

Critical Analysis of Clinical Waste Management System: NHSL

JLHR Wijegunasekara*

Department of Family Medicine, Ministry of Health, Sri Lanka

Abstract

Introduction: Health Care Waste (HCW) Management is an important aspect in hospital management. Clinical wastes are regarded as a hazardous and include; Sharps, Infectious waste, Pathological waste, Pharmaceutical waste and cytotoxic waste, Chemical waste and Radioactive waste which constitute about 10–25% of health-care wastes. **Description:** Clinical waste management system of National Hospital of Sri Lanka are described under basic stages in clinical waste management; Generation; Collection; Segregation; Transportation; Storing; Disposal and mechanisms of Monitoring and Evaluation. **Feeling:** I was enthusiastic to learn the clinical waste management system in NHSL; I felt euphoric to see the successful operation of the programmer; However, I was perturbed to see the sudden disruption of disposal mechanism and at last, I felt calm to see the hospital coping up with the problem. **Evaluation:** Good aspects were identified as correct color coding system, segregation, collection, transportation, storage, outsourced disposal, awareness of the staff, availability of guidelines and procedures, financial ability and monitoring mechanisms. **Bad aspects** were identified as deficiencies in segregation, availability of containers and personal protective equipment, transportation, non-utilization of hydroclave machines, interruption to the disposing mechanism and insufficiencies in monitoring mechanisms. **Analysis:** Color coding; adherence to national guidelines for segregation, transportation, storage and disposal; staff training; supervision, review and monitoring of the process; continuous provision of supplies; financial capacity; and intra sectoral and inter sectoral assistance have facilitated smooth systematic functioning of the process; while deficiencies in all the stages of waste management process; deficiencies in supply chain; deficiencies in inter sectoral collaboration and coordination; and deficiencies in monitoring mechanisms; have resulted in non-optimal operation of this process with complete disruption of some stages occasionally. **Conclusion/Recommendations:** Good aspects have contributed vastly for a satisfactory clinical waste management system. There are some deficiencies in different magnitude which need to be attended according to the need of priority. Recommendations are given accordingly.

Keywords: Health care waste management; Clinical waste management

*Corresponding author:

JLHR Wijegunasekara

✉ himaliadm@gmail.com

Ministry of Health, Department of Family Medicine, Sri Lanka

Citation: Wijegunasekara JLHR, F (2021) Critical Analysis of Clinical Waste Management System: NHSL. Eur Exp Biol Vol.11 No. 2:121

Introduction

Health Care Waste (HCW) Management is an important aspect in hospital management. HCW contains infectious and hazardous substances which make a great risk to the people and the environment. About 10–25% of health-care wastes generated in health care settings are regarded as “hazardous” wastes. In 2001; the Government of Sri Lanka drafted a comprehensive national policy on health care waste management. It states that every hospital is legally responsible for the proper management of waste until its final disposal. Therefore, HCW is considered an integral part of hospital hygiene and infection control.

There are several types of clinical wastes namely

1. Sharps waste: Such as needles, infusion sets, pipets, knives, blades
2. Infectious waste: Waste which is infectious such as waste

contaminated with blood, body fluids laboratory cultures, microbiological stocks, patient excreta and pus from infected wounds.

3. Pathological waste: It consists of human tissues, organs, fluids, body parts, fetuses, placentas, and unused blood products.
4. Pharmaceutical waste and cytotoxic waste: They are the items contaminated by expired Pharmaceuticals and cytotoxic drugs.
5. Chemical waste: Waste containing chemical substances such as laboratory reagents, solvents, X-ray reagents, batteries, broken thermometers and BP apparatus.
6. Radioactive waste: Waste containing radioactive substances, urine and excreta from patients receiving radioactive treatment or investigations.

Description

Generation

Clinical waste is generated from almost all the patient care units such as wards, intensive care units, Operation theatres, Accident and emergency units, Out Patient Department, Cardiology unit and Laboratories.

