Pengelolaan limbah klinis rumah sakit (studi kasus rumah sakit pusat infeksi Prof. DR. Sulianti Saroso, Jakarta)

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Abstrak

Rumah sakit adalah sarana pelayanan kesehatan penghasil berbagai jenis limbah khususnya limbah klinis infeksius, toksis, dan radioaktif. Limbah klinis yang tidak dikelola dengan benar akan menimbulkan dampak kesehatan langsung bagi masyarakat dan lingkungan.

Menurut hasil pemeriksaan BTKL Depkes Jakarta tahun 2003, menunjukkan bahwa effluent limbah cair Rumah Sakit Pusat Infeksi Prof. DR. Sulianti Saroso (RSPI-SS) tidak memenuhi baku mutu BOD5 34 mg/l, TSS 80 mg/l, dan NH3 0,18 mg/l. Pembakaran limbah padat klinis di insenerator menunjukkan gejala adanya pembakaran yang kurang sempurna, dimana suhu pembakaran tidak mencapai 1000°C.

Dari latar belakang di atas, maka pertanyaan penelitian adalah: (1) Apakah IPAL RSPI-SS efektif menurunkan parameter BOD5, COD, TSS, NH3, PO4, dan bakteriologi serta berapakah efisiensinya? (2) Apakah suhu pembakaran limbah padat klinis sudah efektif? (3) Berapakah efisiensi pembakaran (EP) dan efisiensi pemusnahan (DRE) limbah padat klinis di insenerator? (4) Berapakah konsentrasi emisi udara untuk parameter NH3, C12, HCI, NO2, debu, S02, H2S, HF, CO1 dan CO2 dari insenerator?. Penelitian ini bertujuan untuk mengetahui: (1) Kualitas effluent dan efisiensi IPAL. (2) Suhu pembakaran di insenerator, efisiensi pembakaran , serta efisiensi pemusnahan, penghilangan (3) Kualitas emisi udara dari insenerator dengan parameter NH3, CI2, HC1, NO2, debu, SO2, H2S, HF, CO, dan CO2. (4) Pengelolaan limbah klinis dan upaya minimisasi .

Hipotesis kerja: adalah (1) Efisiensi IPAL yang masih rendah menyebabkan parameter BOD5, COD, TSS, NH3, PO4. dan bakteriologi melampaui baku mutu. (2) Temperatur pembakaran limbah klinis yang rendah di insenerator, menyebabkan EP dan DRE rendah. Pendekatan penelitian dilakukan secara kuantitatif, metode penelitian deskriptif analitik dengan desain cross-sectional. Pengolahan data dengan tabulasi, komparasi, dan teknik sampling secara purposive sampling.

Hasil penelitian yang diperoleh adalah (1) Konsumsi air bersih rata-rata tahun 2003 adalah 3810,4 m3/bulan. Rasio BOD5 dan COD dari influent IPAL adalah 0,52 berarti limbah bersifat organik dan metode pengolahannya proses biologi. (2) IPAL berfungsi tidak efektif, dan hasil analisis kualitas effluent tidak memenuhi syarat Kep.MenLH No.58 /1995 lampiran B, IPAL yang mengolah air limbah sebesar 75,5 - 107 m3 hanya mampu menurunkan konsentrasi hari 1 : BOD5 44,2 mg/l, TSS 82 mg/1, dan koliform 8x104. Hari 2 : TSS 74 dan mg/l, PO4 7,7 mg/l, koliform 22x104. Hari 3 TSS 86 mg/l, NH3 0,23 mg/l, dan koliform 4x104. (3).Efisiensi IPAL hanya mampu menurunkan BOD5 16-49%, COD 14-44%, TSS 4-19%, NH344-52, %, PO4 0 0 ? 8 % dan koliform 0%. (4) Suhu pembakaran limbah padat klinis adalah 342°C belum mencapai suhu optimum (1000°C). Hasil analisis kualitas emisi insenerator tidak memenuhi syarat

NH3 yaitu 0,82 mg/m3 menurut SK Gubernur DKI Jakarta No. 670 Tahun 2000. Efisiensi pembakaran 95% dan efisiensi pemusnahan/penghilangan 96% belum memenuhi syarat menurut Kep. Ka.Bapedal No.03/Bapedal 09/1995 yaitu 99,999%. RSPI-SS menangani pembakaran limbah padat klinis dari rumah sakit selain dari sumber internal. Penggunaan air bersih yang berlebih merupakan salah satu obyek untuk minimisasi limbah cair. Limbah fixer, kemasan infus, botol alkohol, botol bayclin, dan betadin merupakan limbah padat yang dapat di daur ulang.

Kesimpulannya adalah bahwa pengelolaan limbah klinis di RSPI-SS baik limbah cair pada IPAL maupun penanganan limbah padat klinis di insenerator belum optimal. Demikian juga upaya minimisasi limbah belum optimal. Pengelolaan limbah klinis rumah sakit tersebut dapat ditingkatkan dengan menerapkan konsep minimisasi limbah dan kaidah dalam penanganan limbah B3 dan limbah non B3 sesuai dengan karakteristik limbah yang dihasilkan.

