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BIOMEDICAL WASTE

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Abstract

As responsible human beings it is our duty to dispose of all the human produced waste safely. We all have it in our knowledge that any kind of waste is harmful for the environment and humans. Safely disposing biomedical waste is necessary to avoid bacterial diseases and harmful infections. The article reflects how biomedical waste has an impact on the environment and human beings. The proper teamwork and government support is essential for effective biomedical waste management. Proper biomedical waste management will reduce serious health problems. Also the environment will be clean and healthy and will be free from these bacterial infections. Hospitals, Health Care Centers, Diagnostic Centers should follow all the safety measures to avoid infections and health implications. The biomedical waste management rules are amended in 2018 for better disposal and safe sustainable management of biomedical waste. Also the article reflects some of the major aspects of Covid-19 biomedical waste, which are extremely harmful for humans. Handling a Covid-19 biomedical waste in an improper manner will lead to great concern towards public health and the environment. After the breakout of novel covid-19 (Covid-19) the biomedical wastes have become more harmful to dispose of anywhere.

Keywords

Biomedical Waste, Environment, Covid-19 , Hospitals , Health care.

Biomedical Waste

We humans generate lots of waste around us from our day to day activities despite being aware that all such waste is dangerous and should be discarded properly. Hospital waste is also very harmful for human beings because the harmful infections like HIV, Tetanus etc. can be transmitted through them if people come in contact with it. Biomedical waste is hazardous for the environment as well as for human beings. It is a waste which is in the form of solid or liquid and is extremely harmful for people around and environment. These are the wastes which are produced by the healthcare centers, hospitals, trauma centers, diagnostic centers, heath camps etc. It includes used and discarded bandages, human and animal tissues, discarded medicines drugs, used cottons, liquid wastes like liquid from laboratories , house-keeping and disinfection activities, infected secretions, contaminated blood etc , solid wastes like used and discarded metal scrapes, used needles, syringes, broken glass, plaster cards, tubes, injections, microbiological waste like blood bags, residual toxins and chemical wastes, fetus below the viability period (as per the Medical Termination of Pregnancy Act,1971) [1] and also expired and discarded medicines cytotoxic drugs along with glass. The disposal of biomedical waste has a high risk to public and especially sanitary workers and the environment as disposing it in an unsafe place will lead to various diseases if anyone comes in contact with it. These wastes need to be properly sterilized, if not it will lead to hepatitis B&C, AIDS, severe acute respiratory syndrome (SARS), tetanus, psychosocial trauma etc.[2] Biomedical waste disposal is based on the principle "Reduce, Reuse and Recycle". Recovering more waste should be encouraged rather than disposing it off. It should be recovered and retreated and at last disposed of. Biomedical waste is very different from normal or trash waste such as other chemical waste. The human organ and tissues which include biomedical wastes should be deeply buried or incineration should be done. The percentage about 10%- 25% biomedical wastes is hazardous and 75%- 95% is non hazardous. [3]

Eco-friendly medical equipment should be used to ensure its safe disposal. Also it's the duty of the government to take an initiative for health care facilities and biomedical waste disposal management. Non-governmental organizations should come forward and take incentives. Biomedical waste also includes wastes which are generated from patients from wards like urine, surgical wounds, used bandages etc. The waste came in contact with the hemodialysis patients including gloves, gowns, aprons etc. The biomedical waste is hazardous for the environment as well as for humans and disposing it off at a safe place will help the environment free from

diseases. These bacterial diseases are very harmful for everyone. The hospitals, health care centers , doctors , everyone should take good care to dispose of these biomedical waste properly and should very well see that these must not harm them , their staff and the patients who are admitted there.

