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Studies on Bio-Medical Waste Management in Kalaburagi city

Dr Srinivas Kushtagi¹, Asst. Prof. Hrushi Abhijeet Prasad,² Shridhar Barad³

Professor, Department of Civil Engineering, PDA College of Engineering, Kalaburagi, India

Asst. Professor, Department of Civil Engineering, PDA College of Engineering, Kalaburagi, India

PG student, Department of Civil Engineering, PDA College of Engineering, Kalaburagi, India

ABSTRACT: Biomedical waste research article it to survey the practice of hospital waste as collection, storage, transportation & removal of total waste generating in the Kalaburagi city. And create awareness the among the staff and patient about bio medical waste. The survey result on bio medical waste generation, disposal and method adopted various hospital of Kalaburagi city.

KEYWORDS: Hospital waste, Environment, Treatment, Hazard Waste in Kalaburagi city.

I. INTRODUCTION

Bio Medical is a Hazardous to the exposed to population is not properly then different waste categories and have been correlated with the health risk and human population and subsequently that hazards waste that kind of produced in daily depend upon kind of specialization and also the medical waste determine number of hazard and non-hazards in generating the hospital , disposal, treatment of medical waste management of special treatment plant in autoclave, incineration ,shredding, chemical disinfection, microwave etc. Hospital waste management rules 1998 hospital Handling and management rules and regulation.

1.1 Classification of Biomedical Waste

BMW in an approximately 85-91% of hospital waste in nonhazardous and harmless as any other municipal waste management. The remaining 25% is hazardous and can be injurious in human or animal and deleterious to environment.

Biomedical waste it is important of the realize that types are mixed together the whole become harmful waste. The apart from the WHO in classified into 8 categories such that sharps, radioactive, chemical, General waste, infectious to potentially waste, pathological waste, Pharmaceuticals, pressurized container.

1.2 Source of Biomedical Waste

Biomedical waste main sources of hospital, laboratories, clinical etc. biomedical waste because waste will be determining the human health required the facilities to follow procedure that protect the waste becoming into contact each other, different aspects of waste management include workplace safety and health administration and food and drug administration. For example, major sources and minor sources of the waste generating in clinical, nursing homes, laboratories, research centers, blood banks, blood donation camps, paramedical, autopsy centers, institutions.

1.3 Objectives

- To study the generation of BMW in Kalaburagi city.
- To analysis the process of BMW in Kalaburagi city.
- To study the impact of BMW on environment.

II. STUDY AREA

Biomedical waste study was carried out in Five selected hospitals in Kalaburagi city. The Kalaburagi city lies between 17.32°Latitude and 76.85°E Longitude with the elevation about 750m above MSL. It is among the Kalaburagi City with the population of 533587 according to 2011 census.

It is situated at a distance of 623km from state capital Bangalore, the average rainfall is 737.25mm, the average maximum and temperature recorded are 45.6°C Respectively.

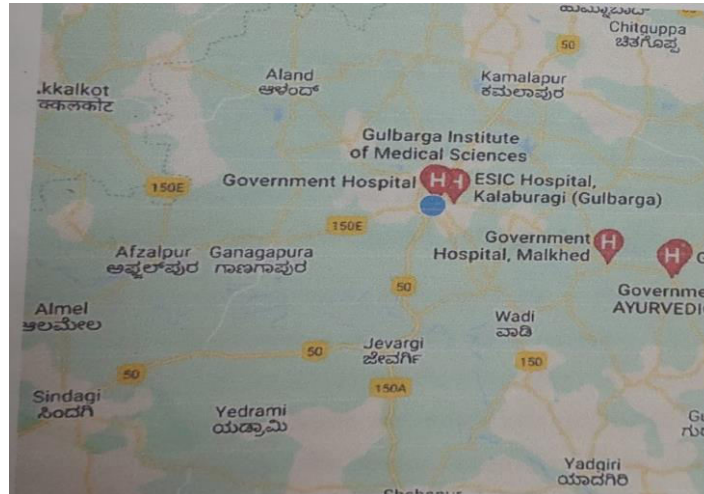


Fig 1. Map Showing study area in Kalaburagi city

III. METHODOLOGY

Study Design: Simple observational, cross-sectional study design in Kalaburagi city

Time & Place: Kalaburagi city from May to July 2025 in secondary and tertiary hospital care hospital in Kalaburagi city.

