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"STUDY ON HOSPITAL SOLID WASTE MANAGEMENT IN INDIA"

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ABSTRACT

Hospital solid waste management is an emergency for hospital management because it directly affects the hygiene and safety of the hospital staff, patients, society, and waste management staff. All the hospital solid waste is collected, stored, separated, and transported through the hospital's central processing unit. The hospital waste management department uses a disposal mechanism. For this purpose hospital, solid waste management uses different color codes to collect and store solid waste. All the waste management staff use safety measures for handling hospital waste. The entire staff must be aware of biomedical waste management law. It is necessary to use a mask, gloves, and aprons to sort, sort, store, and transport hospital waste because some hospital wastes spread infection. Staff should use all safety measures to manage hospital waste. Inappropriate disposal of hospital solid waste is a fundamental source that spreads infection and pollution and creates various health issues for human beings and animals. It also affects the environment. This research paper focuses on various types of hospital waste and their management for improvement of the quality and efficiency of hospitals. This research paper also suggests some recommendations to solve this problem.

INTRODUCTION

The objective of this research paper is to study the hospital's solid waste management system. India has witnessed rapid growth in healthcare organizations and hospitals. Improper hospital solid waste management has spared a negative impact on animals and human beings as well as the environment. This paper aims to take an overall review of hospital waste management and its impact on the environment. There is some waste that is generated by humans, i.e., municipal waste, industrial waste, agricultural waste, sewage, and hospital waste. Wastage can create different kinds of pollution like water pollution, air pollution, and soil

pollution. Smog is harmful to human beings as well as animals, so it is necessary to handle it carefully. Some wastage is hazardous to animals and directly affects them, while some are non-hazardous. In this research, the paper researcher has proposed a study on solid waste generated by hospitals. Some hospital wastes are infectious, while some are not.

OBJECTIVE OF THE STUDY

1. To study the various hospital solid wastages.
2. To examine the hospital waste management system in India.

RESEARCH METHODOLOGY

This paper conducts a qualitative research study to investigate the various factors affecting hospital solid waste management. This research paper aims to find out the various hospital's solid wastes that are directly and indirectly affecting human beings and animals. The researcher uses the qualitative research design, data collected by secondary sources like a published research paper, articles, newspapers and documents, book of laws.

THEORETICAL FRAMEWORK

Hospital solid waste is defined as waste arising during treatment, diagnosis of animals and human beings in hospitals, outside the hospital, or conducting any research. Hospital solid waste has been divided into some categories. The categories are based on risk and injuries incurred in the handling, collecting, and disposal stage of waste, i.e., general waste, pathological waste, radioactive waste, chemical waste, infectious and potentially infectious waste, sharp waste, pharmaceutical waste, pressurized container waste, etc.

1. **General waste-** General waste is found in all the departments of hospitals in various forms. It is collected, sorted, and stored in a black bag, bin bag, or container. General waste is an organic waste material. Hospital food service, canteen, snacks room, tiffin, lunch box of patients, fruits and fruit peel is a basic form of general waste. Hospital food service center, snacks room, canteen generate food-related waste. All by-products used in foodservice, plastic water bottles, papers, tissue paper, paper bags, plastic bags, are also included in general waste. General waste is mostly collected by hospital housekeeping staff and transported to the municipal waste department. Municipal waste material van collects all general waste daily. They store and dispose of general waste in a centralized method.

2. **Pathological and microbiological waste-** microbiological culture, body tissue, organs, blood samples of humans and animals are included in Pathological and microbiological waste. It means any human organs, body parts, tissues used in treatment, an experiment in research, animal waste is related to animal organs, tissues, body part, fluids, blood, etc. all these wastages include dressing cotton, plasters stored in yellow bin bags or container.

3. **Chemical waste-** chemical waste includes expired medicine, medicine bottles, all liquid waste, chemicals, microbiological waste, human anatomical waste, cytotoxic drugs, etc. all this chemical waste is collected and stored in yellow non-chlorinated bags and bins or containers. All the chemical waste is stored in the central unit and transported to the incinerator for further disposal. Some unused and

expired drugs and vaccines, solvents, and reagents utilized for laboratory preparation, heavy metals container, and batteries used in a laboratory also come under chemical waste.

4. **Sharp waste-** it includes metal razors, blades, fixed needle syringes. It is collected, separated, and stored in separate sharp boxes. Sharp waste is harmful in collection and storage steps due to improper precautions. It is held in puncture-proof and leak-proof containers, bags, bins. For storage and display of sharp waste, use a white transparent container. All sharp waste is collected and transported from the central processing unit to the incinerator to further treat disposal. At the time of disposal, waste management staff should take proper precautions and care because it includes broken glasses, sharp metal, and other sharp instruments. All this sharp waste is stored in a blue container box and transported to the central unit for further disposal. Sometimes sharp waste inflicts various injuries to staff and patients.

