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COVID-19 CRISIS ON HOSPITAL WASTE MANAGEMENT

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ABSTRACT:

The outbreak of COVID-19 has to lead to the vast global health crisis and has its overall impact on the economy, society, and of course on the environment. The COVID-19 crisis has also overall lead and endangered the shot up of biomedical waste. The safe disposal of Biomedical waste has lead to a big challenge. Medical Centers including hospitals, clinics, and places where treatments and diagnoses is been done generates a large amount of hazardous biomedical waste.COVID-19 outbreak has imposed a vast challenge on combating the spread of disease and managing biomedical waste. This paper mainly focuses on the COVID-19 crisis on Medical waste, risk of exposure, regulatory acts, medical waste management, and various control techniques.

1. INTRODUCTION:

Any substance (solid, liquid, or gas) that has no direct use and is eliminated permanently is considered waste.If a waste has any of the following characteristics, it is considered harmful: combustible, reactive, explosive, corrosive, radioactive, infectious, irritating, reactive, or bio-accumulative.Infectious, toxic, and other wastes that are produced are excluded from medical waste. clinics, dental offices, and medical laboratories. The management of Management of waste has been a source of great worry due to the potential for serious environmental and health consequences.Previously, medical waste was frequently intermingled with household waste and disposed of in municipal solid waste landfills.

Hassan et al., 2008, report on even a research of Bangladesh hospital that accumulated a maximum of 5562 kg of trash each day, with approximately 77.4% of non-hazardous waste and 22.6 percent of toxic waste.The hospital at which study was taken produces an average of 1.9 kg/bed/day or 0.5 kg/patient/day of garbage.Except in clinics, the study reveals that there is no proper or systematic disposal of medical waste. The rising production of bio-medical waste, just like the COVID-19 outbreak, is inevitable.Safe waste handling, treatment, and dumping should be a top priority in order to minimize trash's contact with land, water, and air.As a conclusion, the current pandemic scenario in India has already been taken into consideration.It also considers different regulatory changes at multiple levels. to deal with the adverse effects of COVID-19(Biomedical waste- COVID-19)

Used syringes, fluid bags, blood bags, and test tubes were observed to be retained by certain cleaners for resale or reuse.Proper medical waste management is a new issue in Bangladesh, and the team is planning to develop a new and modern way to effectively deal with dangerous medical waste. Project in

Agriculture, Rural Industry, Science, and Medicine (PRISM-Bangladesh), a respectable national non-governmental institution in Bangladesh, has recently developed a disposal facility for low-cost harmful hazardous waste treatment and management in Dhaka City, with financial support from the Canadian International Development Agency (CIDA).

Similarly, due of the widespread use of single-use disposable products (e.g. gloves, plastic syringes, medical packaging, tubing, and containers), the amount and diversity of medical waste generated in Korea has increased.Increased public concern over the inappropriate disposal of medical waste has sparked a campaign to control the trash more systematically in recent years.As well as the Korea Ministry of the Environment is quite tough about everything.As waste reduction and recycling are still not widespread, substantial quantities of medical waste must always be disposed of.

In Korea, the key method of hazardous medical waste treatment is incineration.

In addition, the Korean Ministry of the Environment is highly strict on everything.Because waste reduction and recycling are still uncommon, large amounts of medical waste must be disposed of on a regular basis.

In Korea, incinerating hazardous medical waste is the most common technique of disposal.The goal of this paper is to educate readers to medical waste management administrative actions, medical waste definitions, exposure concerns, medical waste management methods, and control approaches.

2.COVID-19 Global Crisis

Growing medical technology and advanced hospital facilities have resulted in an increase in bio-medical waste output overall.All trash from medical operations is known to as "health care waste" or "biomedical waste."These operations include human and animal diagnosis, treatment, and immunization, as well as testing of biomedical materials. The presence of infectious pathogens, radioactive materials, sharps, and genotoxic, cytotoxic, and other toxic materials are all criteria in the classification.The Un Human Rights Council (2011) concentrates on the various effects of these on human life. Besides the health risk associated with biomedical waste management on human health, which might emerge from exposure to highly toxic gas emissions.Incomplete waste destruction, distinct hazardous waste, and improper ash disposal are all generated by improper operations, as well as a paucity of operations due to small-scale incinerators. operations also play a large role in incomplete waste destruction, various hazardous waste, and inappropriate ash disposal.

In the midst of the covid 19 outbreak, Wuhan, China, had a 600 percent increase in health-care waste creation.

