Cancer Treatment 2020 - Process Improvement: Biomedical Waste Management

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Abstract

The project was carried out at 500 bedded Hospital on improvement of the biomedical waste compliance for a period of 3 months. Hospital was with G+6 floors with departments like: Emergency, Laboratory, Radiology, Pharmacy, OPD, ICU, HDU, CCU, NICU, PICU, Oat basement. The audit was carried out on the parameters like; Knowledge on segregation, Handling at point of care, Segregation at point of care/ ward, Transportation & handling and Disposal.

The adherence to the protocol was found to be 66% (baseline) and the nonfresher's and don't have any previous knowledge or experience on BMW segregation, Training was provided only during induction, No guideline displayed on instant rsufficient PPE's at the POC. Mixing of waste of red and yellow bins, Bins were overflowing; Ampoules and needles are not discarded in the puncher proof container instead lying onampoules in the designated container and throws from a distance. Wastes are transported in buckets which in smaller capacity and overflows while transporting. The bins are usually draggedbags are transported unsealed. Puncher proof containers are opened and wastes are shifted to bigger buckets before handed over to agency. Reason being supply of puncher proof containers is limited due to unThe waste segregations area found to be smaller as compare to the amount of waste generated. The frequency of the collection by agency is irregular. The puncher proof containers are lying outside the designated area as no speciffor demarcated. The quality management tools like Dash-board, Histogram, Pareto, Fish Bone, CAPA, Gantt Chart was used in the project. The adherence has increased to 75% over 3 monthsintervals and daily briefing, display of guidelines at waste segregation area, regularization of PPE supply with budget allocation, supply of proper sized waste bins and transport buckets; after reviewing the waste quantity. Waist height platforms were created to keep PPC for easy reachimplement the system of "NOT TO OPEN SEALED PPCs" and demarked area for holding it, regularizing the agency visit from every alternate day to daily.

Biography:

Samrat has completed his B Pharmacy (1998) from Nagpur University and Post Graduation and Hospital Management (2000) from IISWBM, India. He is currently working as Group Head for Quality for a Kolkata based Hospital chain; ILS Hospitals Pvt. Ltd. He has experience in hospital quality management and national (NABH) and international accreditations (Australian) for more than 19 years. He has delivered numerous process improvement projects during his professional tenure. He is a Lean Six Sigma Green Behandled ISO 9001 projects for Hospitals, Medical Col9001 standards. Introduction

Wastes generated by healthcare facilities are divided into 85% non-hazardous waste which is generated by administrative departments and general cleaning work within the hospital and is treated similarly to general/municipal waste.

Hazardous medical waste is generated from contaminated sources or potentially contaminated with infectious, chemical, or radioactive sources that pose a potential risk to health.

This constitutes a small percentage of 15% of total healthcare waste (WHO Fact Sheet 2018; Martin 2005).

The major categories of hazardous waste include the following: Infectious waste: waste

contaminated with blood and blood products, other body secretions, or items contaminated with them (e.g., diagnostic samples);

cultures and stocks of infectious microorganisms from laboratory work; or waste from patients with infections (e.g., discarded bandages and wound covering and disposable medical devices like urinary or venous catheters);

pathological waste: fragments of human tissues, organs, non-viable fetuses, placenta, organs or fluids, body parts, and contaminated animal carcasses; sharps waste: used needles, syringes, disposable blades, and scalpels, etc.; chemical

waste: solvents and reagents from laboratory, disinfectants, sterilants used in reprocessing of medical devices, and heavy metals contained in medical devices (e.g., mercury in broken thermometers) and batteries, exhibiting at

least one of the following properties: toxic, flammable, corrosive, reactive or genotoxic; pharmaceutical waste: unused, expired, or contaminated vaccines, sera and drugs; cytotoxic waste: waste containing substances with genotoxic properties

(i.e., carcinogenic, mutagenic, or teratogenic chemicals), such as cytotoxic drugs used in cancer treatment and their metabolites; and Radioactive waste: All materials contaminated with nucleotides of radioactive substances that are

used in nuclear medicine, radiotherapy, or in cancer diagnosis and treatment (Ale Livs 2013).

