

Medical Waste And Environment

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Over the most recent decades, human activities and the changes related to ways of life and utilization designs have brought about the age of tremendous volumes of various sorts of waste (Oweis et al., 2005). The wastes have hindered the survival of people and other living things, as well as all normal resources that are important for human presence. Subsequently, over two decades, the concerns over waste management and the contamination issues related to waste have been pulled into huge consideration, and a lot of research has been led to assess proper waste management choices to limit natural contamination and enhance recovery of resources (Williams, 2005). Lately, concerns over the waste from medical facilities (i.e., doctor's clinics, hospitals, labs, drug stores and other medicinal services administrations) have expanded all through the world (DenBos & Izadpanah, 2002). This medical waste is perhaps the most hazardous since it can spread illnesses as a result of its infectious nature or potentially cause damage through the disaster of clinical solid waste (Al-Khatib & Sato, 2009).

Medical waste, also known as biohazardous waste, is the waste that contains infectious materials or conceivably hazardous substances, such as blood. Particularly, it also contains other sharp materials, such as surgical tools with cutting edges, needles, blades, glass pipettes, or some other waste material that may cause damage while handling.

Classification Of Medical Waste

There are four unique classes of medical waste based on their potentially disastrous effects and sources.

Clinical Waste

Clinical waste includes drainage bags, body fluid, vials, blood collection tubes, gauze, culture dishes, bandages, different types of glassware along with transmittable agents, or any substance that was contaminated by blood or any infectious agents; moreover, pathological waste, such as body parts, organs, and tissues are also dumped by health centres. These are conceivably hazardous and introduce a high danger of disease to the overall public and to the staff.

Laboratory Waste

This refers to a highly hazardous type of medical waste. This incorporates chemicals utilized as a part of the neurotic research centre, clinical specimens, microbial cultures, slides, needles, culture dishes,

syringes, and, in addition, radioactive waste, for example, Iodine-125 and so forth.

Non-Clinical Waste

This type of waste includes plastic, office paper, and wrapping paper that is not contaminated by human body fluids.

Kitchen Waste

This includes wastewater, food wash, and waste. It is a major source of vermin and pests, for example, mice, rats, and cockroaches, and is, accordingly, an indirect potential risk to patients, health workers, and hospital staff.

Disposal Of Medical Waste

Medical waste includes all waste, natural or organic, that is disposed of from hospitals and not intended to be utilized in future (USEPA, 1989) and also infectious and hazardous chemicals, syringes, blood and blood products, stock cultures, pressurized containers, animal carcasses, pharmaceutical wastes, batteries, low-level radioactive wastes, disposable needles, scalpels pathological, plastics, sharp items, and other radioactive wastes. These are other than clinical bandages, cotton, gauze, food waste, and other varied types of waste. Other kinds of waste include cytotoxic medications, toxic chemicals, and combustible and radioactive wastes that can be quite infectious to living beings (Caltivelli, 1990). With reference to living pathogens that are also found in medical waste, the most prevalent (80 – 90%) is the Bacillus with Streptococci and Staphylococci with a range of 5 to 10%, while the most widely spread pathogens is Staphylococcus aureus (having 2 – 10 colonies in each gram of waste). Escherichia coli, Candida albicans, and Pseudomonas aeruginosa are commonly found with a range of nosocomial pathogens, for example, Enterobacter and Klebsiella Proteus species.

Clinical Waste Generation

Generally, amounts of the waste generation rate in hospitals and clinics relies upon the sort of medical establishment, accessibility of instrumentation, general state of healthcare facilities, proportion of expendable things being used and number of patient care (Alagoz & Kocasoy, 2008; Carson, 2018; Cheng et al., 2009; Mato & Kaseva, 1997). Likewise, the financial, social and social status of the patients may change the measure of medical waste (Hassan et al., 2008). Moreover, the day-care patients have a critical impact on the waste (Patwary et al., 2009). For instance, Bdour et al. (2007) found that, because of a higher number of day-care patients, public healthcare facilities provide a higher measure of health services waste than private hospitals. Similarly, because of the higher number of patients, public hospitals and clinics produce more waste than private healthcare

service providers; however, it adds up to medical waste, and the extent of clinical waste per bed is proportional in both public and private clinics. This may happen due to blunders of doctors and healthcare workers and the absence of isolation of waste to shorten clinical waste in public hospitals.

Environmental Hazard Caused By Medical Waste

Biomedical waste is in all types of medical centres where the treatment of humans, as well as animal patients, is given, for example, clinics, hospitals, dialysis centres, dental clinics, and additionally diagnostic laboratories, and blood banks. In any hospital, clinic, or laboratory, the major risk is to medical doctors, nurses, medicinal attendants, lab workers, hospital attendants, and the supporting staff; – Patient care providers such as their care providers or visitors; and administrative staff, including medical suppliers, laundry workers, and those workers who collect waste material; and community workers dealing with the disposal of the health unit. Related to health care, the most transmitted diseases include human immunodeficiency virus (HIV), Hepatitis B Virus (HBV), and Hepatitis C virus (HCV). Over the 35 million healthcare workers over the globe, it has been observed that almost 3 million workers receive significant exposure to blood-related pathogens, 1.7 million to HIV, 0.9 million to HCV, and 2 million to HBV (WHO, 2018).

