Original Article

A Study On Assessment Of Quality Procedure And Practices Adopted Among Hospitals In Rohilkhand Region

Deepika Sharma[1]*, Prof. (Dr.) Pankaj Kumar Rai[2], Rohit Kumar Bijauliya[3] and Sunny Patel[4]

*[1]Ph.D Research Scholar, Department of Education, Invertis University, Bareilly, U.P., India. Email: mrsdeepika3@gmail.com
[2]Professor & Head of Department, Department of Biotechnology, Invertis University, Bareilly, U.P., India.
Email: pankaj.r@invertis.org
[3]Assistant Professor, BIU College of Pharmacy, Bareilly International University, Bareilly, U.P., India.
Email: rkpharma3791@gmail.com
[4]Ph.D Research Scholar, Department of Biotechnology, Invertis University, Bareilly, U.P., India. Email:patelsunny0111@gmail.com

***Corresponding Author:** Deepika Sharma

*Ph.D Research Scholar, Department of Education, Invertis University, Bareilly, U.P., India. Email: mrsdeepika3@gmail.com
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Abstract

The classification of biomedical wastes based on the source from which they are created includes many risk factor related to their handling and eventual disposal. A tertiary care hospital's compliance with various categories of biomedical waste management was assessed. A checklist with 17 biomedical waste management-related criteria, including "condition of waste containers," "segregation of waste," and "mutilation of recyclable waste," was created and compliance was monitored in 70 different patient care settings, including wards, casualty departments, operating rooms, and intensive care units. During the two-month study period from 1 November to 31 December 2021, any three non-consecutive days were used to visit each area. Thus, a total of 30 visits were made to area and mean percentage score was analysed for each area and each category of biomedical waste management. For Medicity Hospital OTs, Wards, Casualty, and ICU the mean percentage was 90%, 90.67%, 94.64 and 92.17% respectively. In Ram Ganga Hospital, the mean percentage was 88.67%, 91.34%, 92.34 and 91% respectively. For Vaidic Hospital, the mean percentage for these categories was 74.67%, 85.34%, 73.34% and 78% respectively. It was determined that more importance needs to be rested for 'mutilation of recyclable waste' especially in wards.

Keywords: Bio-Medical Waste, Collection of waste, Bio-medical waste segregation, Waste disposal, biomedical waste management

INTRODUCTION:

Biomedical waste management has become a significant issue with the continuous increase in the population the health care facilities are rapidly expanding leading to serious health problems and environmental hazards [1]. With the ongoing population growth and the resulting fast expansion of healthcare institutions, biomedical waste management has emerged as a significant challenge that poses both substantial health risks and environmental risks.

The development of biomedical waste has grown, creating a management issue, as a result of population growth and the fast expansion of healthcare facilities. It is essential for staff members to be aware of the risks posed by the biological waste in the workplace and to dispose of it efficiently and scientifically [2, 3]. After the Government of India's Biomedical Waste (Management and Handling) Rules were put into effect in 1998.

Each occupier of a facility that produces biomedical waste, such as a hospital, nursing home, clinic, dispensary, veterinary facility, animal house, pathological laboratory, or blood bank, shall be responsible for taking all reasonable precautions to ensure that the waste is handled in a manner that protects both human health and the environment.

An excessive amount of waste has been generated as a result of a large number of procedures carried out at the various healthcare facilities. According to WHO report, 20% of the total wate generated by health care activities are hazardous. [4]

Biomedical waste must never be combined with other types of trash. Prior to being stored, transported, treated, and disposed of, biomedical waste must be separated into containers or bags at the place of creation in accordance with Schedule II. The main issue with biomedical waste is that the regulations governing its disposal are not followed. Particularly HIV, Hepatitis B and C, and Tetanus are among the illnesses that are spread by this hazardous waste. Implementing an appropriate strategy and ensuring that waste management procedures are being followed are consequently among the top responsibilities for hospital administration and healthcare staff. Specifically, HIV, Hepatitis

B and C, and Tetanus are spread by this hazardous waste. [5-8] Therefore, putting in place a sound policy and ensuring that waste management procedures are followed should be one of the top objectives for hospital administration and medical staff.

