



Supervision Of Drinking Water Quality in North Sumatra Province

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<p>Track Record Article</p> <p>Accepted: 12 November 2022 Published: 25 December 2022</p> <p>How to cite: Ashar, Khairina, Y., Nasution, Syafitri, I., Harahap, R., Ridho, Ulfa, N., & Berutu, Oktavia, W. (2022). Supervision Of Drinking Water Quality in North Sumatra Province. <i>Contagion: Scientific Periodical Journal of Public Health and Coastal Health</i>, 4(2), 233–246.</p>	<p style="text-align: center;">Abstract</p> <p><i>Water is the most important element in life after air, but water is also the main cause of many diseases. This study uses a descriptive quantitative method with the Secondary Data Analysis approach. We got this secondary data from the Environmental Health Inspection of the North Sumatra Provincial Health Office results. The research results from these data are data Drinking Water Quality Monitoring data in 2021-2022 with 1,317 facilities owned by North Sumatra Province in 33 Regencies/Cities. To data for North Sumatra Province in 2021, 74.39% of the 1,316 facilities will carry out Drinking Water Quality Monitoring. Moreover, it has reached the target indicator of 65%. Meanwhile, Gunung Sitoli City needs communal drinking water facilities. Data for the Province of North Sumatra for 2022, the achievement of the indicator for supervised drinking water facilities is 68.03%, meaning that it still has yet to reach the target of 70%. In conclusion, monitoring of drinking water quality in Sumatra province has been carried out but has yet to meet the desired standards. There are still many areas where supervision of the facilities has yet to be carried out. Most often occurs because the area still needs sanitary staff to supervise. Many human resources still deal with this problem but must understand how the supervision procedures should be. Suggestions for the government in the future are to conduct the government carries out Drinking Water Quality Monitoring carried out once regularly according to a schedule per month or every six months to check the quality of drinking water, including inspection of physical, biological, and chemical parameters.</i></p> <p>Keywords: <i>Drinking Water, Inspection, Monitoring, Water quality</i></p>
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INTRODUCTION

Water is the most important element in life after air, but water is also the main cause of many diseases. Based on data from the National Nutrition Status Survey for 2022, stunting in Indonesia is at 21.6%; this number has decreased because stunting in Indonesia was at 24.4% in the previous year, still far from the government's target to decrease to 14% in 2024. Judging from all the factors that cause stunting, 70% is caused by water, which is why it is important to monitor the quality of drinking water so that water facilities remain safe and fit for use (Mayasari et al., 2022).

Monitoring of the quality of drinking water must be carried out for all facilities (Hudiyani et al., 2019). Monitoring of the quality of drinking water must be carried out for all facilities. This is done to determine the extent to which the quality of existing water facilities in North Sumatra Province. Communities are required to get water that meets the requirements for use in everyday life

(Iqbal, 2019). Water is important because it is widely used for washing, drinking, and cooking. Contaminated water will trigger various diseases because the body's immune condition is weakened after consuming water containing bacteria and other chemicals (Siregar et al., 2019). Clean water that is suitable for drinking, is water that has passed the feasibility test according to applicable regulation (Rantung et al., 2017).

Regulation of the Minister of Health No. 492 of 2010 explains that access to drinking water must be proper and protected, have proper facilities, be able to provide 60 L/person per day, and the quality must meet physical, microbiological, chemical, and radioactive requirements (Permenkes RI, 2010). The Regulation of the Minister of Health also explains that every drinking water provider is obliged to guarantee that the drinking water they produce is safe for health. Groundwater is one of the necessary natural resources for human life. The increase in population in a region will affect population density in the area. The dense residential population causes the quality and quantity of clean water to decrease (Afifah, 2019).

The mandatory parameters for microbiologically determining drinking water quality are total Coliform and *Escherichia coli* bacteria. The determination of water quality microbiologically is carried out by the Most Probable Number Test (Walangitan, R et al., 2016). If a 100 ml water sample is found, Coliform bacteria cells allow diarrhea and other digestive disorders to occur. As contained in the Regulation of the Minister of Health Number 492 of 2010 in article 3 (Arsyina et al., 2019). The higher the concentration of parameters that exceed quality standards, the higher the pollution index obtained (Nipu, 2022).

