

# **Biomedical Waste Management in A Cancer Hospital of Hyderabad**

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## **ABSTRACT**

### **Introduction**

Hospital waste, also known as healthcare waste is the waste generated in healthcare facilities such as hospitals, clinics, nursing homes, laboratories, and research centres. It includes materials that are infectious and hazardous. Hence hospitals must prioritize the proper disposal. It is much more crucial in cancer hospitals due to the nature of waste generated and the potential risks associated with it. Cancer patients often have compromised immune systems, making them more susceptible to infections.

### **Objective**

The study focuses on biomedical waste management practices in a cancer hospital of Hyderabad. It also studies the knowledge, attitude, and practices of healthcare workers in this aspect.

### **Methodology**

An observational study was conducted in a cancer hospital of Hyderabad. An observational checklist was used in 22 areas of the hospital for compliance. A questionnaire was administered to the healthcare workers to understand their knowledge, attitude, and practice levels. The data was analysed using descriptive statistics.

### **Result**

Though the majority of the healthcare staff had adequate knowledge, they did not practice the same. Regular training sessions and surprise auditing can help in improving these practices.

**KEYWORDS:** Radioactive Waste, Cytotoxic Waste, Knowledge, Attitude and Practices

## **INTRODUCTION**

The healthcare sector is one of the fastest-growing sectors in India. As healthcare services have expanded, so has the amount of medical waste generated. This hospital waste or biomedical waste contains sharps, chemicals, syringes, expired drugs, and infectious materials. The increase in medical waste is due to several factors, including population growth, advances in medical technology, and changes in healthcare practices. An increase in purchasing power and awareness of preventive services has resulted in an increase in

healthcare facilities. Changes in healthcare practices such as the increased use of disposable items and the adaption of infection control measures have also contributed to the increase in medical waste. For example, the use of single-use items like gloves, masks, and gowns has become more common, increasing the amount of waste generated.

Hospital waste possess serious risks to the environment and public health. Proper management of this waste is critical to protect public health and the environment, and it requires careful handling and adherence to guidelines and regulations. Biomedical waste management is crucial in all healthcare settings, including cancer hospitals. Cancer patients undergo various treatments such as chemotherapy, radiation therapy, and surgery which generate a significant amount of radioactive waste. Improper management of biomedical waste can lead to the spread of infections and diseases that can be life-threatening to cancer patients.

### **REVIEW OF LITERATURE**

**V. K Maurya et. al (2022)** assessed the knowledge, attitude, and practices of frontline workers after COVID-19. They conducted this study on 260 healthcare workers at a tertiary care hospital in Uttar Pradesh. The nursing staff had the best knowledge and attitude, but resident doctors exhibited better practices. Inadequate knowledge and inappropriate practices in healthcare waste management can lead to poor infection control measures and can result in hospital-acquired infections.

**T. J Basavaraj et. al. (2021)** studied the knowledge, attitude, and practices of biomedical waste management among healthcare workers in a dedicated COVID-19 hospital. The knowledge, attitude, and practices were adequate in doctors and nurses. However, the housekeeping staff lacked in all three aspects.

**K. Deepika (2019)** conducted an observational study in a tertiary hospital in Coimbatore. The study included resident doctors, staff nurses, lab technicians, and class IV employees. The resident doctors and lab technicians had good knowledge regarding waste segregation and legislation, but lacked in other aspects. Group IV workers had poor knowledge in all aspects of biomedical waste management. Regular training sessions can help in reinforcing the practices.

**Rao D. et. al. (2018)** conducted a cross-sectional study on healthcare workers of a teaching hospital. This included doctors, nurses, technicians, and housekeeping staff. The practice of recapping of needles was very low, thereby the incidence of needle stick injury was also very low. This was due to the training sessions and the adequate number of needle cutters in the patient care areas.

**Malini A. et.al (2015)** conducted a study to assess the biomedical waste management practices among healthcare workers of a tertiary hospital in Puducherry. All the healthcare workers had poor knowledge regarding the segregation and colour coding of bins. None of the class IV employees received any training on biomedical waste.

**Vanesh Mathur et. al (2011)** conducted a study among hospitals with a bed capacity of more than 100 beds. Housekeeping staff were ignorant and injury reporting was low in all groups of healthcare workers.

## RESEARCH GAP

While biomedical waste management is a critical aspect of healthcare facilities, the specific context of cancer hospitals brings additional consideration due to the nature of the waste generated. Cancer hospitals generate a wide range of specialized waste including radioactive and cytotoxic waste. As per the findings of the literature review, it is found that there is a scarcity of studies focused on biomedical waste management practices in cancer hospitals. No such study is conducted in the city of Hyderabad.

## OBJECTIVES

The study has the following as its objectives

- To study the biomedical waste management practices of a cancer hospital in Hyderabad.
- To study the knowledge, attitude, and practice levels among the healthcare workers of the cancer hospital.

## RESEARCH METHODOLOGY

The study was conducted in a super specialty cancer hospital in Hyderabad. The areas covered were in-patient wards, intensive care units, laboratories, and central storage area of biomedical waste.

## SOURCES OF DATA

The study included both primary data and secondary data. An observational checklist was prepared and observed for compliance in 22 areas of in-patient wards, intensive care units, laboratory, and central storage area of biomedical waste. A pre-designed questionnaire was prepared on different aspects of knowledge, attitude, and practices of biomedical waste management. Secondary data was collected from journals, articles, and websites.

## SAMPLE DESIGN

A simple random sampling method was used for this study. The sample included nurses, paramedical staff, and housekeeping staff working in different departments and different shifts.

## SAMPLE SIZE

The questionnaire was administered to 200 healthcare staff of a cancer hospital. Before administering the questionnaire, the purpose of the study was briefed to the staff.