Collection

There is a National Color Code for different types of wastes. Colors are given to different types as follows; yellow – clinical wastes; Yellow with 2 red stripes – sharps; Orange – plastics and polythene; Red – glass; Green – bio degradable items; Blue – paper; Brown – metal and Black – others (mops and brooms). There is a separate area for clinical wastes in every unit and waste bins come in 3 sizes; 65 L, 35 L and 10 L with paddles.

Segregation

Staff has been given education and awareness regarding correct method of segregation according to color codes and posters are displayed for easy segregation. It is implemented in all units and wards. Awareness is given to Liaison Nurses monthly by Infection Control Unit and the Nursing management [1-4].

Transportation

There is a separate person in every unit/ward for dispatching wastes; including clinical wastes to the storage area. Collection is done at a definite time. Yellow bags and sharps bins are sealed, labeled and kept in a separate place for collection. Collection is done at 6 am, 11.30 am and 4 pm every day. Sharps bin is sealed, once the level reaches $\frac{3}{4}$ of its volume. Yellow bags with clinical wastes are transported by the cleaning service staff and sharps bins are transported by the minor staff at 7 am, 10 am and 4 pm to the "Hydroclave" unit. There are waste carts for transportation. Special stainless steel containers are available in the accident service for better transportation. Monitoring of transportation is done by the ward sisters and the cleaning supervisors.

Storing

Sharps and clinical wastes are stored in the "Hydroclave" unit for disposal. Weighing is done at the time of disposal. About 1200-1300 kg of clinical wastes is generated per day by NHSL according to data of 2017.

Disposal

There is no incinerator established in NHSL. There are 2 hydroclave machines established in the "Hydroclave" unit which are also currently not functional since 2016. Therefore, task of disposal has been outsourced to a private company for the cost of Rs 67.00/Kg of wastes. It collects clinical wastes from many other hospitals where there are no incinerators. This company has faced with a legal environmental matter at present and stopped acceptance of clinical wastes. Instead, they have come to an agreement with the hospital to transport clinical wastes to agreed hospitals with incinerator facilities. But there is a large back log of clinical wastes accumulated in the storage site.

Mechanism of Monitoring and Evaluation

There is an Infection Control Committee established in the hospital, under the participation of the director, which meets in every 6 months. There are 2 consultant microbiologists to provide technical guidance. There is an Infection Control Unit with a sister in charge and 10 Infection Control Nursing officers. Further, there are about 150 Liaison nursing officers attached to each ward/unit. There are three Public Health Inspectors to look into the smooth functioning of the waste management system in the hospital. There is an Infection Control Meeting with the leadership of 2 microbiologists in every other month. Infection Control Nurses are invited for the Management Committee Meetings and In Charge Meetings to discuss issues. Meeting with Liaison Nurses are held monthly with sectional Infection Control Nurses (ICN). Daily follow up is done by all the 10 ICNs, of their sections by visiting the allocated wards/units. Here, issues are discussed with the Sisters and Liaison nurses and following parameters are assessed; Hospital Acquired Pneumonia Surveillance; Hand washing audits; Ventilator Acquired Pneumonia Surveillance; Communicable Disease Notification rates and CVP line Surveillance. There is a Tool for hand washing audits and defined Criteria for VAP surveillance. In this way there is a very systematic mechanism established in the hospital for monitoring waste management activities.

Feeling

Before I carried out this case study I felt very much enthusiastic to know the amount of clinical wastes generated by this gigantic hospital handling a massive patient load and the implementation of National Guidelines on Clinical waste management with proper coordination. When I was exploring the subject in detail, I felt euphoric to see how the different levels of management and responsible staff members are trying their maximum to implement the clinical waste disposal program thoroughly adhering to the national guidelines. At the same time, I was perturbed to hear the sudden legal decision taken by the court of law disrupting the smooth operation of clinical waste management system abruptly leaving the hospital with no alternative disposal mechanism. However, I felt calmed to know that the management has taken quick decisions and implemented a substitute mechanism to clear the back log at the earliest possible. Hence, I felt proud of the hospital dealing with the problem and contented myself for learning a lesson.

Evaluation

Good

- There is a National Color Coding System for waste segregation which it is established throughout the hospital.
- Separate collecting containers are made available in every ward/unit to collect clinical wastes.
- Separate places are available in wards/units to store containers for clinical wastes and sharps
- There is a system to collect clinical wastes three times a day.
- Transportation of clinical wastes is done in the correct manner in special carts and trolleys.

