

Evaluation of Chemical and Bacteriological Examinations of Drinking Water of Water Refill Depots in Pariaman between 2016 and 2018

Trisfa Augia¹, Olivia Lukman²
{trisfaaugia@ph.unand.ac.id¹, olive_lukman@yahoo.co.id²}

Faculty of Public Health, Andalas University, Padang, Indonesia¹,
District Health Office, Pariaman, Indonesia²,

Abstract: The number of water refill depots in Pariaman increased in the last five years, and the evaluation of water quality examinations has not been conducted already. This research used an observational method based on secondary data from the District Health Office between 2016 and 2018. The data are evaluated according to the eligibility, frequency of examination, chemical and bacteriology parameters determination, and compliance with regulations. These conditions were increased consecutively for three years. Besides, the inspection and evaluation are not scheduled-well, and it expenses the budget of Pariaman Government. Most depots have no initiative to do the test and spend some money on the test. Therefore, it is very important to conduct water quality depots in Kota Pariaman. It needs to be improved the quality and the quantity according to regulations. With the enactment of District Regulation, the Government of Pariaman can impose a penalty for depots.

Keywords: Chemical and Bacteriology Examinations, Drinking Water, Water Refill Depot.

1 Introduction

Regulations from the Ministry of Health on the Hygiene of Water Refill Depot is a legal basis for the management of drinking water. This regulation governs the community and the local government regarding the quality standards and hygiene requirements of drinking water [1][2].

The Water Refill Depot (WRD) is one of the drinking water supply, which rapidly developed recently. Several studies have shown that the quality of WRD treated water was very diverse, both in terms of microbiology, chemistry, and physics. Research conducted by Mirza (2014) found that WRD hygiene operators affect the amount of coliform in drinking water[3]. While Pratiwi (2007) also found that in Bogor, there were still WRD that produced un-met water health requirements[4].

Pariaman is a coastal city in the province of West Sumatra that has a regional regulation governing drinking water depots. It has a population of nearly 85,000 people and one of the tourist destinations in West Sumatera. The local regulation was promulgated in 2015[5]. Along with the ratification of the local regulation, the Pariaman City Health Office has conducted surveillance activities to determine the quality of water of WRD and sanitation inspection in collaboration with the West Sumatra Provincial Health Laboratory Office.

For 3 (three) years, these activities were carried out together among sanitarians at public health centers, and there was no evaluation of these activities regarding sanitation regulations.

2 Method

This study was observational research with a descriptive approach using secondary data from the District Health Office between 2016 and 2018. Fifty WRD Data were evaluated based on indicators: Percentage of eligibility, Frequency of examination, Chemical and bacteriology Parameters determination, and Compliance with regulations. This study was conducted from April to June 2019. It also involved the Environmental Health Officer of Pariaman District Health Office as a respondent to explore the Standard Operating Procedure of sanitation inspections in this period.

3. Result

The percentages of water samples that did not meet the requirements were 25.45%, 65.45%, and 57.41% respectively for three years. In 2017 and 2018, the number of samples that did not meet the requirements increased, and more than half of the samples were not safe for consumption. The criteria are based on the results of the chemical and bacteriological test. There are four chemical parameters measured, namely Fluoride, Iron, Lead, and Cadmium. The test was done once a year, and the expense was charged to the budget of Pariaman Government. Most depot owners or managers did not have the initiative to carry out examinations independently and pay at their own expense.

Table 1 shows an overview of the water quality of water refill depots in Pariaman. The number of samples was nearly a hundred percent. Most of the depots were located in Sub-district Pariaman Tengah. Figure 1 illustrated the percentage of unqualified and qualified drinking water produced by water refill depots. More than half of the samples were un-qualified based on the data between 2017 and 2018.

