Research Article

iMedPub Journals
http://www.imedpub.com/

European Journal of Experimental Biology
ISSN 2248-9215

2017
Vol.8 No.1:8

DOI: 10.21767/2248-9215.100049

Critical Analysis of Clinical Waste Management System in National Hospital of Sri Lanka

Ayanthi Saranga Jayawardena D.B.

National Institute of Health Sciences, Kalutara, Sri Lanka

*Corresponding author: Ayanthi Saranga Jayawardena D.B., Deputy Director, National Institute of Health Sciences, Kalutara, Sri Lanka, Tel: +94718262236; E-mail: jayawardenaayanthi@ymail.com

Received date: January 29, 2018; **Accepted date:** February 19, 2018; **Published date:** February 28, 2018

Copyright: © 2018 Jayawardena DBAS. This is an open-access article distributed under the terms of the Creative Commons Attribution License, which permits unrestricted use, distribution, and reproduction in any medium, provided the original author and source are credited.

Citation: Jayawardena DBAS (2018) Critical Analysis of Clinical Waste Management System in National Hospital of Sri Lanka. Eur Exp Biol Vol. 8 No. 1:8.

Abstract

Health care waste at the National Hospital of Sri Lanka (NHSL) consists of infectious, hazardous as well as non-hazardous waste generated at various places within the institution. Health care waste management function in the NHSL is outsourced to a private company. Waste Management needs due attention and if the procedure did not follow the safe methods definitely create a great problem to the patients, staff as well as the public and the environment. The segregation of waste at the selected units was satisfactory. All (100%) units had a sharp bin to separately collect needles and other sharp materials. They used color code in waste bins. Occupational safety measures take during handling waste were not satisfactory. None of them were found wearing protective gloves, masks or boots. Even though the wards practice segregation of waste according to the color code, the transportation of waste from wards to the disposal area was unhealthy and not up to the standards. This was mainly due to the carelessness of the staff, supervisors and the cleaning service workers. The knowledge on safe handling and transporting waste among waste handlers were not adequate thus they deserves for training on healthcare waste management.

Keywords: Health care waste management; Safety measures; Hazardous waste disposal

Introduction

Health Care Waste Management (HCWM) deserves due attention by the healthcare authorities and consider as an important issue face by the managers of hospitals. HCW contain infectious and hazardous substances. Institutions which do not practice safe HCW management and disposal practices, create a great problem and increase the risks to people and the environment [1].

About 75% to 90% of the waste produced by health institutions is considered as “non-hazardous” or “general health-care waste”. It comes mostly from the administrative, kitchen and housekeeping functions at health-care facilities (**Figure 1**). The remaining 10–25% of health-care waste is regarded as “hazardous” and cause variety of environmental and health risks.

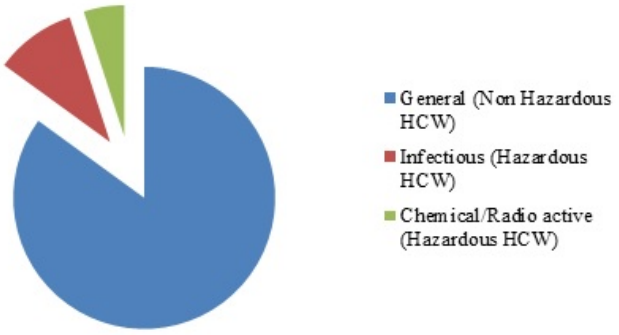

Figure 1: Typical waste compositions in healthcare facilities.

Hazardous HCWs are categorized as follows:

- Sharps waste – Used or unused sharps such as needles, infusion sets, pipettes, knives, blades and broken glasses.
- Infectious waste –Waste that contain pathogens such as waste contaminated with blood, body fluids, laboratory cultures, microbiological stocks, patient excreta and pus from infected wounds.
- Pathological waste – consists of human tissues, organs, fluids, body parts, fetuses, placentas, and unused blood products.
- Pharmaceutical waste, cytotoxic waste – items contaminated by expired pharmaceuticals, cytotoxic, genotoxic pharmaceuticals.
- Chemical waste – Waste containing chemical substances such as laboratory reagents, solvents, X-ray film developers with heavy metals, batteries, broken thermometers and BP apparatus.
- Radioactive waste – Waste containing radioactive substances, urine and excreta from patients receiving radioactive treatments/investigations (Health Care Without Harm Asia, 2007).

Paudel and Pradhan have found in their study, most of the departments in the hospital were not practicing safe disposal of healthcare waste due to the lacking of proper waste management plan in the hospital as well as due to the carelessness of patients, visitors and staff has pointed out that, the importance of the healthcare waste management and the environmental health [2]. The WHO has given the guidance on developing regulations and legislations and policies on health-care waste in countries and also give guidelines to develop a proper healthcare waste management plan to health care institutions.

