

Regional Case Study

Green Hospital Implementation in Dr. Cipto Mangunkusumo National Central Public Hospital

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Abstract

Every day, hospitals carry out various health services and administrative activities constantly, so therefore hospitals are expected to reduce negative impacts on the environment by creating green hospitals. Green hospitals are hospitals that are designed, built, renovated, operated, and maintained by considering health and environmental development principles. This research used qualitative and quantitative methods. The qualitative method used is a case study method in the form of in-depth exploration from various perspectives related to the uniqueness of the green hospital system based on evidence obtained at the research location. The quantitative method was carried out using a descriptive method in the form of simple statistics to describe the extent of green hospital achievements at Cipto Mangunkusumo General Hospital. The types of data collected are primary data from observation and in-depth interviews and secondary data from document review results. Implementation of green hospital in RSUPN Dr. Cipto Mangunkusumo, from 93 indicators 84,9% or 79 indicators are accomplished in RSUPN Dr. Cipto Mangunkusumo. The indicators with the most presentation are location and landscape, hospitals' structure, Water efficiency, food processing, and air quality with 100% percentage. And the indicator with the least presentation are energy efficiency with 64,3% percentage.

Keywords: Green hospital; water; energy; regulation; waste; environmental health

1. Introduction

Based on Indonesian law No. 44 of 2009 about Hospitals (President of Indonesia, 2009), a hospital is a health service institution that provides comprehensive individual health services that provide inpatient, outpatient, and emergency services. Hospitals as health service units carry out various service activities which in their activities produce various types of waste, consisting of domestic solid waste, hazardous and toxic waste, liquid waste, and gas waste which, if not handled properly, will cause environmental impact, especially on the society.

Based on data from Hospital Information System 2023, 3,128 hospitals in Indonesia (Ministry of Health of Indonesia, 2023). Based on research from Agustina in Nusa Tenggara Timur Public Hospital, the daily average non-medical waste is 597,15 kg and 56,77 kg for daily average medical waste. Nationally, daily hospital waste is 376,089 ton (Astuti and Purnama, 2014). With the large number of activities carried out, along with the amount of waste produced, hospitals are expected to take various actions to reduce negative impacts on the environment. Based on Indonesian Law Number 17 of 2023 about health and environmental management Indonesia Law Number 11 the year 2020 about job creation (President of

Indonesia, 2023, 2020) said that development must pay attention to the carrying capacity of the environment and the risks posed to the environment and health.

Green hospitals are hospitals that are designed, built, renovated, operated, and maintained by considering health and Environmental development principles. Based on "Pedoman Rumah Sakit Ramah Lingkungan (Green Hospital) di Indonesia" published by the Directorate of Health Services, Ministry of Health, Indonesia, there are ten indicators of Green Hospital evaluation that is: Leadership, Location and landscape, Hospitals's structure, Chemical and Dangerous material processing, Waste Processing, Energy efficiency, Water efficiency, Environmental health and disease vectors, Food Processing, and Air Quality. Each of these dimensions is further broken down into 42 attributes which are then further broken down into sub-attributes (Minister of Health of Indonesia, 2018).

Indonesia's Law No. 44 of 2009 concerning Hospitals, namely the regulation of hospital administration, one of which aims to protect the safety of patients, the community, the hospital environment, and human resources in hospitals (President of Indonesia, 2009). An environmentally friendly hospital is one manifestation of the hospital's efforts to reduce the impact produced by the hospital, especially on the environment, as well as an effort to increase patient satisfaction. This is in line with the Minister of Health Regulation Number 7 of 2019 concerning Hospital Environmental Health which aims to create environmentally friendly hospitals (Minister of Health of Indonesia, 2019a). This indicates that planning for green hospitals in Indonesia has become the government's commitment.

Based on research conducted in India, it is known that implementing green hospitals is a necessity and can have a positive impact on the continuity of hospital care. Implementation of green hospitals reduces hospital building operating costs by 8.9%, and increases building value by 7.5%, increases occupancy ratio by up to 3.5%. And there is a relationship between improving indoor air quality and health impacts ranging from 13.5 to 87% (Kumari and Kumar, 2020).