3.Medical Waste Tracking Act and Definitions

The first statute to regulate medical wastes has been the Medical Waste Tracking Act (MWTA, 1988).It was implemented after life-threatening situations arose as a result of the lack of adequate treatment waste disposal systems.In June 1987, for example, 12 youngsters in Indianapolis, Indiana, played with vials they spotted in a dumpster outside a medical facility.The containers were brimming with blood, and there were two of them. After medical waste was found on the shore of several East Coast beaches, the USEPA (United States Environmental Protection Agency) persuaded Votes to enact the Medical Waste Transparency Act (MWTA) in 1988 .The Act mandated that the Environmental Protection Agency (EPA) establish a two-year medical waste demonstration program.The MWTA specified medical waste and those wastes to be supervised for the systematic structure, and built a cradle to grave monitoring system. b) constructed a cradle to grave tracking system using a generator beginning tracking form; c) set management standards for waste segregation, packing, labelling and marking, and storage; and d) established record-keeping requirements and penalties for medical

waste disposal mismanagement.

"Any solid waste generated in the diagnosis, treatment, or immunization of any living organism in research, or the manufacturing or testing of biological," according to the MWTA.

The World Health Organization (WHO) has divided medical waste into four categories:

a) Infectious: substance containing pathogens in high enough concentrations to cause disease when exposed to them.

This comprises surgical trash, discarded dressings, and other items.Sharps include disposable needles, syringes, knives, shattered glasses, and other sharps.

c) Pathological: tissues, organs, and components of the body, human flesh, and dressings, and others. body fluids. d) Pharmaceuticals: returned, spilled, expired, damaged, or contaminated medications and chemicals.e) Chemical: waste from diagnostic procedures or cleaning materials.f) Radioactive waste: waste polluted with radioactive materials used in disease detection and treatment.g) Pressurized containers, such as gas cylinders, oxygen cylinders, and other similar items and h)h) Metal substances, such as broken mercury thermometers or blood pressure gauges.The most common types of medical waste are infectious, pathological, and sharp objects.Forensic Medicine and Science play an important role in investigations, from the crime scene through the courtroom.Best forensic methods are essential for identifying and maintaining all types of evidence.

Waste including microbiological cultures used in food processing, urine, saliva, and nasal secretions, unless they contain blood, are not classified as medical waste.Medical institutions, like any other household or office, produce non-hazardous wastes like paper and plastic.Sharps (needles, syringes, scalpels, and other medical waste) can be disposed of be harmful to humans in a non-infectious way.

The quantity of medical waste produced differs based on the institution .Households generate minor quantities of medical waste, but hospitals generate considerable amounts (>100 kg of medical waste per month or more).Medical trash, which includes infectious and sharp waste, accounts for approximately 35% of all garbage created in hospitals. The remaining 65% of wastes are non-infectious.Unlike industrial wastes, which vary based on the type of process or industry (chemical, petroleum, municipal, etc.), medical waste compositions are relatively consistent.

Medical waste, regardless of its quantity or origin, has serious and sometimes lethal effects when uncovered.Direct contact exposes medical workers, janitors, medical clinic visitors, and patients to the risk of infection and disease. Hazards and risks related to medical waste occur not just for waste makers and operators, but also for the general public, particularly children who play near disposal places.Direct contact, airborne transmission, polluted water sources, and the environment in general are all possible exposure pathways.

4.Medical Waste Management Techniques

There are a number of approaches that can be used to reduce the risks associated with medical waste.

4.1.Segregation

Segregation is beneficial because it prevents non-harmful waste from being contaminated with harmful or hazardous trash, hence rendering the entire waste stream hazardous.As a result, the toxicity and volume of the waste stream will be reduced using this procedure.Furthermore, segregation facilitates the transfer of garbage to a separate location.Waste is divided into categories based on quantity, composition, and disposal method. of the waste stream.

4.2Separating Different Categories of Medical Wastes

In hospitals, infectious and pathological waste, as well as sharps, are stored in separate containers.For each sort of medical waste, the containers are labelled "biohazard," closed, watertight, and of a uniform hue throughout the medical centre.The size

of the containers is determined by the amount of garbage created, and the containers are lightweight and easy to move.Specify the type of needles that have been utilised. For used needles, specifically designed containers are used.

Separating medical waste into categories, packaging, labelling, and marking is part of the separation, packaging, labelling, and marking system.Different coloured bags are used for packaging.

Toxic waste material, for example, is put in yellow plastic bags until being burnt or hidden beneath in a landfill.Whether they're going to be lead to many problems or microwaved, they'll be placed in red plastic bags or containers.The effects of saturated steam at extreme temperatures and high pressure are used to eliminate contaminants from waste in steam thermal. This method is impractical for pathological, chemotherapy, and radioactive wastes. Hazardous trash is frequently packaged in blue or white transparent bags and treated with an autoclave, microwave, chemical treatment, and shredding, or disposed of in a landfill.Medical wastes are labeled and marked with the hazardous emblem.Packaging and labeling are done all over the world.