Impact of biomedical waste on Humans and Environment

Biomedical wastes, if not treated properly, can affect the population. The wastes which are produced by the hospitals are dependent on the standard of the hospitals. Most government hospital authorities did not follow the rules of biomedical waste management properly and then at last all the patients and staff get affected with that. They throw hospital waste with normal waste at the roadside and dispose of it there and then it gets even more harmful for the public. The unavoidable thing is that even though they have all the technologies and things available with them then too just because they all are unaware of how to use them and that is why it happens. The biomedical waste has hazardous chemicals because of which the air, land and water gets affected. Dumping the biomedical waste mixed with solid municipal waste will cause harmful infections. The sanitary workers are at risk because they directly get themselves in contact with the biomedical waste. The sharp objects and infectious material in the biomedical waste can cause health hazards. The staff who are working in the hospitals and these health care centers get infections and health hazards from the exposure of radioactive wastes and chemical wastes which generate biomedical wastes. These biomedical wastes affect the wildlife as animals and birds are very fond of colors and they come after it and consume the substances and materials there that at last harm them. When these wastes are dumped into the soil it makes the groundwater contaminated. Disposing them in a wrong way will make the radioactive elements come into the landfills and harm the diseases. From the hospitals to getting it disposed off biomedical wastes had to travel a long way. These types of wastes should be kept away from stray animals and birds as they may directly affect them. If biomedical wastes are not disposed of properly they may contaminate the air, groundwater and soil and this is undoubtedly going to harm the environment and humans. If a person gets himself directly in contact with the biomedical wastes it may cause serious health problems like lung infections, Tuberculosis, Cholera, HIV, Hepatitis B&C, etc. Even a small initiative can help the environment and human life from danger. We together can come forward and make the people aware about every rule

related to biomedical wastes and how it should be disposed of in a proper manner. The rapid growth of hospitals, health care centers and the medical diagnostic technologies have generated a large amount of biomedical wastes around the world which is extremely harmful for both the environment and humans and the way they are not disposed of properly. When the waste management is not good it causes insects, rodents etc and they cause diseases. Due to increasing population and poor health care management the country is facing a big amount of biomedical wastes issues which are increasing day by day. In this situation mostly half of the hospitals failed to adopt biomedical wastes rules after knowing that they are important for all the hospitals. If the hospital wastes are managed and retreated properly then 20%-30% revenue can be generated from it. Most of the biomedical waste has metals and dangerous hazardous materials which contaminate the water in the ground and start harming the human and animals. Therefore it is necessary to remove its harmful toxins before disposing of it off. The landfills should be closed and there should be proper checks on it so that it must not pollute the environment. Biomedical wastes should not be burned as it may cause breathing problems because of which humans and environment both will get impacted. There should not be unplanned and improper disposal of biomedical wastes so that it may affect the employees and staff. As India is a highly populated country, it has been known that there are 6 lakh hospital beds for people and nearly about 15000 private hospitals and clinics. There are rules made by the government for biomedical waste management and disposal and it should be followed by all the health care centers and hospitals.

Biomedical Waste Management

The management of biomedical waste is very necessary as it lessens risk to healthcare problems and also reduces the wastes which is highly harmful for humans. Management of biomedical wastes disposes of the wastes in an eco-friendly way. Waste generated by healthcare activities includes a broad range of materials, from used needles and syringes to soiled dressings, body parts, diagnostic samples, blood, chemicals, pharmaceuticals, medical devices, and radioactive materials.

Poor management of medical waste potentially exposes healthcare workers, waste handlers, patients and the community at large to infection, toxic effects and injuries, and risks polluting the

environment. It is essential that all medical waste materials are segregated at the point of generation, appropriately treated, and disposed of safely."[4]

If anyone comes in contact with the biomedical wastes they can get infected, injured and harmed with it so there is a need to be safe management of biomedical wastes. They need to be segregated, treated and disposed off properly. If they are not segregated then the high risk of infections to the people like nurses, staff, community etc will have to suffer. The people who are generating those wastes should segregate it like paramedical staff, doctors etc. It defines the separation of biomedical wastes in different categories and reduces the risk of infections. The process of segregation prevents it from getting mixed with the general wastes. Also the doctors and staff can't use the medical appliances again like syringes, needles etc. The various other medical wastes components can be recycled like plastics to prevent it from infections. By recycling the biomedical waste the revenue generating activity can also be doubled. The half of the biomedical waste is normal waste which doesn't require treatment so the cost is also reduced. The dustbins and dust-bags should be properly labeled so that the nature of waste should be seen by the public and staff. There should be deep burial for the wastes to dig that in and animals should be kept away from it. Every time the waste is added to the pit soil should be added to it. These pits should be kept away from the housing places and also there should not be groundwater connection to it. The hospital authority should know about the location of the pits and should keep a record of it.

