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"BIO-MEDICAL WASTES TREATMENT MECHANISMS OF COVID-19: A REPORT"

By: Nilutpal Deb Roy & Madhusmita Ronghangpi

ABSTRACT

Bio-medical waste is the wastes containing contagious materials. These wastes are generated from facilities like hospitals, pathology lab, dispensaries, blood bank, etc. People have to be careful as Covid-19 is a new virus, which can be easily transmitted through contact of one person to another. Covid-19 medical wastes such as PPE kits, Gloves, Mask, etc. should be carefully disposed of so that people don't get infected from it. Covid-19 has become a major issue at present as it is a new and easily transmitted virus, and no established waste treatment mechanisms have been developed in the world. This study is to analyse how we can deal with the medical wastes of the COVID-19 and to study the rules and regulation in relation to such wastes. This study helps to educate some of the people in society to understand how to dispense Covid-19 wastes, and they can also protect the environment by disposing of the wastes in the right way.

Keywords: Bio-medical wastes, Covid-19, PPE kits, Gloves, Masks, and Environment.

I. INTRODUCTION:

"There is no such thing as 'Away'. When we throw anything away, it must go somewhere."

-Annie Leonard

Bio-medical wastes are wastes produced in the research institution, healthcare teaching institution, blood banks, etc. "Bio-medical waste, also known as infectious waste or medical waste, and it is defined as waste generated during the diagnosis, testing, treatment, research or production of

biological products for humans and animal."[1] These contain bodily fluids, any parts of the body, injections, sharp metals, bandages, cotton, etc.

The SARS-CoV-2 virus or Covid-19 is a serious issue in today's world, and many countries are being affected by this virus as it spread across at least 190 countries. This virus was first identified in the "city of Wuhan, China" in December 2019. This epidemic was regarded by the World Health Organization (WHO) as a public health emergency. According to the WHO Report, 5.91 million cases have been detected in the world, resulting in 3, 64,000 death, but the relief is that 2.49 million has been recovered from this deadly virus.[2] The cases of the Covid-19 has increasing day by day. The active cases of coronavirus have increased to 10 million, and death has increased to 502 thousand as of early July 2020.

The COVID-19 pandemic is also known as coronavirus pandemic, which is caused by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2). This virus was identified in the Wuhan city of China in December 2019. The world health organisation has declared this outbreak as a public health emergency of international concern on January 30 2020. According to the WHO Report, 5.91 million cases are coping up in the world. The COVID-19 has affected more than 188 countries and union territories in the world, resulting in more than 364,000 death; but the good news is that 2.49 million has been recovered from this dangerous virus.

The virus usually spread between the people with close contact, or through the small droplets while coughing, sneezing or talking. The symptoms of COVID-19 usually appear within 2 to 14 days, and there are the symptoms of fever, cough, a runny nose and difficulty in breathing. At the same time, people of all ages can be affected by this disease. The people whose age is above 65 years have a high risk to get contaminated with this virus.

Dr Michal Ryan, the executive director of the world health organisation, has said that "This virus will never go away". In the news interview, he mentions this statement.

In India, till today, 626k people are infected with Covid-19 and 380k have been recovered and 18,213 people died. According to the “Indian Council of Medical Research (ICMR) in India”, total

[1]V.N.Kalpana, *Biomedical waste and its management*, THE JOURNAL OF CHEMICAL AND PHARMACEUTICAL RESEARCH, ISSN: 0975-7384 CODEN (USA): JCPRCS, 2016 (June 29, 2020, 12:05 PM)https://www.researchgate.net/publication/308294194_Biomedical_waste_and_its_management.

[2]Coronavirus disease 2019 (COVID-19) Situation Report-101 (June 30, 2020, 9:18 AM) https://www.who.int/docs/default-source/coronaviruse/situation-reports/20200430-sitrep-101-covid-19.pdf?sfvrsn=2ba4e093_2.

collective 83, 98,362 samples have been tested till June 28, 2020, and 1,70,560 samples have been tested positive.[3]

II. GUIDANCE OF WORLD HEALTH ORGANISATION (WHO) FOR MANAGEMENT OF COVID-19 WASTE

The world health organisation (WHO) has taken the Covid-19 issue very seriously because this virus has affected the world in a severe manner. The WHO has suggested some technique to dispose of the medical waste which was coming out from the Covid-19

patients. The wastes which are coming out from the corona patients are very dangerous because there is the maximum possibility of transmission of this virus by the waste, if the waste is not properly disposed of then it will affect the people near to that area. The "Centres for disease control and prevention (CDC)" has suggested proper inquiry on the COVID-19 wastes.

