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Evaluasi Higiene Sanitasi Depot Air Minum Di Kota Pekanbaru

(Evaluating the Sanitary Hygiene of Drinking Water Depots in Pekanbaru City)

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ABSTRAK

Latar belakang: Depot Air minum isi ulang merupakan kebutuhan utama masyarakat sekarang ini dalam memenuhi kebutuhan air minum sehari-hair yang mudah didapatkan dengan harga yang murah. Hal ini menjadi pilihan masyarakat akan air minum dengan harga murah. Jika pengusaha depot air tidak memperhatikan higiene sanitasi maka akan membahayakan kesehatan konsumen. Tujuan penelitian untuk memecahkan permasalahan depot air minum dengan higiene sanitasinya di Desa Wonorejo yang merupakan wilayah kerja Puskesmas Garuda di Kota Pekanbaru, Riau, Indonesia. **Metode:** Metode penelitian yang digunakan adalah deskriptif kualitatif dengan mengamati 6 depot air minum pada desember 2021 dan mengisi laporan penilaian mandiri depot air minum yang dikeluarkan oleh Direktorat Penyehatan Lingkungan Republik Indonesia tahun 2017. Penilaian terdiri dari empat kategori (tempat, peralatan, penangan, kualitas air).

Hasil: Hasil penelitian dari 4 kategori, dimana 2 kategori memenuhi persyaratan 100% (peralatan dan sumber air baku dan air minum) dan 2 kategori tidak memenuhi syarat (MS) bangunan 78,5% dan penangan 43%. Bangunan yang tidak memenuhi syarat (TMS) adalah: tata letak pengolahan air minum, ventilasi, tempat sampah tertutup, dan fasilitas cuci tangan yang belum difasilitasi oleh pengusaha depo. Adapun syarat higiene pegawai yang tidak memenuhi syarat yaitu : pegawai tidak menggunakan pakaian khusus, dan tidak membersikhakan tangan dengan sabun sebelum mengisi galon.

Simpulan: Kesimpulan evaluasi Depot Air Minum secara keseluruhan memenuhi syarat (MS) sebesar 80%. Diharapkan kepada pengusaha depot air minum isi ulang untuk memperbaiki aspek-aspek yang tidak memenuhi. Persyarata dan kepada Dinas Kesehatan Kota Pekanbaru untuk melakukan pembinaan dan monitoring secara berkala..

Kata kunci: air minum, baku mutu, depot air minum, higiene sanitasi,

ABSTRACT

Title: Evaluation Drinking Water Depot Sanitary hygiene In Pekanbaru City

Background: *Refilled drinking water depots continue to develop to meet the community's needs for affordable, quality and safe drinking water. However, the sanitary hygiene of the refilled drinking water should be maintained, otherwise consumers health will be at stake. This study was performed to address the problems of sanitation and hygiene at refilled drinking water depots in Pekanbaru City, Riau, Indonesia.*

Method: *In this descriptive qualitative study, six refilled drinking water depots participated as samples in December 2021. Depot owners answered the drinking water depot self-assessment report issued by the Directorate of Environmental Sanitation of the Republic of Indonesia in 2017 which consisted of four categories: place, equipment, handlers, water quality.*

Results: *Out of four categories, two categories met the requirements of 100% (equipment and water source), while two categories did not meet the requirements: (Comply/C) 78.5% related to the buildings and 43% for handlers. The criteria of buildings that did not meet the requirements were layout, ventilation, closed trash cans,*

and hand washing facilities. Whereas, the criteria of operators that failed to meet the requirements were operators not wearing work costume and they never washed their hands before performing their jobs.
Conclusion: *In general, the drinking water depots have met the requirements (Comply/C) by 80%. Owners of the* refilled drinking *water depot s need to improve the assessment items that did not meet the requirements. In addition, the Health Office of Pekanbaru City should conduct regular coaching and monitoring.*
Keywords*: drinking water, quality standard, sanitary hygiene, Pekanbaru, water depot*

INTRODUCTION

Water is one of the most important substances in life which makes up to 70% of the human body, The needs for drinking water vary, depending on ones' standard of living. The demands and needs for quality drinking water in developing areas were not properly fulfilled. (1).

