CHAPTER –II

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2.1 Introduction:

Review of Literature is an essential element of the research; it helps the researcher to understand the earlier work done on particular topic or related topic by other researchers and authors. Review also helps in understanding a particular concept, Methodology used and analysis techniques.

For the present research work, researcher has gone through various books on hospital waste management, Problems regarding to hospital waste management, awareness of hospital workers. Different reports on HWM, Research papers from various journals, various related Thesis, Magazines and News papers.

2.2 Review from research papers:

1.Kamalakanta Mudulil,AkhileshBarve(2012):has discussed the Health Care Waste in India. In India, there are more than 23,000 Primary Health Centres, thousands of registered nursing homes, number of unregistered nursing homes and dispensaries, about 6, 00,000 hospital beds. According to health information statistics 80% are in urban hospitals and 20% of total beds are in rural hospitals. If we studied from past figures of number of beds and average quantity of waste generation producing nearly 1 kg of hospitals per bed per day, it is found that approximately 0.33 million tonnes of hospital waste is generated per year. If we see in India, most of the smaller hospitals and nursing homes doesn't have any effective system for safely disposal off their hospital waste. Same condition is for Government and municipal hospitals regarding to the waste.. According to the World Health Organization (WHO) India is on the way of having an HIV epidemic,Tuberculosis (TB) and HIV affecting on the human health and life. Also there is increase in Hepatitis B and C infections There is increase in death due to Hepatitis C .If proper segregation practices are carried out then it is helpful to keep separate non-infectious waste with infectious waste. Due to the lack of segregation practices there is increases in quantity of infectious medical waste as mixing of infectious waste with the general non-infectious waste, produces the entire infectious waste.. There is poor practice of segregation of the waste starting from generation of waste to disposal as seen in Indian hospitals. Some times segregation of waste at the point of generation is effective but due to the lack of awareness of waste handlers they mixed all the waste together during the collection and results in loss of ultimate value of segregation

2. Dr. Sushma Rudraswamy, Dr.Nagandini (2013): has studied about global scenario of hospital waste management. They throw light on the HWM scenario in developing and developed countries. According to them safe management of health care waste becomes very important when it comes to environment conservation and health of the community.

3. Ira F.Salkin,EdwardKrisiunal (2000) has discuses 'Medical that there is no any national standard that defines the waste that is made up of regulated medical waste.

4.Violet N. Pinto, Sumedha M. Joshi, Deepa Velankar (2014) :has studied the knowledge and attitudes regarding biomedical waste management in specialists, resident doctors, new medical interns, and final year nursing students and found that the knowledge and attitudes is varied from persons toperson of the medical and nursing groups regarding BMW management varied and were not found to be satisfactory. They concludes that there is a need of a strategy consisting of a practical oriented training programme along with awareness sessions in specific regular time regarding safe management of BMW for the all hospitals personnel was found necessary especially focusing at the junior level.

5. Franka et al, (2009). has focused on worldwide, There is a limited information regarding to the infection spread due to waste handling . Salvaged (of is a major component), according to some reports, the injections due to poor clinical waste treatment and disposal accounts for up to 5% of HIV infections in Africa. There were number of injuries happened due to the poor disposal of hypodermic needles in the hospital environment or from other sharps in accurately placed in to thin-walled plastic bags .In clinical waste management policy priority should be given to Increase hospital workers awareness through repetitive training courses and programs.

6.***Amarpreet Singh Ghural, Dr. CM SankaranKutty***"**Bio Medical Waste: A Corporate Responsibility Dilemma in INDIA"** :has studied total number of hospitals, dispensaries and healthcare centers in India and concluded that how the society is facing the problem due to the infectious waste generated from the hospitals waste. Author has focused on awareness and education of harmful effect of the waste, the current status of disposal of biomedical waste in the city of Mumbai and recommends some feasible strategies for managing this problem.

7. Zarook M. Shareefdeen(2012): has explains the meaning of medical waste, risks exposure related to waste management, the acts regarding to medical waste management, medical waste management procedures and control techniques. Further he explains several techniques of medical waste management and emerging new techniques of medical waste management.

8.RaheleTabasi, GovindanMarthandan.(2013) : has reviewed different papers of clinical waste management which shows the amount of waste generated from different hospitals from different countries. They found the different factors of waste generating such as type of hospital, hospital size, kind and number of department, number of beds, percentage of bed occupancy, type of specialization, ratio of disposable items and number of outpatients are considered as different hospital parameters in medical waste generation rate. Out of 20 studies they found about 65% studies shows that there is a significant effect of type of hospitals on amount of waste generation.

2.3 Review from related thesis:

Peter Ikome KuwohMochungong(2011): through light on the awareness of hospital workers, he says hospital workers, through segregation, can play an important role in minimizing mixing of infectious waste with noninfectious waste and managing the environmental effects of poor clinical waste treatment and disposal. Their contribution in the waste management process, according to McVeigh (1993), may be less but each effort builds a strong base of sound behavior and thinking necessary for the success of the entire process. The workers at the selected hospitals in Cameroon had a basic knowledge of clinical waste but theycould not aware of related environmental impacts and policies and guidelines towards efficient clinical waste management. Most of the hospital workers, especially the incinerator operators had received no complaints from the public in relation to existing poor treatment and disposal methods. The workers however showed adequate knowledge and understanding of the health impacts of poor clinical waste management.

