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BIOMEDICAL WASTE MANAGEMENT DURING COVID 19 PANDEMIC

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ABSTRACT

Biomedical waste arising during the corona pandemic stands as a challenge to the whole world. The covid 19 outbreak has left its impact on the health, environment, social and economic sectors. The absence of a strategy for disposing of covid 19 related biomedical wastes is still a threat. Improper practices such as dumping of pandemic biomedical waste in municipal dustbins, water bodies, open spaces etc. leads to the spread of diseases. The Central Pollution Control Board (CPCB) had in March 2020 issued specific guideline (revised in July 2020) for handling, treatment and disposal of such waste at healthcare facilities, quarantine centers, homes, sample collection centers, laboratories, urban local bodies and CBWTFs. CPCB also released Standard Operating Procedure (SOP) in February 2021 for disposal of pandemic waste through incineration in common hazardous waste treatment storage and disposal facilities. Present study illustrates the practice of biomedical waste disposal responding to the novel corona virus.

KEY WORDS: Biomedical waste, Management, Corona Pandemic

INTRODUCTION

The covid 19 pandemic is the defining global health crises caused by severe acute respiratory syndrome coronavirus2 (SARS CoV2). Biomedical waste means any waste which is generated during a diagnostic processes, treatment or immunization of human beings or animals or treatment of a condition or disease. It also includes any research activities or processes that involve biological testing. According to the figure provided by Central Pollution Control Board (CPCB) nearly 146 tones of biomedical waste is generated per day in the country due to diagnostic activities and treatment of covid 19 patients. This includes personal protective equipment, face mask, gloves, head cover, hazmet suit, plastic coverall, syringes among other gears and medical equipment nurses or other healthcare providers and patients. Covid waste is generated in home quarantine, covid hospitals, dedicated covid care centers and other non-health care establishment like salons, hotels and homes. Biomedical waste (BMW) management in accordance to the rules was one of the neglected aspects of health care system for years, especially in developing countries.

In order to deal with corona virus pandemic, central and state government have initiated various steps, which includes setting up quarantine camps\centers and laboratories. CPCB has issued guideline for handling, treatment and disposal of biomedical waste generated during diagnosis\treatment\ quarantine of covid 19 patients related biomedical waste. Medical care is vital for our life and health, but the waste generated from medical activities during corona pandemic represents a real problem of living nature and human world. The main purpose of biomedical waste treatment is to clean up the environment and to identify the appropriate methods for waste neutralization, recycling and disposal. This study illustrates the practice of biomedical waste disposal responding to the corona virus pandemic.

BIOMEDICAL WASTE MANAGEMENT

Central Pollution Control Board (CPCB) has issued guideline and Standard Operating Procedure (SOP) for disposal of bio medical waste including pandemic medical waste generated during treatment and diagnosis of covid 19 confirmed or suspected patients, are required to be followed by all the stakeholders including quarantine centers, isolation wards , laboratories, sample collection centers and common biomedical waste treatment and disposal facilities, In addition to existing practices under BMW Management Rules 2016.CPCB guideline recommend that in case of generation of large amount of yellow colour coded (incinerable) covid 19 waste, permit hazardous waste incinerators at existing treatment, storage and disposal facilities (TSDF) to incinerate the same day by ensuring separate arrangement for handling and waste feeding(table I). Guideline brought out by World Health Organization (WHO), Indian Council of Medical Research (ICMR),Centers for Disease Control and Prevention(CDC),Ministry of Health & Family Welfare(MoHFW) and other concerned agencies from time to time may also be referred for understanding other aspects related to covid-19 medical waste management. The pandemic has definitely increased the quantities of waste but one major factor that has been attributed to increased level of biomedical waste generation is non -segregation.

Part C schedule II of hazardous waste management rule 2016, identifies infectious waste as hazardous and other wastes. These rules also provide for development of Standard Operating Procedures (SOPs) for handling and disposal of hazardous wastes .This SOPs will be applicable when existing Treatment, Storage, and Disposal Facilities (TSDFs) are temporarily permitted for a specific time by State Pollution Control Board (SPCB) or Pollution Control Committee (PCC) for disposal of biomedical waste during an emergency situation such as covid-19 pandemic.