The unfulfilled needs have forced the community to find alternative water resources, including consuming refilled drinking water. Refilled drinking water depots provide unpackaged drinking water for the community (2). Refilled drinking water depots are currently growing and developing rapidly as they set price much cheaper than bottled drinking water. However, the quality of the refilled drinking water remains questionable since no in terms of quality, the public still doubts because there is no clear information in terms of processes or regulations regarding its circulation and supervision (3)

Refilled drinking water depots as an alternative to meeting the needs for drinking water poses health risks due to unstandardized quality of the water, particularly related to the safety and hygiene. (4). The quality of refilled drinking water is likely to decrease due to the absence of sterilizers, inadequate anti bacteria processing, unstandardized water sources and the types of equipment used in the depots. (5).

Depots owners are the ones responsible for the business that they need to guarantee the sanitary hygiene of their products. Sanitary hygiene reduces or eliminates factors that cause contamination of drinking water from the equipment used in the water processing, storing and distribution. Sanitary hygiene of refilled drinking water depot can be measured from the depot location, equipment, raw water sources, and operators (6)

The results of the preliminary observations to the community in Wonorejo Village, Pekanbaru City, people prefer refilled drinking water for consumption despite the health risk it poses because they do not have to boil it, cheap price, and delivery service available. The large number of refilled drinking water depots make them prone to health problems due to issues regarding their location, presentation, and container (packaging) using plastic gallon bottles and improper knowledge of the managers about depot sanitary hygiene (7). In fact, on average, many drinking water refilleddepots are located near the road with dusty surroundings, while the operators do not wear certain clothes design for the job and they do not put on headgear. Therefore, it is considered necessary to develop and supervise adequate sanitary hygiene of refilled drinking water to avoid possible negative impacts on consumers' health(8).

This study evaluated the "Sanitary hygiene of Refill Drinking Water Depots in Wonorejo Village, Pekanbaru City in 2021".

MATERIAL AND METHOD

In this qualitative observation ,evaluation was carried out to 6 drinking water depots located in Wonorejo Village, Pekanbaru City in the Garuda Health Center Work area in December 2021. Respondents answered an environmental health self-assessment scale on the management of drinking water depots issued by the Directorate of Environmental Health, Directorate General of Public Health of the Republic of Indonesia in 2017 (9). Evaluation of sanitary hygiene included the depot location, equipment, water sources and operators.

Direct observation on the sites was performed and laboratory test on the samples of the water resource was performed. The parameters measured in the laboratory test included parameters of the raw water quality and health-quality parameters, including the Bacteriology of Coliform and *E.Coli* contamination.

The questionnaires were checked using checklist and scoring for all criteria. The final results of each criterion was divided into two: Comply = C > 80%, Not Comply = NC < 80%

