IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 3, Issue 1, March 2023
Impact Factor: 7.301

A Study on Biomedical Waste Generation Rate in South, East Zones of Hyderabad

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Abstract: *Waste disposal is especially important when it comes to medical supplies, as some waste can be contaminated with diseases and dangerous pathogens. Not all biomedical waste is treated the same way and different disposal companies use different methods such as autoclaving, incineration, chemicals and microwaves. Improper disposal of medical waste causes environmental pollution, unpleasant odours, the growth and reproduction of insects, rodents and nematodes, and injuries from blood-contaminated sharp objects, typhoid fever, cholera, hepatitis, etc. can lead to disease transmission. Safe and sustainable disposal of biomedical waste (BMW) is a social and legal responsibility of all those who support and fund medical activities. Effective BMW Management (BMWM) is essential for healthy people and a clean environment. The basic principle of (BMWM) is source separation and waste reduction. We also need to do a lot of research and development in the field of developing eco-friendly medical devices and BMW disposal systems to achieve a greener and cleaner environment. This study will reveal the current processes and environmental impacts of biomedical waste management by examining the quantity and quality of biomedical waste (BMW) generated by pharmacies, laboratories and multiple speciality hospitals.*

Keywords: Biomedical waste, health care waste, Clinical waste

I. INTRODUCTION

1.1 Biomedical Waste

"Biomedical Waste" means waste generated during human or animal diagnosis, treatment, or vaccination. Medical waste disposal is an integral part of healthcare infection control and hygiene programs. These environments are a major source of community-acquired infections because they generate large amounts of biomedical waste. Biomedical waste can be classified based on the risk of injury and/or infection during handling and disposal. Waste intended for precaution during handling and disposal includes sharps (needles or scalpel blades), pathological waste (anatomical body parts, microbial cultures and blood samples), and infectious waste. (Includes items contaminated with bodily fluids and excretions such as bandages, catheters, and infusion tubes). Other medical waste includes radioactive waste, mercury-containing instruments, and polyvinyl chloride (PVC) plastic. They are one of the greenest by-products of healthcare. The WHO states that 85% of hospital waste is harmless, about 10% is infectious, and about 5% is non-infectious but hazardous waste. In the United States, approximately 15% of hospital waste is considered infectious waste. In India, this could range from 15% to 35% depending on the total amount of waste generated.

The wastes are potential sources of infection transmission, especially hepatitis B and C, HIV, and tetanus approximately 1.4 kg per bed per day waste is generated in Indian hospitals and as high as 4.5 kg per bed per day in a developed countries like the USA and approximately 15 % of waste is hazardous and 85% non-hazardous, out of 15% of hazardous waste 5% is non-infective and 10% infective.

1.2 Sources of Biomedical Waste

Approximately 85% of the total waste generated from medical activities is a general non-hazardous waste. The remaining 15% are considered potentially infectious, toxic or radioactive hazards. An estimated 16 billion injections are given each year worldwide, but not all needles and syringes are properly disposed of afterwards. Open burning or incineration of health waste can lead to emissions of dioxins, furans and particulate matter. Ensure that medical waste is

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disposed of in a safe and environmentally sound manner, thereby reducing the health and Adverse environmental impacts can be prevented, thereby protecting patient health. Healthcare workers and the general public.

Table 1: Major and Minor Sources of Medical waste

Sl. No	Major sources	Minor sources
1.	Hospitals and other medical facilities	Clinic
2.	Laboratories	Dental Clinic
3.	Research centres	Home care
4.	Autopsy centre	Cosmetic clinics
5.	Animal testing and collection services	Paramedics
6.	The blood bank and collection services	Funerals
7.	Nursing home	Institution

1.2 Types of Biomedical Waste

Waste and by-products include a variety of materials, as shown in the list below.

- **Infectious waste:** Waste contaminated with blood or other bodily fluids (e.g., from discarded diagnostic specimens), cultures and reservoirs of infectious agents from laboratory work (e.g., waste from dissection and laboratories). waste from infected animals), or waste from infected patients (e.g., swabs, bandages and disposable medical supplies).
- **Pathological waste:** Human tissue, organs or fluids, body parts, and contaminated animal carcasses.
- **Sharp Drop:** Syringes, injection needles, disposable scalpels, spare blades, etc.
- **Chemical waste:** B. Solvents and reagents for laboratory preparation, disinfectants, sterilant, and heavy metals in medical devices (such as mercury in broken thermometers) and batteries.
- **Pharmaceutical waste:** Expired, unused or contaminated medicines and vaccines. • Cytotoxic waste: Waste containing genotoxic substances (hazardous mutagenic, teratogenic or carcinogenic substances) such as B. Cytostatic drugs and their metabolites used in cancer therapy.
- **Radioactive waste:** Products contaminated with radionuclides, including radio diagnostic or radiotherapeutic materials.
- **Non-hazardous or municipal waste:** Waste that does not pose a specific biological, chemical, radiological or physical hazard.