5. **Plastic waste-** hospital generates extensive plastic waste. It includes recyclable plastic bottles, bags, vacationers, I/V sets, syringes, urine bags that are recycled. All this material is collected and stored in the central storage unit. All this waste is shredded after recycling the plastic waste. It is sent for final disposal to the incinerator. Hospitals use this recycled plastic waste at a minimum cost with minimum staff. Plastic, directly and indirectly, affects the environment. It is necessary to recycle plastic waste to reduce and control pollution. Firstly the recycle unit needs to find out the various types of plastic waste generated in hospitals, and after that, division of the plastic waste into multiple categories like infectious plastic waste and non-infectious plastic waste must be done. Infectious plastic waste is not to be recycled because it creates a higher risk of infection. Hospital waste managers develop some strategies and technologies for recycling plastic waste. Various factors affect recycling plastic waste. It includes rules and regulations, infrastructural facilities, available finance, cost of recycling, safety, and available recourses.

6. **Radioactive waste-** radioactive waste includes high radiation sources and traces the amounts of specific isotopes. Hospitals and healthcare organizations use radioactive isotopes for diagnosis and therapy. Nuclear medicine mostly generates radioactive waste. Most radioactive waste is in liquid waste, but sometimes it is seen in the solid form. It includes syringes, cotton swabs, contaminated gloves, needles, vials. The primary purpose of effective management of radioactive waste is to minimize and reduce radiation exposure and maintain the safe limit because high radiation exposure is harmful to patients, staff, and the environment. It, directly and indirectly, affects human beings and animals. The effect of radioactive waste is longer. The effective management of radioactive waste should minimize the negative impact of radiation on the environment. Management should prepare some strategies and plans to minimize radiation levels. Some rules and principles for radiation protection to be adopted to optimize the level of radiation. Hospital management should use high-quality and safe radiation equipment and appoint a radiation safety officer to inspect and supervise radiation waste.

7. **Infectious and potentially infectious waste-** human and animal culture, the stock is an infectious agent associated with laboratories and research industries. Any bacteria or virus spread through body tissues and organs, which generates disease and affects humans, is called infectious waste. It is generated from diagnosis,

surgery, and treatment of patients; sometimes, it spreads the infection to the doctors, staff, attendees, and patients. Blood, semen, feces, urine, pleural fluid, vaginal secretions, etc., are highly infectious waste.

PRACTICAL IMPLEMENTATION-

This research study has made some recommendations that would prove to be useful in improving the management system of hospital solid waste. Proper implementation of safety measures and tools provided by hospital waste manager enhances the efficiency of working and reduces the generation of hospital solid waste. This study recommends that management should provide basic training for the proper use of available human resources. It improves the awareness of wastage handling and management. It gives adequate guidelines for creating a healthy and hygienic environment and reducing accidents at the workplace and minimizing infection due to solid hospital wastages.

CONCLUSION

Hospital solid waste management is a process that includes the collection, pickup, separation, transportation, sorting, storage, processing, disinfection, mutilation, and disposal of solid waste that is generated in hospitals. The government of India and the Ministry of environment regulate hospital waste by providing a regulatory framework for the management of hospital waste produced and developed in hospitals. Biomedical waste management (management and handling) rule 1998, Biomedical waste management rule 2016, and environment protection act 1986 is a basic act which provides basic rules and regulation for hospital solid waste management. The proper implementation of these rules improves collection, sorting, transportation, disinfection, treatment, storage, and disposal of hospital solid waste. Hospital solid waste management aims to reduce the generation of hospital waste and improve the healthy environment within the hospital and outside the hospital.

Improper handling of hospital solid waste causes several infections. Every health care organization's in-patient and out-patient creates heavy hospital solid waste. The biomedical waste manager has to follow all the rules of the biomedical waste management act 2016. Waste management staff must be provided full knowledge about the color code usage for storage of waste boxes, bins, and containers. Sometimes there is a transmission error in the collection and segregation of waste in another department or a wrong container. Hospital waste management should follow the proper steps for efficient disposal. It should follow all the rules and regulations for handling waste safely. Sometimes the waste management staff does not use the safety tools like gloves, masks, etc., which spreads the infection to the staff and the patients, creating an unhygienic environment.

RECOMMENDATIONS-

1. Hospital solid waste manager should install color code containers, bin bags, and cardboard boxes to collect various types of hospital waste.
2. Staff and patients should use safety measures while handling solid waste.
3. A record must be kept regarding the hospital waste management; it is useful for improving staff performance, resources allocation, cost management, etc.

4. Hospital solid waste managers should regularly check the quality of the waste management system.
5. It should follow some strategies and policies for the collection and segregation of solid waste to minimize the cost of management.
6. It should provide basic training programs on how to handle and collect, store, transport hospital waste. It should focus on following the best practices.
7. It should concentrate on minimizing the generation of hospital waste and arrange a regular periodical inspection.
8. It should be made sure that the hospital solid waste is managed, handled safely, and disposed of most appropriately.
9. It should provide information and communicate the basic knowledge about waste handling and disposal policies, procedures with manuals.
10. It should be aware of the collection of wastages according to types of waste and concentrate on replacing bags, bins, and containers immediately after transportation of waste.
11. Hospital waste managers should conduct and follow awareness programs to minimize pollution and improve the environment's health.
12. It should be aware of the storage and disposal of infectious waste because it causes infection to the staff and patients.
13. Management should purchase high-quality disposal bags, bins, and containers that are easy for handling and cleaning as well as for easy transportation from one place to another place.
14. All the disposal bags should be labeled appropriately with the name of the department and the date of collection. All containers should have a biohazardous symbol.
15. Hospitals should re-use and recycle waste if possible for example, metal, glass, and plastic can be easily recycled or re-used.

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