Non-compliance with biomedical regulations and disposal are the main issues related to biomedical waste. Improper segregation, results in mixing of hospital waste with general waste making the whole system hazardous hospital waste if mixed with normal waste due to improper segregation, makes the entire system hazardous. In turn, this leads to offensive odour, multiplication of insects, and the spread of infectious diseases like typhoid and cholera via infected syringes and needles. The recycling of usable syringes, needles, and other medical devices and improper sterilization also contribute to the transmission of blood-borne and nosocomial infections such as Hepatitis, HIV. [9, 10]

The World Health Organization (WHO) has classified medical waste into eight categories [4] which includes general waste, pathological, radioactive, chemical, infectious to potentially infectious waste, sharps, pharmaceuticals, pressurized containers as described in Table 1. Hospitals generate waste, which is growing over the years in its volume and type poses a threat to public health and environment in addition to the risk for patients and workers who handle them [11, 12]. The sources for biomedical waste management includes hospitals, primary health centres, research centres, blood banks, mortuaries , animal houses, slaughterhouses, blood donation camps.

Table 1: Classification of biomedical waste [13]

Category	Waste type	Treatment and disposal
Category 1	Human anatomical waste	Incineration and deep burial
Category 2	Animal waste	Incineration and deep burial
Category 3	Microbiology and biotechnology waste	Incineration/microwave/ autoclaving
Category 4	Sharps	Disinfection/microwaving/autoclaving/ shredding
Category 5	Discarded medicine and cytotoxic drugs	Incineration/landfill
Category 6	Contaminated solid waste	Incineration/microwave/autoclaving
Category 7	Solid waste (other than sharps)	Disinfection/microwaving/autoclaving/ shredding
Category 8	Liquid waste	Disinfection and discharge in drains
Category 9	Incineration ash	Disposal in municipal landfill
Category 10	Chemical waste	Disinfection and discharge in drains and secured landfill for solid wastes

Statement of the Research Problem: The main focus of this research is that hospital waste management, particularly in government, charitable, and private hospitals, clinics, and diagnostic facilities, is a severe problem that has not been fully addressed. The majority of the time, primary healthcare providers receive insufficient training on hospital waste management procedures, and there is no hospital waste segregation or risky disposal mechanism. The dumps are unregulated, exposed, and smack dab in the middle of neighbourhoods. Furthermore, the way that people dispose of their rubbish is determined in and of itself. They eliminate their garbage as rapidly and inexpensively as possible without using hygienic methods. This motivated the researcher to carry out a research using Government, Charitable, and Private Hospitals/ Clinics/ Diagnostic centers in Rohilkhand Region, Uttar Pradesh for the study.

Significance of the study: The purpose of this study is to raise staff members of Bareilly's public, nonprofit, and private hospitals, clinics, and diagnostic facilities' awareness of the health risks associated with hospital waste. Additionally, it will provide recommendations to the government and policy makers on the necessity of using the right resources and techniques for trash collection, storage, treatment, and disposal that will benefit the neighbourhood. Additionally, to inform healthcare professionals of the importance of ensuring adequate hospital waste collection, storage, transportation, treatment, and final disposal.

METHODOLOGY:

Study areas and number of visits:

Between 1 November 2021 and 31 December 2021, the study was carried out. There was no sample done, and the study included all 70 patient care areas of the hospital's 100, 60 and 30 beds. There were twelve emergency rooms, twenty-five waste collection points for the wards, eleven ward treatment rooms, eight intensive care units, and three operating rooms (14 in number).

On any three days during the study period—non consecutive—each region was visited. On Sundays and on public holidays, no visits were made. On the same day, between 4 and 7 O'clock in the evening, severe location were visited. In two months, a total of 30 trips were made to the area.
All observations were made by same researcher.