RESULTS AND DISCUSSIONS

RESULTS

3.1 The Hygiene of Drinking Water Depot Building Sanitation

Table 1. The Hygiene of Drinking Water Depot Building Sanitation

No	Building	Assessment Results	
		Comply	Not Comply

		N	%	N	%
1.	The location is free from pollution and disease transmission	6	100	0	0
2.	The building is strong, safe, easy to clean, and easy to maintain.	6	100	0	0
3.	The floor is waterproof, the surface is flat, smooth, non-slippery, does not crack, does not absorb dust, and is easy to clean, and the slope is quite gentle	6	100	0	0
4.	The walls are waterproof, the surface is flat, smooth, not slippery, does not crack, does not absorb dust, and is easy to clean, as well as bright and bright colors	6	100	0	0
5.	Roofs and ceilings must be strong, anti-rat, and easy to clean.	6	100	0	0
6.	**clean, does not absorb dust, flat surface, and light in color, and has a sufficient height**	**0**	**0**	**6**	**100**
7.	Spatial planning consists of room for processing, storage, distribution/supply and waiting room for visitors/consumers.	6	100	0	0
8.	Lighting is bright enough to work, not dazzling and evenly distributed.	6	100	0	0
9.	Ventilation ensures good air circulation/exchange	6	100	0	0
10	Air humidity can provide support for comfort in doing work/activities.	6	100	0	0
11.	Has access to a bathroom and a latrine.	6	100	0	0
12.	**There is a sewerage that flows smoothly and is closed**	**0**	**0**	**6**	**100**
13.	**There is a covered trash can.**	**0**	**0**	**6**	**100**
14.	There is a hand washing area equipped with running water and soap.	6	100	0	0
	% Achievement of Drinking Water Depot Building Sanitary hygiene – NC (Not Comply)		**78,5%**		**21,5%**

Noted: Comply = C > 80%, Not Comply = NC <80%

Table 1. shows that 78.5% of the refilled drinking water depot buildings in Wonorejo Village, Pekanbaru City, 78.5% have met the requirements both in terms of location, building, floors, walls, roofs, ceilings, lighting, humidity, bathroom and latrine facilities, sewerage, and free from rats, cockroaches and flies. However, 21.5% did not meet the requirements: no layout for drinking water treatment, no ventilation, no trash can, and there is no hand washing area with tap water and soap

3.2 The Sanitary of Drinking Water Depot Equipment

Table 2 The Sanitary of Drinking Water Depot Equipment

No	Equipment	Assessment Results			
		Comply		Not Comply	
		N	%	N	%
1.	The equipment used is made of food grade materials.	6	100	0	0
2.	Microfilters and disinfection equipment are not expired	6	100	0	0
3.	Tank water reservoirs are closed and protected.	6	100	0	0
4.	The container/gallon bottle is cleaned before filling.	6	100	0	0

5.	Containers/gallons that have been filled with drinking water must be given directly to consumers and should not be stored for more than 1x24 hours.	6	100	0	0
6.	Perform a reverse washing system (back washing) periodically replacing the macro filter tube.	6	100	0	0
7.	There is more than one micro filter (µ) with tiered size.	6	100	0	0
8.	There are sterilization equipment in the form of ultraviolet, and or ozonation, and or other disinfection equipment that is functioning and used correctly.	6	100	0	0
9.	There are washing and rinsing facilities for bottles (gallons).	6	100	0	0
10	There is a bottle filling facility (gallon) in a closed room.	6	100	0	0
11	A new clean bottle cap is available.	6	100	0	0
	% Achievement of Drinking Water Depot Equipment Sanitary hygiene – C (Comply)		**100%**		**0%**

As seen in Table 2, the six refilled drinking water depots in Wonorejo Village, Pekanbaru City had 100% fulfilment of the hygiene and sanitation equipment requirements.

3.3 The Hygiene of Water Sources of Refilled drinking Water Depots

Table 3.1 Drinking Water Depot Raw Water Source

Raw Water Source	**Frequency**	%
Dug Well	0	0
Bore Well	6	100
Amount	6	100%

As presented in Table 3.1, refilled drinking water depots in Wonorejo Village, Pekanbaru City, the used water from drilled wells,. The quality of water sources affects the quality of the drinking water.