Services provided by Dr. Cipto Mangunkusumo National Central Public Hospital or Rumah Sakit Umum Pusat Dr. Cipto Mangunkusumo (RSUPN Dr. Cipto Mangunkusumo) start from basic services or general doctors until specialists like teeth and mouth, surgery, heart surgery, stem cell, neurosurgery, radiology, the health of both mother and child, kidney transplant, liver transplant, eyes, lung, etc. RSUPN Dr. Cipto Mangunkusumo also provided inpatient services with a 927-bed capacity (Ministry of Health of Indonesia, 2023). Hospitals produce large amounts of waste from services provided by the hospital. Based on the document results for 2023, hospitals produced an average of 2.319,97 kg of nonmedical waste every month or 105,06 kg of nonmedical waste every day. The hospital produces an average 36.455,36 kg of medical waste every month or 1198,53 kg of medical waste every day. Every month, RSUPN Dr. Cipto Mangunkusumo also used an average of 87.515 m³ or 2.881 m³ of clean water every day.

As a health service facility, hospitals are an inseparable part of the surrounding environment, so hospitals are required to be responsible to the surrounding environment regarding the environmental impacts they provide (Azmal et al., 2014). Various studies related to the implementation of green hospitals in Indonesia. There is research that evaluates the implementation of green hospitals. RSUD R. Syamsudin, SH, got a score of 620,1 from 1000 in green hospital implementation (Alatas and Ayuningtya, 2019). Research from Sutanto revealed that the Cancer Hospital Dharmais and RSUP Persahabatan included green hospital categories (developed), and Rumkital Dr. Mintohardjo dan RS Mekarsari Bekasi included yellow hospital categories (quite developed) (Sutanto et al., 2020). Apart from that, the assessment of the implementation of green hospitals carried out at the Batang Regency Regional Hospital received a score of 21 out of 43 assessment points with a percentage of 48.84% (Alifiani et al., 2018) The assessment carried out in 19 hospitals supervised by the Tehran University of Medical Sciences fulfilled 59.9% of the total assessment (Azar et al., 2015). Research conducted at Tugurejo Regional Hospital, Central Java Province also showed that the characteristic variables of innovation, knowledge, and the role of leadership had a positive and significant effect on the acceptance of the green hospital concept by employees at Tugurejo Regional Hospital (Damayanti et al., 2017).

RSUPN Dr. Cipto Mangunkusumo as a type I vertical hospital has a strategic program for 2020-2024 related to the implementation of environmentally friendly hospitals or green hospitals. This research is a green hospital research that has just been carried out in RSUPN Dr. Cipto Mangunkusumo.

2. Method

2.1. Research Location

This research is Conducted in RSUPN Dr. Cipto Mangunkusumo whose aim to find out the achivement of green hospital ini RSUPN Dr. Cipto Mangunkusumo.

2.2. Research Methodology

This research used qualitative and quantitative methods. The qualitative method used is a case study method in the form of in-depth exploration from various perspectives related to the uniqueness of the green hospital system based on evidence obtained at the research location (Leavy, 2014)The quantitative method was carried out using a descriptive method in the form of simple statistics to describe the extent of green hospital achievements at Cipto Mangunkusumo General Hospital (Bacon-Shone, 2020).

2.3. Data Measurement

The guidelines for assessing the achievement of green hospitals are based on “Pedoman Rumah Sakit Ramah Lingkungan (Green Hospital) di Indonesia” (Minister of Health of Indonesia, 2018) published by the Directorate of Health Service Facilities, Directorate General of Health Services, Ministry of Health of the Republic of Indonesia, published in 2018. Data is calculated by collecting data, information, and samples to find out what percentage of gren hospital indicator have been achieved and what indicators have not been implemented. A literature review was then conducted to determine the supporting and inhibitory factors for implementing green hospital indicators.

2.4. Sample and Sampling Methods

The types of data collected are primary data from observation and in-depth interviews and secondary data from document review results. Data collection was carried out by conducting physical observations related to the implementation of green hospitals at RSUPN Cipto Mangunkusumo, in-depth interviews with resource persons, and follow-up with document reviews.

Resources for in-depth interviews were conducted with the head and staff of the Building and External Building Maintenance and Control Sub-Installation, Head of the Mechanical Electrical Maintenance and Control Planning Sub-Installation, staff of the Hospital Environmental Health and Occupational Health and Safety Installation, Person in Charge of Repair and Asset Review of the Maintenance Installation for Medical Devices and Calibration, Archivist for Administration and Household, Person in Charge of Education for the Marketing and Health Promotion Installation, Head of the Nutrition Service Installation, and Head of the Central Sterilization and Laundry Installation at RSUPN, Dr. Cipto Mangunkusumo.