The regional government carries out supervision of drinking water by what has been stipulated in Regulation of the Minister of Health No. 492 of 2010 in article 1 paragraph 2, namely, providers of drinking water are state-owned enterprises/region-owned enterprises, cooperatives, private enterprises, individual businesses, community groups and individuals carrying out the provision of drinking water. As is currently being done by the North Sumatra Provincial Health Office, they carry out an Environmental Health Inspection assessment of the quality of drinking water, which is supervised by the Health Office for each Regency/City and carried out by the environmental health team at each Community Health Center in the Region.

There are 1,316 water facilities in North Sumatra Province. There are two existing facilities in Sumatra Province: Community-Based Water Supply and Sanitation Program and a Local water company. From the secondary data we got from the North Sumatra Provincial Health Office, there are eight districts/cities that do not have a Community-Based Water Supply and Sanitation Program, namely Sibolga City, Tanjung Balai City, Pematang Siantar City, Tebing Tinggi City, Medan City, Binjai City, Padang Sidempuan City, and the City of Mount Sitoli. The Community-Based Water

Supply and Sanitation Program is a community-based water supply and sanitation activity carried out on the basis of cooperation between the Central Government, Regional Governments, and the World Bank (Andini, 2017).

By Regulation of the Minister of Health No.736 of 2010 regarding managing drinking water monitoring. Supervision is divided into two, namely external supervision and internal supervision. By the contents of the Regulation of the Minister of Health above, every Indonesian has the right to obtain drinking water that the Financial and Development Supervisory Agency has inspected (Permenkes, 2010). Therefore, it is important to carry out supervision to guarantee the quality of the facilities and drinking water. We raise this issue to find out how drinking water quality monitoring has been carried out in North Sumatra Province and how North Sumatra Province has achieved monitoring existing facilities.

METHODS

This research uses a quantitative descriptive research method with the Secondary Data Analysis approach. It is a method that uses secondary data as a data source. The secondary data comes from the results of an Environmental Health Inspection inspection of each district/city. We obtained this secondary data from the North Sumatra Provincial Health Office, which was Drinking Water Quality Monitoring data in 2021-2022. Where in the Drinking Water Quality Monitoring Environmental Health Inspection assessment in each region contains an assessment of the facilities and quality of drinking water in each Regency/City area. This supervision is carried out in each District/Cities in North Sumatra with 1,317 registered facilities, and the last time the number of supervised facilities was 979.

The results of quantitative analysis are written in a table in the form of Monitoring Drinking Water Quality that meets the requirements and does not meet the requirements. The eligible and non-qualified categories are for facility inspections sampled to see the quality of drinking water in the area. Then these results are presented to obtain information related to the quality of domestic drinking water in North Sumatra Province in 2021.

RESULT

In the 2021 period, there are 1298 villages for monitoring drinking water quality. 1298 **Community-Based Water Supply and Sanitation Program** facilities and 18 Regional Water Supply Company Tirtanadi were registered to carry out the Environmental Health Inspection for drinking water quality, which was taken directly from the facilities in each Regency/City area. The Community-Based Water Supply and Sanitation Program supervision

results showed that 961 samples met the requirements, 74 did not meet the requirements, and 263 samples that had not been tested are presented in the table.

Table 1. Achievements of Regencies/Cities in Monitoring the Quality of Drinking Water in 2021

No Location/ District/ City	Number of Regencies/ Cities	Existing Drinking Water Facilities			Drinking Water Facility Is Supervised	
		Number of PDAM	Number of PAMSIMAS	Total Drinking Water Facilities	Number of Drinking Water Facilities Supervised	Drinking Water Facilities Supervised
North Sumatra	33	18	1.298	1316	979	74,39%
1 Nias Regency	1	1	25	26	4	15,38%
2 Mandailin g Natal Regency	1	1	62	63	3	4,76%
3 Tapanuli Selatan Regency	1	0	66	66	61	92,42%
4 Tapanuli Tengah Regency	1	1	55	56	56	100,00%
5 Tapanuli Utara Regency	1	1	63	64	63	98,44%
6 Toba Samosir Regency	1	0	38	38	23	60,53%
7 Labuhanb atu Regency	1	1	50	51	3	5,88%
8 Asahan Regency	1	1	55	56	49	87,50%
9 Simalung un Regency	1	1	75	76	75	98,68%
10 Dairi Regency	1	1	68	69	69	100,00%
11 Karo Regency	1	1	60	61	7	11,48%