**SCOPE OF THE STUDY**

The study was confined to the healthcare staff (nurses, paramedic staff, and housekeeping staff) of a cancer hospital in Hyderabad.

**OBSERVATIONAL CHECKLIST**

An observational checklist was designed and checked in 22 different areas (1 MICU, 2 SICU, 2 HDU, 1 female ward, 1 male ward, 4 deluxe wards, 2 triple sharing wards, chemo mixing room, OPD treatment room, Histopathology department, Biochemistry department, Haematology department, Microbiology department sample collection room, PET CT, Biomedical central storage department) of the cancer hospital for compliance.

**Table 1: Observational Checklist**

S.no	List of points	Yes	No
1	Are the biomedical waste bins clearly labeled?	5	17
2	Are the bins tightly closed?	2	10
3	Is there any evidence of container deterioration?	11	11
4	Is the ground clean and dry?	12	10
5	Are spaces between containers clear of debris?	6	16
6	Are there any signs of leaks or spills?	1	21
7	Is spill response equipment adequate and accessible?	7	15
8	Are ‘no smoking’ signs and fire extinguishers in place and clearly visible?	4	18
9	If required, is an eyewash station accessible and ready for use?	6	16
10	Are hazardous waste and cytotoxic waste signs in place and clearly visible?	8	14
11	Are all waste containers stored inside the waste storage area?	13	9
12	Are flammable wastes properly stored?	19	3
13	Is there adequate aisle space?	15	7
14	All infectious wastes are segregated into the yellow bin	14	8
15	All recyclable plastic wastes are segregated into the red bin	17	5
16	All glass wastes are segregated into the blue bin	16	6

17	Biomedical waste is transported to the central storage area in a covered trolley		✓
18	Are infectious and general waste transported separately?		✓
19	Appropriate PPE provided and utilized by waste transporters		✓
20	The waste is not stored beyond 48 hours	✓	
21	Is the BMW colour coding system used by the waste collection van?		✓
22	Does the waste collection van have a biohazard/cytotoxic symbol on it?	✓	

According to the above table, it is clearly evident that out of 22 areas in the hospital many are lacking compliance in different aspects. Covered trolleys are not being used for on-site transportation which can result in spillage. Mixing infectious waste with general waste during transportation should be avoided. Appropriate PPE is not being used by the housekeeping staff during transportation. PPE creates a barrier between the waste and the individual, thereby minimizing the risk of exposure and hazards of infections and injuries.

**Knowledge, Attitude, and Practices of Healthcare Workers**

A questionnaire was designed on different aspects of knowledge, attitude, and practices of biomedical waste management. Each section had 10 questions. A score of 1-3 was categorized as ‘poor’, 4-6 as ‘average’, and a score of above 6 was categorized as ‘above average’.

**Table 2: Knowledge Levels of Healthcare Staff**

S.no	Knowledge levels of healthcare staff	Frequency
1	Poor (score 1-3)	0
2	Average (score 4-6)	13
3	Above average (>6)	187

The data furnished in Table 2 shows that out of 200 healthcare workers, 187 were having ‘above average’ level of knowledge, and 13 were having ‘average, level of knowledge pertaining to biomedical waste.

**Table 3: Attitude Levels of Healthcare Staff**

S.no	Attitude levels of healthcare staff	Frequency
1	Poor (score 1-3)	0
2	Average (score 4-6)	20
3	Above average (score >6)	180

The data furnished in Table 3 shows that out of 200 healthcare workers, 180 were having ‘above average’ level of attitude and 20 had an average attitude pertaining to biomedical waste.

**Table 4: Practice Levels of Healthcare Staff**

S.no	Practice levels of healthcare staff	Frequency
1	Poor (score 1-3)	0
2	Average (score 4-6)	36
3	Above average (score >6)	164

The data furnished in Table 4 shows that out of 200 healthcare workers, 164 exhibited ‘above average’ practices and 36 scored ‘average’ in this section.

**FINDINGS**

The present study was an attempt to understand the biomedical waste management practices of a cancer hospital in Hyderabad. The major findings arrived at are given below

- An analysis of the demographic profile of the healthcare workers revealed that out of 200 healthcare staff, 79% were females and 21% were males.
- 35.50% of the healthcare staff were diploma holders, 34.5% were graduates, 18% had a formal education of less than 10<sup>th</sup> class, and 12% were illiterates.
- 48 % of the healthcare staff had less than 1 year of experience, 39% had an experience of 1-2 years, and 13% had an experience of ‘more than 2 years’.
- 57% of the healthcare staff were nurses, 32% were laboratory staff, and 11% were housekeeping staff.
- Majority of the healthcare staff were having ‘above average’ level of knowledge, attitude, and practices.
- There were some gaps observed in the implementation of guidelines. The bins were not clearly labeled and the ‘cytotoxic’ signs were not clearly visible. The spaces

between containers need to be cleared of debris. Fire extinguishers and eyewash stations should be in place and should be accessible.

- Most of the bins were not closed tightly which can amount to hospital-acquired infections.
- Out of 22 areas only 7 areas had spill management kits. Adequate spill management kits should be placed in all patient care areas.

## CONCLUSION

Cancer hospitals deal with a range of wastes including chemotherapy waste, radioactive waste, cytotoxic waste, pathological waste, and sharps contaminated with potentially hazardous substances. These waste streams require specialized handling, segregation, storage, transportation, and disposal procedures to ensure safety. Proper management of biomedical waste is crucial in cancer hospitals to minimize the risk of exposure to hazardous waste, prevent the spread of infection, and protect the health and safety of patients, healthcare workers, and the general public.

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