3. Result and Discussion

RSUPN Dr. Cipto Mangunkusumo is a Class A hospital belonging to the Ministry of Health, Indonesia. RSUPN Dr. Cipto Mangunkusumo also has the status of teaching hospital, national central general hospital, and accredited international by Joint Commission International. This hospital is located on Diponegoro Street 71, Senen, Jakarta Pusat, and DKI Jakarta, with 927 beds (Ministry of Health of Indonesia, 2023).

3.1. Green Hospital Implementation

RSUPN Dr. Cipto Mangunkusumo has a 2022-2024 strategic program, which is Green Hospital Implementation. As expected by 2014, Dr. Cipto Mangunkusumo has been implementing green hospital

indicators (RSUPN Dr. Cipto Mangunkusumo, 2019). The following are the results of green hospital implementation in RSUP Cipto Mangunkusumo:

Table 1. The score of green hospital implementation in rsupn Dr. Cipto Mangunkusumo

No	Indicator	Number of Indicators	Achievement value		Persentation of Achivement
			Achived	Not Achived	
1.	Leadership	19	18	1	94,7%
2.	Location and landscape	7	7	0	100%
3.	Hopitals's structure	7	7	0	100%
4.	Chemical and Dangerous material processing	11	9	2	81,8%
5.	Waste Processing	11	10	1	91%
6.	Energy efficiency	14	9	5	64,3%
7.	Water efficiency	9	11	4	100%
8.	Environmental health and disease vectors	5	4	1	80%
9.	Food Processing	5	5	0	100%
10.	Air Quality	5	5	0	100%
Total		93	79	14	84,9%

The implementation of green hospitals in RSUPN Dr. Cipto Mangunkusumo was accomplished by 98 indicators 86, 7% or 86 indicators. The indicators with the most presentation were location and landscape, hopitals' structure, water efficiency, food processing, and air quality with 100% percentage. Indicators with presentation less than 100% are Leadership (94,7%, chemical and dangerous material processing (81,8% percentage, waste processing (91%), energy efficiency (64,3% percentage, and environmental health and disease vectors (80%).

Based on our interviews, to support the implementation of green hospitals, RSUPN Dr. Cipto Mangunkusumo carried out various innovations, especially to reduce the impact that hospitals have on the environment. The innovations carried out are Planting Family Medicinal Plants, Planting Hydroponic Plants, Processing Leftover Food Waste, Wastewater Recycling, Using Solar Systems, Drinking Water Processing, and Reject Water Treatment Plan Reverse Osmosis (RO) Water Treatment. Planting of Family Medicinal Plants and Planting of Hydroponic Plants was carried out in the context of reforestation and utilization of open land at RSUPN Dr. Cipto Mangunkusumo. Food waste processing innovation aims to reduce the amount of solid waste disposed of in landfills. Waste water recycling and water processing innovations reject water treatment plan of reverse osmosis (RO), which aims to reduce the discharge of liquid waste into water bodies. Innovation in drinking water treatment aims to reduce plastic waste from patients, patient families, and hospital employees. Meanwhile, the use of a solar system aims to make the electrical energy used in hospitals more efficient.

Program Penilaian Peringkat Kinerja Perusahaan dalam Pengelolaan Lingkungan Hidup, hereinafter referred to as PROPER, is an evaluation of the performance of the person responsible for business and/or activities in the field of environmental management (Minister of Environment and Forestry of the Republic of Indonesia, 2021). There are several PROPER assessment areas, namely, Water Pollution Control, Water Source Maintenance, Air Pollution Control, Chemical and Dangerous material Waste Management, non-chemical and dangerous material waste management, Chemical and Dangerous material Management, Land Damage Control, and Waste Management. Several assessment areas in PROPER overlap with the indicators in Green Hospital. Based on the Decree of the Minister of Environment and Forestry of the Republic of Indonesia Number 546 of 2024 About the Second Amendment to the Decree of the Minister of Environment and Forestry Number

SK.1353/MENLHK/SETJEN/KUM.1/12/2023 concerning the Results of the Assessment of Company Performance Rankings in Environmental Management in 2022 – 2023, RSUPN Dr. Cipto Mangunkusumo received PROPER blue rating (Minister of Environment and Forestry of the Republic of Indonesia, 2024) A blue rating is given to Proper participants who have made environmental management efforts in accordance with regulation.