1.3 Categories of BMW as per WHO Standards

Table 2: Categories of BMW, Treatment and Disposal process

Waste category	Type of waste	Treatment and disposal option
Category NO.1	Human anatomical waste	Incineration/deep burial
Category NO.2	Animal waste	Incineration/deep burial
Category NO.3	Microbiology and biotechnology waste	Local autoclaving/microwaving
Category NO.4	Waste sharp	Incineration/deep burial
Category NO.5	Discarded medicine and cytotoxic drugs	Incineration/destruction and drug disposal in a secured landfill
CategoryNO.6	Soiled waste	Incineration/autoclaving/microwaving
Category NO.7	Solid waste	Disinfection/autoclaving/microwaving/shredding
Category NO.8	Liquid waste	Disinfection by chemical treatment and discharge into drains
Category NO.9	Incineration ash	Disposal in municipal landfill
Category NO.10	Chemical waste	Chemical treatment and discharge into drains for liquids and secured landfills for solids

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1.4 Colour Coding for Segregation of Biomedical Waste

Table 3: Colour coding for segregation of biomedical waste

Colour	Waste	Treatment
Yellow	Human anatomical waste, Animal waste, Microbiology and Biotechnology waste, soiled waste	Incineration/deep burial
Red	Solid waste	Autoclaving/microwaving/chemical treatment
Blue	Waste sharps	Autoclaving/microwaving/chemical treatment/destruction/shredding
Black	Discarded medicine and Cytotoxic drugs, Liquid waste, Incineration ash, Chemical waste	Disposal in a secured landfill

II. OBJECTIVE

The main objective of this Project:

- To collect information on BMW sources in Hyderabad.
- To collect data about BMW generation rate of various sources in Hyderabad.
- To identify the collection, processing, and disposal method adopted at sources.
- Periodical assessment of BMW characteristics and its impacts.
- Impact assessment during collection, transport, and disposal, of BMW on environment and humans.

III. MATERIALS AND METHODS

The flow chart of Biomedical waste identification adopted for the study is shown in Fig. 1.

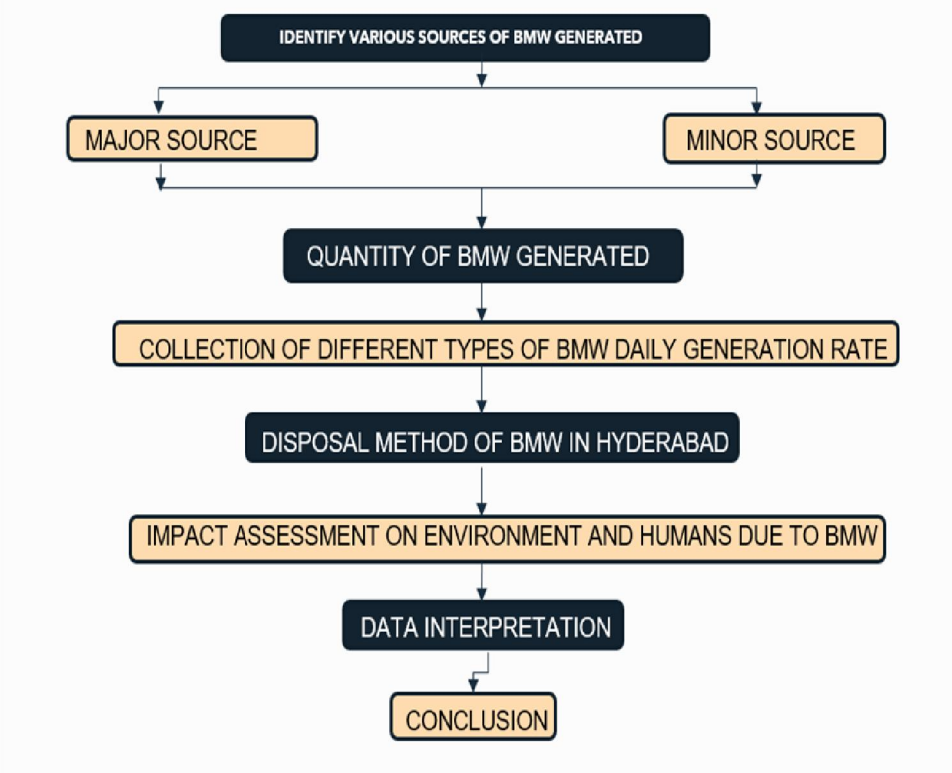

Fig. 1. Flow chart of Biomedical waste identification and collection

3.1 Detail information on hospitals in Hyderabad:

- Hyderabad's healthcare system consists of reputable public hospitals, state-of-the-art private hospitals, private clinics, nursing homes and advanced diagnostic centres, providing excellent services 24 hours a day.
- Hyderabad's healthcare sector is highly standardized and cheaper than other cities in the country. Individual