As a result, around the globe, serious consideration has been given to implementing immunization programs with appropriate waste management. Dangers that are created by pharmaceutical and clinical waste are related to the potential qualities of attributes, such as hazardous, toxic, destructive, explosive, corrosive, and mutagenic. The pharmaceutical waste has a source, including damage to containers, medicines and drugs for the intravenous, used vials, unused prescriptions, and all expired drugs. A greater amount of such medical waste occurs when undesirable or expired pharmaceutical items are expelled. These can cause harm by retention through the skin or mucous layers, by ingestion or by inhalation. Chemicals, drugs, and pharmaceuticals may likewise cause injuries to the eye, skin, and respiratory mucosa. Burns are the most widely recognized wounds. Synthetic waste expelled by the drainage may have drastic effects on the whole ecosystem. Pharmaceuticals also have the same effects: anti-toxins or different medications, disinfectants, heavy metals, antiseptics, and sterilizers.

Dangers related to the conclusive disposal of biomedical waste ought to be additionally considered in an environmental program. Dioxin generation, which is a carcinogen, is formed by the composition of chlorine and plastic. After the formation of dioxin, it is linked with natural particles that are deposited on land or water and are carried by the wind. It is a cancer promoter as it is linked to the nuclear DNA and has a number of negative effects linked to human health and the environment. Every one of these impacts happens when even introduced to low levels of dioxin. Burning of biomedical waste and heavy metals is forbidden everywhere because of their serious health hazards (MedPro Waste Disposal, 2017).

Consequences Of Improper/ Nondisposal Of Medical Waste

Medical waste causes contamination and infection to humans, animals, and the surrounding environment. If medical waste is improperly disposed of, then it might produce dangerous effects, especially when it is contaminated with water supplies and used by nearby animals or communities. At times, improperly disposed-off waste may wind up open to children and beggars and produce hazardous effects.

Medical wastes are so dangerous that they cause infection and disease to man, either through direct contact or through indirect contamination of water, soil, air, or surface of the water. Air that blows from these non-disposed dumps potentially transfers pathogens and dangerous substances. When the local area carries such waste material, and the domestic animals are allowed to graze on these open dumps, pathogenic organisms are also reintroduced into the food chain. Medical wastes, in this way, represent a hazard to people, groups, and the environment if not handled carefully (Akter et al., 1998).

Improperly disposed of medical waste also becomes a source of attraction to bats and other scavenging animals. During fermentation, it produces foul odours and contaminates air and water, thus promoting fly feeding. During the decomposition process, piles of landfills produce thousands of different dangerous gases, most importantly nitrogen (N_2), hydrogen sulphide (H_2S), and methane (CH_4). If this waste is burnt, then it produces carbon dioxide (CO_2), which is again very hazardous. CO_2 and CH_4 both have the potential for greenhouse effects as they are greenhouse gases. The soil beneath such improperly dumped material is contaminated by heavy metals, chlorinated hydrocarbons, and pathogenic micro-organisms, which then clog open drains by diminishing landscapes and giving nasty odour (World Bank, 1991).

Conclusion

Medical waste is quite dangerous and hazardous to human health and ecosystem. Little work and steps have been taken in developing countries to ensure proper waste management. Moreover, medical centres do not have proper facilities and practices for disposing of medical waste. However, to have a safe and healthy environment, there is a need for proper waste management practices.

References

- Alagoz, A.Z., Kocasoy, G. (2008). Determination of the best appropriate management methods for the healthcare waste in Istanbul. *Waste Management*, 28, 1227- 1235
- Al-Khatib, I.A., Sato, C., (2009). Solid health care waste management status at health care centers in

the West Bank–Palestinian Territory. *Waste Management* 29, 2398–2403.

Bdour, A., Altrabsheh, B., Hadadin, N., & Al-Shareif, M. (2007). Assessment of medical wastes management practice: a case study of the Northern Part of Jordan. *Waste Management*, 27, 746–759

Carson. (2018). Effects of bio medical waste on environment. Retrieved from <https://medwasteservice.com/2018/effects-bio-medical-waste-environment/>

Cheng, Y.W., Sung, F.C., Yang, Y., Lo, Y.H., Chung, Y.T., & Li, K.-C. (2009). Medical waste production at hospitals and associated factors. *Waste Management* 29, 440– 444.

DenBos, A., Izadpanah, A., (2002). Building capacity for comprehensive medical waste management in Asia. *EM The Urban Environment*, 18, 20.

Hassan, M.M., Ahmed, S.A., Rahman, K.A., & Biswas, T.K. (2008). *Pattern of medical waste management: existing scenario in Dhaka City, Bangladesh*. BMC Public Health.

Mato, R.R., & Kassenga, G.R., (1997). A study on problems of medical solid wastes in Dares Salaam and their remedial measures. *Resources, Conservation and Recycling* 21, 1–16.

Medpro Waste Disposal. (2017). The effects of biohazard waste on the environment. Retrieved from <https://www.medprodisposal.com/the-effects-of-biohazard-waste-on-the-environment/>

Oweis, R., Al-Widyan, M., Ohood Al-Limoon, O. (2005). Medical waste management in Jordan: a study at the King Hussein Medical Center. *Waste Management* 25, 622–625.

Patwary, M.A., O'Hare, W.T., Street, G., Elahi, K.M., Hossain, S.S., & Sarker, M.H. (2009). *Health and safety perspective on medical waste management in a developing country: a case study of Dhaka City*. University of Teesside.

Williams, P.T., (2005). Waste Treatment and Disposal, second ed. In John Wiley and Sons Ltd. *The Atrium, Southern Gate, Chichester, West Sussex, England*.

World Health Organization. (2018). Health Care Waste. Retrieved from <https://www.who.int/mediacentre/factsheets/fs253/en/>