3.2. Leadership Indicators

In the Leadership indicator, RSUPN Dr. Cipto Mangunkusumo has fulfilled all assessment points, accept Wastewater Discharge Permit on Kiara wastewater treatment plant. Kiara wastewater treatment plant is a new wastewater treatment plant that does not yet have a wastewater discharge permit. This is because RSUPN Dr. Cipto Mangunkusumo has reached the limit of wastewater discharge into water bodies. So RSUPN Dr. Cipto Mangunkusumo is trying to make the Kiara IPAL zero waste by re-managing the water from the IPAL into toilet flushing and plant watering water. However, plumping repairs are still needed so that the facility cannot be maximized.

RSUPN Dr. Cipto Mangunkusumo has a comprehensive policy and has carried out comprehensive outreach to all employees of RSUPN Dr. Cipto Mangunkusumo. This can be seen from the existence of a 2020-2024 business strategic plan document, in which there is one of the strategic challenges, namely "Realizing a hospital that applies environmentally friendly principles or a green hospital" which is translated into one of the strategic targets of the learning and growth perspective, one of the programs implemented in 2020-2024 is the Implementation of an Environmentally Friendly Hospital (green hospital) (RSUPN Dr. Cipto Mangunkusumo, 2019).

Apart from that, RSUPN Dr. Cipto Mangunkusumo has also completed all basic permits related to hospital environmental management. RSUPN Dr. Cipto Mangunkusumo also carries out regular monitoring of environmental aspects.

3.3. Location and landscape Indicators

In the Location and landscape indicator, RSUPN Dr. Cipto Mangunkusumo has ensured that the facilities and buildings are comfortable and safe for patients to use and are equipped with green open spaces. 16% of the area at RSUPN Dr. Cipto Mangunkusumo has been filled with green open space. Based on Agrarian Affairs and Spatial Planning ministerial regulations, the minimum percentage of green open space is 30% of the area of the city or urban area (Minister of Agrarian Affairs and Spatial Planning/Head of the National Land Agency of the Republic of Indonesia, 2022). So the number of green open spaces at RSUPN Dr. Cipto Mangunkusumo is still less than the regulations it should be. RSUPN Dr. Cipto Mangunkusumo is equipped with 62 prescription wells with an area of 223.2 meters and 2 infiltration ponds with an area of 217.5 meters for water conservation. RSUPN Dr. Cipto Mangunkusumo has used paving blocks and grass blocks for the parking area. RSUPN Dr. Cipto Mangunkusumo is located in Central Jakarta and can be accessed by various public transportation such as KRL Commuter Line, transjakarta, and Jaklingko.

3.4. Hospital's structure Indicators

Regarding the hospital 's structure indicator, RSUPN Dr. Cipto Mangunkusumo has attempted to gradually use environmentally friendly building materials in buildings that are under renovation. However, there is a building at RSUPN Dr. Cipto Mangunkusumo, which is a cultural heritage building, is a GH building and Eijkman building so if renovations occur, they must be returned to their original condition, including the materials used.

During this research period, renovation or construction was being carried out on the Eijkman building. In the construction process, a Pre-Construction Risk Assessment (PCRA) document has been completed. In addition, in the implementation of Occupational Health and Safety, workers have been

protected by the existence of environmental health management guidelines and Occupational Health and Safety in building renovation or construction activities.

3.5. Chemical and Dangerous Material Processing Indicators

In the Chemical and Dangerous material processing indicator, RSUPN Dr. Cipto Mangunkusumo has secured hazardous and toxic materials following the standard operation procedure they have prepared, as well as providing chemical and dangerous material handling facilities at the location of use. Apart from that, RSUPN Dr. Cipto Mangunkusumo no longer uses medical devices containing mercury following Minister of Health Regulation Number 41 of 2019 concerning the Removal and Withdrawal of Mercury-Containing Medical Devices in Health Service Facilities which prohibits the use of medical devices containing mercury (Minister of Health of Indonesia, 2019b). All medical equipment used at RSUPN Dr. Cipto Mangunkusumo has gone through an inspection and calibration process by Medical Equipment Maintenance and Calibration Installation so it is safe to use and mercury-free. However, RSUPN Dr. Cipto Mangunkusumo still uses Freon as a cooling agent in cooling machines such as air conditionings and refrigerators/freezers, this is because there is no substitute for a material that is safer and meets hospital needs.

