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# "Disposal of Biomedical Waste and Law"

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## Introduction

Since beginning hospitals are health care institution which provide treatment to patients by performing different methods but people are unaware about its effect of waste generated. The adverse effect of the garbage generated by hospitals on the environment and human being is dangerous. It is creating health hazard to the health care workers, general public and nearby flora & fauna. The waste generated from the hospitals is biomedical waste. It is a kind of waste contain infectious materials and may also include the used and unused bandages, infusion kits and other laboratory waste which contain biomolecules or organism that are restricted for environment release. It may be in solid or liquid form.

## Definition

Bio medical waste means any waste, which is generated during the diagnosis, treatment or immunization of human beings or animals or in research activities pertaining there to or in the testing of biological and including categories mentioned in schedule 1.[1]

The biological waste excised from a patient during surgery, which is disposed of in hazardous waste receptacles at the end of the procedure.[2]

## The Biomedical Management Rules

In year 1986 the act was passed by the ministry of environment and forest and notified the rules in July 1998 relating to Bio-medical waste (management and handling). According to act passed by the ministry in 1986 and rules notified in July 1998, it is the duty of occupier of the institution, to take all the necessary step to dispose of the waste generated out of his possession without any adverse effect to environment, flora and fauna and human being. Operator is also under duty to inform authority immediately regarding the health care establishment which is not handling over the segregation of biomedical waste and medical examination was made compulsory of its workers and to maintain a log book of treatment equipment. These rules were 1st amended on 6th march 2000 and then in 2003. In year 2016 a new rules were passed which totally replaced the old rule of 1998

The bio medical waste (management and handling) rule 2016 is divided into 4 schedules, 5 forms and 18 rules

[1] Megha Maheshwari health law khetrapal publication , disposal of medical and surgical waste, 2017 edition pg 231
[2] IBID1

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Schedule I – Biomedical waste categories and their segregation, collection, treatment and disposal.

Schedule II – Defines the standard for treatment and disposal of biomedical waste.

Schedule III – List of prescribed authorities and the corresponding duties.

Schedule IV – (Part A) label for biomedical waste containers or bags.

(Part B) label for transporting biomedical waste bags or containers.

Form 1- Accident reporting

Form 2, 3 – Applications and authorization documents

Form 4 Annual reports

Form 5 Appeal

**Biomedical waste**

Hospital waste is hazardous waste but only a fraction of hospital waste is actually hazardous and can be injurious to human or animals, and is deleterious to the environment. This may be either:

a. Bio-hazard infectious in nature.

b. Sharps that may lead to secondary infections.

c. Toxic bio-hazard cytotoxic in nature.

d. Radiation bio-hazard radioactive in nature.[3]

**Classification and Management as per Bio-medical waste (Management and Handling) rules 2016**

According to rule of 2016, there are 4 categories in schedule 1 in which the waste generated out of hospitals etc are to be segregated and then stored in 4 different colored containers or bags which are yellow, red, white, and blue. Category I talks about yellow container in which all animal anatomical waste, human anatomical waste, solid waste, expired or discarded medicines, discarded linen, microbiology biotechnology & clinical laboratory waste and chemical liquid waste are to be stored, and then treatment will be done through incineration, plasma pyrolysis and deep burial.

[3]Dr. Vishal Bathma, biomedical waste management rule 2016 (16/07/2018, 10:20 PM) https://www.slideshare.net/prashantfulluke/bio-medical-waste-management-presentation-2016

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Category II talks about red colored containers or bags in which contaminated waste i.e. waste generated from disposable item such as tubing, urine bags, syringe, gloves etc will be stored and then through autoclaving or microwaving process waste will be treated for re use.

Category III is of white colored translucent containers or bags in which sharps including metals like needles, syrings, tip cutter etc are stored. This waste will be treated through autoclaving, dry heat sterilization followed by shredding imutilation.

Category IV is of blue containers or bags in which broken/discarded and contaminated glass including medicine vials and ampoules, etc are stored. The treatment is done by soaking the washed glass waste after cleaning with detergent or sodium hypochlorite treatment or may be through autoclaving or microwaving.

