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Analysis of Wastewater Management Systems at Bhayangkara Hospital, Palu

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ABSTRACT

This study aims to determine the wastewater management system at Bhayangkara Hospital, Palu. In carrying out their activities, hospitals produce liquid waste that can interfere with health. If not handled properly, it will cause harm to society and the environment. The research results at Bhanyangkara Hospital in Palu show that the wastewater management system already has many filters and other control tanks. A cover has accompanied each tub, channeled through an open channel, closed channel, the building is watertight, and the water flows smoothly. , already has a Flow Meter device but does not have a fat catcher, especially in the nutrition room, liquid waste in the Laboratory room at the third party to PT. Tenang Jaya Sejahtera until its destruction, the Radiology room has used the CR System, so there is no wastewater because it has used the tool, carries out primary and secondary treatment and supplies tools for treating liquid waste are still not available such as daily pH tools, pH tools handy for measuring the level of acidity/base of a liquid and besides that for the Flow Meter tool is readily available. Suggestions are expected that this study's results are used as input and become useful information, especially for Bhayangkara Hospital in Palu and the people living around Bhayangkara Hospital in Palu to know the impact of wastewater management.

INTRODUCTION

Hospital is a social facility that cannot be separated from the community, and the community highly expects its existence. According to the Health Word Organization (WHO), the hospital is a social and health organization with the function of providing complete services, cure (curative), and disease prevention (preventive) to the community (1).

Bhayangkara Palu Hospital, which is one of the Health Services owned by the Police of Palu City in the form of a Hospital, is managed by the National Police and is registered as a Class C Hospital. Bhayangkara Palu Hospital has excellent services in the fields of PPT, Prisoner Care, Forensics. After carrying out the Accreditation process for Hospitals throughout Indonesia, they were finally declared to have Passed Hospital Accreditation. Bhayangkara Palu Hospital is located in East Palu Jalan Dr. Suharso Lrg. III No.2 Palu.

Based on Law Number 44 of 2009 concerning Hospitals, what is meant by the hospital is a health service institution that provides complete individual health services that provide inpatient, outpatient, and emergency services (2). With the increasing number of health services, more and more waste is produced by service activities at the hospital. Hospital waste is all waste generated by solid, liquid, and gas hospital activities. Ineffective wastewater management can cause various problems (3).

Liquid waste is all wastewater, including feces originating from hospital activities, containing microorganisms, toxic chemicals, and radioactivity harmful to health (4). Hospital wastewater is all liquid waste from all hospital activities, including domestic liquid waste, namely room discharge from the hospital, containing microorganisms, toxic chemicals, and radioactive (5).

Several diseases that attack humans are caused by ineffective waste management. Wastewater management is critical so that it does not interfere with activities in the environment where the source of

wastewater is generated. This is even more so if the wastewater source is in an environment with a high activity level—especially wastewater management in several community service places such as hospitals. To create a healthy, comfortable, and sustainable environment, efforts must be made to control environmental pollution in health service facilities (6).

Wastewater produced by hospital activities or other health service facilities is a potential water pollution source. It contains high organic compounds, different dangerous chemical mixtures, and pathogenic microorganisms harmful to health. Therefore, the wastewater must be adequately managed to not cause problems for the environment or public health problems (3).

The potential for impact on the environment and public health is enormous, so based on the Decree of the Minister of Health No. 1204 / Menkes / SK / X2004 concerning Hospital Environmental Health Requirements, each health service facility is required to have a Wastewater Treatment Installation, from now on referred to as IPAL. Meanwhile, the wastewater quality standard refers to the Minister of Environment and Forestry Regulation No.5 of 2014 concerning the Quality Standard of Wastewater for Hospital Activities.

Decree of the Minister of Health of the Republic of Indonesia Number 1204 / Menkes / SK / X / 2004 concerning Hospital Environmental Health Requirements where each hospital is required to have its wastewater treatment plant. On this basis, Bhayangkara Hospital Palu already has a Wastewater Treatment Plant to treat wastewater generated from the health care process at the hospital. The quality of the wastewater treatment results cannot be separated from the wastewater treatment system's support. Whether or not a wastewater treatment plant is a determinant of the quality of effluent/wastewater does not exceed the government's quality standard requirements and does not cause pollution to the surrounding environment (7).

