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Research on the Demand and Efficiency Analysis of Waste Management in Biomedical Teaching at RGN Hospital in Kanpur

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Abstract: ***The waste generated in various hospitals and healthcare facilities, including the waste of industries, can be grouped under biomedical waste (BMW). The constituents of this type of waste are various infectious and hazardous materials. This waste is then identified, segregated, and treated scientifically. There is an inevitable need for healthcare professionals to have adequate knowledge and a proper attitude towards BMW and its management. BMW generated can either be solid or liquid waste comprising infectious or potentially infectious materials, such as medical, research, or laboratory waste. There is a high possibility that inappropriate management of BMW can cause infections to healthcare workers, the patients visiting the facilities, and the surrounding environment and community. BMW can also be classified into general, pathological, radioactive, chemical, infectious, sharps, pharmaceuticals, or pressurized wastes. India has well-established rules for the proper handling and management of BMW. Biomedical Waste Management Rules, 2016 (BMWM Rules, 2016) specify that every healthcare facility shall take all necessary steps to ensure that BMW is handled without any adverse effect on human and environmental health. This document contains six schedules, including the category of BMW, the color coding and type of containers, and labels for BMW containers or bags, which should be non-washable and visible. A label for the transportation of BMW containers, the standard for treatment and disposal, and the schedule for waste treatment facilities such as incinerators and autoclaves are included in the schedule. The new rules established in India are meant to improve the segregation, transportation, disposal methods, and treatment of BMW. This proper management is intended to decrease environmental pollution because, if not managed properly, BMW can cause air, water, and land pollution. Collective teamwork with committed government support in finance and infrastructure development is a very important requirement for the effective disposal of BMW. Devoted healthcare workers and facilities are also significant. Further, the proper and continuous monitoring of BMW is a vital necessity. Therefore, developing environmentally friendly methods and the right plan and protocols for the disposal of BMW is very important to achieve a goal of a green and clean environment. The aim of this review article is to provide systematic evidence- based information along with a comprehensive study of BMW in an organized manner.***

Keywords: Colour Coding, Transportation, Segregation, Healthcare Workers, Knowledge, Biomedical Waste

1. Introduction

Biomedical waste (BMW) is any waste produced during the diagnosis, treatment, or immunization of human or animal research activities pertaining or in the production or testing of biological or in health camps. It follows the cradle to grave approach which is characterization, quantification, segregation, storage, transport, and treatment of BMW.

The basic principle of good BMW practice is based on the concept of 3Rs, namely, reduce, recycle, and reuse. The best BMW management (BMWM) methods aim at avoiding generation of waste or recovering as much as waste as possible, rather than disposing. Therefore, the various methods of BMW disposal, according to their desirability should ensure to prevent, reduce, reuse, recycle, recover, treat, and lastly dispose. Hence, the waste should be tackled at source rather than"end of pipe approach.

BMW treatment and disposal facility means any facility wherein treatment, disposal of BMW or processes incidental to such treatment and disposal is carried out.

Only about 10%–25% of BMW is hazardous, and the remaining 75%–95% is nonhazardous. The hazardous part of the waste presents physical, chemical, and/or microbiological risk to the general population and health-care workers associated with handling, treatment, and disposal of waste.

In a World Health Organization (WHO) meeting in Geneva, in June 2007, core principles for achieving safe and sustainable management of health-care waste were developed. It was stressed that through right investment of resources and complete commitment, the harmful effects of health-care waste to the people and environment can be reduced. All stakeholders associated with financing and supporting health-care activities are morally and legally obliged to ensure the safety of others and therefore should share in the cost of proper management of BMW. In addition, it is the duty of manufacturer to produce environment-friendly medical devices to ensure its safe disposal. WHO reinforced that government should designate a part of the budget for creation, support, and maintenance of efficient health-care waste management system. These include novel and ingenious methods/devices to reduce the bulk and toxicity of health-care waste. Nongovernmental Organization should undertake program and activities that contribute in this incentive.

The first edition of WHO handbook on safe management of wastes from health-care activities known as "The Blue

Book" came out in 1999. The second edition of "The Blue Book" published in 2014 has newer methods for safe disposal of BMW, new environmental pollution control measures, and detection.

Research Problem
To understand and analyze the need and efficiency of biomedical waste management with special reference to Regency hospital one of the most important and busiest hospital in the district of Kanpur.

2. Objectives

- To determine the awareness regarding biomedical waste management policyand practice among the staff.
- To determine the attitude of the staff to ward Bio medical waste management.
- To determine their awareness regarding Needle stick injury and its prevalence among different categories of health care providers.

3. Hypotheses

- It is assumed that Super specialist doctors (physician, surgeon) having proper knowledge about BMW hazard and legislation act so can give correct answers from questionnaire.
- Resident doctor (emergency medical officer) having good knowledge about BMW awareness/ knowledge so provide approx. accurate answers.
- Staff nurses may be having knowledge about biomedical waste management and legislation but not as well as doctors.