TABLE I : BIOMEDICAL WASTE MANAGEMENT OF BMW GENERATED FROM SCREENING AND TREATMENT OF CORONA INFECTION

CATEGORY OF WASTE	COLOR CODE	PRE TREATMENT REQUIRED OR NOT	FINAL DISPOSAL OPTION CBWTF/CTF
Soiled waste such as items contaminated with blood(excluding blood bags)and body fluids ,cotton swabs etc.	YELLOW	Not required	Incineration
Chemical or liquid waste generated in labs, used or disinfectants to be discarded, infected secretions, aspirated body fluids,, washing and other disinfecting activities.	YELLOW	Separation ,pre-treatment and neutralization required	The pre-treated liquid waste shall conform to the discharge norms and then is lead to the general drain.
Personal Protective Materials like face mask (used triple layer mask, N95 mask etc.) head cover/cap ,	YELLOW	Not required	Incineration

shoe cover, disposable linen gown, non-plastic or semi-plastic coverall.			
Microbiology or laboratory waste such as cultures, stocks, specimens, vaccines, devices and dishes used for cultures, blood bags etc.	YELLOW	Pre-treatment is required (with non-chlorinated chemicals or autoclave, microwave or hydro-clave in containers or safe plastic bags)	Pre-treated and followed by incineration.
PPEs (Personal Protective Equipments) such as goggles, face shield, splash proof apron, plastic coverall, hazmet suit, nitrile gloves or gloves contaminated with blood and body fluid	RED	Not required	Autoclaved, Shredding followed by recycling
Tubing, plastic bottles, intravenous tubes and catheters, cannulas, syringes without needles, urine bags etc.	RED	Not required	Autoclaved, Shredding followed by recycling
Glass sharps such as broken or intact glassware's, medicine vials, ampoules except those contaminated with cytotoxic waste	BLUE Puncture proof, leak proof box or container with blue marking	Not required	Disinfection then recycling.
Metallic sharp waste like needles, scalpels, blades, syringes with fixed needles	WHITE Puncture proof, leak proof, tamper proof containers	Not required	Autoclaved, Shredding followed by encapsulation or disposed in iron foundries.

According to CPCB guidelines or SOP use separate color coded bins or bags or containers in wards and as precaution double layered bags (using two bags) should be used for collection of waste from covid-19 isolation wards. Use a dedicated collection bin labeled as "covid-19" to store waste. Ensure that TSDF operators follow safe handling and disposal of covid-19 pandemic waste and excess bio medical waste as per SOP issued by CPCB in February 2021. The inner and outer surface of bins, trolleys or vehicles used for transportation of the covid-19 waste shall be disinfected with 1% sodium hypochlorite solution after unloading of pandemic waste. Ensure that TSDF uses tracking app namely COVID19BMW to report and update quantity of pandemic and access biomedical waste disposed. However, in case the TSDF intends to use hazardous waste incinerators (HW incinerator) shall be used for disposal of biomedical waste as per schedule -I of Bio Medical Waste Management (BMWM) rules 2016 for disposal of BMW on regular basis, amendment in the Environmental Clearance revised authorization under HWM rules 2016 as well as BMWM rules 2016 shall be neces