Bhayangkara Hospital, Palu, has 1 Wastewater Treatment Plant or IPAL, namely the IPAL, located to the south of the linen processing installation. Wastewater flows to the WWTP through a closed channel where several maintenance holes monitor sewage's smooth flow along the track.

From field data and the results of interviews conducted with sanitation authorities, it is known that Bhayangkara Hospital in Palu processes its wastewater. In the management of sewage at Bhayangkara Hospital, Palu has never been examined by the Company Performance Rating Program Team or commonly known as the Proper Team, where the Proper Team assesses the hospital waste results by existing regulations. The Proper team encourages hospitals or companies to comply with their wastewater management because many do not comply with environmental regulations. The Proper Team makes it easier for hospitals to be better and is one of the hospital accreditation assessments' requirements.

METHODOLOGY

This research type is qualitative research that is descriptive, namely research that objectively describes the situation (8). In this research, the writer wants to represent the Wastewater Management System in Bhayangkara Hospital, Palu.

The data obtained by researchers was based on observations of Bhayangkara Hospital waste in Palu, which were obtained directly from interviews and field observations.

The materials used in this research are; each sample of 10 grams of rice, 50 ml of distilled water, 1% starch, and 10% potassium iodide. The tools used are; blender, analytical balance, 50 ml Erlenmeyer tube, filter paper, dropper pipette, funnel, stirring rod, label paper, and stationery.

Research procedures for sampling, namely, take and enter the sample into the container that has been prepared, record the number, time, date, and location of the example.

Laboratory examination procedures (color reaction method test), namely; smooth and weigh each sample as much as 10 grams, put the piece into the Erlenmeyer tube, add 50 ml of distilled water, shake then filter the selection using filter paper, take 50 ml of filtrate, then take 2 ml of filtrate, add 10% potassium iodide and starch as much as 1%, then observes the change in a reaction that occurs, if the solution changes color to blue this indicates that the rice sample contains chlorine (Cl2) if there is no change in color it can be ascertained that the rice sample does not contain chlorine (Cl2).

RESULTS AND DISCUSSION

Ownership of Wastewater Treatment Plants

Bhayangkara Hospital Palu already has its own Wastewater Treatment Plant building because this is one of the Hospital Accreditation requirements. The ownership of IPAL is regulated by the Minister of Health Regulation No.7 of 2019 concerning the hospital environment's health. The importance of hospital wastewater treatment is to find out what pollutants before processing or after being processed in the treatment system meet the requirements for environmental discharge or not because if they meet the requirements, it means that the wastewater can flow directly to the environment (9).

Channeled Through Closed Channels

Each owner of a wastewater treatment plant must meet certain conditions where the sewerage must be closed to not interfere with the hospital's activities, according to Permenkes No.7 of 2019 concerning the hospital's health environment. Sewerage is channeled through a closed channel not to contaminate aesthetic value and not easily contaminated by other pollutants to the waste treatment plant. This fast waste is waste originating from all rooms in the hospital (10).

Channels Through Open Channels

The sewerage has met the applicable provisions, which is flowed openly, which is directly streamed to the environment, which has met the standard of wastewater quality according to the 2014 Minister of Environment and Forestry Regulation No.5 Wastewater Quality Standards. The waste that is channeled through this open channel can already be directed into the environment. The difference with that conducted in a closed channel is waste from all hospital rooms (11).

Watertight Duct

The sewerage system at Bhayangkara Hospital, Palu, is made of concrete, the drains are watertight, so there is no worry of dumping them into the environment. According to Permenkes No.7 of 2019 concerning the health of the hospital environment. If the channel is not watertight, it will cause environmental pollution (12).

Water channel smoothly

The sewerage drains smoothly in the real control bath, according to Permenkes No.7 of 2019 concerning the health of the hospital environment. A smooth water channel is defined as any wastewater in all rooms, not clogged with dirt or garbage; if it is blocked, it will result in the wastewater not flowing smoothly into the control tub (13).

WWTP complete with a flowmeter

Bhayangkara Hospital, Palu has used a flow meter tool where this tool is used to calculate the daily discharge of wastewater because the release of the wastewater must be recorded, and it is known every day how much water is generated per day. According to Permenkes No.7 of 2019, concerning the hospital environment's health, every day, the discharge of wastewater is recorded. Still, at Bhayangkara Hospital, Palu has never recorded the discharge of sewage per day.