Sample Size: 5 hospital was selected by convenient sampling. Both tertiary & secondary care hospitals were included. Personnel involved in waste management were interviewed.

Data Collection Tool: Structured Questionnaire with checklist.

Data Analysis: MS Excel Sheet was used graphs & tables.



Fig 3: Showing image in ESIC Hospital



Fig 4: Showing image in GIMS Hospital



Fig 5: Showing image in Jayadeva Hospital



Fig 6: Showing image Basaveshwara Hospital



Fig 7: Showing image in United Hospital

Following the hospital are selected for surveying the biomedical waste in Kalaburagi City.

Govt Hospital – ESIC Hospital 1100 Bed
Govt Hospital – Jayadeva Hospital 371 Bed
Govt Hospital – GIMS Hospital 750 Bed
Private Hospital – Basaveshwara Hospital 820 Bed
Private Hospital – United Hospital 130 Bed

3.1 Biomedical waste management process

1. Collection
2. Segregation
3. Handling & Storage
4. Transportation
5. Treatment
6. Disposal

3.2 Treatment of Biomedical waste management

1. Incineration:

Incineration is the high temperature & oxidation method of that reduces the organic & combustible waste into inorganic & incombustible matter. The result is that it reduces the wt. of volume of waste. The process is used to treat waste in which is not recycled & reused. The advantage of incineration is the pretreatment required suitable for low heating temperature in 850°C in primary chamber 1050°C in secondary chamber and residence time in 2 seconds in secondary chamber & height of stack in 30 meters in the emission control and air pollution control in venturi scrubber in separate droplet etc. Secure ash will be sent to hazardous waste into the landfill.

2. Autoclave:

Autoclave operates on the principle of standard pressure cooker. The autoclave uses steam of high temperature. The waste generating in high temperature penetrating waste material kills the microorganism. There are three types: gravity types, retort types, and pre vacuum types. In these types, air is evaluated to help along the operating system in 121°C and steam pressure of 15 psi. for 60-90 min. The vacuum pump is used to remove the air from the retort. In the 30-60 min, it is operating at about 132°C in the retort types of autoclaves designed in high steam temperature at pressure. Autoclave treatment has been recommended in the waste microbiology and biotechnology, sharps, soiled & solid waste. The biomedical waste management rules treated can be landfill.

3. Microwave:

Microwave is based on the principle of waste generation of high temperature & frequency waves. They are causes of particle within the waste material to vibrating generating the heat. The heat generating kills the microorganism.

4. Chemical treatment:

Chemical disinfection treatment in 1% of hydrochloride solution kills the microorganism.

5. Shredder:

Shredding is a process by which the waste is reshaped or cut into smaller pieces as to make the waste reusable. It helps in the prevention of biomedical waste and also identifies the waste as being disinfected and secure landfill.

6. Deep Burial:

Deep burial in an isolated and rural location without access of burning facilities, anatomical waste, body parts, organs, into highly container items are interred in deep burial pits to regulate and avoid contamination into the environment.

7. Secure Landfill:

Secure landfill is a carefully designed depression of the ground in which the waste is put. It avoids any hydraulic connection between the waste and surrounding environment.

IV. RESULT AND DISCUSSION

Table 1: Information related to the hospital in Kalaburagi city

Sl.no	Name of Hospital	Types of Hospital	Bed capacity of Hospital	Biomedical waste generation in May to July month 2025
1	ESIC Hospital Kalaburagi	Govt. Hospital	1100 Bed	13591.5
2	GIMS Hospital Kalaburagi	Govt. Hospital	750 Bed	4581
3	Jayadeva Hospital Kalaburagi	Govt. Hospital	371 Bed	5201
4	Basaveshwar Hospital Kalaburagi	Private Hospital	820 Bed	7155
5	United Hospital Kalaburagi	Private Hospital	130 Bed	4760

Table 2: Average BMW generating in 5 major hospitals in Kalaburagi city of May Month 2025(kg/month)