There are about 16 billion injections calculated to be administered every year throughout the world. Needles and syringes are not all discarded safely, with a possibility of reuse, making high risk of infection and injury. Thirty-three thousand eight hundred new cases of HIV, 315,000 cases of HCV infections, and 1.7 million cases of HBV infections were encountered in 2010 as adverse effects of unsafe injections (Pépin et al. 2014). A person who experiences one needle-stick injury from a needle used on an infected source patient has risks of 30%, 1.8%, and 0.3% respectively of becoming infected with HBV, HCV, and HIV. Additional hazards occur from searching in waste disposal sites and during the handling and manual segregation of hazardous waste from health-care facilities. The waste handlers are at immediate risk of needle-stick injuries and exposure to toxic or infectious materials (Ale Livs 2013). A disposal plan should be made for the collection, handling, predisposal treatment, and terminal disposal of medical wastes. Trained persons should be designated to be responsible for establishing, monitoring, reviewing, and applying the plan. Sharp waste should be placed into puncture-proof containers located as close as possible to the point of use. Used syringe needles should not be bent, recapped, or broken before discarding them into a container. Regulated medical wastes temporary stored awaiting treatment should be placed in a well-ventilated area that is inaccessible to neither insects nor animals. If the final treatment of the medical waste cannot be done at the site of its generation, regulated medical waste should be transported in closed, rigid containers to the final treatment site. Treatment methods of regulated medical wastes include (steam sterilization, incineration, burial, or microwave treatment). Microbiological wastes must be first inactivated in the laboratory (e.g., by autoclaving) before transport to a sanitary landfill. Safe disposal of liquid infectious waste, blood, suctioned fluids, ground tissues, excretions, and secretions, can be done through sanitary sewers, on the condition that local sewage discharge requirements are fulfilled and that the authority has accepted this to be an appropriate method of disposal (Recommendations of CDC and the Healthcare Infection Control Practices Advisory Committee (HICPAC) 2003). The infection preventionists (IPs) play a key role in improving quality of health care, since they consistently collect definition-driven wealth of data, they routinely use data to monitor practices and outcomes, and they can help their organization to fulfill accreditation requirements for quality assurance and performance improvement (QAPI) programs (Fakih et al. 2013; Freidman et al. 2008). The Six Sigma DMAIC (an acronym for Define, Measure, Analyze, Improve, and Control) methodology is a data-driven improvement cycle used for improving, optimizing, and stabilizing processes and designs (Quinn

2018). Quality improvement essential tools includes the tools and templates needed to launch a successful quality improvement project and manage performance improvement, e.g., cause and effect diagram, flow chart, Pareto diagram, control chart, etc. (Langley et al. 2009). A waste management improving program was designed according to evidence-based best practices.

The aim of the work is to improve the performance of the existing waste management system in the facility, through conducting a quality improvement project to initiate some action plans to organize and control the waste management process according to infection control policy and to build awareness/consciousness among hospital staff.

Methods

This project focused on improving waste management in the facility utilizing the basic Six Sigma breakthrough problem-solving methodology DMAIC. It consists of five phases: Define, Measure, Analyze, Improve, and Control (Langley et al. 2009; Arthur 2016).

Hospital in brief

The healthcare facility is a referral ophthalmic research center, with daily attendance of more than 400 patients referred from all governorates of Egypt at general outpatient and specialized clinics, of which an average of 40 patients are submitted to operative procedure. The average amount of waste output is 100 kg/day of normal waste in addition to 30 kg/day infectious or medical waste.

Define step

Identify a project

After analyzing the process of waste management at hospital, it was noticed that complaints about its performance have been increased, and the hospital was penalized for improper waste disposal. The hospital administration decided to focus on waste management as an improvement opportunity. Hospital administration adopted the head of infection control unit, public health, and quality resource office to increase adherence to waste management policy, and they nominate this project.

Control step : Process outcome: The team designed a control chart (Fig. 4) to weekly monitor errors in performance in waste management process (as shown before in operational definition) using checklist to assess the stability of the improvement, i.e., when the stream of data falls within control limits based on plus or minus three standard deviation (3 sigma) of the central line (the mean). The chart showed process stability through the first 12 weeks, and shifting towards the desired direction of reduced errors in waste management performance was obtained from the 13th week ongoing (more than eight data records on the same side of line of the mean value

Control measures: to sustain the improvement, the team instituted the following measures:

•Orientation programs for physicians, nurses, and workers, including in-service training.

•Continuing audit tool of chick list for waste disposal performance.

•Visual education by posters and signs on proper waste management steps.

•Ongoing training and orientation for new residents, nurses, and housekeeping workers.

•The team had determined the actual standard for the process steps to go through quality control follow-up (Table 5). We established control standards to be less than 0.3% error in solid waste bags disposal and in cleaning of interim storage room, 0.5% in timeliness, and 0% in sorting, sharps disposal, or returning to historic mistake.

•New high-level flow diagram had been designed to show the more detailed steps of proper waste management performance (Fig. 5). Disposal of liquid chemical waste would follow pharmacy guidelines: non-chemical fluid waste to be disposed off through the normal drainage system, sharps waste through

safety box then to be collected in red bags, and solid infectious non-sharp waste to be collected in red bags and finally hand over to the nearby hospital of Veterinary Medicine for incineration, and solid radiation waste to be collected in yellow bags with sign on top then transported to the atomic energy institute, solid ordinary noninfectious waste to be collected in black bags and finally hand over to the General Authority of Cleaning and Beauty.

Note : This is shortly presented at Cancer Treatment 2020 on November 05-06, 2020 at Madrid, Spain.