The hospital health-care waste management involves and interlinks several domains as described in **Figure 2**.

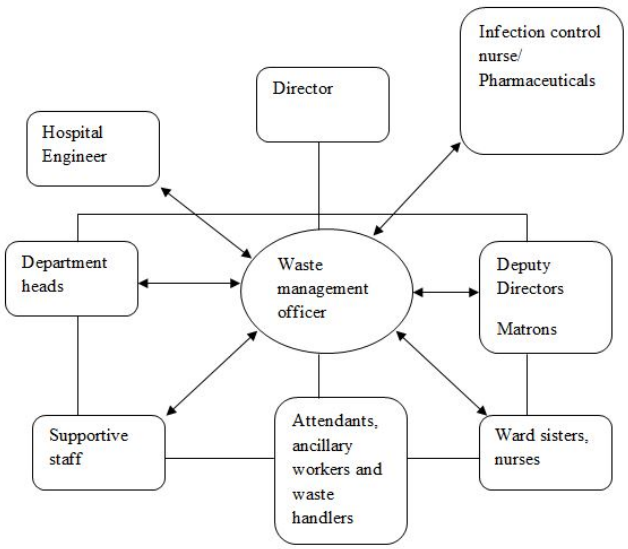

Figure 2: Block diagram representation of hospital health-care waste management.

Muluken has pointed out in his study that, many health care workers do not practice personal protective methods in handling waste because of the lack of knowledge. Therefore several studies recommended healthcare waste management in to the training curricula in clinicians, nurses, laboratory technicians and also in attendants training [3].

Health-care waste management practices in hospitals in Sri Lanka

There were very few literatures found on health-care waste management practices in hospitals in Sri Lanka. One study showed that, improper waste disposal can be seen in many hospitals lead to environmental hazards. The main underlying cause for this improper management of waste was the negligence of the out sourced workers [4].

Samarakoon and Gunawardena have identified several issues and gaps in health-care waste management in Base Hospitals in Colombo mainly due to lack of knowledge on waste management among health care workers.

Objectives

General objective

To critically analyze the Health Care Waste Management (HCWM) System in National Hospital of Sri Lanka (NHSL).

Specific objectives

- To describe the current practice of HCWM at the NHSL
- To identify the issues on HCWM at the NHSL

Methodology

Study design

The study design was a cross-sectional descriptive study.

Study setting

This study was conducted at the National Hospital of Sri Lanka (NHSL) the largest curative healthcare institution in Sri Lanka and the South East Asia Region.

Study period

This study was conducted from 01st of July to 15th of October 2015.

Study population

The study population consisted with all the departments and units that generate waste in the hospital namely, the OPD, ETU, operating theaters, ICUs, wards, radiology unit, laboratories, clinics and office.

Study sample

The Principal Investigator (PI) decided to use a convenient study sample due to the limited time permitted to conduct the study. Therefore the PI decided to include the OPD, ETU, randomly selected five wards (04, 07, 12, 17 and 21) and the surgical ICU in the study. The PI included In-charge officers of above selected units, two Overseers and 10 workers in the cleaning service in this study to gather information [5]. The PI used the simple random sampling technique to select 10 cleaning service workers using their attendance register as a sampling frame and the first worker selected randomly from the register.

Study instrument

The PI adopted the standard method of hospital health care waste management plan to be used by every healthcare institution and added few questions to develop the check list to describe the current healthcare waste management practices at the selected units and to identify issues related to current practice of healthcare waste management.

Reliability, validity and quality of data

Steps taken to minimize instrument variation: Questionnaires were designed carefully to increase acceptability and comprehension. Care was taken to be specific and precise in formulating the questions so that all respondents interpret them in a similar manner. Structured questions were made with the help of structured, validated questionnaires used in literatures giving priority to close-ended questions [6]. The PI has given instructions to respond to questions and gave examples how to respond to some questions as well. Leading questions which were tending to be biased were avoided.

Steps taken to ensure construct validity: Construct validity is considered as the resemblance between the concepts in the study (construct) and the actual measurements. The conceptual design technique was used on developing the questions to improve construct validity.

Steps taken to improve the quality of data: The PI asked participants to fill the questionnaires correctly and completely to the best of their knowledge. All the participants were well educated officers from the government service. The PI presented all the time at the meeting and answered any queries from the participants. The PI did valid checks on data entered.

Measures taken to improve reliability of data: The questionnaires were prepared in English and translated to Sinhala and Tamil languages by a translator. Then these translations in Sinhala and Tamil were re-translated into English by a second translator to improve the reliability of the translations.

