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Review Article

Bio-Medical Waste Management

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ABSTRACT

Proper handling, treatment and disposal of medicine waste play a significant role in hospital infection management programme. Objectives of BMW (Biomedical waste) management primarily involves preventing transmission of illness from patient to patient, from patient to medical expert to forestall injury to the health care employee and staff in support services, whereas handling medicine waste, to forestall general exposure to the harmful effects of the cytotoxic, genotoxic and chemical medicine waste generated in hospitals. If properly designed and applied, waste management is a comparatively effective associate degreed an economical compliance-related observe. This critical review discusses regarding the gathering, segregation, treatment and disposal of medicine waste and its numerous varieties.

Keywords: Segregation, Treatment, Disposal.

INTRODUCTION

Hospital could be a place of almighty, an area to serve the patient. Since starting, the hospitals are legendary for the treatment of sick persons. However we are unaware the concerned the adverse effects of the rubbish and filth generated by them on soma and atmosphere. Currently it's a well established incontrovertible fact that there are several adverse and harmful effects to the atmosphere together with kinsmen that are caused by the "Hospital waste" generated throughout the patient care. Hospital waste could be a potential hazard to the health care employees, public and flora and fauna of the world. Hospital non inheritable infection, transfusion transmitted diseases, rising incidence of viral hepatitis, and HIV, increasing land and pollution cause increasing chance of catching several diseases. pollution owing to emission of unsafe gases by furnace like furfuran, Dioxin, acid etc. have compelled the authorities to suppose seriously concerning hospital waste and also the diseases transmitted through improper disposal of hospital waste. This downside has currently become a heavy threat for the general public

health and, ultimately, the Central Government had to intervene for imposing correct handling Associate in nursing disposal of hospital waste and an act was passed in July 1996 and a bio-medical waste (handling and management) rule was introduced in 1998.

A modern hospital could be a advanced, multidisciplinary system that consumes thousands of things for delivery of medical aid and could be a part of physical atmosphere of these product consumed within the hospital leave some unusable leftovers i.e. hospital waste. The last century witnessed the fast mushrooming of hospital within the public and personal sector, set by the requirements of increasing population the arrival and acceptance of "disposable" has created the generation of hospital waste a major think about current situation.

"*According To Bio-Medical Waste Management and Handling Rules 1998 Of India;*

***Bio-medical waste means any waste which is generated during the diagnosis, treatment or immunisation of human beings or animals or in research activities pertaining thereto or in the production or testing of biological things*.**"**

Sources of Medical Speciality Wastes

The sources of health-care waste are classified as major or minor according to the quantities created. Whereas minor and scattered sources might manufacture some health-care waste in classes almost like hospital waste, their composition is completely different.

Major sources of health-care waste are:

- Hospitals: University hospital; general hospital and district hospital.
- Other health-care institutions: emergency treatment services; aid centres and medical speciality and maternity clinics, patient clinics; medical analysis centres; first-aid posts and sick bays; long health-care establishments and hospices; transfusion centres and military medical services.
- Related laboratories and analysis centres: Medical and medical speciality laboratories; biotechnology laboratories and institutions; medical research centres.
- Mortuary and autopsy centres: Animal analysis and testing; blood banks and blood assortment services and nursing homes for the senior.

Minor sources of health-care waste include:

- Small health-care establish-ments: Physicians' offices; dental clinics; acupuncturists and chiropractors.
- Specialized health-care organization and institutions with low waste generation: Convalescent nursing homes; mental hospitals; disabled persons' organisations.
- Non-health activities involving blood vessel or body covering, Cosmetic ear-piercing and tattoo parlours and illicit drug users.
- Funeral services; car services and residential treatment.

