

Extension Lecture

“Bio-Medical Waste Management”

It is said that Rome was not built in a day. Similarly, Extension was not master-minded by one individual; rather it evolved through hard work of extension professionals around the world over more than a century.

Keeping in vision the teaching-learning process there are many topics and issues in each discipline which require some other experts specializing in the field for the particular issue. This evolves the idea of an extension lecture to be scheduled considering the need of students as well as teacher educators. The Extension Lecture Series have been visualized to motivate the young children from schools and colleges to go for higher studies of their choice. The teacher-education institutes are not an exception and there also extension lectures are organised for the growth of student-teachers and teacher-educators.

In this vision an extension lecture was organized on the topic “**Bio-Medical waste Management**”. The resource person invited to speak on the above topic was Ms D. Anupama, Head of School, Gitarattan Jindal Public School, Rohini.

Ms D Anupama, defined what is bio-medical waste and how it can be managed to keep environment free from its hazards. She mentioned and explained that Biomedical waste management has recently emerged as an issue of major concern not only to hospitals, nursing home authorities but also to the environment. The bio-medical wastes generated from health care units depend upon a number of factors such as waste management methods, type of health care units, occupancy of healthcare units, specialization of healthcare units, ratio of reusable items in use, availability of infrastructure and resources etc.

The proper management of biomedical waste has become a worldwide humanitarian topic today. Although, hazards of poor management of biomedical waste have aroused the concern world over, especially in the light of its far-reaching effects on health and the environment.

She further explained that now it is a well established 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 in the hospitals and other health-care institutions have become issues of increasing concern.

Ms D Anupama also classified the bio-medical waste which is as follows:

Classification of Bio-Medical Waste

The World Health Organization (WHO) has classified medical waste into eight categories:

- General Waste
- Pathological
- Radioactive
- Chemical

- Infectious to potentially infectious waste
- Sharps
- Pharmaceuticals
- Pressurized containers

After discussing about the types of waste, she talked about the sources from which this waste is produced in the environment classifying them into two types- major sources and minor sources which are as follows:

Sources of Biomedical Waste

Hospitals produce waste, which is increasing over the years in its amount and type. The hospital waste, in addition to the risk for patients and personnel who handle them, also poses a threat to public health and environment.

Major Sources

- Govt. hospitals/private hospitals/nursing homes/ dispensaries.
- Primary health centers.
- Medical colleges and research centers/ paramedic services.
- Veterinary colleges and animal research centers.
- Blood banks/mortuaries/autopsy centers.
- Biotechnology institutions.
- Production units.

Minor Sources

- Physicians/ dentists' clinics
- Animal houses/slaughter houses.
- Blood donation camps.
- Vaccination centers.
- Acupuncturists/psychiatric clinics/cosmetic piercing.
- Funeral services.
- Institutions for disabled persons

Next, the problems relating to biomedical waste were discussed. A major issue related to current Bio-Medical waste management in many hospitals is that the implementation of Bio-Waste regulation is unsatisfactory as some hospitals are disposing the waste in a haphazard, improper and indiscriminate manner. Lack of segregation practices, results in mixing of hospital wastes with general waste making the whole waste stream hazardous. Inappropriate segregation ultimately results in an improper method of waste disposal which poses a big problem for the environment and human survival.

Inadequate Bio-Medical waste management thus will cause environmental pollution, unpleasant smell, growth and multiplication of vectors like insects, rodents and worms and

may lead to the transmission of diseases like typhoid, cholera, hepatitis and AIDS through injuries from syringes and needles contaminated with human.

Various communicable diseases, which spread through water, sweat, blood, body fluids and contaminated organs, are important to be prevented. The Bio Medical Waste scattered in and around the hospitals invites flies, insects, rodents, cats and dogs that are responsible for the spread of communication disease like plague and rabies. Rag pickers in the hospital, sorting out the garbage are at a risk of getting tetanus and HIV infections. The recycling of disposable syringes, needles, IV sets and other article like glass bottles without proper sterilization are responsible for Hepatitis, HIV, and other viral diseases. It becomes primary responsibility of Health administrators to manage hospital waste in most safe and eco-friendly manner.

Need of Biomedical Waste Management in Hospitals

The reasons due to which there is great need of management of hospitals waste such as:

- Injuries from sharps leading to infection to all categories of hospital personnel and waste handler.
- No socomial infections in patients from poor infection control practices and poor waste management.
- Risk of infection outside hospital for waste handlers and scavengers and at time general public living in the vicinity of hospitals.
- Risk associated with hazardous chemicals, drugs to persons handling wastes at all levels.
- “Disposable” being repacked and sold by unscrupulous elements without even being washed.
- Drugs which have been disposed of, being repacked and sold off to unsuspecting buyers.
- Risk of air, water and soil pollution directly due to waste, or due to defective incineration emissions and ash.

Process of Biomedical Waste

There is a big network of Health Care Institutions in India. The hospital waste like body parts, organs, tissues, blood and body fluids along with soiled linen, cotton, bandage and plaster casts from infected and contaminated areas are very essential to be properly collected, segregated, stored, transported, treated and disposed of in safe manner to prevent nosocomial or hospital acquired infection. The process follows the below given steps:

- Waste collection
- Segregation
- Transportation and storage
- Treatment & Disposal
- Transport to final disposal site

- Final disposal

Biomedical Waste Treatment and Disposal

Health care waste is a heterogeneous mixture, which is very difficult to manage as such. But the problem can be simplified and its dimension reduced considerably if a proper management system is planned.

Incineration Technology

This is a high temperature thermal process employing combustion of the waste under controlled condition for converting them into inert material and gases. Incinerators can be oil fired or electrically powered or a combination thereof. Broadly, three types of incinerators are used for hospital waste: multiple hearth type, rotary kiln and controlled air types. All the types can have primary and secondary combustion chambers to ensure optimal combustion. These are refractory lined.

Non-Incineration Technology

Non-incineration treatment includes four basic processes: thermal, chemical, irradiative, and biological. The majority of non-incineration technologies employ the thermal and chemical processes. The main purpose of the treatment technology is to decontaminate waste by destroying pathogens. Facilities should make certain that the technology could meet state criteria for disinfection.

Autoclaving

- The autoclave operates on the principle of the standard pressure cooker.
- The process involves using steam at high temperatures.
- The steam generated at high temperature penetrates waste material and kills all the micro organism
- These are also of three types: Gravity type, Pre-vacuum type and Retort type.

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.

Chemical Methods

1 % hypochlorite solution can be used for chemical disinfection.

She also talked about the color coding followed by the professionals on guidelines to dispose off the bio medical waste.

Colour Coding	Type of Container	Waste Category	Treatment options as per Schedule I
Yellow	Plastic bag	Cat.1,Cat.2, Cat.3 and Cat.6	Incineration/ deep burial
Red	Disinfected container/ plastic bag	Cat.3, Cat.6, and Cat.7	Autoclaving/Micro waving/ Chemical Treatment
Blue/ White Translucent	Plastic Bag/ puncture proof container	Cat.4 and Cat.7	Autoclaving/Micro waving/ Chemical Treatment and destruction/ shredding
Black	Plastic bag	Cat.5, Cat.9, and Cat.10 (solid)	Disposal in secured landfill

The extension lecture ended with a vote of thanks on the note that we must be careful about hazardous waste around us and should act as responsible citizens of the country to save the Earth.