12	Deli Serdang Regency	1	1	37	38	36	94,74%
13	Langkat Regency	1	1	30	31	30	96,77%
14	Nias Selatan Regency	1	0	29	29	9	31,03%
15	Humbang Hasundutan Regency	1	0	50	50	46	92,00%
16	Pakpak Barat Regency	1	0	48	48	46	95,83%
17	Samosir Regency	1	0	53	53	53	100,00%
18	Serdang Bedagai Regency	1	0	53	53	52	98,11%
19	Batubara Regency	1	0	57	57	49	85,96%
20	Padang Lawas Utara Regency	1	0	102	102	50	49,02%
21	Padang Lawas Regency	1	0	60	60	60	100,00%
22	Labuhan Batu Selatan Regency	1	0	38	38	36	94,74%
23	Labuhan Batu Utara Regency	1	0	38	38	25	65,79%
24	Nias Utara Regency	1	0	45	45	40	88,89%
25	Nias Barat Regency	1	0	41	41	27	65,85%
26	Kota Sibolga	1	1	0	1	1	100,00%

27	Tanjung Balai City	1	1	0	1	1	100,00%
28	Pematang Siantar City	1	1	0	1	1	100,00%
29	Tebingtin ggi City	1	1	0	1	1	100,00%
30	Medan City	1	1	0	1	1	100,00%
31	Binjai City	1	1	0	1	1	100,00%
32	Padang Sidempua n City	1	1	0	1	1	100,00%
33	Gunung Sitoli City	1	0	0	0	-	100,00%

From the results of the distribution above, we can see that the achievements of North Sumatra Province in 2021 in carrying out Drinking Water Quality Monitoring amounted to 74.39% of the 1,316 facilities in the Province. Moreover, it has reached the target indicator of 65%. There are 12 Regencies/Cities that are required to supervise every facility in their territory, namely, Central Tapanuli, Dairi, Samosir, North Padang Lawas, Sibolga City, Tanjung Balai City, Pematang Siantar City, Tebing Tinggi City, Medan City, Binjai City, and Padang Sidempuan City with 100% achievement. Meanwhile, Gunung Sitoli City needs communal drinking water facilities.

Table 2. Regencies/Cities with Qualified Facilities

Regency/City	Amount Means	Supervised facility	Eligible facilities	Percentage
Sumatera Utara	1.316	979	961	73,02%
Nias	26	4	3	15,38%
Mandailing Natal	63	3	2	3,17%
Tapanuli Selatan	66	61	61	92,42%
Tapanuli Tengah	56	56	55	98,21%
Tapanuli Utara	64	63	62	96,87%
Toba Samosir	38	23	23	60,52%
Labuhanbatu	51	3	2	3,92%
Asahan	56	49	48	85,71%
Simalungun	76	75	74	97,36%
Dairi	69	69	68	98,55%
Karo	61	7	6	9,83%

Deli Serdang	38	36	35	92,10%
Langkat	31	30	29	93,54%
Nias Selatan	29	9	9	31,03%
Humbang Hasundutan	50	46	46	92%
Pakpak Barat	48	46	46	95,83%
Samosir	53	53	53	100%
Serdang Bedagai	53	52	52	98,11%
Batubara	57	49	49	85,96
Padang Lawas Utara	102	50	50	49,01%
Padang Lawas	60	60	60	100%
Labuhan Batu Selatan	36	36	36	100%
Labuhan Batu Utara	36	25	25	69,44%
Nias Utara	45	40	40	88,88%
Nias Barat	41	27	27	65,85%
Sibolga	1	1	1	100%
Tanjung Balai	1	1	1	100%
Pematang Siantar	1	1	1	100%
Tebing Tinggi	1	1	1	100%
Medan	1	1	1	100%
Binjai	1	1	1	100%
Padang Sidempuan	1	1	1	100%
Gunung Sitoli	1	1	1	100%

From the distribution results above, it can be seen that the achievement of drinking water facilities that meet the requirements in North Sumatra Province is 73.02% of the 979 facilities supervised. Around 11 Regencies/Cities have conducted Environmental Health Inspections, and all the facilities are assessed to meet the existing Regulation of the Minister of Health standards. Regencies/cities that meet the requirements are Samosir, Padang Lawas, Labuhan Batu Selatan, Sibolga City, Tanjung Balai City, Pematang Siantar City, Tebing Tinggi City, Medan City, Binjai City, Padang Sidempuan City, and Gunung Sitoli City with 100% achievement.