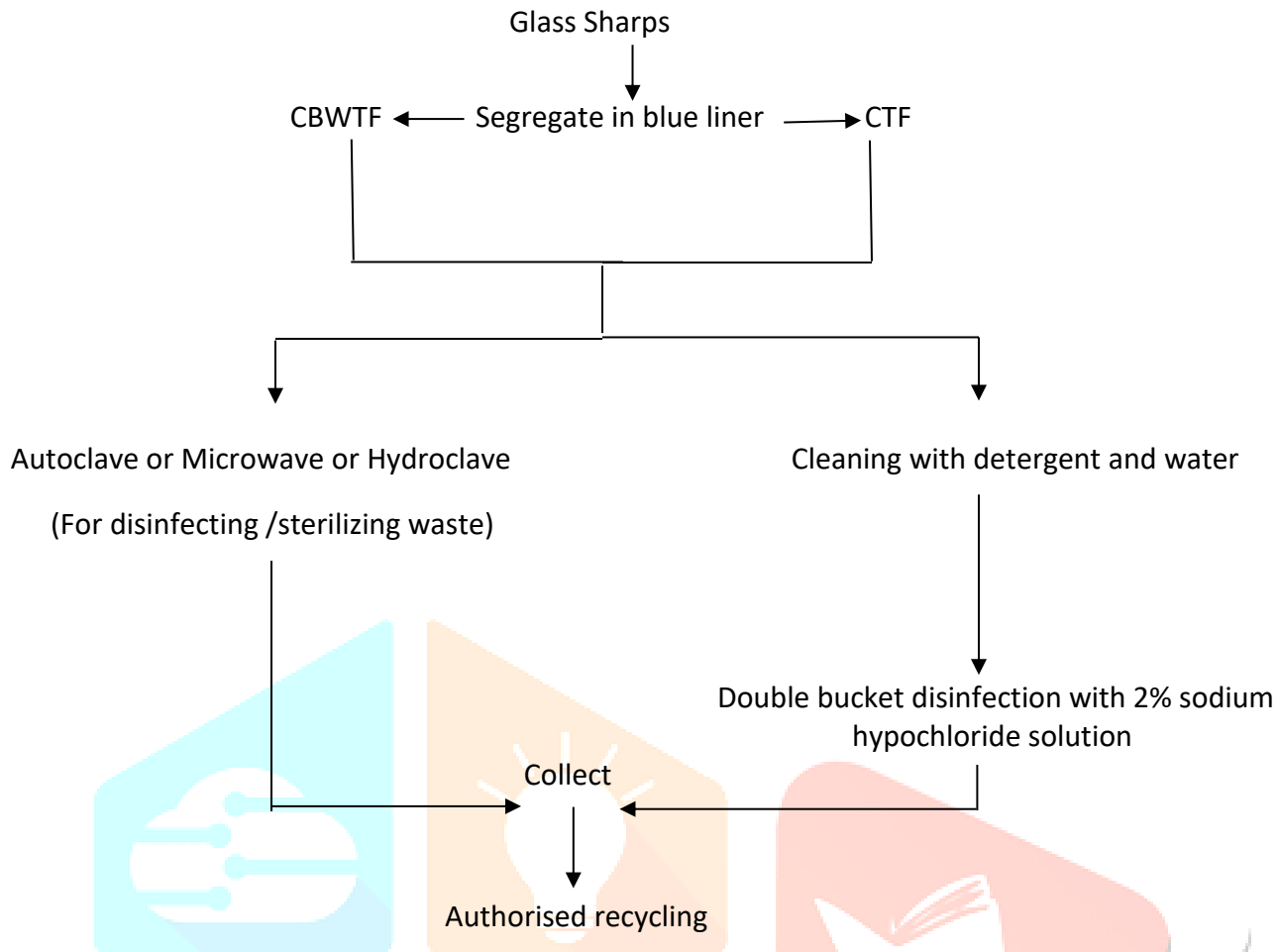


Fig.1.Treatment and disposal of blue category waste (According to BMWM RULES ,2016)

For safe disposal of biomedical waste in pandemic operators of the Common Hazardous Waste Treatment, Storage and Disposal Facility (CHWTSDF) shall receive yellow and red category of medical waste for disposal by incineration as per BMWM rules 2016 (fig 1,2 & 3). CPCB data states that about 198 common biomedical waste treatment facilities (CBWTFs) are involved in the treatment and disposal of covid-19 medical waste across the country.

