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Managing Health care wastes Waste in India: The Genuine Challenge.

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ABSTRACT

The present review article deals with the basic issues as definition, categories, problems relating to biomedical waste and procedure of handling and disposal method of Biomedical Waste Management. It also intends to create awareness amongst the personnel involved in health care unit.Improper management of health care wastes is a public concern because of risks of infection, injury, and other health hazards. Poor health care waste management is also a reflection of broader management deficiencies in health care facilities. Public awareness about the dangers of careless disposal, and the introduction of regulatory measures for managing these wastes, are both relatively new in India.

KEYWORDS :

Introduction:

Health care wastes are all wastes generated by Hospitals and health research facilities and associated laboratories. They include both potentially dangerous "biomedical wastes", such as sharps (needles, scalpels, knives, blades, broken glass) and "Common waste," such as paper and bottles that can be dealt with through the local solid waste management system; wastes with infectious, hazardous, radioactive, and genotoxic properties that endanger human health and the environment. Managing Health care waste safely is essential, but not easy.

Health care waste management strategies and guidelines and provided assistance to government hospitals in implementing Health care waste management initiatives. Nongovernmental organizations (NGOs) have played a major role in bringing the Health care waste management agenda to the attention of government officials, creating public awareness of Health care waste issues and training health care facility personnel. The culture at many health care facilities has changed to recognize the importance of adopting good Health care waste management practices, and the private sector has become increasingly involved in providing Health care waste management services both on and off the premises of health care facilities.

Definition:

According to Biomedical Waste Management and Handling Rules, 1998 of India. "Any waste which is generated during the diagnosis, treatment or immunization of human beings or animals or in research activities pertaining thereto or in the production or testing of biological."

Problems relating to biomedical waste:

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 of 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 incorrect method of waste disposal.

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.

The problem of bio-medical waste disposal in the hospitals and other healthcare establishments has become an issue of increasing concern, prompting hospital administration to seek new ways of scientific, safe and cost effective

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

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

Strategies for Health Care Waste Management

The responsibility for implementing India's Biomedical Waste Rules was delegated to individual states and territories, with State Pollution

Control Boards (SPCBs) in states and Pollution Control Committees in territories designated as the authorities. The national rules require that each state constitute a committee to advise the state government and the SPCBs about implementation of the rules. For such an advisory committee to function effectively there must be close coordination and participation among different stakeholders— in particular, state environmental and healthagencies, local authorities, health care facility representatives,academia, and NGOs. Individual states have had to develop their own specific strategies for HCW management.

One of the strategic decisions that state authorities had to make was how to refine the technology options included in the Biomedical Waste Rules. Another strategic decision for state authorities was whether to opt for on-site treatment of BMWs or common treatment of BMWs. Common treatment of BMWs can offer several advantages in terms of better and more efficient operation of the treatment equipment by trained personnel, reduction of the potential adverse human health impacts and waste treatment and disposal costs, and lessening of the enforcement burden on the regulatory agencies involved. For these reasons, India's central government views common waste treatment as the most appropriate approach to the treatment of BMWs generated in urban areas.

Need of biomedical waste management in hospitals

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

1. Injuries from sharps leading to infection to all categories of hospital personnel and waste handler.
2. Infections in patients from poor infection control practices and poor waste management.
3. Risk of infection outside hospital for waste handlers and scavengers and at time general public living in the vicinity of hospitals.
4. Risk associated with hazardous chemicals, drugs to persons handling wastes at all levels.

Biochemical waste disposal procedure:
Biomedical Waste Management Process

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.

1. Waste collection
2. Segregation
3. Transportation and storage
4. Treatment & Disposal
5. Transport to final disposal site
6. 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. 120 MATHUR *et al.*, *Curr. World Environ.*,Vol. **7**(1), 117-124 (2012)

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**.7**

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 themicro organism These are also of three types: Gravity type, Pre-vacuum type and Retort type. In the first type (Gravity type), air is evacuated with the help of gravity alone. The system operates with temperature of 121 deg. C. and steam pressure of15 psi. for 60-90 minutes. Vacuum pumps are used to evacuate air from the Pre vacuum autoclave system so that the time cycle is reduced to 30-60 minutes. It operates at about 132 deg. C.

Retort type autoclaves are designed much higher steam temperature and pressure. Autoclave treatment has been recommended for microbiology and biotechnology waste, waste sharps, soiled and solid wastes. This technology renders certain categories (mentioned in the rules) of bio-medical waste innocuous and unrecognizable so that the treated residue can be land filled. 8

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

Plasma Pyrolysis

Plasma pyrolysis is a state-of-the-art technology for safe disposal of medical waste. It is an environment-friendly technology, which converts organic waste into commercially useful byproducts. The intense heat generated by the plasma enables it to dispose all types of waste including municipal solid waste, biomedical waste and hazardous waste in a safe and reliable manner. Medical waste is pyrolysed into CO, H2, and hydrocarbons when it comes in contact with the plasma-arc. These gases are burned and produce a high temperature (around 1200oC).

Label for Bio-Medical Waste Containers/Bags

Cyto-toxic Hazard Symbol Biohazard Symbol.

Benefits of Biomedical Waste Management

- Cleaner and healthier surroundings.
- Reduction in the incidence of hospital acquired and general infections.
- Reduction in the cost of infection control within the hospital.
- Reduction in the possibility of disease and death due to reuse and repackaging of infectious disposables.
- Low incidence of community and occupational health hazards.
- Reduction in the cost of waste management and generation of revenue through appropriate treatment and disposal of waste.
- Improved image of the healthcare establishment and increase the quality of life.

CONCLUSION:

Hospitals laboratories and research institution should need to adopt SOPs for the disposal of Medical wastes. The biological wastes should be classified according to their source, typology and risk factors associated with their handling, storage and ultimate disposal. The segregation of waste at source is the key step and reduction, reuse and recycling should be considered in proper perspectives. The biochemical waste should label as per their category. We need to consider in-

novative and radical measures to clean up the distressing picture of lack of civic concern on the part of hospitals and slackness in government implementation of bare minimum of rules, as waste generation particularly biomedical waste imposes increasing direct and indirect costs on society. The challenge before us, therefore, is to scientifically manage growing quantities of biomedical waste that go beyond past practices. If we want to protect our environment and health of community we must sensitize ourselves to this important issue not only in the interest of health managers but also in the interest of community.

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