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hospitals offer ambulance services, fully stocked pharmacies, 24-hour emergency and trauma centres, and well-equipped pathology laboratories. Many hospitals have their blood banks. Advanced diagnostic labs and state-of-the-art equipment enable doctors to make accurate and timely diagnoses. A great advantage of these hospitals is the fact that all medical services are available under one roof.

- Hyderabad City is well connected to other cities and states by road, rail and air, making it easy for patients to reach their destinations. Numerous trains are running to and from Hyderabad, making commuting easy for out-of-town and out-of-state patients. This list will help you easily select a hospital according to your needs and convenience. In addition to the hospital name and number, a list of available tests and procedures will also help you choose a hospital based on your budget and needs.
- 87 government hospitals – 5749 beds
- 334 private hospitals
- 4000 clinics and nursing homes 12000 beds
- 500 diagnostic centres

3.2 Description of the Study Area

General Description

- Hyderabad City, Telangana State, South Central India. It is the largest and most populous city in Telangana and the most important urban centre for all of South-Central India. Hyderabad was the capital of Andhra Pradesh from 1956 to 2014, but with the establishment of Telangana in Andhra Pradesh in 2014, Hyderabad became the capital of both states.
- Hyderabad is located on the Musi River in the heart of the Telangana Plateau, the major highland region of the Deccan (Indian peninsula). The urban area is about 500 meters above sea level and is relatively flat compared to the gentle undulations. The climate is mild to hot monsoon (that is, characterized by wet and dry seasons) with moderate annual rainfall. Most of the rain falls during the rainy monsoon season from June to October.
- Hyderabad has developed into a commercial hub and an international information technology (IT) hub. Pharmaceuticals, tobacco, textiles, etc. are manufactured here. Service activities, especially those related to IT, have expanded dramatically and now constitute a large part of the urban economy.
- Hyderabad City is divided into 6 zones. Shown in Fig 2.

1 Charminar.
2 L.B. Nagar.
3 Khairtabad.
4 Secunderabad.
5 Serilingampally.
6 Kukatpally.

- Each zone is further divided into a total of 30 circles.
- In addition, the circle will be divided into 150 stations.
- In 2020, each district will have 40,000-50,000 people.

3.3 Description of Charminar zone and L.B. Nagar Zone

- Charminar zone consists of areas such as Charminar, Falaknuma, Chandrayangutta, Santoshnagar, Malakpet and Rajendranagar. The Charminar zone comes belongs to the south zone of Hyderabad.
- L.B. Nagar zone consists of the area such as Uppal, Saroornagar, Hayatnagar, L.B. Nagar and Kapra. The L.B. Nagar zone belongs to the east zone in Hyderabad.
- In the Charminar zone, we have taken 10 sources (Private hospitals, Government hospitals, Dental clinics, diagnostics centres etc.) shown in Fig 3.