The "Occupational safety and health administration (OSHA)" is providing the worker with the safety technique how to deal with the waste. The CPCB (Central pollution control board) said that "biomedical wastes of the quarantine centres must be tied in a yellow coloured bags."[4] The WHO also suggests that the "used plastic aprons of the medical warriors should be cleaned by the soap water and decontaminated with the sodium hypochlorite solution of 0.5%."[5] The "gloves made of nitrile or latex" should be used for one time only and hand sanitisation should be used after removing of the PPE.[6]

Safety measures to deal with the dead bodies of the COVID-19 Patients:-

However, the imparting fear of COVID-19 is very low from the deceased body. But the health workers should adopt precautions every time.[7] "Health care workers or mortuary workers/staff preparing the dead body should wear: scrub suit impermeable disposable gown, gloves mask, face shield, etc. After the use of PPE, the same thing should be disposed of properly".[8]

[3]Hindustan Times, ICMR tests nearly 84 lakh samples for Covid-19, positive cases over 5.4 lakh (June 30, 2020, 2:30 PM) https://www.hindustantimes.com/india-news/icmr-tests-nearly-84-lakh-samples-for-covid-19-positive-cases-over-5-4-lakh/story-nKYwOgevdmZRaYHpbEoaXM.html.

[4] Coronavirus disease (COVID-19): Regulated medical waste and sharps packaging guidance (July 4, 2020, 08:51 AM) https://www.stericycle.com/covid-hub/packaging-guidance.

[5] *Water, sanitation, hygiene and waste management for the COVID-19 virus*, WORLD HEALTH ORGANISATION (July 6, 2020, 08:41 AM) https://covid19.who.int/?gclid=Cj0KCQjw9IX4BRCcARIsAOD2OB0ERBFf9WyVO0ypoCIKHdFr9xpyd4Zytnw_myXFF2njZXdLefDFT_UaAmLLEALw_wcB.

[6] Ibid.

[7] Ibid.

[8] Ibid.

The body of the deceased person of the COVID-19 patients should be wrapped in a cloth and transfer the body as soon as possible to the mortuary area.[9]

III. INITIATIVES TAKEN BY THE GOVERNMENT OF INDIA IN DEALING WITH "COVID-19" WASTES

Due to COVID-19 pandemic period, the Central and State Governments have taken very significant measures to control the wastes of "quarantine centres or camps, isolation wards, sample collection centres and laboratories". Some of the measures are point out below:

India had legislation like Bio-Medical Waste Management Rules, 2016 to deal the bio-medical waste but the Central Pollution Board of India provided guidelines to ensure that the waste generated specifically during testing of people and treatment of COVID-19 patients is disposed of in a scientific manner. According to Biomedical Waste Rules, "Bio-medical waste is any waste that is generated during the diagnosis, treatment or immunisation of human beings, animals or research activities etc."[10] "It could include human tissues, items contaminated with blood, body fluids like dressings, plaster casts, cotton swabs, beddings contaminated with blood or body fluid, blood bags, needles, syringes or any other contaminated sharp object."[11]

The CPCB gave guidelines for properly disposing of wastes produced in the treatment of COVID-19 patients.[12] It deals with measures to dispose of waste of COVID-19 safely generated in "hospital isolation wards, testing centres and laboratories, quarantine facilities and homes of suspected patients". These WHO, MoH and FW and other concerned agencies brought these Guidelines. The guidelines are:[13]

A. ISOLATION WARDS:

1. Maintain separate "colour coded bins or bags or containers in Isolation wards" and conventional disposal according to this guideline with BMW Management Rules, 2016.
2. Use double-layered bags for collection of wastes marked as "COVID-19".
3. "General waste not having contamination should be disposed of as solid waste as per Solid Waste Management Rules, 2016".
4. Maintenance of record of waste generated in the COVID-19 isolation wards.

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[9] Dr. Irin Hossain & Dr. Ashekur Rahman Mullick, *Pandemic COVID-19 and biomedical waste handling: a review study*, THE JOURNAL OF MEDICAL SCIENCE AND CLINICAL RESEARCH, (July 6, 2020, 10:09 AM) https://www.researchgate.net/publication/341763507_Pandemic_COVID-19_and_Biomedical_Waste_Handling_A_Review_Study.