Sebagai saran: untuk meningkatkan pengelolaan limbah klinis di RSPISS adalah perbaikan dan pemeliharaan peralatan IPAL, operasi IPAL sesuai SOP, menambah waktu aerasi, segregasi dan pre-treatment limbah sebelum masuk ke IPAL, memasang meteran di IPAL dan Instalasi air bersih, efisiensi penggunaan air bersih, serta mengkaji syarat mikrobiologi limbah cair pada Kep.MenLH No.58/1995 Lampiran B.

Pengelolaan limbah padat klinis perlu upaya segregasi, mengendalikan suhu di insenerator, operasi insenerator sesuai dengan SOP, meningkatkan pengetahuan / ketrampilan petugas, dan uji TCLP abu hasil insenerasi serta penanganan abu sesuai prosedur limbah B3.
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Management of Hospital Clinical Waste (A Case Study at National Medical Center for Infectious Disease Prof. Dr. Sulianti Saroso Hospital Jakarta)Hospital is a healthcare facility, which generates variety of waste particularly infectious, toxic, and radioactive clinical waste. The improper management of hospital clinical waste will cause direct health impacts on the surrounding community and on the environment.

Data from BTKL Department of Health Jakarta year 2003, obtained result analysis of effluent quality of RSPI-SS waste-water treatment plant (WWTP) was excessive compared to standard issued by Ministry of Environment regulation number 58 year 1995 attachment B on BOD5 34 mg/l, TSS 80 mg/l, NH3 0,18mg/l. Hospital clinical waste incineration was inadequate temperature which is less than 1000°C.

Therefore based on the above data, research questions were as follow: (1) was the WWTP of RSPI-SS effective to remove BOD5, COD, TSS, NH3, PO4, and bacteria and what was its efficiency? (2) Was the combustion temperature of clinical solid waste effective? (3) What were the combustion efficiency (CE) and destruction removal efficiency (DRE)? (4) What was the concentration of emission quality of incinerator such as NH3, Cl2, HCI, NO2, dust, SO2, H2S, HF, CO, C02?

This research aimed to assess management of hospital clinical waste on effluent quality of WWTP and its efficiency, combustion temperature in incinerator, CE, DRE, and also clinical waste management and minimization program. Working hypothesis are: (1) Low efficiency of WWTP caused excessive quality of

effluent on BOD5, COD, TSS, NH3, PO4, and bacteria. (2) Low combustion temperature of clinical solid waste caused low on CE and DRE of incinerator. Research was conducted by quantitative approach and analytical descriptive research methodology. Research design was cross-sectional, purposive sampling technique, and data processing by tabulation and comparation.

Results obtained from the research are as follows:
(1) Average water use at RSPI-SS year 2003 was 3810.4 m3/monthly, and BOD5/COD ratio of influent quality was 0.52 which meant organic loading and treatment method was biological process. (2) WWTP functioned ineffective, in which result analysis of effluent quality was exceeded standard, observed parameters on: Day I: BOD5 44.2 mg/l, TSS 82 mg/l, and coliform 6x104. Day 2: TSS 74 mg/l, PO4s 7.7mg/l and, coliform 22x104. Day 3: BOD5 86 mg/l, NH3 0.23 mg/l, and coliform 4x104. (3) Treatment efficiency of WWTP was only enable to remove observed parameters on: BOD5 16 - 49%, COD 14 - 44%, TSS 4 -19%, NH3 44 - 52%, and PO4' 0 - 8% and coliform 0%. (4) Combustion temperature in the incinerator was only 342 °C, which unreached optimum temperature (1000°C). Result analysis of the incinerator emission quality indicated excessive concentration on ammonia refer to stationary source of air quality standard issued by Governor of Jakarta Decree number 670 year 2000). CE of clinical waste incineration was 95% and DRE was 96%, which meant below the standard requirement by ministry of environment which is 99,999%. RSPI-SS hospital incinerated clinical solid waste from out side source. Inefficiency of water use was one of the waste water minimization objects. The hospital waste minimization program covers the following action such as efficiency of water use, effluent re-use, fixer recovery , re-use of infuse bottle, alcohol, detergent, and betadine.

Conclusions are as follows: Clinical waste management at RSPI-SS hospital which consisted of waste water on WWTP and clinical solid waste handling on incinerator were not optimum. Clinical waste management could be improved by application of minimization concept and method of hazardous waste and non hazardous waste handling based on generated waste characteristic.

Recommendations are: repairing and maintenance of WWTP instrument, WWTP operation based on SOP, extend the period of aeration, segregate the waste water, install the flow rate meter on the WWTP and water plant, water efficiency, evaluation of microbiology standard of hospital effluent issued by ministry of environment, segregation of clinical solid waste, operation of incinerator based on SOP, to improve knowledge and skill of operator, and residual TCLP test of incineration and residual handling based on hazardous waste handling procedure.