Wastewater Management Comes From Nutritional Plants Equipped With Fat Catchers

Wastewater management at Bhayangkara Hospital, Palu, especially in the Nutrition Installation, does not yet have a fat catcher. The sewerage must be equipped/covered with a grill because of its high oil and fat content (14). The fat catching device's function is to filter fat and solid waste from flowing into the sewer, thus preventing blockage of the drain pipe, environmental pollution, and its impact will disrupt activities in the hospital.

Liquid Waste Is Collected In Containers That Are Suitable For Chemicals And Radiology

Liquid waste chemicals in the Laboratory Room of Bhayangkara Hospital Palu have been on the third party since its establishment. Every month, the waste is transported and destroyed directly by the related party, namely PT. Calm Jaya Sejahtera. Because laboratory waste has to be handled directly by a third party, whereas in the Radiology Room, it is already using a CR (Computer Radiology) System, so this system is perfect for every hospital. The CR system is used for hospital accreditation levels. This radiological waste is classified as B3 waste and is handled by a third party, for the destruction is stored in Jergen because this radiological waste is hazardous (15).

Perform Primary Processing

Bhayangkara Hospital in Palu for primary processing has met the applicable provisions of Permenkes 82 of 2001 concerning water quality management and water pollution control.

Perform Secondary Processing

Bhayangkara Hospital in Palu for secondary processing has met the applicable provisions of Permenkes 82 of 2001 concerning water quality management and water pollution control. The secondary processing stage is a biological processing process, which involves microorganisms that can break down / degrade organic matter (16). The organisms used are generally aerobic bacteria. Secondary treatment's importance is to separate contaminants in wastewater to reduce suspended solid organic matter and stable microorganisms.

Availability of equipment for treating liquid waste

Bhayangkara Hospital, Palu for supplies of tools for treating liquid waste, is still not available for processing waste such as a daily pH tool. This pH tool is handy for measuring the acidity/alkaline level of a liquid, and besides that, a Flow Meter tool is available. The regulation issues the ownership of pH meters in hospitals, namely Permenkes No.7 of 2019 concerning Hospital Environmental Health.

In this study, there was also research that was previously conducted at the dr. Achmad Darwis in 2017 regarding the analysis of hospital wastewater management systems, the results of research at dr. Achmad, regarding his waste management, is not yet fully adequate because the workforce is not sufficient. At the same time, the facilities and infrastructure are already equipped such as the WWTP building, channeled through closed channels, channeled through open canals, watertight channels, smooth channels, have flow meters, have fat catching equipment, Liquid waste is collected in containers suitable for chemicals and radiology, carries out secondary and primary treatment and has waste treatment equipment.

In the aspect of the planning process, there is an organization. However, it is not yet entirely by the requirements in implementation; there is still wastewater that exceeds the quality standard of sewage—policy regarding the management of liquid waste in dr. The Minister of Health guides Achmad Darwis No. 1204 of 2004 concerning Hospital Environmental Health Requirements and PermenLH No. 05 of 2014 concerning Wastewater Quality Standards. In Bhayangkara Hospital, Palu, the wastewater product has met the existing requirements and does not exceed the wastewater quality standard.

CONCLUSION

This research concludes at Byangkara Hospital Palu that Bhayangkara Hospital Palu already has its IPAL, the way to treat liquid waste is carried out by sanitation authorities. The results of liquid waste from various rooms are directly disposed of to the WWTP via piping. Meanwhile, most of the building criteria have met the requirements according to Permenkes RI No. 07 of 2019 concerning Hospital Environmental Health Requirements and the Minister of Environment Decree No. 5 Permenkes Year 2014 Liquid Waste Quality Standards. For the activities of the Bhayangkara Hospital in Palu, as in filter tubs and other control tubs, each tub has been accompanied by a cover, is channeled through an open channel, closed channel, the building is watertight, and the water flow is smooth, has a Flow Meter device, does not have Fat catching equipment, especially in the nutrition room, the liquid waste in the Laboratory room is in the third party, the Radiology room already uses the CR System so there is no wastewater because they have used the tool and carried out primary and secondary

processing. The results of waste inspection at Bhayangkara Hospital in Palu have met the requirements according to the Minister of Health Regulation Number 5 of 2014 concerning the quality standards of wastewater.

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