Condition of waste containers:

- Is red colour bin available in each area?
- Is yellow colour bin available in each area?
- Is blue colour bin available in each area?
- Is green colour bin available in each area?
- Is red colour bag placed in the red colour bin in each area?
- Is yellow colour bag placed in the yellow colour bin in each area?
- Is blue colour bag placed in the blue colour bin in each area?
- Is green colour bag placed in the green colour bin in each area?
- Is the biohazard symbol printed over waste bags?
- Are the colour bins covered?

Segregation of waste:

- Does the red bin with red bag contain only plastics?
- Does the yellow bin with yellow bag contain only soiled infectious waste?
- Does the blue bin with blue bag contain only glass-broken or unbroken, metallic and body implants?
- Does the green bin with green bag contain general waste?

Mutilation of recyclable waste:

- Is used hypodermic needle destroyed?
- Is used hypodermic needle disposed in white puncture-proof containers?
- Is used hypodermic needle re-capped?

RESULTS:

Total waste generated in the Medicity hospital 100-bedded hospital in 2 months was 561.004 kg/2month. After segregation, 220.946 kg, 215.740 kg, 108.738 kg and 15.580 kg was kept in yellow, red, blue, and black bins respectively in 2 months. The bed occupancy rate of the hospital was 81% - thus, average hospital waste generated in the hospital was 8.46 kg/bed/day [Table 2].

Total waste generated in the Ram Ganga Hospital 60-bedded hospital in 2 months was 139.932 kg/2-month. After segregation, 100.061 kg, 12.038 kg, and 27.833 kg was kept in yellow, red, and blue bins respectively in 2 months. The bed occupancy rate of the hospital was 74% - thus, average hospital waste generated in the hospital was 2.30 kg/bed/day [Table 2].

Total waste generated in the Vaidic hospital 30-bedded in 2 months was 27.250 kg/2-month. After segregation, 15.050 kg, 7.100 kg, and 5.100 kg was kept in yellow, red, and blue bins respectively in 2 months. The bed occupancy rate of the hospital was 56% - thus, average hospital waste generated in the hospital was 0.446 kg/bed/day [Table 2].

Table 2: List of waste generated Hospital

Name of Hospital	Total waste generate in 2 month	Waste in Red	Waste in Yellow	Waste in Blue	Waste in Black
Medicity hospital	561.004 kg/2month	215.740 kg	220.946 kg	108.738 kg	15.580 kg
Ram Ganga Hospital	139.932 kg/2month	12.038 kg	100.061 kg	27.833 kg	-
Vaidic Hospital	27.250 kg/2-month	7.100 kg	15.050 kg	5.100 kg	-

Table 3: Quantity of waste in different areas of 3 different hospitals

MEDICITY HOSPITAL (100 bedded hospital)					
Category of biomedical waste	**Wards (n=15) %**	**OT (n=10) %**	**ICU (n=6) %**	**Casualty (n=4) %**	**Overall score of BMW (n=35) %**
Condition of waste containers	92	87	85	91	88.75
Segregation of waste	95	94	99.5	98	96.625
Mutilation of recyclable waste	85	89	92	95	90.25
Overall score of the area (%)	90.67	90	92.17	94.66	91.875
RAM GANGA HOSPITAL					
Category of biomedical waste	**Wards (n=9) %**	**OT (n=7) %**	**ICU (n=3) %**	**Casualty (n=1) %**	**Overall score of BMW (n=20) %**
Condition of waste containers	93	87	89	92	90.25
Segregation of waste	92	91	93	93	92.25
Mutilation of recyclable waste	89	88	91	92	90
Overall score of the area (%)	91.34	88.67	91	92.34	90.84
VAIDIC HOSPITAL					
Category of biomedical waste	**Wards (n=7) %**	**OT (n=5) %**	**ICU (n=2) %**	**Casualty (n=1) %**	**Overall score of BMW (n=15) %**
Condition of waste containers	85	87	75	65	78
Segregation of waste	87	72	86	74	79.75
Mutilation of recyclable waste	84	65	73	81	75.75
Overall score of the area (%)	85.34	74.67	78	73.34	77.84