Categories of Health-Care Waste

Types Of Waste
Human anatomical waste Animal waste, animal tissues, organs, body parts, carcasses, bleeding parts, fluid, blood and experimental animals employed in analysis, waste generated by veterinary hospitals, colleges, discharge from hospitals, animal homes
Microbiology and biotechnology waste Waste from laboratory cultures, stocks or specimens of micro-organisms live or attenuated vaccines, human and animal cell culture employed in analysis and infectious agents from analysis and industrial laboratories, waste from production of biological, toxins, dishes and devices used for transfer of cultures
Waste sharps Needles, syringes, scalpels, blades, glass etc. This will cause puncture and cuts. This includes each used and unused sharps. Discarded medicines and cytotoxic medicines waste comprising out of date, contaminated and discarded medicines.
Solid waste Waste generated from disposal things alternative then waste sharps like tubings, catheters, blood vessels sets. etc.
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Liquid waste Waste generated from laboratory and laundry cleaning work and disinfecting, activities
Incineration ash from burning of any medical speciality waste
Chemical waste Chemicals employed in production of biological, chemicals employed in medical care as pesticides.

Need For Bio-Medical Waste Management

Medical care is significant for our life and health; however the waste generated from medical activities represents a true downside of living nature and human world. Improper management of waste generated in health care facilities causes an immediate health impact on the community, the health care employees and on the setting each day, comparatively great deal of probably infectious and dangerous waste area unit generated within the health care hospitals and facilities round the world. Indiscriminate disposal of BMW or hospital waste and exposure to such waste possess serious threat to setting and to human health that needs specific treatment and management before its final disposal. This criticism deals with the essential problems as definition, categories, issues about medicine waste and procedure of handling and disposal methodology of medicine Waste Management. It conjointly intends to make awareness amongst the personnel concerned in health care unit.

Problem related to bio-medical waste organism and diseases

Caused due to waste item

- ***Virus***: AIDS, hepatitis A, Infected needles, body HIV, serum hepatitis, Infectious diseases like Hepatitis, Fluids, Human waste product, soiled A,C, Arboviruses, Dengue, Japanese linen, Blood, body fluids. Enteroviruses encephalitis, tick-borne fevers, etc.
- ***Bacteria:*** Typhoid fever, Cholera, Tetanus Human waste product and Salmonella typhosa, Wound infections, body fluid in landfills and B Vibrio cholera, septicemia, rheumatic hospital wards, Sharps such eubacterium Clostridium Tetani, fever, endocarditis, skin as needles, surgical blades in Pseudomonas, Streptococcus and soft tissue infections hospital waste.
- ***Parasites:*** Cutaneous leishmaniasis, Human excreta, blood and Wucheraria Bancrofti, Kala Azar, protozoal infection Malaria body fluids in poorly Plasmodium

managed sewage facility of hospitals.

STEP TO MANAGE HEALTH CARE WASTE

Colour cryptography	Type of Material	Waste Category	Treatment option
Yellow bag	Plastic bag	Human Anatomical Waste, Animal Waste.	Incineration or burning
Red bag	Plastic bag	Infected /Non-Infected Plastics	Shredding after Autoclaving
Blue bag	Plastic bag	Glass	Autoclaving /Destruction
Black bag	Carboy	Infected metal sharps	Autoclaving/ Destruction

Waste category	Treatment and disposal
Human anatomical waste	Incineration , Deep burial
Animal waste animal tissues, organs, body parts, carcasses, bleeding parts, fluid, blood and experimental animals utilised in analysis, waste generated by veterinary hospitals, colleges, discharge from hospitals, animal homes.	Incineration Deep burial
Microbiology and biotechnology waste Waste from laboratory cultures, stocks or specimens of micro-organisms live or attenuated vaccines, human and animal cell culture utilised in analysis and infectious agents from analysis and industrial laboratories, waste from production of biologicals, toxins, dishes and devices used for transfer of cultures	Local autoclaving, micro- waving, incineration or burning
Waste sharps Needles, syringes, scalpels, blades, glass etc. that can cause puncture and cuts. This includes each used and unused sharps	Disinfection by chemical treatment Autoclaving, micro- waving and mutilation, shredding
Discarded medicines and cytotoxic medicines waste comprising of out of date, contaminated and discarded medicines	Incineration or burning, destruction of drugs and Disposal in secured landfills
Solid waste items contaminated with blood and body fluids together with cotton, dressings, soiled plaster casts, lines, beddings, different material contaminated with blood	Incineration , autoclaving, micro- waving
Solid waste Waste generated from disposal items different then waste sharps like tubings, catheters, intravenous sets. etc.	Disinfection by chemical treatment autoclaving, micro- waving and mutilation, shredding
Liquid waste waste generated from laboratory and laundry, cleaning, work and disinfecting, activities	Disinfection by chemical treatment and discharge into drains
Incineration ash from burning of any medicines waste	Disposal in municipal lowland
Chemical waste chemicals utilised in production of biologicals, chemicals utilised in disinfection, as pesticides etc.	Chemical treatment and discharge into drains for liquids and secured lowland for solids

Approach for Hospital Waste Management

Based on Bio-medical Waste (Management and Handling) Rules 1998, notified underneath the atmosphere Protection Act by the Ministry of atmosphere and Forest (Government of India).