1 Major source-7.
2 Minor source-3.

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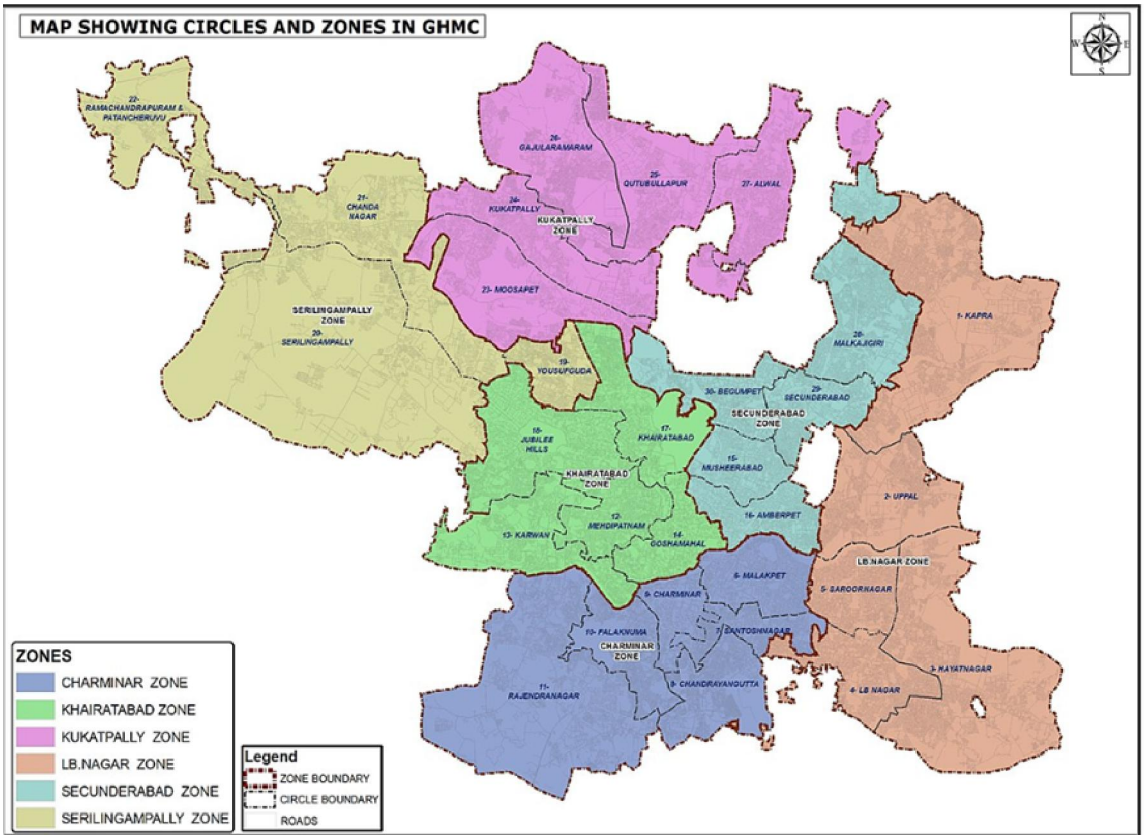

Fig. 2: Hyderabad map showing circles and zones in GHMC

- In the L.B. Nagar zone, we have taken 5 sources(Private hospitals, Government hospitals, Dental clinics, diagnostics centres etc.) shown in Fig 3.

1 Major source-2.
2 Minor source-3.

- In Charminar zone there are 10 hospitals location as show in fig 3.

1 Major hospitals: 1,3,8,9,10,12,13.
2 Minor hospital: 7,11,14.

- In L.B. Nagar zone there are 5 hospitals location as shown in fig 3.

1 Major hospital: 2,4.
2 Minor hospital: 5,6,15.

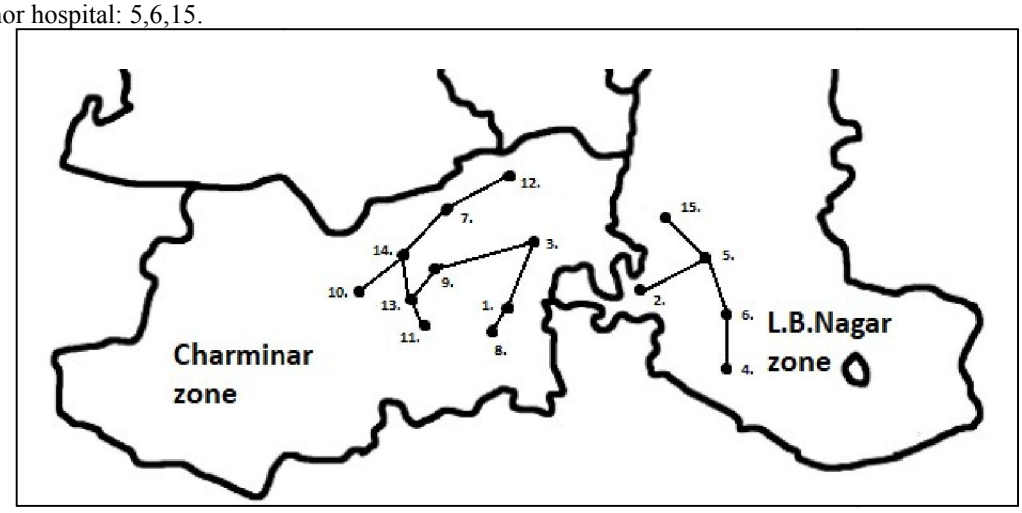

Fig. 3: Location of hospitals in Charminar zone and L.B. Nagar zone

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3.4 Detail information on hospitals in Hyderabad:

- Hyderabad's healthcare system consists of reputable public hospitals, state-of-the-art private hospitals, private clinics, nursing homes and advanced diagnostic centres, providing excellent services 24 hours a day.
- Hyderabad's healthcare sector is highly standardized and cheaper than other cities in the country. Individual hospitals offer ambulance services, fully stocked pharmacies, 24-hour emergency and trauma centres, and well-equipped pathology laboratories. Many hospitals have their blood banks. Advanced diagnostic labs and state-of-the-art equipment enable doctors to make accurate and timely diagnoses. A great advantage of these hospitals is the fact that all medical services are available under one roof.
- Hyderabad City is well connected to other cities and states by road, rail and air, making it easy for patients to reach their destinations. Numerous trains are running to and from Hyderabad, making commuting easy for out-of-town and out-of-state patients. This list will help you easily select a hospital according to your needs and convenience. In addition to the hospital name and number, a list of available tests and procedures will also help you choose a hospital based on your budget and needs.
- 87 government hospitals – 5749 beds
- 334 private hospitals
- 4000 clinics and nursing homes 12000 beds
- 500 diagnostic centres

3.5 Collection of BMW generation rate data:

- The data includes the various types of BMW generated at major and minor sources.
- Major sources are 9 and minor sources are 6.
- The data collected is from November-2022 to January-2023.
- The hospitals are located in the L.B. Nagar zone and Charminar zone.
- The data is tabulated in table 4,5,6.

Table 4: BMW generation rate in the month of November-2022

S. no	Name of hospitals	location	Type of hospital	beds	Waste generation rate (in kgs)				
					Yellow	Red	Blue	White	Total
1.	Apollo hospital	DRDO	Private	150	1124	789	103	85	2101
2.	Aware global hospital	L.B. Nagar	Private	100	974	514	138	98	1716
3.	Dr Agarwal healthcare	Santosh Nagar	Private	10	41	18	7	7	73
4.	FMS dental clinic	Vanasthalipuram	Private	0	12	10	6	3	31
5.	Health care diagnostics	L.B. Nagar	Private	0	13	9	3	3	28
6.	Kamineni hospital	L.B. Nagar	Private	750	2178	748	112	101	3139
7.	DR. Motiwala dental clinic	Afzalgunj	Private	0	13	12	6	4	35
8.	Owaisi hospital	Kanchanbagh	Private	250	1078	441	98	84	1701
9.	Princess essra hospital	Moghalpura	Private	200	754	215	89	48	1106
10.	Urban community health centre	Falaknuma	Govt	30	121	69	21	11	222
11.	Sun diagnostics	Pool Bagh	Private	0	27	14	5	4	50
12.	Kamineni hospital	King koti	Private	150	974	369	101	82	1526
13.	Anu prasad hospital	Shalibanda	Private	10	48	22	7	4	81
14.	Elbit diagnostic centre	Charminar	Private	0	12	8	3	2	25
15.	Vasan eye care	dilsuknagar	Private	10	26	16	6	4	52

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Table 5: BMW generation rate in the month of December-2022

S. No	Name of hospital	location	Type of hospital	beds	Waste generation rate (in kgs)				
					Yellow	Red	Blue	White	Total
1.	Apollo hospital	DRDO	Private	150	1075	768	114	82	2039
2.	Aware global hospital	L.B. Nagar	Private	100	985	514	114	98	1711
3.	Dr Agarwal healthcare	Santosh Nagar	Private	10	41	18	7	7	73
4.	FMS dental clinic	Vanasthalipuram	Private	0	12	10	6	3	31
5.	Health care diagnostics	L.B. Nagar	Private	0	13	9	3	3	28
6.	Kamineni hospital	L.B. Nagar	Private	750	2189	856	125	114	3294
7.	Dr. Motiwala dental clinic	Afzalgunj	Private	0	13	12	6	4	35
8.	Owaisi hospital	Kanchanbagh	Private	250	1107	468	101	81	1757
9.	Princess essra hospital	Moghalpura	Private	200	726	274	91	41	1132
10.	Urban community health centre	Falaknuma	Govt	30	121	69	21	11	222
11.	Sun diagnostics	Pool Bagh	Private	0	27	14	5	4	50
12.	Kamineni hospital	King koti	Private	150	957	374	112	84	1527
13.	Anu prasad hospital	Shalibanda	Private	10	44	21	8	7	80
14.	Elbit diagnostic centre	Charminar	Private	0	12	8	3	2	25
15.	Vasan eye care	Dilsuknagar	Private	10	26	16	6	4	52

