (20.0%). People who use Babura River water are usually children. Children usually play and bathe in the Babura River. After bathing in the river, usually, the children do not immediately clean their bodies by bathing again using PDAM water.Water conditions that do not meet the requirements of river water quality standards in accordance with the provisions of PP RI No. 22 of 2021 will have a negative impact on skin health. Fitria and Hayani (2021) stated that water sources have a relationship with the incidence of skin health complaints. Purba (2018) states that poor water quality can be a risk factor for the occurrence of skin disorders or skin dermatoses. Water that is not good or polluted can cause the skin to experience red spots or bumps and itchy and peeling skin-like scales and dry (Purba, 2018).

IV. CONCLUSION

1. Total Suspended Solid water of the Babura River still meets the requirements of river water quality standards in accordance with Government Regulation of the Republic of Indonesia Number 22 of 2021 concerning Implementation of Environmental Protection and Management.
2. Dissolved oxygen (DO) of Babura River water does not meet the requirements of river water quality standards in accordance with Government Regulation of the Republic of Indonesia Number 22 of 2021 concerning Implementation of Environmental Protection and Management.
3. Biological Oxygen Demand (BOD) meets the requirements of river water quality standards in accordance with Government Regulation of the Republic of Indonesia Number 22 of 2021 concerning Implementation of Environmental Protection and Management.
4. Fecal Coli and Total coliform do not meet the requirements of river water quality standards in accordance with Government Regulation of the Republic of Indonesia Number 22 of 2021 concerning Implementation of Environmental Protection and Management.
5. There is a relationship between the use of Babura River water and complaints of skin disorders in the people of Jalan S. Parman, Petisah Hulu Medan Baru.

For Puskesmas or related Health Offices, it is recommended to conduct counseling related to skin health problems that can be caused by polluted water so that people do not use polluted water. Based on the results of the study, it is hoped that this research can be developed with a different/same research design in looking at other factors related to complaints of skin disorders around riverbanks.

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