3.6. Waste Processing Indicator

In the Waste Processing indicator, the indicator that has not been met is the temporary waste storage for chemical and dangerous material waste which meets the requirements according to Minister of Health Regulation 7 of 2019 (Minister of Health of Indonesia, 2019a). At the chemical and dangerous material temporary waste storage, the distance between waste is still less than 50 cm. This could be due to the large amount of chemical and dangerous material waste that has not been taken to the landfill by third parties or burned by incinerator. For medical waste, RSUPN Dr. Cipto Mangunkusumo has 2 incinerators while the rest will be transported by a third party to be destroyed. All transportation by third parties was recorded in the Logbook, Manifest, and Balance Sheets. Domestic waste is divided into three groups: recycled waste, food waste, and other wastes. Recycled waste can be cardboard, plastic bottles, plastic cups, and infusion bottles. Food waste is obtained from Nutrition Service Installation. This type of waste is processed using a third party, which then uses maggots as decomposers of food waste. For waste that does not fall into the three categories, it will go to the domestic waste TPS which is transported every Monday to Friday. All of these activities were in accordance with the SOP for solid waste processing.

To process liquid waste, RSUPN Dr. Cipto Mangunkusumo has three wastewater management installations (IPAL), namely IPAL 1, IPAL 2, and IPAL Kiara. These three IPAL facilities have met the standards according to Minister of Health Regulation 7 of 2019.

3.7. Energy Efficiency Indicator

In the Energy efficiency indicator, RSUPN Dr. Cipto Mangunkusumo has used various energy-saving electronic devices such as sensor lights, LED lights, and energy-saving air conditioning. In addition, Dr. Cipto Mangunkusumo has also innovated solar-powered main street lighting in Building A, a drinking water treatment system, and cooperatives. In carrying out health services to patients every day at RSUPN, Dr. Cipto Mangunkusumo uses a high amount of electricity; therefore, energy efficiency is very important, one of which is to reduce operational costs for electricity payments. However, Dr. Cipto Mangunkusumo did not calculate the Energy Consumption Intensity of electricity, so it is not yet known how much electricity has been saved. However, various savings efforts cannot be calculated because no electricity measurement savings instruments are used. In addition, electricity usage has not been calculated per block / floor of the building, there is only a central calculation, so the results of electricity savings efforts cannot be read. Calculation of the Intensity of Electric Energy Consumption has also not been performed. In addition, Dr. Cipto Mangunkusumo also uses electricity meters centrally, not per

building block or floor, so it is not yet possible to measure which buildings or activities consume the most electrical energy to make savings.

3.8. Water efficiency Indicator

In the Water efficiency indicator, RSUPN Dr. Cipto Mangunkusumo has used equipment for efficient use of water such as dual flushing toilets, pressure faucets or sensor faucets, urinals with sensors, sensors/automatic water floats in water tanks (roof tank/ground tank), as well as water meters per building block/floor. Currently, water efficiency is an important thing for RSUPN Dr. Cipto Mangunkusumo, because to meet service needs, operational activities including watering plants, every month RSUPN Dr. Cipto Mangunkusumo used an average clean water of as much as 87.515 m³. Apart from that, various warning stickers have also been installed as a campaign to visitors, patients, and employees of RSUPN Dr. Cipto Mangunkusumo for taking part in saving the water used.

In addition to savings, water conservation efforts are also carried out by creating wastewater recycling facilities in the Kiara building, and RO rejects the water in the CMU building. In the Kiara building, it is used for flushing toilets and watering plants in the Kiara Building, but until now it has only been used for watering plants. Utilization as a flushing toilet has not been carried out due to the need for repairs to the water plumbing.

3.9. Environmental Health and Disease Vectors Indicator

In the Environmental Health and Disease Vectors indicator, RSUPN Dr. Cipto Mangunkusumo carried out all green hospital assessment points to accept the availability of competency certificates for Integrated Pest management operators, but this happened because the competency certificate was not yet available in Indonesia. In implementing environmental health and cleanliness, and eradicating disease vectors, RSUPN Dr. Cipto Mangunkusumo uses a third party with regular monitoring by hospital environmental sanitation personel by carrying out standard operational procedures for cleaning and disinfecting low, medium and high risk rooms according to the location and needs of the cleaning area.