Figure 1: Collection of waste in different dustbin

62 (59.65%) of the 89 handlers of hospital waste who were surveyed said they were aware of risks such infections like HBV and HIV, injuries from sharp objects, chemical burns, and spills while handling trash during segregation, transportation, storage, disinfection, and disposal. The remaining 37 (65.21%) individuals reported not knowing about the risks.

It was found that 17 (or 60.87%) of the 75 locations where waste was generated had all four color-coded trash cans. However, 5 (14.34%) and 8 (25.65%) locations lacked coloured bins in the shades of red, yellow, blue, and black, respectively. Only 3 (10.00%) of the plastic bags in these bins were properly arranged according to their colour.

Separate timed and covered wheeled carts were utilised while transporting garbage from the locations of generation to the storage area in order to prevent mixing of the hazardous waste generated during medical procedures with the non-hazardous general waste generated in the hospital. No distinct routes were developed for the conveyance of the hospital wastes, and neither were the trolleys used to move the waste color-coded.

There was a separate room at the level of storage for keeping rubbish after collection. However, there was no weighing equipment in the storage section, which could be locked to prevent unlawful entry. Nothing was kept in storage for longer than 48 hours.

DISCUSSION:

According to the country's bio-medical waste management and handling regulations, only 42 (25%) of the three hospitals in Bareilly City that participated in the study by Shahida Rasheed et al., (2005) separated sharps, pathological waste, chemicals, infectious, pharmaceutical, and pressurised containers at the source. Two (25%) hospitals gave its trash handlers the necessary protective gear for handling potentially hazardous waste.

Only one hospital (38.5%) frequently scheduled training sessions for its waste handling staff. Although two (62.5%) hospitals had storage spaces, most of them were not guarded against scavenger access. [8] The community is seriously threatened by the existing practise of inadequate biological waste management. Due to different mechanisms of

transmission, including injuries from sharps, there is a danger of transmission of various communicable diseases, including gastro- intestinal infections, respiratory tract infections, and skin disorders. Some of the most prevalent microbes that cause infections include Pseudomonas species, Enterococcus species, Acinetobacter species, Escherichia coli, Clostridium tetani, Staphylococcus aureus, Klebsiella species, Hepatitis A, HIV, and Hepatitis B [8].

The most important stage in properly managing BMW is to separate garbage into different color-coded containers, which are then transported to appropriate disposal locations. The efforts of proper disposal of garbage appear to be rendered useless if the wrong kind of waste is present in a certain container. This suggests that garbage bins in the suitable quantity, locations, and with the proper color-coding must be placed at the point of waste formation in order to properly segregate waste.

CONCLUSIONS:

The goal of the current study was to assess, using a checklist, how well various patient care areas in a tertiary care hospital in Bareilly City, India managed biomedical waste. It was discovered that "mutilation of recyclable garbage," especially in wards, has to be given more consideration. To address the shortcomings found in the study, hospital management may need to develop and put into action a plan for offering Health Care Workers (HCW) adequate and suitable training. We must educate ourselves on this crucial topic if we are to save the environment and the general public's health.

Additionally, the location under research lacked enough data on knowledge and compliance. In order to raise awareness & about safe practises from the point of generation to final disposal, it was decided to conduct this study to examine the compliance of biological waste management in our hospital. For the purpose of strengthening the hospital's biomedical waste management procedures, recommendations and follow-up actions were made.

The proper disposal of used personal protective equipment's.

Mapping and examination of the storage location and transportation path.

Modification of the collection process, transportation system & storage areas in accordance with the hospital setting layout.

The deployment of inspection to supervisor.

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