

# REVIEW ARTICLE

## BIOMEDICAL WASTE MANAGEMENT IN INDIA- A REVIEW

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### ABSTRACT:

Financial advancement of India in most recent two decades has brought about natural contamination and waste era in enormous amount in India. Today biomedical waste administration has turned out to be one of significant issue of worry in India considering the rate of development of populace. In this paper an endeavor is made to concentrate the arrangement, enactment and administration rehearses in connection with biomedical waste in India. The paper incorporates different administration hones embraced for biomedical waste administration by different nations. In all around 60 original copies were gathered which might be ordered, for example, general writing, administrative angle, doctor's facility encounter, city encounter, nation encounter for the audit. In the nation like India just 1 to 1.5% is Bio restorative misuse of the aggregate sum of strong waste created in a city, of which 10-15% is viewed as irresistible. The paper intends to make mindfulness among the souls. The key stride in decreasing the dangers from Bio medical waste is to isolate the waste at source.

**Keyword:** Biomedical waste, knowledge, awareness, institution. health care waste

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### INTRODUCTION:

Hospitals are those organizations which have existed since time immemorial in one frame or the other and have turned out to be more perplexing in the present time frequented by individuals from each stroll of existence with no distinction between sex, age, position and religion. As of late, there is a critical increment in the dental and medicinal showing healing centers and correspondingly there has been huge increment in the measure of biomedical waste created by the doctor's facilities. Biomedical waste [BMW] can be characterized as "any strong, liquid or fluid waste, including its compartment and any transitional item, which is created amid its analysis, treatment or immunisation of individuals or creatures, in research relating thereto, or in the, generation or testing of natural and the creature squanders from butcher houses or whatever other like foundations.

Waste produced in a dental showing doctor's facility is like that created by different clinics which incorporates a vast segment of general waste and a littler extent of perilous waste. Dental experts are at a more serious hazard for obtaining cross-disease while treating patients. This is apparent from the way that the greater part of the human pathogens have been disconnected from oral discharges. Dental healing facilities utilize instruments and materials that are straightforwardly presented to blood and spit and are accordingly potential wellsprings of contamination. Numerous chemicals like acrylics, impression materials and mercury utilized for therapeutic purposes may have a conceivable natural and human wellbeing sway if not dealt with legitimately.

Economic development of India in last two decades has resulted in environmental pollution and waste generation in huge quantity in India. Today biomedical waste management has become one of major issue of concern in India taking into account the rate of growth of population. The key step in reducing the hazards from Bio medical waste is to segregate the waste at source.

### Biomedical waste

Doctor's facilities, centers, investigate focuses and social insurance focuses utilize wide assortment of medications including anti-toxins, radioactive substances, destructive chemicals, which at last contribute in Bio therapeutic waste. In the nation like India the aggregate sum of civil waste a city produces, just 1 to 1.5% is Bio medicinal waste, of which 10-15% is viewed as irresistible. While, In created nations because of expanded utilization of disposables the waste delivered has been up to 5.24 Kg for each bed every day.

It is evaluated, a city like New Delhi with around 40,000 beds creates around 60 metric huge amounts of Bio medicinal waste every day. Bio medicinal waste, till as of late was not being overseen but rather it was essentially 'arranged off'. The transfer of Bio therapeutic waste can be exceptionally risky especially when it gets blended with city strong waste and is dumped in uncontrolled or unlawful landfills, for example, empty parts in neighboring local locations and ghettos. This can prompt a higher level of ecological contamination, aside from posturing genuine general wellbeing dangers, for example, AIDS, Hepatitis, cholera, and so forth.

### Duties of the operator of a common bio-medical waste treatment and disposal facility:

The duties of the operator of a common bio-medical waste treatment and disposal facility (CBWTF) as enunciated under Rule 5 of the Bio-medical Waste Management Rules, 2016 shall be ensured and complied with. Also, all the existing CBWTFs shall also complete augmentation of the existing incineration facility so as to comply w.r.to the residence time as well as emission norms including for Dioxins and Furans prescribed under BMW Rules, 2016 within two years from the date of notification of the BMW Rules, 2016 (i.e., prior to 27.03.2018). In addition to the above, to ensure proper management of bio-medical waste

in the respective coverage area, as a mitigation measure, especially in the event of

(a) a temporary break down (not more than a week) of a CBWTF especially for rectification of the refractory lining of the incineration chambers or change of requisite APCD due to failure; and

(b) Closure of a CBWTF for violation of the provisions of the BMWM Rules or any other reason.