In carrying out pest management, RSUPN Dr. Cipto Mangunkusumo carries out integrated pest management in building A and the Nutrition and Food Management Installation. Integrated Pest Management (IPM) is pest control with an environmentally friendly approach both inside and outside health service facilities, by prioritizing preventing the appearance of pests using less poison, so this method is considered more suitable for use in hospitals (Hardy et al., 2021). Because apart from lower costs, there are many people in hospitals with more vulnerable conditions. It is hoped that this pilot can be carried out in all buildings at RSUPN Dr. Cipto Mangunkusumo.

3.10. Food Processing Indicator

In the Food Processing indicator, RSUPN Dr. Cipto Mangunkusumo has carried out all green hospital assessment points. Food Processing Installation at RSUPN Dr. Cipto Mangunkusumo was certified to ISO 22,000 on December 8, 2023. To carry out food processing activities every day, the nutrition and food processing installations also prepares and uses Standard Operational Procedures to meet food needs for patients, attending doctors and other needs such as consumption for meeting activities. RSUPN Dr. Cipto Mangunkusumo routinely conducts inspections every six months and provides training for food handlers.

Apart from that, RSUPN Dr. Cipto Mangunkusumo is also trying to make savings related to single-use packaging except for some packages and quarantine patients. In relation to food waste processing, nutrition and food processing installations try to reduce food waste by modifying diets for patients, providing and purchasing food according to their needs, and separating food waste to be reprocessed.

3.11. Air Quality Indicator

In the Air Quality indicator, RSUPN Dr. Cipto Mangunkusumo has carried out all green hospital assessment points. Based on the results of interviews and data processing, ambient air checks are carried out routinely at four points at RSUPN Dr. Cipto Mangunkusumo, namely at the Kiara building parking lot, entrance to the Integrated Outpatient Services Installation, building A parking lot, and Kimia Street every 6 months, as well as measuring chimney emissions in boilers, generators and incinerators every three months, measuring house operational vehicle emissions. sick every 3 months, and measuring indoor air quality in the operating room, ICU, sampling treatment room, emergency room and isolation room every 6 months.

RSUPN Dr. Cipto Mangunkusumo as a health service facility based on Regulation of the Governor of Special Capital Territory of Jakarta Number 40 of 2020 about Amendments to Regulation of the gubernur number 50 of 2012 concerning guidelines for implementing guidance, supervision and law enforcement in no-smoking areas has also become a smoke-free area (Governor of Special Capital Territory of Jakarta, 2020). All the patients, families, health workers, employees and everyone who work in hospitals are not allowed to smoke in hospital area. RSUPN Dr. Cipto Mangunkusumo continuously reminds them by installing various campaign facilities to remind all visitors.

3.12. Factors that Influence Green Hospital Implementation

In implementing a green hospital various factors influence its implementation. Based on research conducted at Mekarsari Hospital, there are two driving factors in implementing water use efficiency, namely the existence of a water policy of 16.37% and the availability of wastewater recycling facilities of 13.84% (Palapessy et al., 2019). RSUPN Dr. Cipto Mangunkusumo already has a policy related to saving water, namely the Regulation of the Main Director of RSUPN Dr. Cipto Mangunkusumo Number HK.02.03/4.2/34177/2021 about Water Saving and Conservation Regulations in the Environment of RSUPN Dr. Cipto Mangunkusumo (Main Director of RSUPN Dr. Cipto Mangunkusumo, 2021a). In it, there is a list of activities carried out by RSUPN Dr. Cipto Mangunkusumo, namely installing clean water flow meters in every building, making and maintaining absorption wells, biopore absorption holes and absorption ponds, planting trees that store a lot of water, saving on the use of clean water, utilizing rainwater, utilizing reject water from treatment plants, recycling wastewater for toilet flushing activities, and water-saving sanitation equipment. These various activities have begun to be implemented at RSUPN Dr. Cipto Mangunkusumo by his respective duties and sections. Apart from that, regarding the availability of wastewater recycling facilities, these facilities are available in various buildings with different processing techniques. In the Kiara Building, there are facilities for processing wastewater into toilet flushing water and for watering plants. In the MCU building, RO rejects water processing as toilet flushing water is available.

Apart from that, the inhibiting factor is the unavailability of wastewater recycling facilities (Palapessy et al., 2019). This can also be an obstacle because not all buildings at RSUPN Dr. Cipto Mangunkusumo have wastewater recycling processing facilities so most of the wastewater produced is still channeled to the waterwaste treatment plant before finally being distributed to the river.