- There is a separate building with rooms for storage.
- There is a well recognized private sector company with which service agreement has been made by the hospital to dispatch clinical wastes for disposal.
- Staff is provided with continuous education on correct waste management systems.
- There is a well – established waste management supervision, monitoring and evaluation mechanism, functional according to guidelines of the Ministry of Health
- There is a national health waste management guidelines and procedures.
- Sufficient budgetary allocations are provided from the Ministry of Health for purchasing material and paying for disposal.
- There is a registered supplier with a huge capacity for the disposal of the total amount of clinical wastes generated by the hospital.
- Financial assistance is provided by relevant units in the Ministry of Health for training activities for the staff.
- Guidance and monitoring is provided by the Quality Secretariat and the Occupational and Environment Health unit of the Ministry of Health.
- Assistance was at a time provided by the Colombo Municipal Council.
- Frequent critical analysis of clinical waste management system of the hospital by trainees of Medical Administration to suggest recommendations from different view points.

Bad

- Correct segregation of wastes at times does not occur accurately.
- Container (eg: yellow bags) availability occasionally becomes unsatisfactory.
- Responsibility of clinical waste transportation has been given to the cleaning service staff.
- Personnel handling clinical wastes do not use Personal Protective Equipment regularly.
- Both hydroclave machines established in the storage site are not functional due to a decision taken 2 years ago.
- There is an interruption going on, in dispatching clinical wastes by out sourced companies.
- Infection Control Committee meetings are not held in an adequate frequency.
- Results of audits and surveillance are not adequately disseminated among all categories of staff.
- In 2016, Colombo Municipal Council has taken a decision not to accept clinical wastes even after hydroclaving by the hospital.
- Following a complaint made by the Environmental Authority and the public, the Court of law has temporarily suspended the disposal of clinical wastes collected by the private company to

the site at Mulleriyawa.

- Many hospitals are using the same private company for clinical waste disposal leading to over use of its disposal sites.
- Environmental Authority does not grant permission to install an incinerator for the hospital.

Analysis

National Color Coding System for waste segregation which is established throughout the hospital has enabled efficient waste segregation; facilitating separate transportation, storage and disposal, using standard techniques, to improve safety of patients, employees and the environment. Hospital management has made a great effort to maintain an uninterrupted supply of containers for collection of clinical wastes in every ward/unit with the supervision of the Infection Control Unit to minimize hospital acquired infections. Staff is being continuously educated and supervised regarding segregation, placing of containers, collection of containers on a schedule, proper method of transportation and storage, as per the national guidelines. It has created a hospital wide uniform system for clinical waste management. Assistance, guidance and monitoring of the process by the Quality Secretariat and the Occupational and Environment Health unit of the Ministry of Health has empowered the whole staff. Even though, the expenditure for disposal through “out – sourcing” is a significant amount, there was sufficient budgetary allocations from the Ministry of Health. Therefore, it had been a sustained and an efficient method since recently, till the private company responsible for this purpose had to face with a legal issue. When taking decisions by the legal authority to suddenly stop the current disposal method without granting a reasonable period of time for adjustments, it could create an unbearable crisis in a huge hospital like NHSL which produces a large amount of clinical wastes per day. However, deficiencies in the segregation, availability of containers, use Personal Protective Equipment which is mainly due to less adequate commitment of staff and financial constraints have affected the smooth functioning of the clinical waste management system. The two hydroclave machines are not in operation because the sterilized items are not accepted by the Colombo Municipal Council (CMC), to dispose as nonclinical wastes. One reason for not acceptance could be, inadequate convincing of CMC by the health authority, regarding its absence of danger. On the other hand, some other health care units in the private sector could use this opportunity to dispose its clinical wastes to the collection of CMC without sterilizing which are hazardous. Anyway, the expenditure for two hydroclave machines has become a waste. They could be utilized again if another final disposal mechanism is established. Further, Incinerators are not approved by the Environmental Authority to be established in NHSL because of its location in a highly populated area. The fume produced in the process of incineration would pollute the atmosphere causing health issues. Therefore, it cannot be recommended as a method of disposal of clinical wastes. Infection Control Committee meetings, audits and surveillance are essential components in the monitoring and evaluation of clinical waste management process. Their inadequacies have caused fewer adherences of the staff with the

national quality standards related to clinical waste management.