Table 4 The Quality of Refilled Drinking Water Sources

Depot	**Source**	Physical Quality			Biological Quality			Chemical Quality	
		Odor	**Flavor**	**Criteria**	**Coliform**	***E.Coli***	**Criteria**	**pH**	**Criteria**
1.	Boreholes	Odorless	Flavorless	C	0	0	C	6.6	C
2.	Boreholes	Odorless	Flavorless	C	0	0	C	6.5	C
3.	Boreholes	Odorless	Flavorless	C	0	0	C	6.4	C
4.	Boreholes	Odorless	Flavorless	C	0	0	C	6.6	C

5.	Boreholes	Odorless	Not Flavor	C	0	0	C	6.5	C
6.	Boreholes	Odorless	Not Flavor	C	0	0	C	6.7	C
	% Achievement					100 % Comply (C)			

Table 3.2 shows that the quality of the water in terms of physical and chemical quality have 100% met the requirement. Hence, the quality of drinking water at the refilled drinking water depots in Wonorejo Village, Pekanbaru City is 100% qualified and safe for the health.

3.4. Sanitary Hygiene of Refill Drinking Water Depot Operators (*Operators*)

Table 4 The Sanitary Hygiene of Refilled drinking Water Depot Operators

No	Operator/*Operator*	Assessment Results			
		Comply		Not Comply	
		N	%	N	%
1	Healthy and free from disease transmission	6	100	0	0
2	Don't be a carrier of germs	6	100	0	0
3	Behave with hygiene and sanitation every time you serve	6	100	0	0
4	**Consumer.**	**0**	**0**	**6**	**100**
5	**Always wash your hands with soap and running water every time you serve**	**0**	**0**	**6**	**100**
6	**Consumer.**	**0**	**0**	**6**	**100**
7	**Wear clean and neat work clothes.**	**0**	**0**	**6**	**100**
	% *Operator* Hygiene Achievements (Handlers)– Not comply (NC)		**43%**		**57%**

From Table 4, it can be seen that the operators of all depots did not wear standard outfit such as headgear, mouth cover, and shoes when performing their jobs. They also did not wash their hands properly before handling and filling up the gallons. Moreover, they did not have their health checked regularly unless when they were sick and they did not comply with the sanitary hygiene requirements of drinking water depots.

Table 5 Sanitary hygiene for Drinking Water Depots in Wonorejo Village, Pekanbaru City

No	Variable/Component	C	NC
1	**Building**	**79%**	**22%**
2	Equipment	100%	0%
3	Raw Water/ Drink Water	100%	0%
4	***Operators* / Handlers**	**43%**	**57%**
Total	Average	80%	20%

C= Comply > 80% , NC = Not Comply < 80%

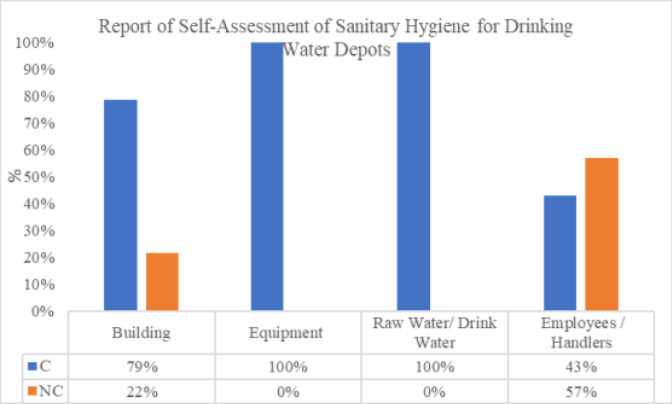

Figure 1. Report of Self-Assessment of Sanitary Hygiene for Drinking Water Depots

DISCUSSIONS

In general, the sanitary hygiene has 80% met the quality standard (Comply). However, two categories scored below the standard: building standard (78.5%) and operators (43%). It is a fact that the drinking water pumped from water wells and from the drinking water company could not supply the whole needs for water among the community. Refilled drinking water offers a new, practical and inexpensive alternative to meet this need. The price of refilled drinking water is relatively cheaper when compared to bottled water. The regulation issued by the Minister of Health of the Republic of Indonesia Number 492/Menkes/PER/IV/2010 stipulates that drinking water must not contain pathogenic bacteria which can cause diseases, especially digestive tract diseases that are often caused by coliform bacteria.(10).