Table 6: BMW generation rate in the month of January-2023

S. No	Name of hospital	location	Type of hospital	beds	Waste generation rate (in kgs)				
					Yellow	Red	Blue	White	Total
1.	Apollo hospital	DRDO	Private	150	1049	752	112	78	1991
2.	Aware global hospital	L.B. Nagar	Private	100	978	509	110	89	1681
3.	Dr Agarwal healthcare	Santosh Nagar	Private	10	48	17	8	7	80
4.	FMS dental clinic	Vanasthalipuram	Private	0	11	9	6	3	29
5.	Health care diagnostics	L.B. Nagar	Private	0	14	9	3	3	29
6.	Kamineni hospital	L.B. Nagar	Private	750	2147	842	129	112	3230
7.	Dr. Motiwala dental clinic	Afzalgunj	Private	0	13	10	5	3	31
8.	Owaisi hospital	Kanchanbagh	Private	250	1126	487	107	82	1802
9.	Princess essra hospital	Moghalpura	Private	200	769	284	87	42	1182
10.	Urban community health centre	Falaknuma	Govt	30	121	69	21	10	221
11.	Sun diagnostics	Pool Bagh	Private	0	29	17	6	5	57
12.	Kamineni hospital	King koti	Private	150	947	358	110	81	1496
13.	Anu prasad hospital	Shalibanda	Private	10	42	22	8	6	78
14.	Elbit diagnostic centre	Charminar	Private	0	11	8	3	2	24
15.	Vasan eye care	Dilsuknagar	Private	10	25	15	6	5	51

IV. RESULTS AND DISCUSSIONS

A questionnaire was prepared and used for data collection during this project. The questionnaire contains 11 questions regarding general information, handling, segregation, disposal and a health hazard of biomedical waste was prepared. Questionnaires were distributed amongst the 15 randomly selected authorities of government and private hospitals in Hyderabad(L.B. Nagar zone and Charminar zone). Questionnaires were collected after completion and interaction regarding biomedical waste was carried out. Responses to the questionnaire were coded and entered into Excel Sheet. Later data were tabulated and analysed by various statistical methods as per need. To study the existing storage, collection, transportation, processing and disposal facilities a site visit to the common biomedical waste management

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facility at Hyderabad was done which was run by "GJ Multiclave Pvt Ltd". During the site visit information related to storage collection, transportation, processing and disposal was collected in addition to this the information related to working of plant, costing, details of hospitals, etc were collected. Analysis of the questionnaires was done to produce comments, figures and tables. Later data was tabulated.

4.1 Data Analysis

- The data from the table 4,5,6 have compared and analysed in the table 7.
- There are a total of 15 hospitals, Major-9, Minor-6, which are located in Charminar zone (South zone) and L. B. Nagar zone (East zone).
- The data collected over a period of three months November-2022 to January-2023.

Table 7: Comparison of the table (4,5,6) from November (2022) – January (2023).

S. No	Name of hospital	location	Type of hospital	beds	Total waste generated in the months		
					November	December	January
1.	Apollo hospital	DRDO	Private	150	2101	2039	1991
2.	Aware global hospital	L.B. Nagar	Private	100	1716	1711	1681
3.	Dr Agarwal healthcare	Santosh Nagar	Private	10	73	73	80
4.	FMS dental clinic	Vanasthalipuram	Private	0	31	31	29
5.	Health care diagnostics	L.B. Nagar	Private	0	28	28	29
6.	Kamineni hospital	L.B. Nagar	Private	750	3139	3294	3230
7.	Dr. Motiwala dental clinic	Afzalgunj	Private	0	35	35	31
8.	Owaisi hospital	Kanchanbagh	Private	250	1701	1757	1802
9.	Princess essra hospital	Moghalpura	Private	200	1106	1132	1182
10.	Urban community health centre	Falaknuma	Govt	30	222	222	221
11.	Sun diagnostics	Pool Bagh	Private	0	50	50	57
12.	Kamineni hospital	King koti	Private	150	1526	1527	1496
13.	Anu prasad hospital	Shalibanda	Private	10	81	80	78
14.	Elbit diagnostic centre	Charminar	Private	0	25	25	24
15.	Vasan eye care	Dilsuknagar	Private	10	52	52	51

4.2 Disposal process used in Hyderabad:

In Hyderabad, two companies dispose of the BMW generated at various sources like private hospitals, government hospitals, clinics, diagnostic centres, labs, nursing homes etc.

GJ multi clave Pvt Ltd – Hyderabad

Fig 4: Location of GJ multi clave Pvt Ltd-Hyderabad

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Medicare environmental management Pvt Ltd – Hyderabad

Fig 5: Location of Medicare environment management Pvt Ltd-Hyderabad

4.3 Treatment and disposal of biomedical waste:

Medical waste is a heterogeneous mixture and as such is very difficult to manage. However, a well-designed management system can simplify the problem and greatly reduce its scale.