Manowan,Vorapong (2009): Researcher studied the hospital waste management in Thailand. Here researcher puts light on how the hospital waste is harmful to human health

and environment. . Thailand is a country that has been very active in the field of healthcare industries during the past ten years. In Thailand number of hospitals has hospital waste management programs, but their program is not quite widespread.

Seye]D All Akbar JafariMosavi, (1993):has discusses the major environmentally significant impact caused by hospital waste incinerator and find out that hospital incinerator and other methods of waste disposal can introduce hazardous material like air pollution, contamination of water and soil by emission from hospital incinerators into environment

2.4 Review from related articles:

1. Andile Makholwa,(2013): Puts light on health management, he says the harms troubling the health system stem from poor management and not a lack of funds."Communication is the key. We need to relate better with patients." he says."Good etiquette makes a big difference and that doesn't take money."Government spends about 11%, of its budget on public health care. Even though the public hospitals has been provided little improvement in the quality of service . Bara, the country's biggest hospital, with 2888 beds, has been suffering from in-depth management for years. He says there should be a paradigm shift at the hospital and in staff attitudes. Among his goals were improving communication with patients, staff safety availability and cleanliness.

2.**Praveen Mathur, SangeetaPatan And Anand S. Shobhawat.(2012)**
Has discused, proper management of biomedical waste has becomes a sensitive topic throughout the world. The hazardous effect of poor management of biomedical waste have aroused the concern of biomedical waste management because of its long term effects on human, health and the environment. Now it is a well known fact that there are many adverse and harmful effects to the environment including human beings which are caused by the "Hospital waste" generated during the patient care. Hospital waste is a potential health hazard to the health care workers, public and flora and fauna of the area. The problems of the waste disposal become critical in the hospitals and other health-care institutions.

3. PRISM Bangladesh (2002), the author has emphasis on the level of awareness on clinical waste among waste handlers. It was not good enough to manage the waste systematically. The same report stated that the nurses and staffs were aware of the health impacts of clinical wastes. The Bangladesh study, just like this one, did not apply any predictors of knowledge.

But it is subjective there is no any support, only we can assume that the hospital workers with longer years of experience are more aware of the associated health impacts of clinical waste. The survey suggested that practical training should be given to related staff rather than the traditional theoretical training, before they are allowed to handle the waste. Some of the identified training needs involved good practices on hospital waste management such as the use for different containers and bags for different waste types and the use of personal protective equipments such as aprons, gloves, gas masks and rubber booths at the appropriate stages of the waste management process.

2.5 Review from Related books:

1. **Dr. SushamaSahai, Biomedical waste management (2009):** has highlighted the present scenario of the various phases of Bio-medical waste management throughout the country.Also it suggest what are the environmental parameters which are helpful to adopt sustainable strategies in decision making process. It addresses the obstacle revolving around biomedical waste management. To find out the amount of waste generated through healthcare practices a Waste Audit was conducted in each of the selected government hospitals. It was found some important issues, like lack of
awareness of the rules and regulations and lot of risks involved during handling hospital waste and unwanted recycling of infectious waste products need to be addressed in order to develop a full proof biomedical waste management system.

2. **PeterA. Reinhardt, (1990):** has discussed that how the hospital waste is infectious and how there is a need to proper management o hospital waste. This book is very useful to the persons which handles the waste, treats' transports, disposes of, and who is responsible for this waste.

3. **Dr. MoirangthemJiban, (2012):** has explains Cleanliness is next to Godliness. Author explains the role of doctors in hospital waste management and also it is the discipline, character and common sense of a doctor to manage and dispose the infectious syringes and other healthcare waste to save the life of community.

4 Handbook of Operations and Maintenance of hospital medical waste incinerators(2007): This book helps to identify the operations and maintenances procedure that should be practices on hospitals waste incinerators and associated air control equipments.

5. R. B. Patil, (2009): In his book the author puts light on common biomedical waste treatment facilities (CBWTF) in western Maharashtra. CBWTF is set up to reduce adverse effect of the hospital waste .Author writes that generally this waste may send for disposal in landfills or for recycling purpose. It is not possible for small healthcare units to install the individual treatment facilities because it requires comparatively high investment, manpower and infrastructure.

6. Maduri Sharma (2007): describes the safety measures regarding to hospital waste, the laws regarding to biomedical waste treatment, segregation practices, transportation and disposal techniques and also awareness and education techniques related to hospital waste management.

7.SinghAnantpreet, Kaursukhjit(2012) ::Author in this book explain the need of segregation practices, the persons responsible for segregation practices, labeling , training of staff and infection control practices in hospital waste management.

2.6 Review from government reports:

1. Central Pollution Control Board (CPCB) 2012: A study conducted by , an apex pollution monitoring body of Government of India, on incinerators in Delhi Hospitals, concluded that the incinerators were found to discharge a high level of deadly residues and toxic emissions such as cancer-causing dioxins and chemicals which cause neonatal abnormalities, skin disorders, endocrine trouble and reduction of the resistant power.