The quality of hygiene and sanitation of drinking water depots should be regularly evaluated to guarantee that the water is safe to consume, clean and does not contain harmful substances. (11). The SDGs No. 6 regarding sanitation and clean water, (12), (13) targets Indonesia to have clean water for everyone by 2030.

The Hygiene of Refilled Drinking Water Depot Building Sanitation

The environmental conditions of the refilled drinking water depots in Wonorejo Village, Pekanbaru City are 100% eligible, because the depots are located in pollution-free and disease-transmission free areas that are far from landfill, waterlogged and swampy areas. They are not located close to the accumulation of used goods or toxic hazardous materials (B3). From the observation, it was found that the condition of the building at the refilled drinking water depot in Wonorejo Village, Pekanbaru City have 100% met the requirements, because the buildings were built from concrete and bricks that are strong, safe, easy to clean and easy to maintain. This is in accordance with the requirements written in the Minister of Health No. 43 of 2014 concerning Hygiene and sanitation of drinking water depots that are eligible to possess the certificate of proper drinking water depot from the health office.(14)

The buildings have waterproof floors made of ceramic, waterproof walls are made of concrete, strong roof and ceiling, anti-rat, and has a flat surface, smooth, non-slippery, not cracked, no-dust absorb, easy to clean, and bright colored. However, the depots have no special room for drinking water treatment. All processes are carried out in one place in a glass-insulated cupboard from the water source inlet to the bottle rinsing before filling up the gallons. No separated rooms were available for drinking water storage and consumer waiting room. Those weaknesses should be put into consideration by the health office in accordance with Permenkes No. 736. 2010 regarding the supervision of refilled drinking water depots which are routinely carried out every six months. (15)

All refilled drinking water depots have bright lighting yet not dazzling with lights spread evenly throughout the room. However, the depots did not have ventilations, where air circulation occurs through the door. Meanwhile, ventilations are important because they let air to circulate and the temperature in the room can be maintained similar to the outside. All refilled drinking water depots have a qualified humidity that makes operators feel comfortable in performing their jobs (16).

Access to proper sanitation facilities is still minimal. All refilled drinking water depots already have access to bathrooms and latrines and they have waste water channels that flow smoothly that are not clogged. However, the trash cans were not covered which can be a potential source of pollution and creates unhealthy which can spread various diseases as stated by the WHO (17). No hand washing facilities were available because

Operators prefer using bathrooms in washing their hands. The buildings of the six depots are clean from mice, flies and cockroaches that can contaminate or damage the equipment.

The Hygiene and Sanitation of Drinking Water Depot Equipment

The machines of the six depots were made of food grade material and equipped with raw water storage tanks. However, they did not have sand filters, instead they had carbon filters. Meanwhile, every depot should carry out a gradual filtering by filtering the water through sand or other types of filters. Simple screening for clean drinking water can actually be done on a household scale.

Secondary data from the demographic and health survey V, 2017–2018 showed that access to clean water is still lacking (18). In Mozambik and Uganda, improvement in the water quality regarding the microbiological aspects of the drinking water should be carried out in order to supply clean quality drinking water for the community.(19).

The disinfection was performed using Ultra Violet (UV) disinfection which have met the predetermined standards of proper water treatment. Disinfection reduces the microorganisms in the water, especially the pathogenic ones because microorganism can cause stomach diseases. This condition should be maintained well.

Hygiene, sanitation and storage practices of drinking water storage facilities can prevent microbial contamination as seen from a case study done in Makwane village, South Africa (20). Hygiene and sanitation management of refilled drinking water depots for proper consumption in Kendari City states that the equipment in the drinking water depot needs to be periodically checked/maintained to make sure that the equipment is proper in producing drinking water that meets the health standards. (21).