4. Review of Literature

Most of the 64 dentists working in a teaching hospital in New Delhi were unaware of proper management of hospital waste (Kishore et al., 2000).

Distribution of hospital waste management guidelines to staff at a600-bed tertiary care super-specialty hospital in Delhi found that approximately 80% of medical and professional staff, approximately 60% of nursing staff, an d less than 20% of nursing staff ,thereafter staff and laboratory operations (Saini et al. 2005).Similar differences were observed in teaching hospitals in Sri Nagar, Jammu and Kashmir (Waseem, 2007).Daily biomedical waste generation in external wards of Baripada District Hospital, Orissa was studied by Mohanty and Tiwari (2001).The range was 9.9 to 14.0 kg day-1 with a mean of 11.6 kg day-1, and 22.4% of the waste was infectious. A study in Uttar Pradesh found that biomedical waste was not properly segregated and disposal was unscientific. For example, waste is being burned within the hospital campuses of major government hospital s in Lucknow (Gupta & Boohj 2006) and government hospitals in Agra (Khajuria & Kumar 2007).

A study by Gupta et al. (2008) concluded that a health center in Lucknow, Uttar Pradesh, needed staff development in terms of continuous training and provision of up-to-date equipment to develop a biomedical waste management model. Good habits. Das et al. (2001) documented how, TATA General Hospital, Jamshedpur, Jharkhand, implemented proper disposal and management of hospital waste within the time frame set by the Government of India using a total quality management approach. After providing an information booklet on biomedical waste management, post-test scores on biomedical waste management practices of university hospital nursing staff were found to be significantly higher than pre-test scores (Singh et al. 2002). Patil and Pokhrel (2005) documented how a 500+ bed hospital in Belgaum, Karnataka treats and disposes of biomedical solid waste in accordance with BMW regulations. The hos pital also expands its use of the site to nearby clinics and hospitals by accepting waste generated for incineration. A pilot project supported by the World Health Organization (WHO), conducted at the Air Force Hospital, Bangalore, from January 1999 to May 2000, involved integrated hospital waste using a "multi- option" approach to disinfection and environmentally friendly disposal. Developed a management system. (Ver ma and Srivatsava, 2006).

Using medical students as observers to correct deficiencies resulted in statistically significant improvements in waste segregation practices in all areas of a medical college in Mumbai, Maharashtra (Nataraj et al., 2008).

Mohansundarm (2003) listed the number and distribution of private and government hospitals in Coimabtore, TamilNadu. The city's 1,000-bed public teaching hospital did not use scientific methods to collect, separate, transport and dispose of biomedical waste, while the 350-bed corporate hospital used a powered incinerator.

A study to assess the generation and disposal of biomedical waste in various healthcare facilities in urban and rural areas of Chandigarh found that although large hospitals have installed incinerators, proper biomedical waste management systems are not yet implemented. (Singh et al., 2004).

A study conducted in 2004 among doctors, paramedical staff, home surgeons, students and support staff in hospitals and nursing homes in Pondicherry found low levels of awareness of biomedical waste management practices. Only about a quarter engaged in waste sorting and used approved waste collection agencies (Joseph, 2005).

An evaluation of waste management practices in three major government hospitals in Agra, Uttar Pradesh found that there was a lack of knowledge and awareness of biomedical waste management legislation even among qualified hospital staff. None of these hospitals were equipped with modern technologies such as incinerators, autoclaves, microwave ovens, and were not equipped to deal with the liquid waste generated within the hospitals (Sharma & Chauhan 2008).

A study of 30 hospitals with more than 30 beds in

Sabarkantha district of Gujarat found that most doctors were aware of the existence of laws on biomedical waste, but details were unknown to many other staff. It turned out that it wasn't. The knowledge of support staff (guardians, ayaven, caretakers) was lacking. There were no hospitals in the area with effective waste sorting, collection, transportation and disposal systems (Pandit et al., 2005).

Banerjee and Mani (2006) assessed the availability of equipment such as needle disposal units, needle separation containers, buckets with lids, knowledge, attitudes, and training on sepa ration practices in three government hospitals, two cooperative hospitals, and one private hospital. The impact was studied. Along with seven primary health centers and three community health centers in Kannur district of Kerala.

A 2007 study of government and private hospitals/nursing homes and private practitioners in urban and rural areas of Andhra Pradesh, Maharashtra and UttarPradesh found that there was a significant increase in availability of CWMF services in these states. Accessibility was found to be low at approximately 35%and the speculation rate was also low. Biomedical waste on roads near hospitals is still widespread (Rao 2008).

