RESEARCH METHODOLOGY

Introduction;
This chapter narrates the research methodology adopted by the researcher in detail. The present study consists of three parts;

Part One- Descriptive Analysis of the survey data; Survey method is used to find out the methods and procedures adopted to dispose off hospital waste in general hospitals of city of Nashik.

Part Two;- Cost Effective Analysis; Interview and observation method is adopted to assess the cost effectiveness of medical waste treating technologies.

Part Three- Impact of bio-medical waste on Community Health; Secondary data is utilised to study the adverse impact of mismanagement of bio medical waste on the healthcare personnel, environment and community health.

Statement of Problem;

‘Dynamics of Hospital Waste Management and its impact on Community Health in Nasik’

The need and significance of study, definitions of the terms used in the research problem are clearly explained in this chapter.

Area of Study;
Nashik is one of the largest and most progressive districts of Maharashtra. It has got State Health University located. There are more than 120 hospitals of different capacity either government run or privately owned. Besides there are number of pathology labs,blood banks, opthalmology clinics and other medical/para medical units.Nashik district has been chosen as area of research.

Sample of Study:
The field of enquiry for the present study is taken to be the area covered in Nashik Distt. The population of the study consists of healthcare personnel namely the administrators, nurses, and sweepers engaged in medical waste management in general hospitals of Nashik. The representative sample of the population is selected by using quota sampling. The sample is made representative of all the geographical areas of Nashik by judicially selecting at least one private or government hospital for each ward.
Therefore approximately 100 medical establishments of different locations, type, and age have been sampled for detailed study. This will give true picture to researcher.

**Tools For Data Collection;**

Questionnaire for administrators, nurses, sweepers is prepared by the researcher. Interview schedule for the manufacturers and general managers of the companies operating and maintaining the medical waste treating facilities are also prepared.

**Data Collection;**

The researcher personally visited the wards of the selected hospitals and collected the data by giving questionnaire to the administrators, nurses and sweepers. The researcher verified the authenticity of the data by personally observing and taking note of procedures followed by the hospital nurses and sweepers in segregation, collection, transportation, and storage of biomedical waste.

For collecting the data for cost effective analysis of the three technologies namely autoclave, hydroclave and incinerator, the researcher visited and interviewed the administrative officers of the companies who manufacture and market the treatment and disposal technologies and obtained information regarding the cost of plants. These facilities are managed by private companies. Site was also visited and collected data regarding technological, social, and environmental effectiveness by observing the process of medical waste treatment by each technology.

Besides these, researcher also interviewed many people living in neighbourhood of all such facilities to assess impact inhibition in their minds.
DESCRIPTIVE ANALYSIS OF SURVEY DATA

This chapter gives descriptive analysis of data collected during survey.

The present research is an exploratory and descriptive type of research and therefore survey data is organised in tabular form and then percentage of each characteristic is calculated for the hospitals together as well as separately for the government and private hospitals.

Graphs are drawn and data is interpreted. Findings and conclusions are highlighted. Suggestions for the improvement of biomedical waste management system are also given by the researcher.

COST EFFECTIVE ANALYSIS OF HOSPITAL WASTE MANAGEMENT

This chapter describes the cost effective analysis of 3 biomedical waste treating technologies namely incinerator, autoclave and hydroclave currently used for disinfection of biomedical waste in Nasik.

For the present study cost effectiveness analysis of the entire hospital waste management system could not be taken up due to non availability of reliable data, and financial constraints. The researcher therefore opted to carry out cost effective analysis of 3 medical waste treating technologies that form very important part of medical waste management system as it renders the infectious waste into infectious waste which then becomes safe for disposal in the dumping ground.

For assessing economic effectiveness of three bio- medical waste treating technologies per unit cost for disinfecting the infectious waste is calculated by taking non-recurrent costs into consideration.

For identifying and measuring technological effectiveness, social effectiveness and environmental effectiveness environmental impact assessment is carried out. Weighting rating approach is used for evaluation and comparison of selected waste treating technologies. The weight age rating method refers to methodology that embodies the assignment of relative importance weights each decision factor and rating them in terms of impact of these criterion each technical and environmental factor. The rating for various alternate technological and
environmental factors is modified into aspect sensitivity index as the cost and benefit of these technologies are not known with certainty.

The importance weights for each decision factor is thus multiplied by the rating of each alternative and the resulting products for each alternative and the resulting products (scores) for each are then summed up to develop an overall composite index or final score for each medical waste treating technology.

Mathematically composite index is represented as;

\[
\text{Composite index} = \sum_{i=1}^{n} W_i \times \text{ASI}_i
\]

Where composite index shows the technological/social/environmental effectiveness for comparing the technologies.

\( W_i \) is the importance weight of the decision factor

\( \text{ASI}_i \) is the Aspect Sensitivity Index

The decision factors considered for estimation of technological effectiveness are process capacity, waste exclusion, waste limitation, waste change, volume change, disfigurement and dryness, decontamination, performance data process complexity and operator training. The decision factors considered for social and environmental effectiveness are air emissions, liquid effluents, treated residue and permeability public perception occupational health and safety issues. Economic, technological, social, and environmental effectiveness was thus calculated for all the three medical waste treating technologies.

The study results reveal that autoclave and hydroclave as bio medical waste treating technologies are economical, technologically sound, and eco-friendly. Thus they are cost effective technologies. The incinerator is uneconomical, technologically complex and not eco friendly and so discouraged. Many other researches in this field have also arrived at similar conclusions and therefore incinerator as bio medical waste treating technology is banned in some of the western countries while publicly opposed in many countries.
**SURVEY OF IMPACT OF BIO MEDICAL WASTE ON COMMUNITY HEALTH; CONCLUSIONS, AND RECOMMENDATIONS**

**Survey of Impact of Bio Medical Waste on Community Health.**

This chapter reviews the adverse impact of mishandling bio medical waste on community health. Hazard of bio medical waste on healthcare worker is discussed in detail by citing cases reported earlier.

Hazards of chemicals, pharmaceutical waste, genotoxic waste, radio active waste are also explained. Hazard from infected sharps is explained in detail by giving case studies undertaken all over the world.

Environment health risks associated with special reference o the adverse effects of incinerator are discussed with the help of examples. Overview and issues of bio medical waste worldwide with special reference to incinerator in India is narrated in detail.

**Conclusions and Recommendations**

This chapter presents conclusions derived by the researcher regarding hospital waste management practices adopted by general hospitals of Nasik after going through the findings of the study. This chapter also narrates suggestions given by the researcher for improving procedures followed for hospital waste disposal by the hospitals of Nashik.