From Drinking Water Quality Assessment data for North Sumatra Province, there are 1,316 Community-Based Water Supply and Sanitation Program facilities and Regional Water Supply Company Tirtanadi facilities, with a total of 1298 for Community-Based Water Supply and Sanitation Program facilities and 18 for Regional Water Supply Company Titanadi facilities. Then from these suggestions, 979 facilities were supervised per the indicators set out in Regulation of the Minister of Health No. 736 of 2010. It was found from the results of the Drinking Water Quality Assessment that 74 facilities did not meet the requirements according to Regulation of the Minister of Health No.492 of 2010

DISCUSSION

Drinking Water Quality in North Sumatra Province has been supervised with the achievement of 68.03% of the 1,317 existing facilities in North Sumatra Province. This achievement cannot meet the requirements because it refers to Regulation of the Minister of Health No. 736 of 2010 that all facilities must be supervised. Supervision is usually carried out using the Environmental Health Inspection assessment form, where the assessment results must meet the requirements. Suppose the results of the monitoring value are low or moderate. In that case, a sample must be taken to test the water quality directly in the laboratory. At the same time, a recommendation must be given for improvement for a high value. According to Setioningrum, (2020), if clean water is used as raw material for drinking water, the total number of dissolved solids must meet drinking water requirements

Smelly water drink is the biggest factor causing the physical quality of drinking water respondents in the two groups that do not meet the requirements. The case group found as much as 63.6% of the physical quality of the respondents' drinking water odor, and the control group found as much as 60.6% of the drinking water quality of the respondents smelled. According to researchers' observations, the drinking water has an odor like earth, smoke, and iron. This causes the physical quality of drinking water to not comply with the requirements set by the Minister of RI Health that good quality drinking water is not cloudy, colorless, odorless, and does not Feel (Khairil, 2019).

From the results of the research distribution, it can be seen that the achievement of drinking water facilities that meet the requirements in North Sumatra Province is 73.02% of the 979 supervised facilities. Around 11 Regencies/Cities have conducted Environmental Health Inspections, and all the facilities were assessed to meet the existing Regulation of the Minister of Health standards. Regencies/cities that meet the requirements are Samosir, Padang Lawas, Labuhan Batu Selatan, Sibolga City, Tanjung Balai City, Pematang Siantar City, Tebing Tinggi City, Medan City, Binjai City, Padang Sidempuan City, and Gunung Sitoli City with 100% achievement.

Based on the research results, it is known that of the 31 respondents who experienced stunting, as much as 87.1% with Sewerage did not meet the requirements; according to the opinion of Sewerage researchers, those who do not meet requirements can be a child's risk of experiencing growth constraints; this is because the Sewerage does not meet conditions or not managed properly can cause stagnant and smelly not delicious so that it becomes a medium/breeding ground for disease germs and can contaminate water quality caused by the construction of clean water

facilities that are not clean meet the requirements such as diarrhea, respiratory infections or worms that can affect the condition of the toddler's body in the process of nutritional intake (Simanjuntak, 2021)

You have to go through many procedures for facilities that meet the requirements. It is usual to check whether the machines and tools are good or not. We can see whether the facility's environment is prone to flooding or not until it is seen by the workers working there. So to get a facility that meets the requirements is very difficult; you have to go through all the existing checks (Walangitan, et al., 2016).