The main management of biomedical wastes from its emergence to its disposal is managed by Biomedical waste management rules 2016 and Biomedical Waste Management (Amendment) Rule 2018. The extent of these rules have been applied to the healthcare centers ,health camps, surgical camps, blood donation camps, research labs etc. [5] The management rule explains that a person as an occupier who manages an institution from where the biomedical wastes has been generated has the duty to ensure that biomedical waste there should be handled properly without any mistake. The rules also explains that a person as an operator who controls (CBMWTF) Common Biomedical Waste Treatment Facility has a duty to make sure that the biomedical waste should be properly transported and handled from the occupier without any effect to humans . The rules also ensure that the vehicles that are collecting the biomedical wastes should have barcoding system to track it. According to the rules the wastes should be segregated,

treated, transported properly. Also without the assent of the authority the biomedical waste cannot be kept untreated for long time. If there is improper handling of the biomedical waste the occupier and the operator is held responsible for the damage caused to the environment and humans. If any violation of these rules have been done the operator or occupier is held liable under section 5 and section 15 of Environment Protection Act and Rules 1986.[6] There is an advisory committee at the state level who in every six months have to look after all the matters of the application of the biomedical waste management rules. The new rules of biomedical waste management has an effective way to control the disposing facility and also the Ministry of Environment Forest and Climate Change will look after the HFCs in a year.

Covid-19 Biomedical Waste

Covid-19 has brought a big trouble all over the globe. Till now we have been searching for its cure and no such drug or vaccine is found for its patients. We all have been fighting with this pandemic with keeping social distancing, isolating the patients, using personal protective measures etc to cope up with it. Using Personal Protective Equipment (PPE) , surgical face masks , gloves etc are being used to protect each of us from this infection.[7] Hospital wastes should be classified with the proper manner .This may reduce the infection to the people who handle the waste. The covid-19 biomedical waste should be kept in the separate bins with a proper labeling on it. While at the time of classification the waste should be kept in double layered bags before the transportation from the originated ward. For selecting the exact disinfection technology the cost, maintenance etc is necessary to be considered. It is also held that the incineration should be done and to be adopted on the basis of capacity. Covid-19 waste has a big role in the outspread of hospital infections. Not only all the wastes from the hospitals but also the wastes generated from a place where a covid-19 positive patient has been through is also treated as covid-19 wastes and is harmful for us. There should be proper and closed monitoring of covid-19 waste which has been generated from quarantine homes, hospitals, isolation wards to track the wastes disposal. They should be disposed of within the 24 hours. Despite the biomedical waste management rules the Central Pollution Control Board under the Ministry of Environment, Forest & Climate Change has made guidelines for the treatment, handling and management of covid-19 waste from the patients who are covid-19 positive and home quarantine centers etc to deal with the proper management of waste disposal. If a person

gets in contact with it they will get affected by the infection and this will become harmful for their lives. Also guidelines held that the common people who are not covid-19 positive should wrap their face masks and gloves in an envelope and keep it for 72 hours and then dispose of it off. The covid-19 waste should not be mixed with the general house waste as it may also cause harm. The awareness among the general people is very necessary for proper handling of covid-19 waste , so the government , healthcare institutions should reach people with the help of the media. The people who are curing and helping covid-19 positive patients should take special care that soon after removing PPE, face masks and gloves they must not touch their face, mouth etc. Everyone should avoid coming in contact with covid-19 biomedical wastes.

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[1] https://main.mohfw.gov.in/

[2] Department of Biotechnology, Stani Memorial PG College, India

[3] https://www.ncbi.nlm.nih.gov/

[4] https://www.who.int/topics/medical_waste/en/

[5] Bio-Medical Waste Management Rules. 2016 Published in the Gazette of India, Extraordinary, Part II, Section 3, Sub-Section (i), Government of India Ministry of Environment, Forest and Climate Change. Notification; New Delhi, the 28th March, 2016.

[6] http://dgmhup.gov.in/en/BMW_mannual

[7] CPCB Guidelines for handling, treatment and disposal of waste generated during treatment/diagnosis/quarantine of COVID-19 patients. 2020.