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A Case Study on Bio-Medical Waste (BMW) Management in Mewar University Hospital, Gangrar Chittorgarh (Raj.)

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Abstract: Biomedical waste poses a major risk to human health and the environment if it is not appropriately removed or destroyed. In the current world, hospitals must control biomedical waste. It directly affects both the hospital environment and patient safety. BMW management in hospital is very sensitive and strongly advised because it has the largest risk of infectious disease if the waste is not properly processed. BMW waste management entails several phases, including trash identification, type-based sorting, and scientific treatment. This study includes general survey and report of biomedical waste. General survey conducted among the doctors, hospital staff, healthcare personals, and common hospital patients. The report was prepared according to questionary and data collected from various department of hospital. The study results indicated that the people of hospital were aware about the Biomedical waste and generated biomedical waste is properly collected and disposed according to Bio-Medical Waste Management Rules 1998.

Keywords: *Biomedical Waste, Human Health, Environment, Dispose of Waste, Hospital, Health Hazardous, Infectious.*

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I. INTRODUCTION

Any object or substance that is wasted, undesirable, or useless is considered waste, regardless of whether it has any other or potential uses.[1] Waste generated during the diagnosis, treatment, or immunization of human or animal research operations, as well as in the manufacturing or testing of biological products or in health camps, is referred to as biomedical waste (BMW).[2] An estimated 0.33 million tonnes of hospital trash are produced in India each year, with a daily waste generation rate ranging from 0.5 to 2.0 kg per bed.[3] According to the World Health Organization, 85% of hospital trash is truly non-hazardous, whereas 10% is infectious and 5% is non-infectious yet falls under the category of hazardous waste. 15% to 35% of hospital garbage is subject to infectious waste regulations. The overall amount of garbage produced determines this range (Glenn and Garwal, 1999).[4] Medical waste management was not widely regarded as a problem until recently. worries around exposure to the hepatitis B virus (HBV) and human immunodeficiency virus (HIV) in the 1980s and 1990s raised worries about possible hazards associated with medical waste.[5] According to estimates, infected sharps and syringes cause 32% of new Hepatitis B infections, 40% of Hepatitis C infections, and 5% of new HIV infections per year. [6] In July 1998, the Ministry of Environment & Forests released the "Biomedical Waste (management & handling) Rules, 1998" (BMW Mgt). Every hospital that produces BMW is required by law to either put up the necessary BMW treatment facilities on-site or guarantee that the necessary waste is treated at a common treatment facility.[7] Since then, BMW Management Rules have been promptly updated to reflect current requirements. Four revisions have been made thus far in 2000, 2003, and 2011. The most recent guidelines went into effect on March 28, 2016.[8] The biological waste regulations should be followed when handling and disposing of the waste (Chudasama et al., 2013). [9] The 3Rs—reduce, recycle, and reuse—are the foundation of good BMW practice.[6]

In the southern part of Rajasthan, Mewar region is known for his courage and sacrifice. In the Mewar, Chittorgarh is one of the city known for his glorious history. In the city of Chittorgarh, Mewar University Hospital is one of the best hospital in this region. It provides comprehensive healthcare services to the general public. Because of its well-established infrastructure and specialties like Treatment Procedure Dental Procedures, Ophthalmology, and

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Paediatrics, Mewar University Hospital Chittorgarh offers trustworthy care for a range of diseases. The hospital is particularly well-known for its excellent dentistry operations, ophthalmology, paediatrics, obstetrics and gynaecology, ENT, orthopaedics, and general surgery in the Bhilwara, Rajsamand, Udaipur, Pratapgarh and Neemuch regions.

The Mewar region in southern Rajasthan is renowned for its bravery and selflessness. One of the top hospitals in the area is the Mewar University Hospital. It offers the public complete healthcare services. Mewar University Hospital provides dependable care for a variety of conditions thanks to its well-established infrastructure and specialties like Treatment Procedure Dental Procedures, Ophthalmology, and Paediatrics. In the Bhilwara, Rajsamand, Udaipur, Pratapgarh, and Neemuch regions, the hospital is especially well-known for providing high- quality care in the areas of dentistry, ophthalmology, pediatrics, obstetrics and gynecology, ENT, orthopaedics, and general surgery.