**Steps for Waste Management:**

According to biomedical waste (management and handling) rule 2016 schedule I, there are 4 steps of waste management are as follows

1. Segregation:-
   Segregation is very important step for waste management in which basic separation of different categories of waste was done which reduces the handling of waste and also helps to take different methods to dispose different kinds of waste. It prevent from using used components like used syringes, needles etc and gives us a chance for recycling of certain components after proper disinfection. It also reduces the cost of treatment and disposal because 80% of the hospital waste is general waste and does not need special treatment before its disposal.
2. Collection and storage:-
   When the segregation of biomedical or surgical waste is done then these waste is collected in different types of container having different color as stated in schedule 1 of new rule 2016. It must be placed in such a condition that that 100% waste must be collected. The segregated waste of different categories must contain in identifiable containers so that it will easy during disposal. According to rules the waste cannot exceed 8 to 10 hrs in hospital and the storage area must be marked with a caution sign.
3. Transportation:-
   The third step is transportation in which all the waste collected must be transported to the area of treatment before disposal. The waste uploaded in the vehicle must have document about its quantity and destination signed by nurse or doctor. Special vehicle must be used for transportation. At the time of uploading the waste all the workers must wear gloves, masks and boots for personal safety.
4. Treatment and disposal

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When the waste is transferred from hospital to treatment plant then the waste was treated chemically with the help of machines to reduce its infectious nature and then disposed off. The processes of treatment are as follows;

a. Incineration
   Incineration is a controlled burning of the medical waste. It is one of the oldest method of treatment and disposal of waste. It is widely used to dispose all types of waste but this method was not approved by local public and NGO's because it causes air pollution and the bottom ash or sinter was very hard to keep in control. Even after so much of protest in different part of the world there are certain open pit burning which is very dangerous to nearby public and environment.
b. Autoclave
   Autoclave is another form of treatment of medical waste in which all the waste are kept in a close chamber called autoclave and then apply heart and sometimes pressure and stream to sterilize medical equipment. It is used to reuse the equipment like surgical knives, clamps etc. It is a heat treatment processing unit in which all the microorganism are destroyed before burring.
c. Chemical disinfection
   It does not kill the pathogens, but it reduces the volume of waste which can be used for further treatment.
d. Irradiation
   This process attempts to disinfect waste by exposition all the surgical waste to gamma rays which is fatal to bacteria. This is the radiation which is used in cancer treatment. But this process is less in used because it is too costly and does not give 100% result in treating the waste.
e. Land disposal
   It is another method of disposal of surgical or medical waste in which the waste is disposed in the land. Some waste is first treated and then disposed in the land and some are not dangerous in nature and directly disposed in the land.

**Management and administration of biomedical waste**

The prescribed authority for management and administration of bio medical waste will be Pollution Control committee in respect of Union Territory and SPCB in case of state. The prescribed authority shall comply with the responsibilities as stipulated in schedule III of these rules[4].

[4] Biomedical waste management rule 2016 vilaspedia (15/07/2016 9:40 AM) http://vikaspedia.in/energy/environment/waste-management/bio-medical-waste-management/bio-medical-waste-management-rules?b_start:int=5&content=large

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Every State Government and Union Territory administration shall constitute an advisory committee for the State and Union Territory headed by heath secretary to oversee the implementation of the rules in the respective state and to advice any improvements and the advisory committee shall include representative from heath, environment, urban development etc. This committee shall meet at least once in 6 month. The Central Pollution Control Board shall monitor the implementation of these rules in respect of all the armed forced heath care establishment under the ministry of defence.

Every State Government or Union Territory shall constitute district level monitoring committee in the district under the chairmanship of District Collector or District Magistrate to monitor the compliance of the provisions of these rules.[5]

**Present condition of Biomedical Waste**

The Central Pollution Control Board (CPCB), has reported in 2015 that 1,69,913 healthcare facilities (HCFs) generate approximately 495.30 tonnes/day biomedical waste. Report also mentions that 21,491 healthcare facilities have in-house treatment and disposal facilities and 1,38,001 healthcare facilities are using Common Bio-medical Waste Treatment Facilities (CBWTFs) for disposal of biomedical waste in environmentally sound manner.