Marzani, S (2022) Adequate water access is access to drinking water whose sources consist of piped water, rainwater, and [(drilled wells/pumps, protected wells, and protected springs) with a distance to a waste/sewage/feces collection site. Research conducted by Suseno (2017) also found that Regional Water Supply Company Tirta Manggar water also contained Coliform bacteria which exceeded the threshold limit for raw water sources that are allowed as raw water sources. According to sfandy (2019) Also, the water quality at the Vatutela Water treatment plant did not meet health requirements because coliform/*Escherichia coli* bacteria were still found. According to Devina (2017), through research, says that the factors that can affect the quality of clean water with Regional Water Supply Company water samples are caused by microbiological factors.

Monitoring of the quality of drinking water in Indonesia has been carried out through surveys, periodic inspections, and independent inspections. Previous monitoring activities show that supervision of drinking water quality is carried out independently and informs that there are corrective actions in both urban and rural areas and in health service facilities. Fulfillment of drinking water needs in households, health service facilities, and public facilities can be measured from access to water. Adequate drinking water several factors related to access to proper drinking water include:

- 1) Type of main water source used for drinking;
- 2) Type of main water source used for cooking, bathing, and washing;
- 3) The distance from the water source to the nearest waste/sewage/feces collection is \geq 10 meters.

Adequate water access is access to drinking water whose sources consist of piped, rainwater, and (drilled wells/pumps, protected wells, and protected springs) with a distance to the nearest waste/sewage/feces collection site \geq 10 ml] and water sources bottled drinking/refillable water where the source of water for washing/cooking/bathing/bathing/etc. Uses (drilled

wells/pumps, protected wells, and protected springs) with a distance to the nearest waste/dung/feces collection site ≥ 10 m (Badan Pusat Statistik, 2018).

Good water conditions are divided into:

A. Physical Requirements

Requirements for drinking water quality must comply with the provisions stipulated in the Ministerial Regulation, or the chemicals contained in drinking water must not damage the material for storing water. However, the main substances are substances or minerals harmful to health. It is hoped that the substances or chemicals contained in drinking water will not damage the material where the water is stored. However, the substances or chemicals and or minerals needed by the body should be present at reasonable levels in the source of the drinking water.

Water should be colorless, tasteless, odorless, and clear for drinking water, with a temperature below air temperature. If one of these physical requirements is not met, then there is a possibility that the water is not healthy. However, if these conditions are met, the water is not necessarily good for drinking because there is still the possibility of disease germs or substances that endanger health.

B. Bacteriological Terms

All drinking water should be able to avoid contamination from bacteria, especially pathogenic ones. To measure whether drinking water is bacteria-free, the handle used is e.coli bacteria and coliforms.

C. Chemical Terms

Mainly by substances or minerals that are harmful to health. It is hoped that the substances or chemicals contained in drinking water will not damage the material for storing the water. However, the substances or chemicals and or minerals needed by the body should be present reasonably in the drinking water source. Requirements for drinking water quality must comply with the provisions contained in Regulation of the Minister of Health of the Republic of Indonesia no 492/Menkes/per/IV/2010. There are two parameters in the water quality requirements: mandatory and additional. Where the mandatory parameters include parameters that are directly related to health and parameters that are not directly related to health, and additional parameters which include sodium, lead, pesticides, mercury, nickel (Irianti et al., 2019).

On examining drinking water using the Membrane Filter Technique, 90% of the water samples examined for one month must be free of e.coli and coliform bacteria. If there is a deviation from these provisions, the water does not meet the requirements and needs further

investigation. *Escherichia coli* and coliform bacteria are used as bacteriological requirements because, in general, these germs are found in human feces and are relatively more difficult to kill by heating water (Afdaliah, 2019). Monitoring of Drinking Water Quality uses Environmental Health Inspection for each checking of facilities in North Sumatra Province. From the results of the uses Environmental Health Inspection conducted in 2020, there are several facilities in the province of North Sumatra; several Drinking Water Quality Monitoring using Environmental Health Inspection for each checking of existing facilities in North Sumatra Province. From the results of the uses Environmental Health Inspection conducted in 2020, several facilities in the province of North Sumatra totaled 81918 facilities. Then the facilities carried out in uses Environmental Health Inspection are 42585. Then the facilities in the low or / medium category are taken in the amount of 34218 for sampling. After sampling, 130 facilities meet the requirements, and 220 facilities do not maintain the condition. With an achievement of 51.98% of the 81,918 facilities that meet the requirements in the province of North Sumatra in January - December 2020. then the results of the uses Environmental Health Inspection in 2021.