2. **Praveen Mathur, SangeetaPatan And Anand S. Shobhawat.(2012)** Proper management of biomedical waste has becomes a concern topic throughout world today. The poor management of biomedical waste has arouse the concern regarding to its effects on human, health and the environment Now It is recognized that there are many adverse and harmful effects to the environment including human beings which are caused by the "Hospital waste" generated during the patient care. Hospital waste is a potential health hazard to the hospital

workers, public and flora and fauna of the area. The problems of the waste disposal in the hospitals and other health-care institutions have become issues of increasing concern

3.Darshini Mahadevia, Bela Pharate Amit Mistryn, (2005) : pointed out that the main problem related to the waste management is lack of participation and communication among the concerned people.. Author observed the basic problem regarding to waste management is the absence of communication between government and the communities.

4.Indira Gandhi Institute of Development Research, State of Environment Report, Maharashtra: Disposal of hospital waste requires special attention because it cause a major health problem. Also waste disposal and treatment site causes a serious health problem for the neighborhood community. The incineration plants which can not handle properly cause air pollution and improperly managed and designed landfills attract all types of insects and rodents that spread disease. Recycling of waste sometimes also causes a problem to the health if proper precautions are not taken. If the solid waste is handle without any precaution then it results into in various types of infectious and chronic diseases to the waste workers and the rag pickers .

2.7 Review from news papers:

Times of India,Bhopal (05 June 2014): Many hospitals fail to segregate bio-medical and plastic waste at source which creates additional problems for the treatment facilities to properly dispose of the waste as per Bio-Medical Waste Rules. Hospitals and health care facilities from Madhya Pradesh, Chhattisgarh and Rajasthan raised concern over disposal of hospital waste during the one-day meet on bio-medical waste management organized by zonal office of central pollution control board (CPCB)

2.Times of India (sep2012) :Kamla Nehru Hospital which is run Pune Municipal Corporation has show-cause notice from Maharashtra Pollution Control Board (MPCB) for generating biomedical waste without obtaining mandatory authorization from the board. It is mandatory for all clinical establishments to obtain authorization under Biomedical Waste (management and handling) Rules, 1998, and amendment. It is also compulsory for them to submit an undertaking and treat the biomedical waste generated at their units as per the Act.

3. Times of India (03 Jul 2014): One fifth of hospitals and healthcare facilities operating in state capital are neither properly disposing of bio-medical waste nor are running with valid authorization.

4. Indian–express Lucknow (June2011): According to UP Pollution Control Board (UPPCB) computerization of common biomedical waste treatment plants in the state help them to ensure proper monitoring of treatment of bio-medical waste. Automation will help the UPPCB and CPCB in evaluating the efficiency and treatment capacity of the plants according to the environment standards.

5.Indian Express (January 2010): This article reveals the MPCB is conducting a special drive to identify health care set-ups that have not taken the mandatory authorization for generation of bio-medical waste and also have not joined the common facility for treatment of the waste. So MPCB issued notices to 56 hospitals in Pune and 177 hospital in solapur and Satara for not treating there hospital waste properly.

6. Indian Express February 27: Large quantities of used syringes, catheters, bottles of medicines, saline bottles, and intra-venal scrap were found in a swoop from different parts of the city by officials of the health department of the Ahmedabad Municipal Corporation (AMC)

2.8 Research gap

From the above review it is seen that most of the work on hospital waste is carried out in various aspects such as-the rate of waste generation from hospitals is approximately 0.5 to 1kg per bed per day. But there is no any effective system for disposal of hospital waste. Due to the lack of segregation practices and proper transportation hospital waste becomes dangerous. The level of awareness is not up to the mark and there is no proper work on awareness and training regarding to hospital waste management among the staff, waste handlers and general public also there is no focus on after disposal practices. Aspects related to diseases caused by hospital waste and its effect is carried out. Review puts light on lack of segregation methods, collection of hospital waste, transportation and disposal of hospital waste. Studies about the knowledge and attitude regarding hospital waste management are carried out. Researcher could find articles related to injuries caused by poor hospital waste management. Few researcher has carried out research related to meaning of HW, risk due to

exposure of HW. Few studies focus on the Acts and laws regarding hospital waste management, different techniques of HWM .Studies on education and training on segregation of waste, use of aprons, gloves and mask are carried out. Study of environmental impact of HW, policies, guidelines towards efficient HWM, effect of HW on flora and fauna are carried out. Few studies focus on role of doctors in HWM, investment, manpower and infrastructure for HWM. Different authors also talk about global situation of HWM and use of computers for managing HW. But still all aspects of hospital waste are not covered.

Researcher study focuses on hospital waste in Sangli city, It includes management of hospital waste in Sangli city, including systematic planning, organizing the waste, Awareness and training regarding HW. Researcher in his study covers the aspect of – Role of waste collecting agencies towards HW, Process of collecting HW by agency, transportation, treatment and disposal of HW in Sangli city so researcher has focused on this area.