Face validity and content validity were reached by discussing with the supervisor and the several other key personals conversant in the subject.

Data collection

The PI conducted key informant interviews with in-charge officers at the OPD, ETU, four selected wards (04, 12, 17 and 21) and the surgical ICU and two Overseers. Then the PI had a group discussion with 10 cleaning service workers. The PI visited above selected units and the waste disposal area and data was collected using observations made at site visits. The PI used the check list to collect data from the observations [7].

Data analysis

Quantitative data was analyzed using Epi-info and Statistical Package of Social Sciences (SPSS). The data entry was totally done by the PI. The accuracy of data entry was ensured by introducing valid checks and re-entering a selected sub-sample and comparing them with the original data set. Basic descriptive analysis was presented by frequency distribution tables and graphs. The appropriate statistical tests were used to describe the significance of the tests. The difference was considered significant at P-value<0.05 levels. As done by the Muluken and Njaqi in their studies, the current practice of waste disposal from each and every unit was observed and analyzed with the check list developed by the PI.

Results

Situation analysis

The procedure of waste management starts at the five wards, ETU, OPD and surgical ICU in the NHSL. There were instructions given to units on categorizing waste at its origin into hazardous and non-hazardous which were displayed as posters in all eight units. Different types of hazardous waste are collected separately [8]. The type of collected hazardous waste was different according to the service unit. The percentage of hazardous and non-hazardous wastes collected from each selected units were described in **Table 1** and **Figure 3**. Out of eight selected units, the most hazardous waste was collected at the surgical ICU.

Table 1: Percentage of hazardous and non-hazardous wastes collected from each selected units.

Unit	Hazardous Wastes Weight (kg/day)	Non-hazardous wastes Weight (kg/day)	Percentage of hazardous waste of total waste (%)
OPD	02.7	12.6	17.6
ETU	03.9	15.8	19.9
Ward 4	05.6	10.4	35.0
Ward 7	04.9	11.5	33.6
Ward 12	10.6	19.5	35.1
Ward 17	08.9	18.5	32.5
Ward 21	11.8	22.5	34.2
Surgical ICU	16.7	19.8	45.8

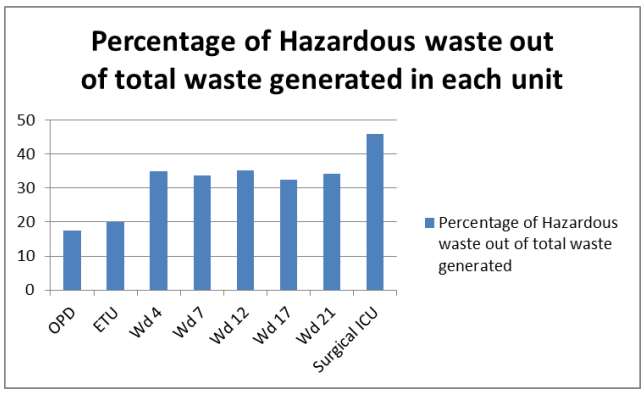

Figure 3: Percentage of hazardous and non-hazardous wastes collected from each selected units representation in graph.

Scalpel blades, injection needles and other sharp waste were collected in to a sharp bin in all selected units. Other different types of waste were collected in to different bins which were colored accordingly.

The striking feature identified during the observation was that, though they separate contaminated hazardous sharp needles into a separate bin, the rest of the contaminated saline

© Under License of Creative Commons Attribution 3.0 License

bottles with blood filled wires were thrown out into an open space until they were collected by the cleaning staff. The PI found one saline bottle wire with a needle which was accidently thrown out without dispatching the needle [9]. The cleaners were found handling hazardous waste without wearing protective gloves and boots. They were found, transporting waste carts during the visiting hours. They dumped theses hazardous waste in to an open space. Due to a mass construction at the premises, the waste disposal area was shifted into a temporary place where incinerator also placed in it. All the waste collected bags were placed out-side the room with no protection. The gas expelling tunnel of the incinerator is very small.

Analysis of waste disposal procedure using the check list

The segregation of waste at the selected units was satisfactory. All (100%) units had a sharp bin to separately collect needles and other sharp materials. They used color code in waste bins.

Occupational safety measures take during handling waste were not satisfactory. None of them were found wearing protective gloves, masks or boots. When the PI inquired about the supplement of personal protective equipment, out of the 10, 08(80%) said that, they received only gloves on time but they were not provided with boots or caps or aprons. Other 02(20%) said that, they were provided with gloves, masks occasionally but have received boots only once long time back and not usable now. All of them were wearing slippers. Internal transport and internal storage of waste were not safe. Three waste transporting trolleys were inspected and found not cleaned properly.