From the distribution results above, it can be seen that the achievement of drinking water facilities that meet the requirements in North Sumatra Province is 73.02% of the 979 facilities supervised. Around 11 Regencies/Cities have conducted Environmental Health Inspections, and all the facilities were assessed to meet the existing Regulation of the Minister of Health standards. Regencies/cities that meet the requirements are Samosir, Padang Lawas, Labuhan Batu Selatan, Sibolga City, Tanjung Balai City, Pematang Siantar City, Tebing Tinggi City, Medan City, Binjai City, Padang Sidempuan City, and Gunung Sitoli City with 100% achievement.

From Drinking Water Quality Assessment data for North Sumatra Province, there are 1,316 facilities, both Community-Based Drinking Water and Sanitation Provision facilities and Regional Water Supply Company Tirtanadi facilities, totaling 1298 for Community-Based Drinking Water and Sanitation Provision facilities and 18 for Regional Water Supply Company Titanadi facilities. Then from these suggestions, 979 facilities were supervised by the indicators set out in Regulation of the Minister of Health No. 736 of 2010. It was found from the results of the Drinking Water Quality Assessment that 74 facilities still needed to meet the requirements according to Regulation of the Minister of Health No.492 of 2010.

Related machinery and equipment directly with raw materials or final products must be cleaned and maintained regularly so as not to cause contamination of the final product.

Equipment plays a big role in processing raw water into drinking water; conditions and equipment that could be better will cause suboptimal processing. Processing that is not optimal can cause bacterial contamination (Arumsari et al., 2021).

Achievements that meet the requirements are still far from the target, but if you look at the achievements of 2021-2022, Drinking Water Quality Supervision has experienced a rapid increase. However, despite these high achievements, many unsupervised facilities still make the government unable to know the quality of drinking water in these places. The data above shows that the North Sumatra provincial government did its best for maximum results in 2022. However, some causes or problems occur, and these problems greatly impact society. Gusril's (2016) research found that observations made on the water quality of the drinking water company to Duri residents were increasingly concerning; in addition to having to rotate with erratic schedules, the water quality was also declining yellow and released much silt. The quality of raw water declines, especially in the dry season, due to increased water users by customers. Hastiaty research (2023) found that the quality of PDAM Tirta Benteng drinking water still needs to meet the drinking water quality requirements for physical, chemical, and microbiological parameters.

(1). HR (Human Resources)

Activity is certainly not spared by human resources; the activity will not run well and well if the capacity of officers continues to be increased. This is an example of a case where many human resources in the Environmental Health Inspection at the Community Health Center are not slinging experts.

(2). Budgeting

Budget is the most important thing to support the success of a program or idea. Our province is still focused on Drinking Water Quality Monitoring. Where the government only focuses on supervision and assessment. Even after the Environmental Health Inspection, each Sara must carry out a quality test to find the final result.

CONCLUSION

1. The research results show that the achievement of drinking water facilities that meet the requirements in North Sumatra Province is 73.02% of the 979 supervised facilities. Around 11 Regencies/Cities have conducted Environmental Health Inspections, and all the facilities were assessed to meet the existing Regulation of the Minister of Health standards. Regencies/cities that meet the requirements are Samosir, Padang Lawas, Labuhan Batu Selatan, Sibolga City, Tanjung Balai City, Pematang Siantar City, Tebing Tinggi City,

Medan City, Binjai City, Padang Sidempuan City, and Gunung Sitoli City with 100% achievement.

2. In conclusion, monitoring of drinking water quality in Sumatra Province has been carried out but has yet to meet the desired standards. There are still many areas where supervision of the facilities has yet to be carried out. Most often occurs because the area still needs sanitary staff to supervise. Many human resources still deal with this problem but must understand how the supervisory procedures should be.

SUGGESTION

Suggestions for the future government to carry out drinking water quality monitoring is carried out once a month; checking the quality of drinking water includes checking physical, **biological**, and chemical parameters. The government is obliged to improve the quality of knowledge of inspection staff to carry out supervision.

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