[10] Mayank Aggarwal, Pollution watchdog releases guidelines to handle Covid-19 biomedical waste, Mongabay, (June 30. 2020. 3:05 PM) https://india.mongabay.com/2020/03/pollution-watchdog-releases-guidelines-to-handle-covid-19-biomedical-waste/.

[11] Ibid.

[12] Central Pollution Control Board, Guidelines for Handling, Treatment and Disposal of Waste Generated during Treatment/Diagnosis/ Quarantine of COVID-19 Patients – Revision 2 dated 18/04/2020– reg. April 19, 2020.

[13] Ibid.

5. Daily disinfected the inner and outer surface of “COVID-19” waste containers or bins or bags or trolleys with 1% Sodium Hypochlorite (NaClO) solution.
6. The confirmed patients' who are not capable of using toilets, their excreta should be collected in the diaper and placed it in yellow bins or bags or containers. However, for a bedpan, the faeces should be washed in the toilet and cleaned with a neutral detergent and water, disinfected with a "0.5% chlorine (Cl) solution", and rinsed with clean water.
7. **Red bags** for collection of PPEs such as "goggles, face-shields, splash-proof apron, Plastic Coverall, Hazmat suit, nitrile gloves”.
8. **Yellow bags** for the collection of used masks, head cover or cap, shoe-cover, disposable linen Gown.

B. SAMPLE COLLECTION CENTERS AND LABORATORIES:

Red bags for collection, according to BMWM Rules, 2016, of “pre-treat viral transport media, plastic Vials, Vacutainers, Eppendorf tubes, plastic Cryovials, Pipette tips”.

C. QUARANTINE CENTERS OR CAMPS OR HOME:

1. Collectors, identified by Urban Local Bodies (ULBs), should collect the general solid wastes produced in quarantine centres or camps should be handed to the collectors or those wastes can be disposed of through other local methods.
2. Biomedical wastes of quarantine centres or camps should be collected in double-layered yellow coloured bags.
3. Persons Quarantine camps or centres should contact the CBWTF operator to collect biomedical wastes.
4. Person quarantine at home or Home-care should contact local bodies to collect the wastes in the yellow bags.

D. COMMON BIOMEDICAL WASTE TREATMENT FACILITY (CBWTF)

1. The workers are given “PPEs including three-layer masks, splash-proof aprons/gowns, nitrile gloves, gumboots and safety goggles".
2. Maintenance of records for “collection, treatment and disposal of COVID-19 waste”.
3. After every trip, the dedicated vehicle used to collect COVID-19 ward wastes should be "sanitised with sodium hypochlorite or any appropriate chemical disinfectant".

E. OBLIGATIONS OF SPCBS/PCCS:

1. They should maintain records of COVID-19 treatment wards or quarantine centres or quarantines homes in the respective States of India.
2. Collection and disposal of biomedical waste properly according to BMW Rules 2016 and SoPS are given in the guidelines.

3. In states, where there is no access to CBWTFs, they should follow provisions of BMWM Rules, 2016 and these guidelines and disposed of in deep burial pits of yellow containers or bags or bins.

F. OBLIGATIONS OF URBAN LOCAL BODIES:

Trained a team of workers for "sanitisation, collection of biomedical waste and precautionary measures" to handle biomedical waste and they should be engaged in door-to-door, waste collection, waste deposition centres and quarantine homes.

G. MANAGEMENT OF WASTEWATER FROM HEALTH CARE FACILITIES (HCFs) OR ISOLATION WARDS:

The Sewage Treatment Plants operators and HCFs should continue to disinfection of treated wastewater and no utilisation of treated wastewater in utilities within HCFs.

III. CONCLUSION AND RECOMMENDATIONS

The COVID-19 is regarded as dangerous because it is easily transmitted and affect the body of the people badly. The Government has initiated many measures to control this virus and to protect the people of India from getting infected. However, the number of infected people is rising higher, and this indicates an increase in wastes produce by the Quarantine camps or wards or homes, isolation wards, etc. The treatment is also necessary because the waste can infect other people. Though many initiatives have been taken by the Government of India, we can see people throwing away their masks and other kits here and there and thus harming nature and also infecting other non-infected people. Therefore, the Government of India should stringent the rules and guidance implement by them.