The Hygiene of Water Sources and Sanitation

All of the depots that participated in this study used water sourced from bore wells as seen in a study on the water sources for refilled drinking water depots in Kampar Hulu sub-district, Kampar Regency, Riau, Indonesia (22). The water source will affect the quality of the products as stated by (23) (24). Therefore, the overall quality of drinking water at refilled drinking water depots in Wonorejo Village, Pekanbaru City with Pekanbaru laboratory have met the physical, bacteriological, and chemical requirements as predetermined in Permenkes No 492 of 2010 (10), (25).

The drinking water produced at refilled drinking water depots in Wonorejo Village, Pekanbaru City is is protected from physical, chemical, and biological contaminations. This findings are contradictory to a research conducted in Depok city where the water source was contaminated with *E.Coli* bacteria (26). The purification process has met the standard regulations using ozonation or UV (Ultra Violet). It is also necessary to properly carried out the water processing based on the standard requirements under the responsibility of the depot owners. (27). The highest level of sanitary hygiene is the condition where there is no relationship between bacteriological quality of refilled drinking water depots (28). To ensure the safety of refilled drinking water products, bacterial inspection at refilled drinking water depots is carried out every 3 months while chemical and physical examinations were performed every 6 months.

Sanitary hygiene of Drinking Water Depot Operators

The results of this study showed that the operators of the depots are in good health and free from infectious diseases, especially water-borne diseases such as diarrhea. In addition, the operators should apply hygienic and sanitary behaviors in serving the consumers. They are not allowed to smoke, skip meals, and spit. Conditions like this should be maintained to prevent the water from being contaminated by the germs contained in operators' saliva when they eat or spit. In fact, the contamination of drinking water and hygiene in drinking water depots is mostly caused by operators who do not keep the area clean (29), (30)

All operators in six depot did not wear certain clothes, have their mouth covered with mask, did not wear headgear and shoes while they are working whilst those attitudes are the parameters to the contamination avoidance. Ideal work outputs should be clean and dirt-free, light-colored and non-patterned. Light colored-clothes make dirt visible that it can be immediately cleaned before contaminating the products. Likewise, in India, the hand hygiene of operators in semi-urban areas of India significantly affects the hygiene of their products (31) and diseases due to the contaminated water, poor sanitary hygiene and contaminated water. In Korea, diseases due to low-quality drinking water, sanitation and cleanliness often occur (32).

The operators in all refilled drinking water depots did not properly wash their hands in soap and water before handling the gallons. They carry out regular health checks and have a certificate of having attended a drinking water depot sanitary hygiene course. A study done in Padang City on the same topic showed that the sanitary hygiene only reached 45.2%, which is significantly lower than the minimum limit >80%. The condition might have occurred due to unhygienic habits of operators in performing their jobs. (33) and due to inadequate information dissemination by the local Health Office and relevant parties regarding hygiene and sanitation (34)

CONCLUSIONS

In general, the six refilled drinking water depots evaluated in this study have met the sanitary hygiene requirements by 80% (Comply). Of the four categories, two categories have 100% met the requirements (equipment and sources of water) The other two categories have not completely met the requirements (buildings 78.5% and handlers 43%) determined by the Directorate General of Public Health of the Republic of Indonesia in 2017 (Directorate of Environmental Health, 2017). The sub-criteria of buildings that do not meet the requirements are: the layout of drinking water treatment, ventilation, closed trash cans, and hand washing. Depot operators do not meet the requirements in terms of not wearing work outfit and not washing their hands regularly before performing their jobs.

Business owners need to renovate the buildings to install building ventilation up to 10% of the area, provide closed trash cans, hand washing facilities with water and soap. Depot operators should also wash their hands using soap and running water, wear clean and tidy work outfit. The Pekanbaru City Health Office as the authorized agency is advised to conduct more comprehensive supervision and guidance for entrepreneurs and operators of refilled drinking water depots. Courses or workshops on sanitary hygiene to make sure that the quality of the drinking water is well-controlled and meets the quality standards.

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