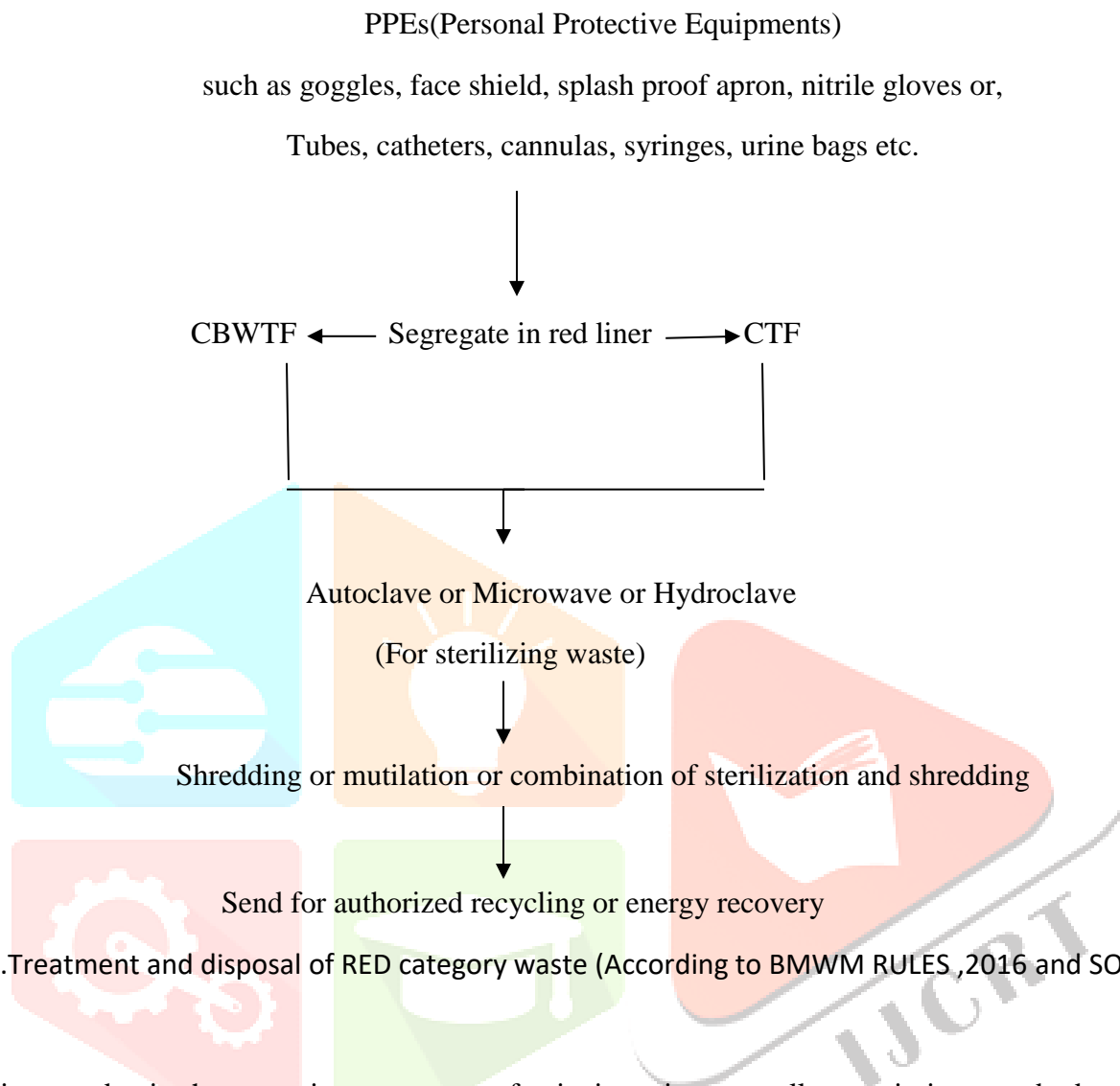


Fig.2.Treatment and disposal of RED category waste (According to BMWM RULES ,2016 and SOPs of CPCB)

During pandemic the operating parameters for incineration as well as emission standard as mentioned in schedule -II of BMWM rules ,2016 shall be complied with. To comply with operating standard for temperature of both Biomedical waste and hazardous waste ,ensure minimum temperature of $800\pm 50^{\circ}\text{C}$ for primary combustion chamber and $1050\pm 50^{\circ}\text{C}$ for secondary combustion chamber. Incinerator may be operated at 1200°C in case the BMW contains cytotoxic drugs.