Prior to commencement of a new CBWTF as well as all the existing CBWTF Operators are required to submit action plan, to the respective SPCB/PCC, for imposing suitable condition while granting authorisation under the BMWM Rules, 2016. The action plan should also include:

(a) a MoU made with the nearest CBWTF located within the respective State/UT, as alternate arrangement. In case, if there is no CBWTF located nearby then such CBWTF should have to install stand by treatment equipment (equal to the existing treatment capacity as per consents granted by the SPCB/PCC), and

(b) decontamination plan of the CBWTF for execution of such plan prior to closure of a CBWTF.

All Incineration based technologies, Hydroclave, Microwave and Autoclave for the treatment of IBMW (infectious biomedical waste) are too expensive for developing countries and therefore, low cost treatment options are needed as an alternate for biomedical waste (BMW) management arises. Hence using treatment options and analytical procedures of various other wastes, a detailed investigation was carried out for infectious biomedical waste (IBMW) to understand the effect of lime, neem (*Azadirachta indica*) leaves extract and also utilizing solar energy and solar energy with addition of lime solution in box-type solar disinfectors as a Pre-treatment to destroy the pathogenic organisms absolutely from the IBMW.

Biomedical waste management has been brought into focus recently in India, particularly with the notification of biomedical waste rules, 1998 which was brought out by Union Ministry of Environment and Forests under the provision of Environment [protection] act, 1986. These rules apply to all those persons which are connected with generation, collection, receiving, storage, transportation and handling or biomedical waste in any form.<sup>7</sup>

The composition and characteristics of infectious waste is given in table no.1.

**Table 1:** Typical Composition and Characteristics of Infectious Waste

<b>Particulars</b>	
<b>Composition:</b>	
Celluloid Material (paper & Cloth)	52-72%
Plastics	18-58%
Glassware	10-20%
Fluids	1-10%
<b>Typical Characteristics:</b>	
Moisture	8.5-17% by weight
Incombustibles	8% by weight
Heating Value	7,500 BTU/lb

Category	Waste Content	Components	Method of treatment and disposal
Category No. 1	Human Anatomical Waste	Human tissues, organs, body parts	Incineration /deep burial
Category No. 2	Animal Waste	Animal tissues, organs, body parts carcasses, bleeding parts, fluid, blood and experimental animals used in research, waste generated by veterinary hospitals colleges, discharge from hospitals, animal, Houses	Incineration /deep burial
Category No 3	Microbiology & Biotechnology Waste	Wastes from laboratory cultures, stocks or specimens of micro-organisms live or attenuated vaccines, human and animal cell culture used in research and infectious agents and industrial laboratories, wastes from production of biologicals, from research toxins, dishes and devices used for transfer of cultures	Local autoclaving/ micro waving/ incineration
Category No. 4	Waste sharps	Needles, syringes, scalpels, blades, glass, etc. that may cause puncture and cuts. This includes both used and unused sharps	Disinfections chemical treatment /autoclaving/micro waving and mutilation shredding
Category No. 5	Discarded Medicines and Cytotoxic drugs	Wastes comprising of outdated, contaminated and discarded medicines	Incineration / destruction & drugs disposal in secured landfills
Category No. 6	Solid Waste	Items contaminated with blood, and body fluids including cotton, dressings, soiled plaster casts, lines, beddings, other material contaminated with blood	Incineration , autoclaving/ micro waving
Category No. 7	Solid Waste	Wastes generated from disposable items other than the waste sharps such as tubing's, catheters, intravenous sets etc	Disinfections chemical treatment /autoclaving/micro waving and mutilation shredding
Category No. 8	Liquid Waste	Waste generated from laboratory and washing, cleaning, house-keeping and disinfecting activities	Disinfections by chemical treatment and discharge into drains
Category No. 9	Incineration Ash	Ash from incineration of any biomedical waste	Disposal in municipal landfill
Category No. 10	Chemical Waste	Chemicals used in production of biologicals, chemicals used in disinfection, as insecticides, etc	Chemical treatment and discharges into drains

### **Hazards from biomedical waste**

Execution of tenets and control of the biomedical waste administration frameworks in India is real disadvantage of the entire framework. The specialists, attendants, professionals, sweepers, doctor's facility guests, patients, cloth pickers and their relatives are presented routinely to Bio-Medical Waste and are at more hazard from the numerous lethal contaminations because of aimless administration. Because of dishonorable administration of the biomedical waste this irresistible waste gets blended with strong waste. Amid the stormy season irresistible substance may get added to the ground water and spreads perilous infections.