The study aims to analyse the biomedical waste management including storage, collection & disposal and how much awareness about the biomedical waste among the hospital staff & patients.

The study was initiated and conducted as a case study at Mewar University Hospital, Gangrar, Chittorgarh, India. (fig. 1) Chittorgarh is a city in Mewar, Rajasthan is renowned for its illustrious past. It is located at 24.88 N latitude and 74.62 E longitude. It is situated 403.24 meters above sea level. Chittorgarh is situated beside the Gambhiri and Berach rivers. According to 2011 census of India, population of Chittorgarh district is 1.54 million.

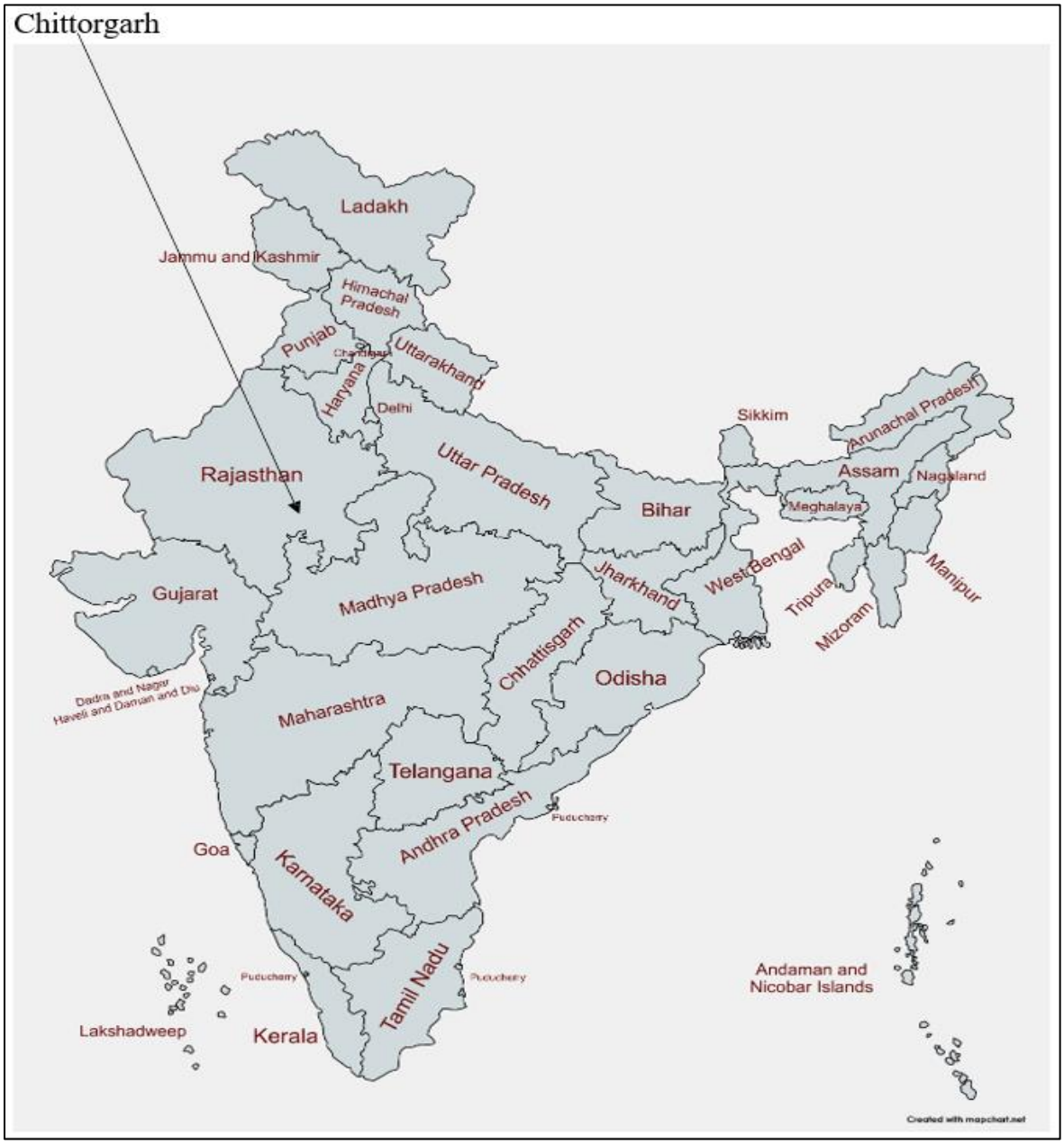

Fig 1 Location of Chittorgarh in India

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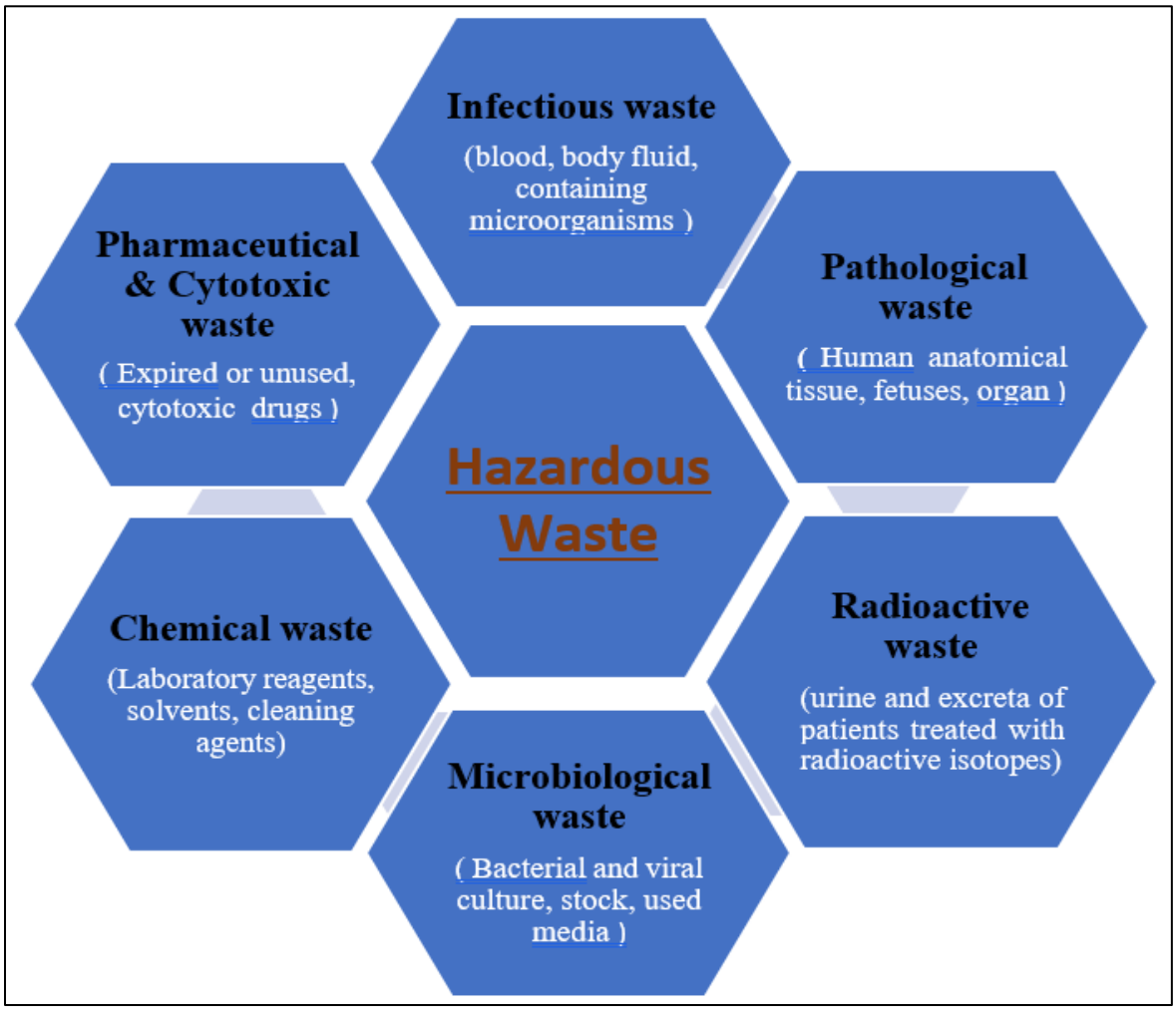
➢ *Types of Biomedical Waste -*