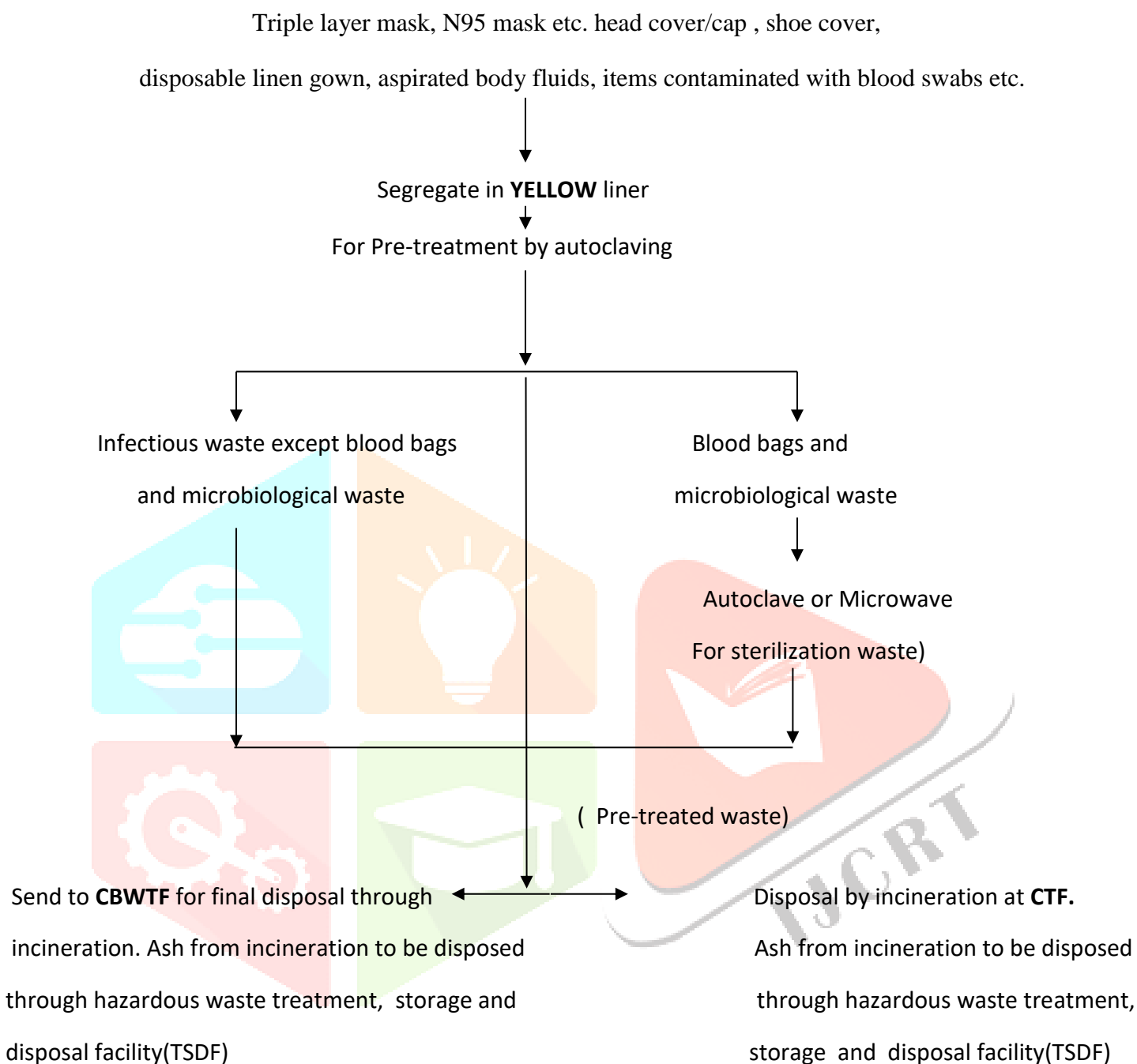


Fig.3.Treatment and disposal of Yellow category waste (According to BMW RULES ,2016 and SOPs of CPCB)

According to SOP of CPCB , ensure regular sanitization of the staff involved in collect ,transportation and disposal of covid-19 medical waste. Also ensure vaccination of staff against covid-19 and other infectious diseases. Provide Personal Protective Equipment (PPEs) such as three layer mask , splash proof apron, gum boots ,nitrile gloves etc all the worker involved in handling and disposal of pandemic covid-19 biomedical waste. CHWTSDF operator shall maintain and submit the compiled monthly occupier wise record of waste collected and disposed to concerned State Pollution Control Board/ Pollution Control Committee.

CONCLUSION

Biomedical waste is a threat to global public environmental health, especially in developing countries. The rise in biomedical waste due to Corona pandemic has worsened the problem at hand, and there is an immediate threat of unsafe disposal of such waste that may create an environmental crisis. Safe disposal of large quantity of biomedical waste has gradually posing a major challenge. Proper segregation, safe storage, and disposal of waste are key to the effective management of biomedical waste. Following the rules and standard operating procedure legislation of CPCB the method for segregation, packaging, labeling, neutralization and final disposal of biomedical waste are analyzed. In addition, the World Health Organization has set out guidelines for management of healthcare waste. This paper provides useful insights into biomedical waste management scenarios during the covid-19 pandemic and a possible way forward. We need to ensure that the health workers and overall environment remain safe.

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