In terms of energy efficiency indicators, based on research conducted at Mekarsari Hospital, some factors encourage the implementation of energy efficiency, namely the existence of energy-saving regulations (Palapessy et al., 2019). Energy saving regulations have been issued, namely in the Regulation of the Main Director of RSUPN Dr. Cipto Mangunkusumo Number HK.02.03/4.2/38821/2021 Regarding the Energy Saving and Conservation Program at RSUPN Dr. Cipto Mangunkusumo (Main Director of RSUPN Dr. Cipto Mangunkusumo, 2021b). It lists activities that can be carried out by RSUPN Dr. Cipto Mangunkusumo, namely installing Kwh Electricity Meters in every building, carrying out routine maintenance of electrical equipment in the area of RSUPN Dr. Cipto Mangunkusumo, saving electricity usage, replacing electrical components and equipment that are not energy efficient to become energy efficient, deactivating work equipment that uses electricity when not in use, turning off the AC when

there are no employees in the workroom, turning off the lights when leaving the workroom, regulating elevator operations related to energy savings, and carrying out monitoring and evaluation related to energy savings. These various activities have begun to be implemented at RSUPN, and Dr. Cipto Mangunkusumo is his respective duty and section.

Based on other research conducted at the Tehran University of Medical Sciences (Azar et al., 2015), there is a significant relationship between water dimensions and the number of active beds. This needs to be considered considering that RSUPN Dr. Cipto Mangunkusumo has a high number of active beds, namely 927-beds capacity. The number of active beds certainly influences the amount of water used in patient care, both inpatient and outpatient. In addition, the number of beds also influences the energy dimensions in green hospital assessment. In hospital operations, electrical energy is needed. The higher the number of patients or number of active beds, the higher the electricity required by the hospital.

Apart from that, there is a significant relationship between the age of the hospital and the dimensions of the building in the green hospital assessment. The age of the hospital affects the quality and durability of the buildings used. Old buildings will certainly require routine and periodic maintenance. This maintenance time is also an opportunity to make a building more environmentally friendly by replacing building materials with materials that are more environmentally friendly and have lower maintenance.

Based on research conducted at the Aliyah General Hospital, Kendari City (Al Edy Dawu et al., 2022), found a relationship between facilities and infrastructure and hospital medical waste processing. On waste processing indicators at RSUPN Dr. Cipto Mangunkusumo, the indicator that has not been met is the assessment of temporary dumping site for Chemical and Dangerous material waste which meets the requirements for monitoring the placement distance between Chemical and Dangerous material waste storage areas which should be around 50 cm. This could be due to the high amount of Chemical and Dangerous material waste produced and not being managed directly either independently or sent to third parties.

In research conducted in Darab, Iran, it was discovered that the main obstacles in implementing green hospitals were knowledge and awareness, followed by technological infrastructure obstacles, human obstacles, and finally obstacles originating from the environment (Yazdanpanah et al., 2018).

4. Conclusions

RSUPN Dr. Cipto Mangunkusumo is the final referral government hospital with superior services with a large number of patients and varied services. The large number of patients with services also causes development to adapt to needs. In addition, it results in high electricity and water demand. In addition, large and varied amounts of solid, gaseous, and liquid wastes, as well as medical and non-medical wastes, require attention because of their impact on the environment. In order to reduce the impact on the environment due to service activities, RSUPN Dr. Cipto Mangunkusumo has committed to implementing a green hospital by issuing various policies which are included as one of the strategic work programs as well as providing various needs needed for operational activities.

In an effort to implement strategic work programs, most green hospital indicators have been implemented by RSUPN Dr. Cipto Mangunkusumo. Implementation of green hospital in RSUPN Dr. Cipto Mangunkusumo, from 98 indicators 87,8% or 86 indicators are accomplished in RSUPN Dr. Cipto Mangunkusumo. Some indicators that have not been achieved are Wastewater Disposal Permit, Use of air conditioners and Refrigerators/Freezers without Freon, qualified hazardous and toxic waste disposal sites, Calculation of Electric Energy Consumption Intensity, Use of Capacitor Bank, Use of electricity meters per block/floor of the building, Documents of energy saving programs that are measured and evaluated, Energy usage monitoring records, and Competency certificates for Integrated Pest Management operators. Additionally, various innovations have been introduced. This innovation helps in reducing the impact caused by hospitals. Several indicators that have not been implemented can be developed continuously by the commitment of RSUPN Dr. Cipto Mangunkusumo.

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