### **Sources of generation of biomedical waste:**

Although the solid waste management has become one of the major topic of importance but still local bodies are unable to give the proper attention towards some special sources of wastes out of which biomedical waste is one. The

### **Classification and components of biomedical waste:**

The World Health Organization (WHO) has classified medical waste into eight categories such as General Waste, Pathological, Radioactive, Chemical, Infectious to potentially infectious waste, Sharps, Pharmaceuticals, Pressurized containers.

Whereas, In India, Ministry of Environment and Forest, Government of India (1998) has notified Bio-medical Waste (Management & Handling) Rules -1998, which describes ten categories as follows.

### **Biomedical waste handling, treatment and disposal methods:**

In India tremendous measure of therapeutic office are accessible which are creating the Biomedical waste, for example, body parts, organs, tissues, blood and body liquids alongside ruined material, cotton, bandage and plaster. This waste is extremely tainted and polluted. It is extremely basic to appropriately gather, isolate, store, transport, treat and arrange this waste in safe way. Incineration of biomedical waste is a standout amongst the most generally received techniques for treatment in India on account of its ease however Incineration causes terrible ecological impacts. Other than cremation the techniques, for example, autoclave treatment, microwave treatment, dielectric heating, Depolymerization, Pyrolysis-Oxidation, and so forth are utilized as a part of a few places in India.

### **Collection of bio-medical waste:**

Generator of the bio-medical waste is responsible for providing segregated waste in accordance with the provisions of the Bio-medical Waste Management Rules, 2016, to the CBWTF operator. Dedicated temporary storage at healthcare unit shall be designated. The coloured bags handed over by the healthcare units shall be collected in similar coloured containers with proper cover. Each bag shall be labeled as per the BMW Management Rules as well as with bar coding system (to be complied by the occupier or operator of a CBWTF as per BMW Rules) so that at any time, the healthcare units can be traced back that are not segregating the bio-medical wastes as per BMW Rules. The coloured containers should be strong enough to withstand any possible damage that may occur during loading, transportation or unloading of such containers. Sharps shall be collected in puncture resistant container. The person responsible for collection of bio-medical wastes shall also carry a register with him to maintain the records such as name of the healthcare unit, the type and quantity of waste received, time at which waste collected from the member HCF, signature of the authorised person from the healthcare unit etc.

sources of biomedical waste can be categorized as primary and secondary sources according to the quantities produced. Primary sources includes waste generated from hospitals, medical college, nursing center, dialysis centers, maternity homes, blood bank, research labs, immunization centres etc and secondary sources includes waste from clinics, ambulances, funeral services, slaughter houses, educational institutes and home treatments.

As a result of developing healthcare technology, the amount of hospital wastes being generated is increasing due to the use of more disposable products (Omran 1998). The waste produced in the course of health-care activities carries a higher potential for infection and injury than any other type of waste. Environment and natural resources can be polluted, and consequently human beings, animals and plants can be impacted

During transportation, the containers should be covered in order to prevent exposure of public to odours and contamination.

### **Transportation of the collected bio-medical waste to the CBWTF:**

All the vehicles used by the CBWTF (Common Bio-medical Waste Treatment and Disposal Facility) operator shall not be sub-letted or contract vehicles should not be used by the CBWTF operator. All the vehicles owned by the CBWTF operator and intended only for collection of bio-medical waste from the member health care facilities should be registered under the Motor Vehicle Act with the respective RTO/Transport Department and such vehicle numbers should also be registered with the respective SPCB/PCC for the purpose of collection of bio-medical waste from the member health care facilities. The bio-medical waste collected in designated coloured containers shall be transported to the CBWTF in a fully covered vehicle. Such vehicle shall be dedicated for transportation of bio-medical waste only. Depending upon the volume of the wastes to be transported, the vehicle may be a two or three-wheeler, light motor vehicle or heavy duty vehicle.

### **CONCLUSION:**

The present study concludes that Bio medical waste is one of the most hazardous waste generated by human beings. Management of the bio medical waste is becoming a challenging issue in India. Governmental and non governmental agencies have recognized the biomedical waste management as matter of concern. More and more studies must be conducted in qualitative as well as quantitative access for bio medical waste so that the proper management of bio medical waste take place. Proper methods of treatment of bio medical waste needs to be developed for health and environmental safety.

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