

WASTE MANAGEMENT THE THE FUTURE NECESSITY – A REVIEW ARTICLESupurna Pandit¹, Pradeep Tangade², Ankita Jain³, Jeevan Josh⁴,

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Abstract

All kind of biomedical waste that are produced in dental clinics and hospitals if are not managed properly, can cause various health hazards to dental professionals, dental auxiliaries, patients and other dental health care service providers who work in dental office. Every one working in the health care sectors should have knowledge about handling and disposal of biomedical waste. This review article is an attempt to discuss different kind of biomedical waste and the different methods for management and disposal of biomedical waste

Key words: Waste Management, Bio medical Waste, dental waste,

Introduction

According to Biomedical Waste (Management and Handling Dental 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 biologicals [1], one of the main ecological challenges currently face by modern era is waste management . our activity produces waste, our activity show our basic manners and how much waste we can create the waste which we create shows our finical and social way of living [2]

Dental profession is noble profession which is committed to encourage and reinforce oral health. To achieve this goal dental professional use different type of materials and equipment. Dental professionals in dental procedure produces small as well as large biomedical waste , these biomedical waste should given equal importance and management , biomedical waste (BMW) from dental clinic include latex ,cotton, glass and other contaminated with body fluids [3] . the other BMW produces in dental offices are plastic glasses and plastic bottles ,X ray processing solutions [X ray developer , X ray Fixer] lead foils , disinfectant chemicals, impression material , dental cast waste sharps like lancet surgical needle disposable syringes BP blades extracted tooth expired medicine

human cells and tissues as these above materials are at great risk because they are contaminated with Patients blood and saliva and they have great chance of spreading infections and the microbes which causes disease which may effect both the dental professional and the ecosystem

The procedure of taking care of BMW are generation , sorting , segregation, use of color coded waste dustbins dental waste collection, dental waste storage, dental waste packaging ,dental waste loading, dental waste transportation, dental wasted unloading, dental waste processing, dental waste treatment, dental waste destruction, dental waste conversion, or offering for sale, transfer, disposal of such waste.[4].All dental professionals should take training in taking care of BMW and all the dental professionals should make themselves updated annually .immunization of all health care workers should be done so that they stay protected by the disease which cause by handling of BMW. [4]

Bio-Medical Waste Rules (1998)

Bio-Medical Waste (management and handling) rules in July 1998 was given by The Ministry of Environment and Forests. According to the guideline of these Rules, it is the duty of every “occupier” i.e. a person who look

after or take care of the school college hospitals institution and or its premises

<p>lead foil ,X Rays solutions]</p>	
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have to take all foremost procedure or steps and make sure that waste which is produce should be handle properly and that waste should not create and poor or harmful effect to the nearby living habitat and the nearby ecosystem [5,6]

According to the law 2016 BMWM limitation were enforced on caretaker for proper treatment and disposeoff of waste generated in the industries within the radius of atleast 75 km and the health care facility have install individual treatment plant for the proper waste disposal

Classification of Bio Medical Waste

Bio Hazardous waste	Non-Hazardous waste
<ul style="list-style-type: none"> • Infectious waste [laboratory culture cotton swabs] • Waste by pathology [human tissues or body liquid] • Pharmaceutical waste [expired medicine] • Geno toxic waste • Sharps [BP Blade ,Needle , disposable syringes] • Chemical waste disinfecting solutions] • Cytotoxic waste • Radioactive waste{ X Ray foils covers 	<ul style="list-style-type: none"> • Disposable paper towels • Paper mixing pads • Disposable covers of operating surfaces

Classification of Medical waste [8] :

1. Common Waste:- Is anything which cannot be recycle easily. Ex- expanded polystyrene, tissues , contaminated packaging.
2. Pathological:- Is defined as a bio-hazardous waste that can be contained with any type of infectious biological fluid, blood.
3. Radioactive:-It is a by-product of various nuclear technology processes.

Chemical:- These are waste products that are produced by harmful chemicals.

4. Infectious to potentially infectious waste
5. Sharps:-It is a form of biomedical waste composed of use of sharp instruments which can puncture or lacerate the skin which can cause infection.
6. Pharmaceuticals:-Includes used and unused expired prescription pharmaceuticals.
7. Pressurized containers

Source of waste

The source of biomedical waste are as follows[9] :-

- Government hospitals
- Private hospitals

- Nursing home
- Dental office / clinic
- Primary health centers
- Blood banks
- Laboratories
- Vaccinating center

Type of dental waste

Several type of dental waste are as follows [10] :-

- Dental Amalgam Waste [amalgam traps, Bulk Mercury]
- scrap heavy metals [Lead foils waste produce in processing of X rays]
- Silver containing Wastes [X ray fixer and developer]
- Chemical disinfectants and sterilizing Agents,
- Medical Waste,
- Sharps waste
- Bio hazardous waste.