The above review shows that the focus of most Indian studies on hospital waste management systems is the "microsystem", i.e. what happens in hospitals with regard to biomedical waste management.

These studies examined employee knowledge and attitudes, waste training and management practices, and IMFus eBMW compliance in hospitals and nursing homes is also influenced by other stakeholders. i.e. a "macrosystem" consisting of pollution control panels:

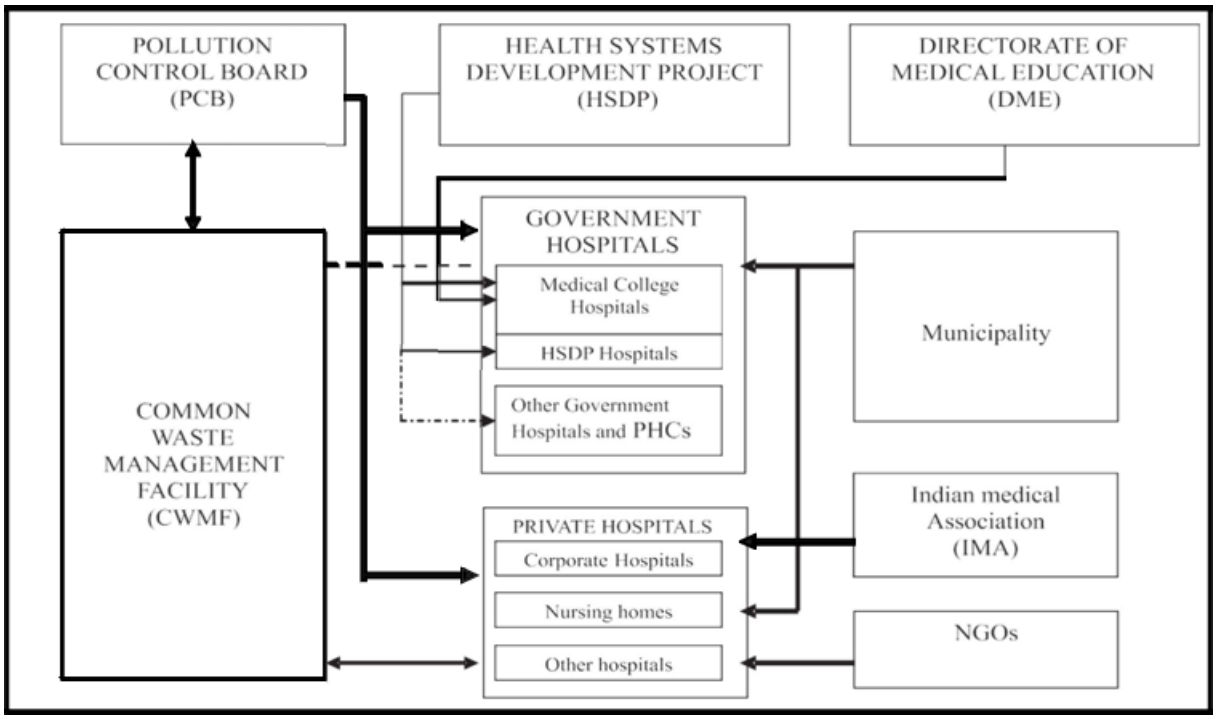

Figure 1: Macro-system of hospital waste management system in a city. Source: Secondary data

CWMF, municipalities, state governments, professional associations and NGOs such as Indian Medical Association (IMA). This study aims to fill this gap. The microsystems of a representative sample of urban hospitals are also considered. Hospitals were selected to represent

(a) different types of care (government, commercial, missionary) and (b) different sizes (large, medium, small, and nursing home).

A state capital in southern India was chosen for this study. By June 2000, all major cities are expected to comply with the 1998 BMW regulations. In India, cities in southern India generally perform better in health care. By selecting a city in South India, you will be given the opportunity to check the status of BMW compliance.

5. Research Methodology

Following chapter highlight the description of variables used in the research, the approach used to perform the research, research layout, characteristics of the tool used for data collection, target population, statistical technique and soon.
Data Type- Quantitative and Qualitative primary data

Sample Size-100 people from doctors and staff were selected as sample. It took approximately one month to collect method.

Data collection method- Primary data was collected through structured questionnaire.

Source of data Collection- Respondents of Regency hospital and existing literature available.

Sampling Technique- Simple random sampling method was used.

Tools of Analysis – Descriptive statistics. A predesigned pretested questionnaire was used to determine the various variables to assess the knowledge of BMW Management and legislation, awareness about Needle stick injury practice etc.

Study Design- This is a question based study, interview, direct observation with an individualbeing a study unit.

Study Approach- The research study has quantitative approach.

Study Area- The study was conducted in the areas proximal to Govind nagar kanpur. Hospital working staff of RGN hospital provide questions for Answering.