- **Incineration Technology:** This is a high-temperature heat treatment that burns waste under controlled conditions to convert it into inert substances and gases. Incinerators may be oil-fired, electric, or a combination thereof. Three types of hospital waste incinerators are commonly used. Multi-hearth type, rotary kiln, conditioned air type. All types can have primary and secondary combustion chambers to ensure optimum combustion. These are lined with refractory material.
- **Non-Incineration Technology:** Non-incineration treatment involves four basic processes: Thermal, chemical, radiation, and biological. The majority of non-combustion technologies use thermal and chemical processes. The main purpose of treatment technology is the decontamination of waste by destroying pathogens. Facilities must ensure that their technology can meet government disinfection standards.
- **Microwave Irradiation:** The microwave is based on the principle of generation of high-frequency waves. These waves cause the particles within the waste material to vibrate, generating heat. This heat generated from within kills all pathogens
- **Autoclave:** Autoclaves work on the standard pressure cooker principle. This process uses hot steam. High-temperature steam penetrates the waste and kills all microbes. Also, there are three types. Gravity type, pre-vacuum type, retort type In the first type (gravity type) the air is expelled using only gravity. The system operates at a temperature of 121 degrees. C. and vapour pressure of 15 psi. 60-90 minutes. Use a vacuum pump to evacuate the air from the pre-vacuum autoclave system and shorten the time cycle to 30-60 min. Works at about 132 degrees. C. Retort-type autoclaves are designed for much higher steam temperatures and pressures. Autoclaving is recommended for microbial and biotech waste, sharps waste and dirty solid waste. This technology detoxifies and degrades certain categories of biomedical waste (referenced in regulations), allowing the treated residue to be landfilled.
- **Chemical Methods:** 1 % hypochlorite solution can be used for chemical disinfection
- **Plasma Pyrolysis:** Plasma pyrolysis is a state-of-the-art technology for the safe disposal of medical waste. This is an environmentally friendly technology that converts organic waste into commercially viable by-products. The high heat generated by the plasma allows for safe and reliable treatment of all types of waste, including municipal, biomedical and hazardous waste. Medical waste is pyrolyzed into CO, H2, and hydrocarbons upon contact with the plasma arc. These gases burn and reach high temperatures (approximately 1200 °C).

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V. CONCLUSION

Hyderabad consists of six zones (Charminar, L.B. Nagar, Khairtabad, Secunderabad Serilingampally, Kukatpally). There are 421 Majorhospitals and 4500 Minor hospitalsin and around six zones of Hyderabad. For our first phase of study,we have selected two zones, Charminar zone(south zone) and L.B. Nagar zone(east zone). Which consists of major hospitals-9, minor hospitals-6. The biomedical waste generation rate data is collected over a period of three months November-2022 to January-2023. We have compared the generation rate from that we have identified yellow colour waste bag consists of Human anatomical waste, Microbiology and Biotechnology waste, soiled waste. Pathogenically biomedical waste generation rate is increased. We have gained knowledge about quantity and quality of biomedical waste generation ratein Charminar zone (south zone) and L.B. Nagar zone (east zone). In next phase we are planning to study about the detailed BMW disposal process and quality and quantity of BMW in remaining zones of Hyderabad. The improper segregation, collection, disposal process of BMW affects the environment and human health. This study focuses the EIA on BMWM in Hyderabad.

REFERENCES

[1]. Singh, Amrita & Singh, Jaspal & Singh, A & Singh, Dr. (2014). BIOMEDICAL WASTE MANAGEMENT AND THEIR POSSIBLE HEALTH RISKS WITH CONTROLLING MEASURES IN BAREILLY CITY, UP, INDIA. Octa Journal of Environmental Research. Vol 2 9(4): pp 296-302.

[2]. Dixit AM, Bansal P, Jain P, Bajpai PK, Rath RS, Kharya P. Assessment of Biomedical Waste Management in Health Facilities of Uttar Pradesh: An Observational Study. Cureus. 2021 Dec 2;13(12): e20098. doi: 10.7759/cureus.20098. PMID: 34993039; PMCID: PMC8720173.

[3]. Mr Saikiran Ravi Chindam, STUDY ON HOSPITAL SOLID WASTE MANAGEMENT IN INDIA, -- Palarch's Journal of Archaeology of Egypt/Egyptology 18(1). ISSN 1567-214x

[4]. Dr. Biswapriya Jena, Dr. Sangha Mitra Patnaik, Dr. Nabnita Patnaik. IMPACT OF IMPROPER BIOMEDICAL WASTE DISPOSAL ON HUMAN HEALTH AND ENVIRONMENT DURING COVID-19 PANDEMIC. European Journal of Molecular & Clinical Medicine ISSN 2515-8260 Volume 08, Issue 03, pp 4137-4143, 2021.