- *Category -I; Hazardous Waste*



- *Category – 2; Non – Hazardous Waste*

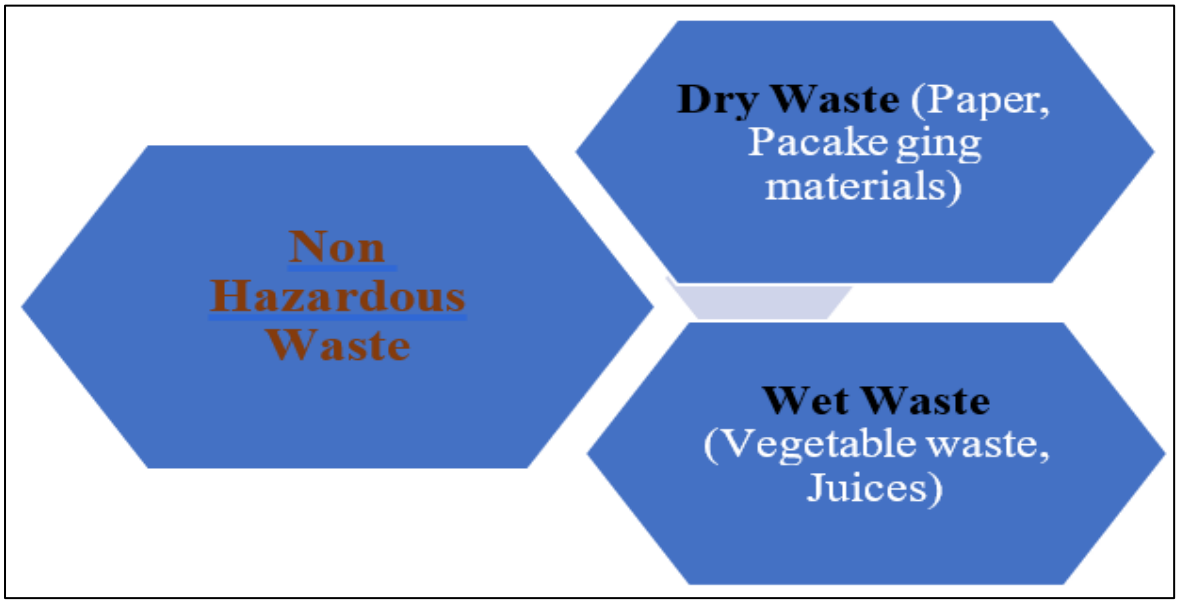


Fig 2 Types of Biomedical Waste

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Table 1 Segregation of Bio Medical Waste according to Color Coding

Color	Waste Type	Type of container or color coding
Yellow	Human Anatomical Waste	Yellow colored non-chlorinated plastic bags
	Animal Waste	
	Microbiology and Biotechnology Waste	
	Contaminated Solid Waste	
Red	Plastic waste	Red colored non-chlorinated plastic bags
	Contaminated Solid Waste (Recyclable)	
White	Waste sharps including Metals	Leak-proof, puncture-proof, and tamper proof containers
Blue	Glassware: Broken or discarded and contaminated glass	Cardboard box with blue colour marking
Black	Non-infectious and non-hazardous waste	Black Plastic Container

II. METHODOLOGY

The Authors conduct a general survey among the doctors, hospitals staff, health care personnel and common people of Mewar University Hospital, Gangrar, Chittorgarh. The methodology also includes to report the quantity of biomedical waste generate in hospital. The hospital visit was including to conduct the survey and obtained knowledge of management of biomedical waste (collection, disposal, and transport). For the general survey author prepare a questionary. Questionary include 10 questions of operating procedure include handling, general awareness of biomedical waste and their management according to Bio-Medical Waste Management Rules 1998.

The doctors, hospital personnel, healthcare professionals, and general public of Mewar University Hospital, Gangrar, Chittorgarh are all surveyed by the authors. Reporting the amount of biomedical waste produced in hospitals is another aspect of the process. The purpose of the hospital visit was to perform a survey and gather information about the collection, disposal, and transportation of biomedical waste. The author will create a questionnaire for the general survey. Twenty questions about handling, general knowledge of biomedical waste, and its treatment in accordance with the 1998 Bio-Medical Waste treatment Rules are included in the questionnaire.