There were two specific reasons for choosing this locality: The first one was convenience of the researcher and second one was availability of hospital workers in an appropriate number in the hospital area.

Study Duration- Data collection was carried out from 30th April to 20 may 2024 and then data analysis and report writing were done. The study consists of male and female both, with females being more willing as respondents than males.

Data analysis

Data was entered in XL Microsoft 365 version and spreadsheet across validated. Data was transferred and analyzed using IBM SPSS (Statistical Package for Social Science) version 24. Descriptive statistics were used to describe categorical data as frequency or percentages.

6. Findings

- The findings suggest that while Regency Hospital has established basic biomedical waste management protocols, significant gaps remain in implementation and adherence.
- Key issues include insufficient training, inadequate infrastructure, and limited financial resources.
- These challenges compromise the overall efficiency and effectiveness of the wastemanagement system.

7. Conclusion

India has a huge medical infrastructure. With increasing number of private/government hospitals and medical and dental colleges opening, improper disposal of biomedical can lead to significant environment and health related hazards. Thus, adequate knowledge for surgeons, Nurses, Wardboy, Aya, Sweeper, Waste handler about this is essential. This study shows that there is lack of sufficient knowledge among Medical Officer, Wardboy, Aya, Sweeper, Waste handler regarding biomedical waste management. For this, immediate academic assessment to increase the awareness is required during training courses. Thus, small advances need to be made in this aspect to reap great and huge benefits.

References

[1] Banerjee, R. & Mani S.K. (2006) Constraints in management of biomed- ical waste in smaller/ rural healthcare settings and possible solu- tions. In: Proc. of 21st International Conference on Solid Waste Technology and Management, Philadelphia, PA USA, 26–29 March 2006. See http://www2.widener.edu/~sxw0004/21proceedings.html

[2] (accessed 18 April 2007)

[3] Chandra, H., Jamalludin, K., Agnihotri, K. & Leela M (2006) Cost-ben- efit analysis/containment in biomedical waste management: model for implementation. *Journal of Financial Management and Analysis*, 2006, **19**, No. 2 (Available at SSRN: http://ssrn.com/abstract=

[4] 979242)

[5] Das, N.K., Prasad, S. & Jayaram, K. (2001) A TQM approach to imple- mentation of handling and management of hospital waste in Tata Main Hospital. *Health Administrator*, **11–12**, 75–78.

[6] Environmental Health Engineering Cell (1999). Guideliens for Manage- ment of Liquid Waste Streams in Biomedical Waste. Sri Ramachan- dera Medical College & Research Institute, Porur, Chennai, India.

[7] Environmental Training Institute (2002). Biomedical Waste Manage- ment – A practical guide for Administrators and Regulators. Tamil Nadu Pollution Control Board, Chennai, India.

[8] Gupta, S. & Boojh, R. (2006) Report: Biomedical waste management practices at Balrampur Hospital, Lucknow, India. *Waste Manage- ment & Research*, **24**, 584–591. DOI: 10.1177/0734242X06068342

[9] Gupta, S., Boojh, R., Mishra, A. & Chandra, H.(2008) Rules and man- agement of biomedical waste at Vivekananda Polyclinic: A case study. Waste Management, [Epub ahead of print]

[10] Joseph, J. & Krishnan, C.G.A. (2005) *Hospital Waste Management in the Union Territory Of Pondicherry – An Exploration*. Department of Community Dentistry, Mahatma Gandhi Dental College and Hospital, Govt. of Pondicherry Institution, Pondicherry.

[11] Khajuria, A. & Kumar, A. (2007) Assessment of healthcare waste generated by Government Hospital in Agra City,India. *Our Nature*, **5**, 25–30

[12] Sharma, S. & Chauhan, S.V. (2008) Assessment of bio-medical waste management in three apex government hospitals of Agra. *Journal of Environmental Biology*, **29**, 159–162.

[13] Saini, S., Nagarajan, S.S. & Sarma, R.K. (2005) Knowledge, attitude and practices of bio-medical waste management amongst staff of a ter- tiary level hospital in India. *Journal of the Academy of Hospital Administration*, **17**, 25–30. (2005-01–2005-12).

[14] Singh, R., Kishore, J., Mathur, R.G,. Mandal, K. & Puri, S. (2002) The role of an information booklet on bio-medical waste management for nurses.

Nursing Journal of India, **93**, 271–272.
[15] Singh, K., Arora, S.K., Dhadwal, P.J., Singla, A. & John, S. (2004) Bio- medical waste management in the U.T., Chandigarh.
[16] *Journal of Environmental Engineering and Science***,** **46**, 55–60.
[17] The Hindu (2002). An IMAge-building bid in waste disposal. http:// www.hinduonnet.com/thehindu/lf/2002/02/28/stories/20 020022802150200.htm