1. ***Segregation of waste***

Segregation is the essential part of waste management and should be done at the supply of generation of Bio-medical waste e.g. all patient care activity areas, diagnostic services areas, operation theatres, labour rooms, treatment rooms etc. The responsibility of segregation should be with the generation of medical specialty waste i.e. doctors, nurses, technicians etc. (medical

and paramedical personnel). The medical specialty waste must be divided as per classes mentioned within the rules.

2. *Assortment of bio-medical waste*

Collection of bio-medical waste must be done as per Bio-medical waste (Management and Handling) Rules. At standard temperature the collected waste materials mustn't be kept for quite twenty four hours.

3. *Transportation*

Within hospital, waste routes ought to be selected to avoid the passage of waste through patient service care areas. Separate time should be earmarked for transportation of bio-medical waste to cut back probabilities of mixing with general waste. Desiccated wheeled containers, trolleys or carts ought to be wont to transport the waste/plastic luggage to the positioning of storage/ treatment.

4. *Treatment of hospital waste*

4.1General waste

The waste generated inside the hospital belongs to the different class. The safe disposal of these wastes is the responsibility of the bureau.

4.2 Bio-medical waste

1. It must be deep burial
2. It must go under autoclave and microwave treatment
3. There must be Shredding
4. There must be Secured landfills
5. T here must be Combustion

5. *Safety measures*

A. All the generators of bio–medical waste ought to adopt universal precautions and acceptable safety measures whereas doing therapeutic and diagnostic activities and additionally whereas handling the bio-medical waste.

B. It should be ensured that:

1. Drivers, collectors and different handler's square measure responsive to the character and risk of the waste.
2. Written directions, provided regarding the procedures to be adopted within the event of spillage/ accidents.
3. Protecting gears should be given and directions concerning their use square measure given.
4. Staffs square measure protected by vaccination against tetanus and serum hepatitis

6. *Training*

1. Each and every hospital should have strategically awareness and coaching programme for each and every class of personnel together with directors (medical, paramedical and administrative).
2. All the medical professionals must be created responsive to Bio-medical Waste (Management and Handling) Rules 1998.
3. To institute awards for safe hospital waste management and universal precaution practices.
4. Coaching should be conducted to any or every classes of employees in acceptable language/medium and in a suitable manner.

7. *Management and administration*

Heads of each hospital must take authorization for generation of waste from acceptable authorities as notified by the involved State/U.T. Government, well in time and to induce it revived as per time schedule arranged down within the rules. Each hospital ought to represent a hospital waste management committee, chaired by the pinnacle of the Institute and having wide illustration from all departments. This committee ought to be liable for creating Hospital specific action set up for hospital waste management and its supervising, watching and implementation. The annual reports, accident reports, pro re natal underneath BMW rules must be submitted to the involved authorities as per BMW rules format.

8. *Measures for Waste Diminution*

As such a lot as achievable, purchase of reusable things product of glass and metal

got to be inspired. Choose non PVC plastic things. Adopt procedures and policies for correct management of waste generated and the mainstay of that is segregation to cut back the number of waste to be treated. Establish effective and sound usage policy for plastic usage and produce actually with authorised manufactures

Bio-Medical Waste Management in India

New Delhi, Feb. twenty two-As per the annual report submitted by SPCBs/PCCs/Directorate General of soldiers Medical Services (DGAFMS) for the year 2010, a number of the Health Care Facilities (HCFs)/Common Bio-Medical Waste Treatment Facilities (CBWTFs) square measure rumoured to be violating the provisions of the Bio-Medical Waste (Management &Handling;) Rules, 1998 notified beneath the surroundings (Protection) Act, 1986.

