

The Quality of Drinking Water Preparation in Drinking Water Refill Depots in Kendari, Indonesia

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Abstract: The society in Kendari are using drinking water have a source of drinking water refill depots. The drinking water should qualify the physical, chemistry and microbiology rules and regulations. The population in this study is the whole drinking water depots in Kendari that carrying by Kendari Health Department in January 2018 as many as 87 depots. The number of sample as many as 36 drinking water depots. Sampling technique is proportionate random sampling. The result of this study is finding that from 36 depots obtaining as many as 91, 7% water resources (water standard) is unqualified (contains coliform and Fe). After processed by drinking water depots, the water quality is re-test and obtaining as many as 16,7% the water fickle by drinking water depot is unqualified (contains coliform and Fe). There are still drinking water depots that the preparation system of drinking water are unqualified by the health regulation of Republic Indonesia. So that evaluation and supervision is necessary in term the implementation so it does not fazing health.

1 INTRODUCTION

Water is the important thing in life because the whole creatures in this world are needing water (WHO/UNICEF JMP for Water Supply and Sanitation, 2014). Predominantly water in this world sea water as many as 97%, while as many as 2% water is stuck in ice form and the number of clean fresh water that can be used by people to suffice their lively need on a day generally 1%. Clean and fresh water can be organized as underground water, river water and lake water (Pimentel *et al.*, 1997).

Everyone needs water around 64, 8 liter/person/day a day (Prima *et al.*, 2017). Indonesian drinking water is getting clean water from local drinking water region company, especially the citizen, and the others are using the well or another source. In the dry season, water crisis can be occur and the gastroenteritis disease is appear everywhere (Hall and Guyton, 2011). There are some sources of drinking water in Kendari , Drinking Water Region Company (PDAM) is distributing drinking water however the water quality which is distributed by the pipeline system generally turbid, rust colored and obtaining bacteriology.

So, it needs special treatment for consuming before it is using like filtering Total Suspended Solid (Syauqiah, Wiyono and Faturrahman, 2018) and also it is boiling until 100°C for slewing the bacteriology (Barke, 2019). Today, the boiling water habit (Geetha and Sivachidambaranathan, 2019) and water filtering is rarely to find in citizen because it needs more energy (the fossil fuel) and spending hours. The citizens recently choose to use drinking water that immediately consume which is come from the drinking water depots around Kendari.

Drinking water depots that have operated should be qualified in administration or technical rules (Nurlila *et al.*, 2019) and regulations according to legalization regulations (Adam, 2019). Technical regulation is begin at water quality (water standard and drinking water), place, instrumentation that used and operator of drinking water depots. Drinking water should be fulfilling the physical, chemistry and microbiology rules and regulations.

Water preparation in drinking water depots fulfils the health standard of drinking water based on Health Ministry of Republic Indonesia Rules and Regulation Number 32 years 2017 about quality standard of environmental health rules and regulation of water for

the hygiene sanitation necessity, swimming pool, solus per Aqua and bathing place. However in fact, there are still drinking water distribute their water that obtaining Fe and coliform (Wiyata, 2013).

2 METHODS

This research is observational study. Population in this research as many as 87 drinking water depots in Kendari, the number of sample in this research as many as 36 drinking water depots. This research is using the official regulations orientation of Health Ministry of Republic Indonesia Number. Water quality testing in Laboratorium Kesehatan Provinsi Sulawesi Tenggara (Dinkes Sultra, 2017).

3 RESULTS AND DISCUSSION

Water resources quality (water standard).

Water standard is the water resources that using to be the basic material that will be processing in drinking water depot. Standard water quality can be seen in table 1.

Table 1: Standard water quality of drinking water depots in Kendari in 2018.

Water Standard	N	%
Qualified	3	8,3
Unqualified	33	91,7
Total	36	100

Drinking water quality.

Drinking water is the fickle water result by the drinking water depot that immediately consume by citizen. The quality of fickle water result by the drinking water depot can be seen in table 2.

Table 2: The distribution of drinking water quality in Kendari in 2018.

Depot Drinking Water Quality	N	%
Qualified	30	83,3
Unqualified	6	16,7
Total	36	100

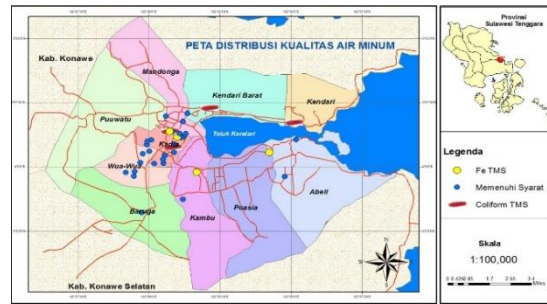


Figure 1: The map of water quality of depot drinking water in the whole Kendari.