Report of survey and data of waste generated is shown in table 3.

➢ *The Mewar University Hospital*

Mewar University hospital is promoted by the Mewar University. It is governed by a Board of Management established by the MES, led by Chairperson Shri Ashok Kumar Gadiya, a remarkable visionary, educationist, and nationalist who made his aspirations to advance higher education a reality by establishing educational institutions across a range of disciplines. He quickly established himself as an educationist who supports instilling ideals in the next generation via education.

Under the capable direction of Dr. Ashok Kumar Gadiya, the company has created a network of higher education and learning institutes with the active assistance and affiliation of distinguished academicians, seasoned professionals, and technocrats.

The Mewar University Hospital, Gangrar, Chittorgarh is a Three-story building with a total capacity of 300 beds. The Mewar University Hospital provides various types of important facilities, which are listed in Table 2.

Table 2 Facilities at Mewar University Hospital

Facilities at Mewar University Hospital		
SPECIALITIES	**SERVICES**	**OTHER FACILITIES**
ORTHOPEDICS	AMBULANCE (24X7)	BEDS & ROOMS
OBSTETRICS & GYNECOLOGY	EMERGENCY	CAFETERIA
PEDIATRICS & NEONATOLOGY	PHARMACY	PROVISIONAL STORE
RADIOLOGY & IMAGING	OPD & IPD	JUICE CENTRE
GENERAL MEDICINE	CRITICAL CARE - ICU	MILK PARLER
SURGERY	DIAGNOSTIC	SALON
DENTISTRY	DIALYSIS	ATM & BANK
PHYSIOTHERAPY		
EMERGENCY		

➢ *Data Collection*

Authority approval was acquired prior to the actual study. A questionnaire was created, and its validity was pretested. The time and date were set. Physicians, hospital employees, medical professionals, and a small number of patients were invited to participate in the study. The study's goal was explained to the participants, and their verbal agreement was obtained. Their anonymity and confidentiality were guaranteed. They were offered the choice to participate in the study or not. They were then asked to complete the questionnaire, and information was gathered.

➢ *Data Interpreted*

At the end of the study tabulations and interpretations using the collected information were carried out.

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Table 3 Generation of Biomedical Waste at Different Places in Mewar University Hospital (in kg)

S. No.	Place	Red Bag	Yellow Bag	Blue Bag	Total (Per Day)	Total (Per Week)	Total (Per Year)
1	General Ward	2.90	0.60	0.50	4.00	28	1460
2	Maternity Ward	2.10	0.50	0.80	3.40	23.8	1241
3	ICU Ward	1.50	0.22	0.32	2.04	14.28	744.6
4	Injection Room	0.25	0.18	0.15	0.58	4.06	211.7
5	Operation Theatre	2.50	0.56	0.60	3.66	25.62	1335.9
6	Emergency	2.00	1.20	0.90	4.10	28.7	1496.5
7	Eye OPD	1.50	0.11	0.05	1.66	11.62	605.9
8	ENT OPD	0.88	0.09	0.06	1.03	7.21	375.95
9	Dental Ward	1.50	0.29	0.22	2.01	14.07	733.65
10	Sample Collection Room	2.20	1.50	1.00	4.70	32.9	1715.5
11	Pathology Department	2.30	0.90	0.36	3.56	24.92	1299.4
12	Paediatric Ward	1.50	0.50	0.30	2.30	16.1	839.5
Total		21.13	6.65	5.26	33.04	231.28	12059.6

III. RESULT & DISCUSSION

Based on the discussion and survey data, the authors concluded that, from the perspective of regulatory compliance, the Mewar University Hospital is a good example of biological waste management. As envisioned in a policy document, the hospital may easily be established as a model biomedical waste management facility for the City and State owing to its commitment to the environment. According to the data, hospital staff, the general public, and healthcare professionals were all aware of the health risks associated with biomedical waste.

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➢ *Declaration of Competing Interest*

Regarding the publishing of this paper, the author or authors state that they have no conflicts of interest.

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