Out of the 10 selected workers from the cleaning service, all of them were not given training on waste handling from the hospital management or from their employer. All in-charges of the eight selected units and two overseers have good knowledge on HCWM but their supervising on HCWM in the hospital was not satisfactory.

When inquired about the instructions given on collecting timetable for each trolley route, the type of waste to be collected and number of wards/units to be visited on one route, 10 workers gave 10 different answers but none of them were given proper instructions.

Problems identified

- Lack of awareness about the health hazards related to health-care waste among waste handlers.
- Inadequate training in proper waste management for waste handlers.
- Absence of proper waste management and disposal systems.
- Insufficient financial and human resources.
- The low priority given to the waste management process.

Problem analysis

- All hazardous as well as general wastes from all selected units were transported in one stock from wards to the disposal site and the common public walking path was used.
- Trolley and the waste bags were not covered properly.
- Persons who are handling clinical waste have not covered themselves properly and no one was found wearing protective cloths, gloves, masks or boots. When the PI inquired, all the waste collectors from the cleaning service said that,
- They transport waste even during visiting hours.
- The wastes are collected haphazardly from wards and other units and there was no proper allocated time to collect or transport waste.

Discussion

The PI found in this study, the NHSL does not have a properly designed Health Care Waste Management Plan in contrast with the hospitals in developed countries where they have a written document of HCWM plan for most of the hospitals.

In this study the PI found that, waste handlers did not practice personal protective methods in handling waste because of the lack of knowledge similar to the studies done by Paudel et al., Njaqi et al. as well as due to unavailability of masks and boots for them and also similar result found in Samarakoon and Gunawardena in their study, where they found that, health care workers do not practice safety methods due to their negligence on HCWM.

Conclusion

The health care waste management practice at the NHSL was not satisfactory. Even though the wards practice segregation of waste according to the color code, the transportation of waste from wards to the disposal area was unhealthy. This was mainly due to the carelessness of the staff, supervisors and the cleaning service workers. The knowledge on safe handling and transporting waste among waste handlers were not adequate thus they deserves for raining on healthcare waste management.

Recommendations

Steps towards improvement

Improvements in health-care waste management rely on the following key elements

- Building a comprehensive system, addressing responsibilities, resource allocation, handling and disposal. This is a long-term process, sustained by gradual improvements.
- Raising awareness of the risks related to health-care waste, and of safe and sound practices.
- Give training on safe health care waste management practices to all staff categories including out-sourced

cleaning staff and also the importance of wearing hard hat, goggles, gloves, high visibility vest and boots should be highlighted. All the staff members handling waste should be provided with adequate protective wearing.

- Selecting safe and environmentally-friendly management options, to protect people from hazards when collecting, handling, storing, transporting, treating or disposing of waste.
- There is a mass construction is currently under process which includes a proper waste disposal site with installation of incinerators.
- Correctly label hazardous waste transporting carts and places with internationally recognized symbols.

Implementation

Out of several proposals made by the PI, arrangement of a training programme on safe health care waste management practices and safe handling of waste to all staff categories including out-sourced cleaning staff was selected as a most feasible solution.

References

1. Abdulla F, Qdais HA, Rabi A (2008) Site investigation on medical waste management practices in Northern Jordan. Waste Management journal 28: 450-458.
2. Ammakiw CL, Baliag JS, Odiem MP (2013) Health care waste management practices in the hospitals of Tabuk city. European Scientific journal 4(Special Issue): 584-597.
3. Health Care Without Harm Asia (2007) Best Practices in Health care waste management: An example from two hospitals in Phillipine.
4. Karunasena G, Jayathilaka WMDM, Rathnayake RMNU (2015) Comparison on disposal strategies for clinical waste: Hospitals in Sri Lanka. International conference on structural engineering and construction management held on 11th-13th December at Kandy, Sri Lanka.
5. Mulluken A, Haimanot G, Mesafint M (2013) Health care waste management practices among Health Care Workers in healthcare facilities of Goudar town, Northwest Ethiopia. Health Science Journal 7: 315-327.
6. Njaqi N, Oloo M, Kithinji MJ (2012) Knowledge, attitude and practices of health care waste management and associated health risks in the two teaching and referral hospitals in Kenya. Journal of Community Health 37: 1172-1177.
7. Paudel R, Pradhan B (2010) Healthcare waste management practices in a hospital. Journal of Nepal Health Research Council 8: 86-90.
8. Samarakoon MASC, Gunewardena NS (2011) An evaluation of Health care waste management in Base hospitals in Colombo district. Journal of college of Community Physicians of Sri Lanka 16: 15-21.
9. WHO (2014) Safe management of wastes from health care activities, WHO 2nd edition.

© Under License of Creative Commons Attribution 3.0 License