Name of Hospital	Yellow	Red	Blue	White
ESIC Hospital	1324.5	2297.5	847.5	64.5
GIMS Hospital	439	615	118	40
Jayadeva Hospital	501	939	192	19
Basaveshwar Hospital	850	1013	439	42
United Hospital	599	851	212	13

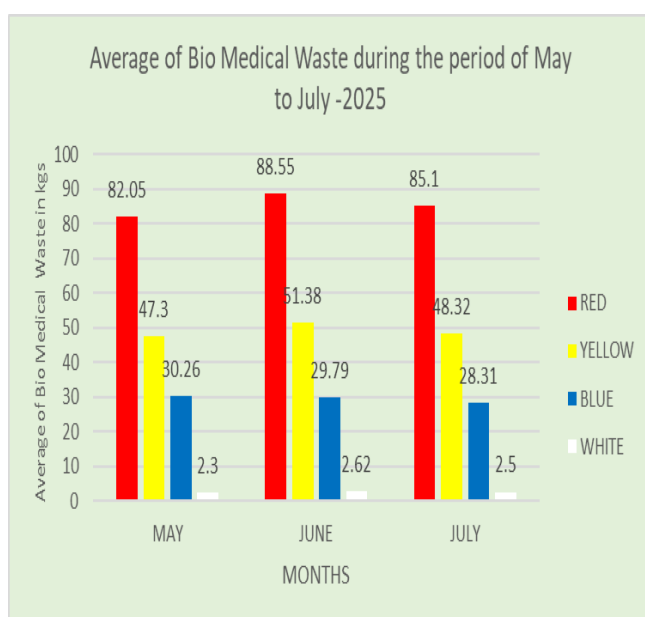
Table 3: Average BMW generating in 5 major hospitals in Kalaburagi city of June Month 2025(kg/month)

Name of Hospital	Yellow	Red	Blue	White
ESIC Hospital	1387.5	2391	804.5	71
GIMS Hospital	543	887	263	56
Jayadeva Hospital	448	1044	247	23
Basaveshwar Hospital	846	1085	225	33
United Hospital	580	750	98	5

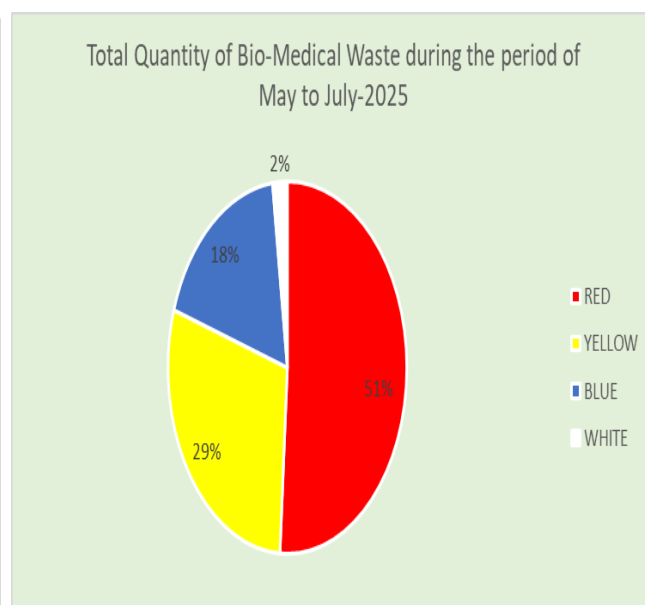
Table 4: Average BMW generating in 5 major hospitals in Kalaburagi city of July Month 2025(kg/month)

Name of Hospital	Yellow	Red	Blue	White
ESIC Hospital	1401.5	2468.5	821	72.5
GIMS Hospital	459	804	306	51
Jayadeva Hospital	514	1068	184	22
Basaveshwar Hospital	964	1289	312	57
United Hospital	629	826	188	9

ESIC HOSPITAL KALABURAGI:

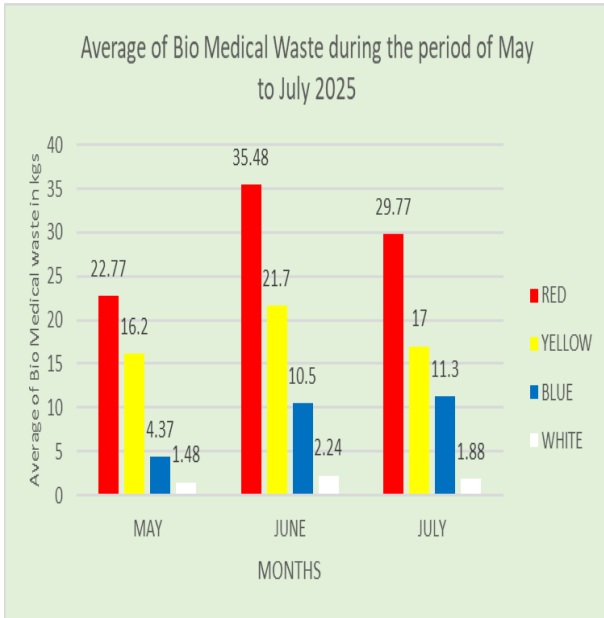


Chat 1: Average waste in ESIC Hospital

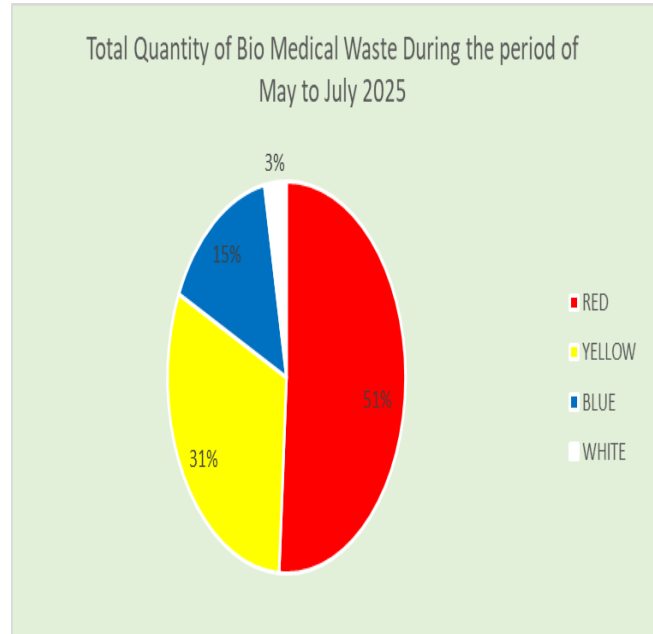


Chat 2: Percentage of BMW in ESIC Hospital

GIMS HOSPITAL KALABURAGI:

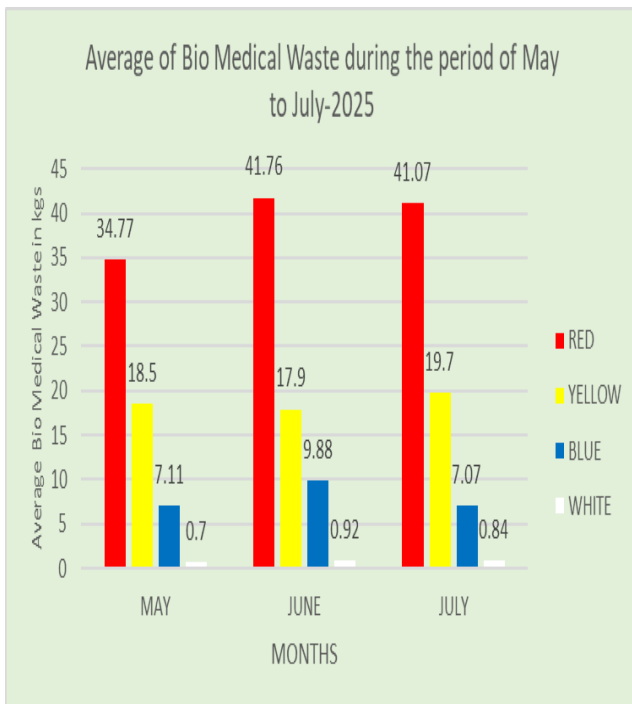


Chat 3: Average waste in GIMS Hospital

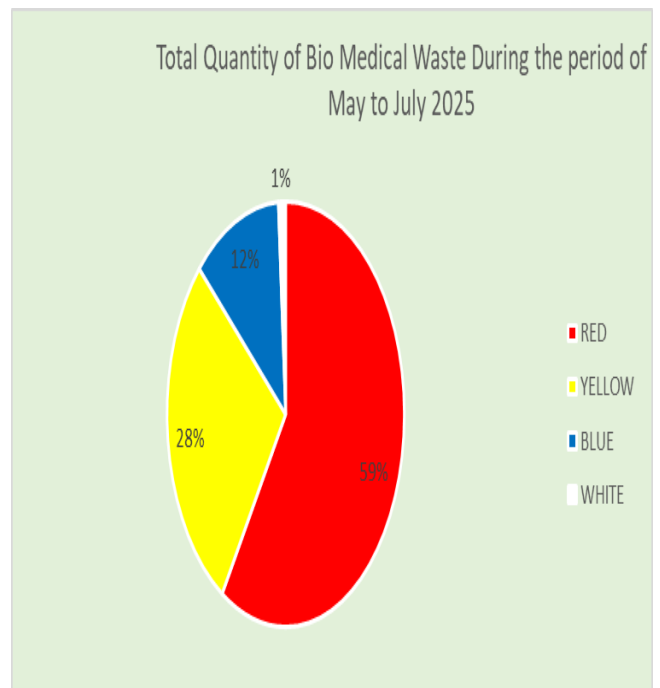


Chat 4: Percentage of BMW in GIMS Hospital

JAYADEVA HOSPITAL KALABURAGI:

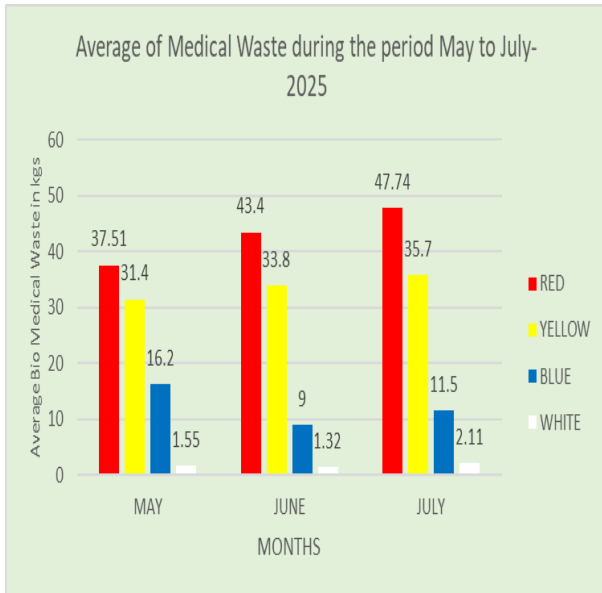


Chat 5: Average waste in Jayadeva Hospital

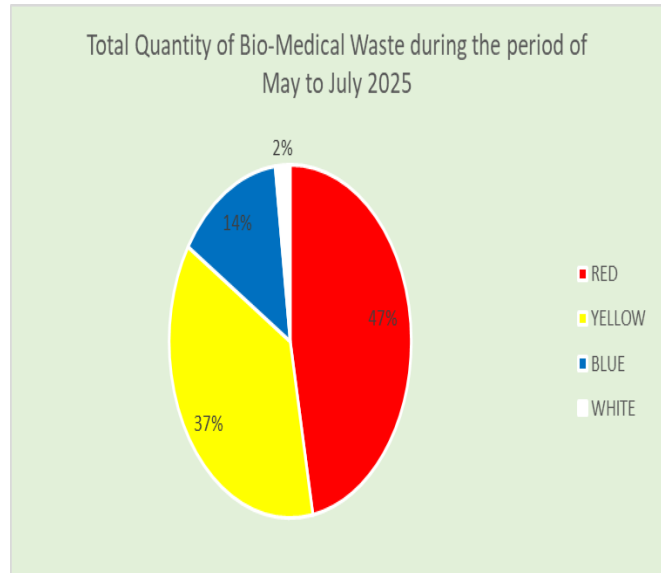


Chat 6: Percentage of BMW in Jayadeva Hospital

BASAVESHWAR HOSPITAL KALABURAGI:

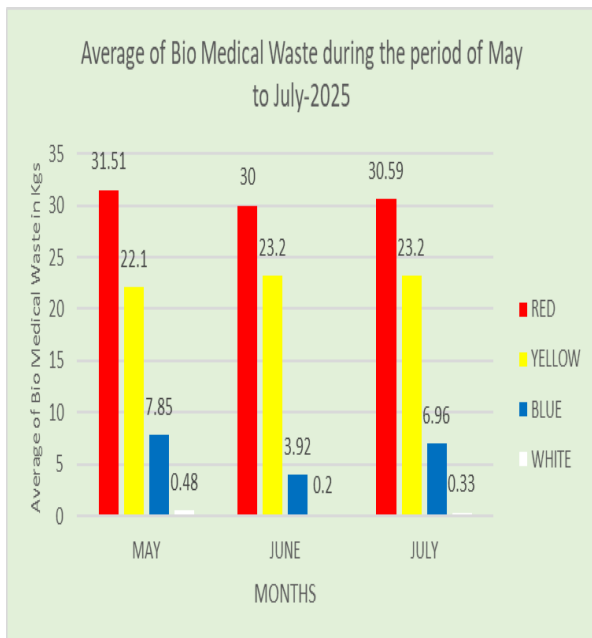


Chat 7: Average waste in Basaveshwar Hospital

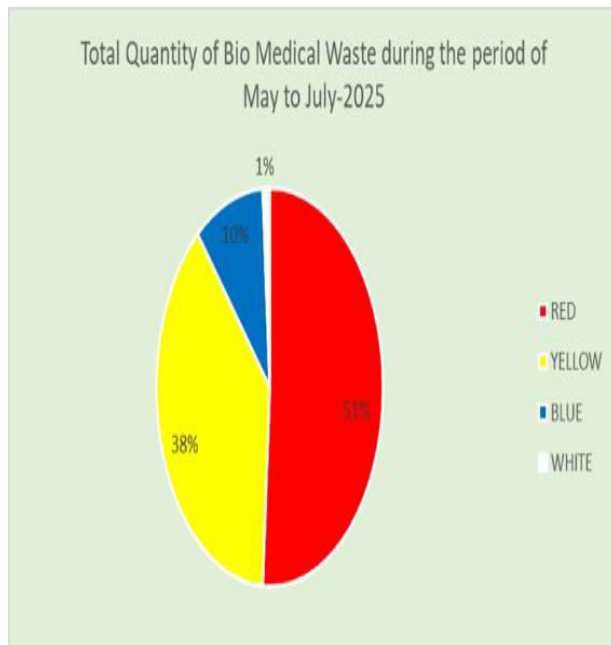


Chat 8: Percentage of BMW in Basaveshwar Hospital

UNITED HOSPITAL KALABURAGI:



Chat 9: Average waste in United Hospital



Chat 10: Percentage of BMW in United Hospital

Biomedical waste prepared in used for data collection in the project. The BMW in the regarding general information data, collection, handling, segregation, treatment & disposal of the health hazards of BMW waste in the prepared. Biomedical waste in 5 selected hospitals in private & govt hospital in Kalaburagi city. BMW collecting of the after completion &

regarding in hospital waste in the carried out. The waste entered in the excel sheet .and later data were tabulated & analysed various selected hospital in Kalaburagi city and statistical method as per need. The study conducted in collection, storage, transportation, disposal & treatment facilities a visit to the common biomedical waste management facility in Bidar & Yadgir District they were done by the Parisara Associates & Enviro Bio tech the site visit in the information related to collection, storage, transportation, treatment & disposal they information related in the biomedical waste management plant, costing, details information into the hospital were collected in receipt. the biomedical waste procedure comment, tables and figure & chat.

V. CONCLUSION

We have studied in three months in regular protocol followed in biomedical waste collection by Kalaburagi city. the during the study in the observed in the hospital properly managing the BMW. Regularly the hospital segregated in the waste in specified color coding. The capabilities and risk and non-risk biomedical waste treatment alternatives, it is emphasized the treatment technology they have used in treat pathological waste & Anatomical, sharps, soiled & solid waste in treatment in autoclave, incineration, chemical disinfection, shredding, microwave, deep burial system.

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