[5]. Srivastava, Dr Jyoti. (2013). Knowledge Regarding Biomedical Waste Management among the Staff Nurses. Vol 5. pp 1714-1717.

[6]. Roy P, Mohanty AK, Wagner A, Sharif S, Khalil H, Misra M. Impacts of COVID-19 Outbreak on the Municipal Solid Waste Management: Now and beyond the Pandemic. ACS Environmental Au. 2021 Aug 20: acsenvironau.1c00005. doi: 10.1021/acsenvironau.1c00005. PMCID: PMC8525346.

[7]. Rajak R, Mahto RK, Prasad J, Chattopadhyay A. Assessment of bio-medical waste before and during the emergency of novel Coronavirus disease pandemic in India: A gap analysis. Waste Manag Res. 2022 Apr;40(4):470-481. doi: 10.1177/0734242X211021473. Epub 2021 May 27. PMID: 34044644.

[8]. Gowda A S, R., B., R., Satish Wantamutte, S., & Kumar P, V. (2020). BIOMEDICAL WASTE MANAGEMENTCURRENT PRACTICES AND FUTURE PROSPECTIVE IN URBAN AREA. International Journal of Engineering Applied Sciences and Technology, 2020 Vol. 5, Issue 8, ISSN No. 2455-2143, Pages 229-231.

[9]. Gadicherla, Suman & Thapsey, Hemanth & Krishnappa, Lalitha & Somanna, Shivaraj. (2016). Evaluation of biomedical waste management practices in select health care facilities of Karnataka. International Journal of Community Medicine and Public Health. Vol 3 issues 10 /pp 2394-6040.

[10]. NS, Saritha & B M, Veeregowda & G, Leena & Chakraborty, Sandip & Tiwari, Ruchi Dhama, Kuldeep & Singh, Shoor. (2014). Biomedical Waste Management. Advances in Animal and Veterinary Sciences. Vol 2(2). Pp 67-72.

[11]. Ramkrishna Mondal, Siddharth Mishra, Jawahar S. K. Pillai, Mukunda C. Sahoo. COVID-19 Pandemic and biomedical waste management practices in the healthcare system. Journal of Family Medicine and Primary Care. Volume 11: Issue 2 pp 439-446.

[12]. Acharya, Dr & Gokhale, Dr & Joshi, Deepa. (2014). Impact of Biomedical Waste on City Environment: Case Study of Pune, India. IOSR Journal of Applied Chemistry. Vol 6 issue 6. pp 21-27.

IJARSCT
ISSN (Online) 2581-9429
International Journal of Advanced Research in Science, Communication and Technology (IJARSCT)
Volume 3, Issue 1, March 2023
Impact Factor: 7.301

[13]. Javid Manzoor & Manoj Sharma (2019): Impact of Biomedical Waste on Environment and Human Health, Environmental Claims Journal, DOI: 10.1080/10406026.2019.1619265

[14]. Kumar, Ramesh & Abinaya, Venkata & Venkatesan, Alaga & Natrajan, Mohan. (2019). Bio-medical waste disposal in India: From paper to practice, what has been affected. Indian Journal of Health Sciences and Biomedical Research. Vol 12, issues 3, pp 202-210.

[15]. Rai, Dhananjai & Patel, Naveen & Srivastava, Amitabh. (2018). Assessment of Biomedical Waste Disposal and Management in Three Hospitals of Rishikesh, India. Vol 6. Issues 10, pp 2611-2616.

[16]. Narendra Singh, Oladele A. Ogunseitan & Yuanyuan Tang (2022) Medical waste: Current challenges and future opportunities for sustainable management, Critical Reviews in Environmental Science and Technology, 52:11, 2000-2022.

[17]. Kanwar VS, Sharma A, Rinku, Kanwar M, Srivastav AL, Soni DK. An overview of biomedical waste management during a pandemic like COVID-19. Int J Environ Sci Technol (Tehran). 2022 Jun 6:1-16. doi: 10.1007/s13762-022-04287-5. Epub ahead of print. PMID: 35694150; PMCID: PMC9167668.

[18]. Karnata, Sravanthi. (2021). BIO-MEDICAL WASTE AND ITS IMPACT OF MISMANAGEMENT WITH THE STUDY OF THE STATE MAHARASHTRA, INDIA.AN INTERNATIONAL BILINGUAL PEER REVIEWED REFEREED RESEARCH JOURNA Vol 10, issues 40, pp 134-139.