As so much as 3 central government hospitals specifically Dr. RML Hospital, Safdarjung Hospital and LHMC beneath the board General of Health Services square measure involved, they're disposing Bio-medical waste as per the BMW rules.

Health being a state subject, it's the responsibility of the involved regime to require necessary steps to observe the disposal of drugs wastes through the State Pollution management Boards (SPCBs)/Pollution management Committees (PCCs) within the Union Territories, as per the provisions created beneath the Bio-medical waste (Management & Handling) Rules in 1998, as amended within the years 2000 & 2003. The State Pollution management Boards (SPCBs)/Pollution management Committees (PCCs) square measure the prescribed authorities to grant authorization for the BMW Management. They're sceptered to confirm the compliance of provisions of those Rules.

As per the Bio-Medical Waste (BMW) (Management & Handling) Rules, 1998, each and every occupier of an establishment generating BMW needs to make sure that such waste must be handled with none adverse result to human health and surroundings. The Bio-Medical Waste is needed to be white as per the color code for bags prescribed in the BMW Rules. Further, it's the responsibility of the occupier to treat and get rid of bio-medical waste in accordance with treatment and disposal choices mentioned in the aforementioned Rules.

The State Pollution management Boards (SPCBs) and Pollution management Committees (PCCs) within the Union Territories square measure the selected Prescribed Authorities for guaranteeing implementation of the Bio-medical Waste (Management and Handling) Rules, 1998, notified beneath the surroundings (Protection) Act, 1986. the Govt. of Republic of India have delegated necessary powers unconditional in it beneath Section five of the surroundings (Protection) Act, 1986 to any or all the SPCBs and PCCs in UTs, to issue directions to any business or the other authority for violation of standards and Rules, inter-alia, about Bio-medical Waste (Management and Handling) Rules, 1998. The SPCBs/PCCs square measure needed to closely monitor the implementation of the principles by the Health Care institutions (HCEs) and take necessary legal actions against the institutions that violate these Rules.

An inter-ministerial Committee of Senior Officers at the Central level has been habitual comprising representatives from the Ministry of surroundings & Forests, Ministry of Health & Family Welfare, Ministry of Urban Development and therefore the Central Pollution board (CPCB) to review the implementation of

Bio-Medical Waste (Management and Handling) Rules within the country.

The on top of data was given by the Union Minister for Health & Family Welfare, Shri Ghulam Nabi Azad in a much written reply to a matter within the Lok Sabha these days.

Rule and Regulation against Bio –Medical Waste Management

- The Environment (Protection) Act 1986
- The Biomedical Waste (Management & Handling) Rules 1998
- The Municipal Solid Waste (Management & Handling) Rules 2000
- The Hazardous Waste (Management & Handling) Rules 1989
- The National Environmental Tribunal Act 1995
- The Air (Prevention and Control of Pollution) Act 1981

CONCLUSION AND SUGGESTIONS FOR BIO-MEDICAL WASTE IN HOSPITALS

The hospitals and bio medical facilities meant to verify higher health which has sadly become a possible health risk owing to management of the infectious waste. BMW from hospitals, institution and alternative health centres composed of types of wastes like hypodermic needles, scalpels blades, surgical cottons, gloves bandages, clothes, discarded medication, blood and body fluids, human tissues and organs, radio-active substances and chemicals etc. The area of waste management is grossly neglected.

The scientist, therefore, states that there must be requisite stress on the subsequent that may be done through a program that includes:

1. Updated pointers for the segregation, management and disposal of infectious or probably infectious drugs waste.
2. Reduce the incidence of health care workers and conjointly with the public from contacting illness or injury from drugs waste.
3. Supply steering to the health care system on the opportunities for waste minimisation and also the reduction of air contamination from burning of drugs waste.
4. Strategies and applicable handling too land techniques for bio-medical waste management
5. Generate awareness relating to Hospital certification with target pointers associated with care questions of safety concerned with disposal of Bio-Medical Waste.
6. Develop the new technologies obtained for Safe disposal of Bio medical Waste from setting friendliness purpose of scan and infection management in hospitals
7. Economic issue involved in Management of Bio-Medical Waste & Role of Public-Private Partnership.

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