

INTISARI

Latar belakang: Aktivitas rumah sakit menggunakan bahan, fasilitas dan peralatan yang mengandung bahan berbahaya beracun dan mengakibatkan penurunan kualitas lingkungan seperti air, udara, pangan, sarana dan bangunan, vektor dan binatang pembawa penyakit serta gangguan kesehatan masyarakat yang berasal dari limbah padat dan limbah cair. Pengelolaan limbah fasilitas pelayanan kesehatan belum maksimal sehingga masih menjadi masalah secara global dan nasional. Penerapan konsep *Green Hospital* sebagai salah satu upaya pengamanan limbah rumah sakit. RSUP Dr. Sardjito Yogyakarta telah menerapkan konsep *Green Hospital* berdasarkan indikator penggunaan air dan pengelolaan limbah.

Tujuan: Mengevaluasi sistem pengelolaan air limbah dan potensi pemanfaatannya di RSUP Dr. Sardjito Yogyakarta.

Metode: Penelitian dilakukan di RSUP Dr. Sardjito Yogyakarta pada Agustus sampai November 2020 dengan menggunakan *mixed method* dengan pendekatan *convergent design*. Pengumpulan data menggunakan teknik *purposive sampling* melalui wawancara dengan petugas di Bagian Instalasi Sanitasi Lingkungan Rumah Sakit, observasi dan uji laboratorium sampel air limbah serta telaah dokumen rumah sakit dengan triangulasi sumber dan metode. Analisis data kualitatif secara narasi dan data kuantitatif secara deskriptif. Penelitian dilaksanakan setelah diterbitkan *ethical approval* dan mendapatkan izin penelitian rumah sakit.

Hasil: RSUP Dr. Sardjito sebagai rumah sakit pendidikan dan rumah sakit rujukan nasional memiliki banyak sumber daya manusia yang bekerja, pasien, pengunjung dan aktivitas lain di lingkungan rumah sakit. Sumber air rumah sakit dari 5 sumur bor dan air PDAM untuk higiene sanitasi rumah sakit, kegunaan khusus (*Reverse Osmosis*, laboratorium) dan air minum dengan debit 800-900 m³/hari. Pengelolaan air limbah dilakukan berdasarkan ketersediaan sumber daya manusia, pendanaan sesuai prosedur dan proses operasional berdasarkan landasan hukum, pedoman *Standard Operational Procedure*, pemakaian alat pelindung diri, *quality control* dan pelaporan. Semua air limbah masuk di Pusat Pengelolaan Limbah Terpadu kecuali air limbah drainase dan radioaktif yang ditampung khusus tanpa melalui pengolahan unit IPAL. Pengolahan IPAL unit 1 (*activated sludge*) dan IPAL unit 2 (*biofilter anaerob-aerob*) dengan pemantauan secara periodik dan insidental. Inovasi penggunaan air limbah terolah yaitu pencucian sarana prasarana, pemanfaatan pencucian skala besar (*back wash, filter press*), pemeliharaan ikan, tanaman kangkung, hidroponik dan potensi pemanfaatan air limbah terolah dengan penyiraman tanaman dan *flushing toilet* yang masih dalam perencanaan. Penerapan pemanfaatan air limbah terolah diasumsikan dapat menghemat penggunaan air bersih dari sumber utama meskipun dalam jumlah sedikit sekitar 100 m³/hari dan efisiensi biaya secara khusus terhadap pengelolaan limbah sebesar Rp 342.000/hari. Kandungan indikator nilai *Sodium Adsorption Ratio* terhadap kualitas air limbah terolah yaitu 2,12 mEq/liter masih tergolong aman untuk digunakan meskipun

membutuhkan pemeriksaan lanjutan terhadap indikator lain untuk menjamin penggunaan kualitas air limbah terolah.

Kesimpulan: Aspek sumber daya manusia masih kurang secara kuantitas dan perlu meningkatkan kontrol terhadap aspek proses operasional untuk menjamin kualitas air limbah terolah sesuai regulasi. Inovasi dan potensi pemanfaatan air limbah terolah masih belum diterapkan secara keseluruhan karena terbatas pada regulasi, ketersediaan sarana prasarana dan membutuhkan pemeriksaan lanjutan terhadap indikator lain dalam pemanfaatan air limbah terolah.

Kata Kunci: sistem pengelolaan limbah rumah sakit, instalasi pengolahan air limbah, *activated sludge*, *anerobic aerobic biofilter*, inovasi pengelolaan limbah cair, potensi pemanfaatan limbah cair

ABSTRACT

Background: Hospital activities use materials, facilities, and equipment that contain hazardous and toxic materials and result in environmental quality degradation such as water, food, facilities and buildings, vectors and animals carrying diseases as well as public health problems originating from solid waste and liquid waste. The management of waste in health service facilities is not optimal so that it is still a problem globally and nationally. The implementation of the Green Hospital concept is one of the efforts to protect hospital waste. RSUP Dr. Sardjito Yogyakarta has implemented the Green Hospital concept based on indicators of water use and waste management.

Objective: To evaluate the wastewater treatment system and its potential utilization in RSUP Dr. Sardjito Yogyakarta.

Method: The research was conducted at Dr. Sardjito Yogyakarta from August to November 2020 using a mixed-method with a convergent design approach. Data collection using purposive sampling technique through interviews with officers in the Hospital Environmental Sanitation Installation, observation and laboratory testing of wastewater samples, and review the hospital documents by triangulation of sources and methods. Analysis of qualitative data in narrative and quantitative data descriptively. Research implemented after the ethical approval and toward a hospital's research approval was issued.

Result and Discussion: RSUP Dr. Sardjito is an educational hospital and a national referral hospital which has many human resources who work, patients, visitors, and other activities in the hospital environment. Hospital water sources from 5 drilled wells and PDAM water for hospital hygiene sanitation, particular uses (Reverse Osmosis, laboratory), and drinking water with a discharge of 800-900 m³/day. The implementation of wastewater management base on human resources availability, funding according to the procedures and operational processes base on the regulation, Standard Operational Procedures guidelines, personal protective equipment, quality control, and reporting. All wastewater enters the Integrated Waste Management Center except drainage and radioactive wastewater which collected particularly without through the Wastewater Treatment Plant (WWTP) unit treatment. The processing of WWTP unit 1 (activated sludge) and WWTP unit 2 (anaerobic-aerobic biofilter) which monitoring periodically and incidentally. Innovations in the treated wastewater used, namely washing of infrastructure, utilizing large-scale washing (backwash, filter press), raising fish, kale plants, hydroponics, and the potential for utilization of treated wastewater by watering plants and toilet flushing are still under planning. It assumed that the utilization of treated wastewater could save the use of clean water from the primary source, even though in a small amount 100 m³/day and the cost efficiency in particular for waste management is Rp 342,000/day. The content of the indicator value of Sodium Adsorption Ratio to the quality of treated wastewater, which is 2.12 mEq/liter, is

still classified as safe to use, even though it requires further examination of other indicators to ensure the use of treated wastewater quality.

Conclusion: The lack of human resource aspect in quantity, and it is necessary to increase control over the operational process to ensure the quality of treated wastewater according to regulations. The potential utilization of treated wastewater still not fully implemented because limited to the regulation, availability of infrastructure and require further examination of other indicators in the use of treated wastewater.

Keyword: *hospital waste treatment system, wastewater treatment plants, activated sludge, anaerobic-aerobic biofilters, wastewater treatment innovations, potential utilization of wastewater*