Only the treatment procedures differ.

4.3.Disinfection

Chemical antiseptics (such as chlorine dioxide, chlorine, or peracetic acid) are sometimes used to reduce the toxicity of various medical wastes.Disinfection of solid wastes is only possible when the trash is shredded.Because the germicides themselves can be hazardous in some cases, these are not suggested for handling pharmaceutical, **chemical, or infectious wastes.**

4.4.Incineration

The technique of eliminating waste by burning it at high temperatures in furnaces is known as incineration.The procedure removes dangerous components, decreases the waste's mass and volume, and turns it to harmless ash.For wastes that are 60% combustible, incineration is preferred.For pathological and contagious garbage, as well as sharp waste, incineration is preferred Incinerators are available in a wide range of shapes and sizes, each with its particular purpose.
are disposed of using a "drug terminator," a mobile incinerator.
In small medical facilities and laboratories, a diesel-fired medical waste incinerator known as "MediBurn" deals with pathological and infectious waste .This equipment is portable and simple to operate, and it can incinerate everything from paper to plastic. from laboratory waste to animal remains.
The advantage of the incineration process is that the volume of the waste will be reduced drastically by 50 - 400 times. Incineration offers the advantage of reducing waste volume; nevertheless, it has drawbacks such as high costs, smoke production, and pollution issues.
In comparison to municipal incinerators, hospital incinerators produce higher pfcs and dioxins.
The higher levels of styrene and dioxins are attributed to a) frequent machine on and off, and b) lax emission regulations. c) Inadequate combustion control, changes in the waste feed composition relative to municipal solid waste (e.g., waste mixing and oxygen controls).A chimney is used in incinerators to reduce the amount of smoke produced and the pollution it produces.
Furthermore, incinerators are typically located far away from major hospitals to reduce the influence of smoke.
In the majority of cases, there is a pit beneath the incinerates.

4.5. Disinfection by Plasma

A combustion process is arranged in this method by low-temperature plasma created by the plasma generator using air as the working fluid.
Because the medical waste is continuously mixed, the heat and mass exchange is increased, reducing energy loss.In the process, the heat generated is employed as an additional heat source .This technique facilitates the possibility and release of toxic substances such as carcinogens and irregular forms of NOX into the atmosphere.

Another significant benefit is that it uses less energy than other mining (i.e. combustion) methods.

4.6.Emerging Technology

A new technique for the handling of hazardous medical waste has just been introduced, which converts regulated medical waste into municipal solid waste.Sharp cutting blades positioned within the vessels shred and ground the hazardous medical waste bags.The blades move at 1750 revolutions per minute, reducing the volume of shredded waste by a factor of two. Loading, shredding, heating, sterilizing, chilling, draining, suction, and unloading are all processes in the process.The entire process is contained within a compact system, and there is no waste treatment in the middle of the process.

This system may easily be used for on-site waste treatment and put in hospitals due to its compact size. Medical waste transportation expenses will be reduced of this.In terms of climate, it is a clean and chemical-free technology that emits no harmful radiation .This method is both cost-effective and environmentally beneficial, as well as easy to use and operate.This technology is currently in use in countries in the Middle East, including as Iraq, Jordan, and Kuwait, Lebanon, Syria, and UAE.

Similarly, engineers at Idaho National Laboratory in the United States have developed a new patented device that helps in the better management and treatment of medical waste.Med-Shred, Inc. (Texas, USA) has developed a mobile shredding and chemical disinfecting machine based on this technology for the on-site treatment of hazardous medical waste .

The gadget converts medical waste into a different type of garbage. municipal waste using shredders that shred the waste into smaller particles which are then led with disinfectant spray and immersed in a disinfection solution. The wet waste is then dried using hot off-gas in a drying chamber. Considering the number of clinics and hospitals in middle-east, this method will be very useful if utilized, as it can treat the medical waste on-site which helps in better management of wastes.

As a result, several guidelines have been proposed, ranging from (1) proper management of municipal solid waste using personal protective equipment, safety practices, and administrative and engineering controls to (2) proper management of municipal solid waste using personal protective equipment, safety practices, and administrative and engineering controls.(2) treating COVID-19-infected medical waste as controlled medical waste(3) waste recycling with infection and cross-contamination prevention methods.(4) appropriate wastewater management, including inactivation with ultraviolet irradiation and oxidation with peracetic acid and hypochlorite.
As a result, waste management is a critical public service for containing the spread of COVID-19.

Conclusion

Medical waste is extremely hazardous and puts individuals at risk of contracting deadly infections.
It is critical to have a solid understanding of medical waste management and control procedures.
Initial information on the definition of medical waste, regulatory acts governing medical waste treatment, dangers of exposure, medical waste management procedures, and control mechanisms are offered in this study.

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