Table 1. Overview of water quality at the Water Refill Depots in Pariaman

Water Refill Depots	Year					
	2016		2017		2018	
Total number	58		58		60	
The number of Examination Depots	n	%	n	%	n	%
Pariaman	55	94.83	55	94.83	54	90
Sub-district Pariaman Tengah	19	32.76	20	34.48	19	31.67
Sub-district Pariaman Utara	9	15.52	8	13.79	10	16.67
Sub-district Pariaman Timur	13	22.41	13	22.41	12	20
Sub-district Pariaman Selatan	14	29.31	14	24.14	13	21.67
BACTERIOLOGY PARAMETERS	Coli	Coliform	Coli	Coliform	Coli	Coliform
Pariaman	14	14	36	36	23	23
Sub-district Pariaman Tengah	4	4	13	13	10	10

Sub-district Pariaman Utara	3	3	7	7	4	4
Sub-district Pariaman Timur	3	3	5	5	4	4
Sub-district Pariaman Selatan	4	4	11	11	5	5
CHEMICAL PARAMETERS					(+) Fluoride	
					n	%
Pariaman					15	27.78
Sub-district Pariaman Tengah					4	7.41
Sub-district Pariaman Utara					1	1.85
Sub-district Pariaman Timur					3	5.56
Sub-district Pariaman Selatan					7	12.96
Frequency of examination		1		1		1

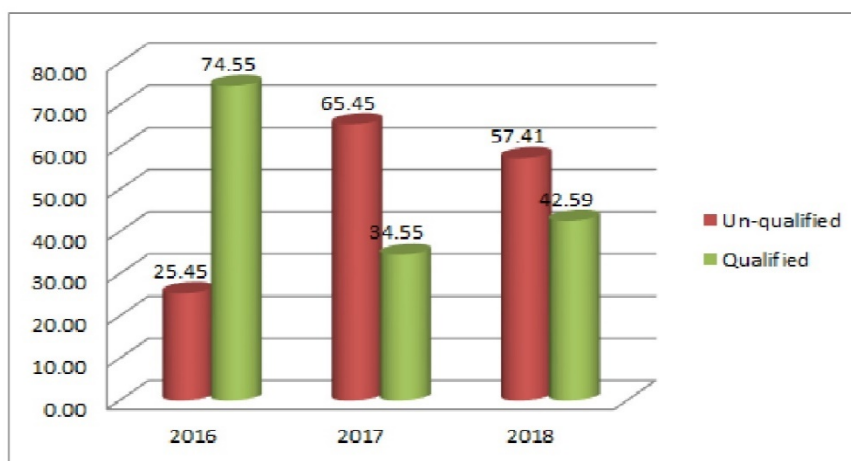


Figure 1. Percentage of qualified and unqualified water

4 Discussion

According to the result of this research, it is found that the water quality of WRD in Pariaman is still un-met requirements as drinking water. A similar result was found by Pratiwi (2007) in Bogor[4]. The quality of drinking water can be affected by the hygiene of the operator of WRD [3].

4.1 Percentage of eligibility

The number of un-qualified samples indicated high in three years. District Health Office examined four elements representing chemical parameters. Meanwhile, based on the ministry of health regulation, it required at least eight elements that should be examined in terms of chemical assessment[1]. The minimum requirement for an examination of drinking water consists of microbiology parameters, eight inorganic chemical matters, health unrelated parameters (physical and chemical), and additional parameters.

4.2 Frequency of examination

The test was conducted only once a year. It has not met the standard of Ministry of Health. Ideally, the chemical test should be determined every three months, and once a month to assess Coli and Coliform. According to information from the environmental health officer, budgeting was one of the problems to test all parameters. Moreover, there has no good laboratory has not existed. The samples required special handling when delivered to the laboratory in the nearest city. The laboratory is located in Padang, about sixty kilometers from Pariaman.

4.3 Chemical and bacteriology Parameters determination

As shown in Table 2, there are two parameters, mandatory and additional parameters. Bacteriology and chemical examinations are included as mandatory parameters, which means should be determined regularly. Choosing several elements to examine is not to represent the quality of water overall. Local government should ensure the examination activities refer to regulations. District regulation should support the higher regulation to control water refill depots and to protect the community from waterborne diseases.

4.4 Compliance with regulations

As mention above, although Pariaman has a regulation about water refill depot, it did not have influences on the sanitation inspection due to the lack of government budgeting. The community requires a guarantee from the government to consume safe drinking water.

5 Conclusion

The quality test of drinking water from depots in Kota Pariaman needs to be improved, for both the quality and quantity, according to regulations (Minister of Health Regulation Number 492 of 2010 and Number 43 of 2014).

With the enactment of District Regulation (Number 9 of 2015), the Government of Pariaman can impose a penalty for depots who do not regularly examine the quality of their treated water in an accredited laboratory.

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