Steps for Waste management procedure

- **Waste Survey:** Water survey a deceive component of the waste management method.it is use to Quantify and differentiate waste , survey conducted helps in evaluation quality and quantity of waste created . [9,11,12]. Water survey in the process of proper waste disposal [13.14]
- **Segregating waste :** Segregation is an elementary method of categorization of waste created in day to day life Waste segregation means keeping waste in different colour coded plastic dustbin containers or color coded plastic bags . It play a vital role in the reduction of amplitude of contagious waste and cost of treatment The BMWs have to be segregated by following the guideline schedule 1 of BMW Rules, 1998
- **Accumulation and storage waste :** Accumulation and storage waste is the area between waste generation point and disposal site , containment of small amount of waste on the site of its production fore a small duration of time Accumulation of wastage means holding of

small quantities of waste near the point of generation for very little duration of time span , There are different type of waste holding containers or plastic bins to store waste. These waste holding containers or bins should be kept in area of 100 percentage waste disposal is achieved. Sharps should be thrown into a puncture proof container so these sharps should not injure the person who is handling them .once the collection is done the collected biomedical waste should be placed in an appropriate area with each colour coding and labeled bins or plastic but for not more than 8-9 hours in big hospitals or 24 hours in dental clinic and nursing home .In storage area 'EXPLICIT sign should be posted

- **Transportation of waste :**Untreated biomedical wastage should be transported to the treatment site. Untreated biomedical wastage is transported by carts trollies Biohazard sign should be dyed on these cart and trollies before disposing plastic bags its should be shredded .Unprocessed biomedical wastage should not be kept more than 48 hour.[15,9]
- **Treatment of waste:** Treatment of waste is important for regulating environmental pollutants. Waste treatment is a process of converting waste into some way before dumping it into its final resting place ,before discarding needle it should be destroyed by cutting needle from the whole syringe with help of needle cutter and needle nozzle should be shredded in syringe cutters. In dental clinic sharp instrument like Broken glass /Scalpel blades/ Lancet/ in minor or major surgical procedure before discarding them these items should be kept in bleech in a container . when we discard extracted tooth in which amalgam is filled as a restorative material these tooth must be kept or dipped Gluteraldehyde as gluteraldehyde is a high level disinfectant for half an hour .dental office waste which is dissolvable should be kept in 1% sodium hypochlorite for half an hour to an hour
- **Minimization of waste:** As we know disposal of contagious waste is more costly then disposal of normal waste so treatment of contagious waste should be done by any method through which quality of infection is reduce the cost of disposal of infectious

waste will automatically reduce cost of infectious waste disposal

Act in relation to biomedical waste management

- In year 1974 The water Act
- In year 1981 The Air Act
- In year 1986 The Environment Act,
- In year 1988 The hazardous waste rules,
- In year 1998 The Biomedical waste rules,
- In year 2000 Municipal Solid waste rules,
- In year 2000 and 2003 The Biomedical waste rules Amendment,
- In year 2011 The Biomedical Waste Rules,
- In year 2016 Plastic Waste Management Rules,
- In year 2016 E-Waste (Management) Rules,
- In year 2018 The Bio-Medical Waste Management (Amendment) Rules

Effect of dental waste on environment

Amalgam

Mercury is the main component of dental amalgam as we all know that mercury is neurotoxic and nephrotoxic as well . mercury is more dangerous to embryo and new born as compare to the adult new born baby is more sensitive than adults [16].vacant amalgam plastic box or vacant amalgam capsules are thrown carefully in the trashes[17] .there should be proper disposal of amalgam scraps as amalgam come inn hazardous waste or we can recycle it [18 ,19,20].by heating amalgam scraps amalgam can be disposed while heating waste dental amalgam toxic vapours are the by products,by the guideline recommended by ADA waste amalgam should be kept in small amount of photographic fixer in closed air tight container [17].

X ray waste

X ray fixer contain heavy silver content[20] it is hazardous waste as it contain free ions , these free silver ions of x ray fixer act as an enzyme inhibitor . this enzyme inhibitor interfere with the metabolic process of organism [18] . free silver ion disposed off a

bio hazardous waste we can send to a silver collection system .X ray developer solution can be disposed of directly

into the water stream. X ray cleaner solution contain chromium and it should be disposed of as hazardeouswaste . or we can switch to non chrome cleaner .lead is a heavy metal as lead effect in neurological development and dental x ray lead foil or lead shield contain pure lead [21]these lead foil or x ray shield are hazardous waste it should be recycle as scrap metal content or disposed as hazardous waste[18]

CONCLUSION

Inappropriate discarding of biomedical waste in open space and water bodies can further leads to the spread of hazardous diseases. In modern dentistry the clinical practitioners should take extreme care about the safe disposal of dental waste in order to safeguard other workers and patients along with natural environment. If these hazardous biomedical wastes are not properly discarded they can affect not only the people in contact with it but also pollute the environment. So safe and proper waste management is not only a judiciary need but responsibility of dental professional and the other health care workers for safe wellbeing but reduction in motivation, awareness about waste and its management and cost factor are may be some of the reasons for negligence. To overcome all this factors necessary measures have to be kept in mind to make sure that biomedical waste is disposed in safe manner

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