The Minister of Environment, Forest and Climate Change, Mr Anil Madhav Dave, told the Parliament recently that there are reported violations of provisions of Biomedical Waste Rules by approximately 5980 HCFs/CBWTFs and 4965 such defaulting institutions have been issued show cause notices or directions to comply with the rules.[6]

India is likely to generate about 775.5 tonnes of medical waste per day by 2022 from the current level of 550.9 tonnes daily, a study conducted jointly by industry body ASSOCHAM and Velocity has said. [7]

Major waste sections such as municipal solid waste management market, e-waste market and bio-medical waste are expected to grow at CAGR of 7.14 per cent, 10.03 per cent and 8.14 per cent respectively. [8]

According to the study, the key challenges in bio-medical waste management include speed of data availability, under-reporting of waste generated and handling capacity, operation of

[5] Supra 4
[6] Bio voice correspondent, title - More than 500 tones of BMW generated in India per day (17/07/2018 6:50 PM) https://www.biovoicenews.com/more-than-500-tonnes-of-biomedical-waste-generated-in-india-per-day/
[7] By PTI India to generate 775.5 tonnes of medical waste daily by 2020 (16/07/2018 5:50PM) https://economictimes.indiatimes.com/industry/healthcare/biotech/healthcare/india-to-generate-775-5-tonnes-of-medical-waste-daily-by-2020-study/articleshow/63426284.cms
[8] IBID 7

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healthcare facility without authorisation under Biomedical Waste Management Rules, lack of awareness among various sections of the staff at all levels among others.[9]

**Impact of waste dumped**

Medical or hospital Waste dumped have an adverse effect on public health and environment. Dumping in open area and pits releases methane after decomposition of biodegradable waste under anaerobic condition. The methane released after decomposition has huge contribution on global warming and also causes fires and explosions. The smell coming out of dumb is also a major problem and this problem become very serious in summary season when the temperature reaches 45 to 47 degree C. These dumps also collect water and give a place to breed mosquitoes which directly increases the diseases like dengue, malaria and fever etc. The smoke from the burning of waste is very dangerous for human respiratory system. The impact to improper medical waste management can be seen from increased number of cases of nose and throat infection.

**Problem in Biomedical waste Management in India**

The present condition of waste management is very poor in India. The laws were made and regularly amended but its implementation is a big problem in every field and biomedical waste management is one of the problem. There is lack of training of the workers who are engaged in waste management and in India only limited professional are doing the work of waste management. In India Municipal Corporation having the responsibility to manage the biomedical waste but budget of treatment and disposal of waste was insufficient to Carrie out efficient waste management. These wastes are not only harming human being but also to environment and flora & fauna. Sometime after treatment all the waste water is released into water body which is polluting the water.

And mainly the public is not aware about the effect of these wastes on human beings health and environment.

**Improvement of waste Management in India**

To increase the biomedical waste management we must segregate the waste in such a manner that what can be reused after recycle must be separated from what cannot be recycled. The authorities made under the biomedical waste (management and handling) rule, 2016 must be strict with their function and the State and Union Government shall allot them such funds that they can take major steps for waste management in India. We must adopt new technologies which are used by developed country. They believe more in recycle, we must adopt the same

[9] By PTI The Hindu problem with biomedical waste (17/07/2018 5:30 PM) https://www.thehindu.com/todays-paper/tp-in-school/the-mounting-problem-of-biomedical-waste/article23337961.ece

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principle. During segregation, the biodegradable and biodegradable waste must be separated so that its dumping can be done accordingly. Some machines for basic treatment of waste must be compulsorily installed in every hospital. The process of incineration, autoclave etc must be performed before dumping the waste.

**Conclusion**

The graph of population growth is increasing with the constant rate which also lead to increase in metro or mega cities in India and this is the major problem which is increasing the rate of bio medical waste and leads to poor waste management. The present condition in India is worst when it comes to medical waste management. The laws are made but they are not able to handle the management of waste. The major issue is with mismanagement of waste is lack of public involvement. The general public is unaware about the effect of these waste and the occupier are generating and dumping waste anywhere they want. There is a need of public to change their attitude towards social problem. The management of waste must be of such kind that its maximum uses must be taken before dumping. Sustainable waste management system must be adopted. Until these requirements do not meet, the problem of poor management of waste will increase and its impact on human health as well as environment will increase.