Refill drinking water depot is a place where refill drinking water is done. The depot is a place where refill drinking water is done by using water filling machine. This filling machine is the machine that has function to convert water into drinking water after several filtering processes, so the basic water is ready to drink (Bartram *et al.*, 2014)

Based on the result of this research obtaining the information that from 36 drinking water depots, there are 33 drinking water depots (91,7%) that have basic water which is unqualified, and there are 3 (8,3%) drinking water depots that qualified. After doing the preparation in drinking water depot obtaining that water quality in drinking water depots are qualified as many as 30 (83,3%) drinking water depots, while the water quality that unqualified as many as 6 (16,7%) drinking water depots.

Several researches indicate water quality that distributed in Kendari the drinking water depots is unqualified. (Nurlila *et al.*, 2019) found that there are 81, 8% drinking water depots unqualified (coliform >50 CFU/100ml) from 11 drinking water depots. Others research also found 60% bacteria (Askreneng and Yunus, 2017).

This research found the depot which the basic water is unqualified caused of the result of physical water inspection that there are 17 drinking water depots are smelly, have contents Fe over the basic quality of drinking water which has been set in (1 mg/l) as many as 14 drinking water depots. The depot that contents the basic water has Fe contents over the basic quality using water resources from dig well and electric pump well. The contents of iron elements naturally found in groundwater, especially in well water (Khatri, Tyagi and Rawtani, 2017).

The basic water that come from Drinking Water Region Company (DWRC/PDAM) become the basic water usually has qualified physical quality, it caused of the water basic which comes from Drinking Water Region Company (PDAM) has been processing or

treatment process is not distributed yet and become water basic by the drinking water depots.

The quality of drinking water in drinking water depot is very determined by the preparation process in the drinking water depot. Start from the instrument that used in the drinking water depot, the instrument maintenance, hygiene employee and the employee's treatment toward the produced water.

Drinking water should be qualified based on Peraturan Menteri Kesehatan Republik Indonesia Nomor 32 Tahun 2017 about basic quality of environmental health and health regulations of water for sanitation hygiene necessity, swimming pool, Solus pe Aqua, bathing place. Physical parameter condition including turbidity (<25 NTU), color (<50 TCU), *Total Dissolve Solid* (<1.000 mg/l), temperature ($\pm 3^{\circ}\text{C}$ air temperature), tasteless and odorless, biological parameter consist of coliform total (<50 CFU/100 ml), and *E.coli* (0 CFU/100 ml). Several addition of chemistry's parameter is included, if there is a contamination toward that water.

Drinking water that peaceful to consume should be free from the dirty microbe, Coliform and *E. coli* is the normal flora toward the digestion access (large intestine). The high condition of Coliform and *E.coli* is caused by the disturbance of digestion system (Adzitey *et al.*, 2012). Smell, taste and color toward the drinking water can be one of the first indicator of that water is reasonable or unreasonably to consume (Watts and Linden, 2007).

The labor drinking water depot appears not only in Kendari but also in several regions including developing counties. The preparation system of water basic in drinking water depots are using reverse osmosis or UV treatment (Pérez-González *et al.*, 2012)

The problem appears when the instrumental is not taking care goodly. Some of them are not substitute the old *micro filter* that not used anymore and also some of them is not pay attention to the ultraviolet lamp that has been expired. The sleazy instrument make the instrument activity cannot be working optimally. Other factors also influence the water quality in depot like the employee's behavior who not keep the sanitation and hygiene.

4 CONCLUSIONS

There is shelf potential of coliform and Fe in citizen's drinking water that produced from drinking water depot. Organization evaluation from local government and resembling supervision is necessary in drinking water depots, so the water that distributed

will qualified based on the standard of Peraturan Menteri Kesehatan Republik Indonesia Nomor 32 Tahun 2017 about basic quality of environmental health and health regulations of water for sanitation hygiene necessity, swimming pool, Solus pe Aqua, bathing place (Peraturan Menteri Kesehatan Republik Indonesia Nomor 492/MENKES/PER/IV/2010, 2010).

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