Conclusion

National color coding system; National health waste management guidelines and procedures; Assistance and guidance by the Ministry of Health; Existence of a well established waste management supervision, monitoring and evaluation mechanism in the hospital; Sufficient budgetary allocations; and Frequent training of the staff have resulted in a satisfactory clinical waste management system in the hospital. However, there are deficiencies in waste collection, segregation, transportation, storage, disposal and monitoring mechanism which could be due to inadequate awareness, shortage of staff, insufficient commitment and motivation of the staff and the leadership of different levels, issues with progress reviews and ministerial decision making. Finally, The current problem of sudden and unexpected interruption of clinical waste disposal which has raised with the unplanned decision of the court of law, has resulted in a huge burden to the management, bio hazard to the people and to the environment, saturation of other hospitals with incinerators, high cost for transportation and distraction of the focus from other health care functions.

Recommendations

Staff awareness should be strengthened; by conducting frequent training programmes to all categories of the staff; by displaying

more striking Information, Education and Communication material and by giving announcements using a public addressing system to enhance waste collection and segregation. Required containers and bags should be made available in the stores by making the supplier adhere to an annual calendar and making them participate in progress review meetings. The responsibility of clinical waste transport should be given to the minor staff after convincing the value of their skill with staff unions. Personal Protective Equipment should be provided to the waste handling people and supervised their compliance. Backup systems such as "Hydroclaving and disposal" should be planned and arranged with the Colombo Municipal Council and Central Environmental Authority by sharing this public responsibility with other stakeholders. Supervision of the clinical waste management system should be strengthened by recognizing the work of Infection control committee members including the microbiologists. More research activities such as audits and surveillance should be broadened to include all the possible adverse effects of poor waste management and the results should be disseminated to the staff as a way of; an eye opening; identifying deficiencies; and offering credits for good performance to motivate the staff. Measures should be sought to solve the immediate situation including Legal advice, to get the inter-ministerial and intra ministerial corporation of all the stakeholders who are responsible for waste disposal. As a long term measure, policy decisions should be taken as a country to attend to such situations.

References

- 1 Atukorala SD. (1998) Monitoring effectiveness of controlling hospital acquired infections by prevalence surveys. *Ceylon Med* 43:134-137.
- 2 Jayawardena AS. (2017) Critical Analysis of Clinical Waste Management System in National Hospital of Sri Lanka. *Eur J Exp Bio* 8:1-8.
- 3 Ranasinghe GSP, Wickremasinghe W K, Panapitiya PWC (2020) An analysis of clinical waste management system in a tertiary care hospital. *Int J Sci Res Publications (IJSRP)* 10:296-300.
- 4 Liyanage B, Chanpika A, (2015) Waste Management Practices of Government Hospitals in Colombo, Sri Lanka. *Int J Waste Res* 05:02
- 5 Haniffa, R (2011) Management of health care waste in Sri Lanka. *Ceylon Med J* 49:93-95
- 6 Mathusuthan K , Vasanthiny J (2017). Review on Management of Hospital Waste in An Efficient Manner. *International J Environ Agri Res* 3:55.
- 7 Arjun S, Himadri B (2019) Health-Care Waste Management in Public Sector of Tripura, North-East India: An Observational Study. *Indian J Community Med* 44: 368-372
- 8 Andrea M S, Shalika H, Bridget A (2016) Community-based population-level interventions for promoting child oral health. *Cochrane Database Syst Rev* 15:9
- 9 Silvia B, Francesca G, Michele S (2018) Environmental and individual exposure and the risk of congenital anomalies: a review of recent epidemiological evidence. *Epidemiol Prev* 42:01-34
- 10 Gaétan C (2015) The effect of grounding the human body on mood. *Psychol Rep* 116:534-542f