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Management of waste during COVID-19 Pandemic – A Global Challenge

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ABSTRACT:COVID-19 has affected numerous countries , rapidly spreading within a short duration forcing W.H.O to declare that it is now a global pandemic throwing which is throwing new challenge for prevention , treatment including the bio-waste management . At first, while the pandemic was progressing, and lockdowns imposed in many countries, public authorities and municipal waste operators had to rapidly acclimatize their waste management systems and procedures to the demand once they noticed the mode of spread. Management of bio-waste is one of the most crucial elements in preventing the spreading of illnesses and diseases. Present scientific research has been in consistent to relate that waste management and its role has a vector for the transmission of the SARS-CoV2 virus as this virus is new to the man kind but certain studies stress on the importance of proper biowaste management to contain the spread . The measures taken by the waste management workers on a daily basis are insufficient as the number of new cases requiring isolation and quarantine are on the rise and the rapid spreading nature that is air borne and some studies prove to be surface induced with increased the usage of PPE to prevent Covid-19 has thrown a more significant task to enable proper disposal of the current waste along with the waste being disposed of from households, industries, hospitals, and factories. The regulatory authorities should ensure proper waste management services and proper mechanism must be ensure in placed for the provision of basic services at every level for the well-being of the population and the best possible containment of the virus at the earliest .

Keywords: Biowaste, disposables, PPE, waste management, disposable barriers, health care workers

1. INTRODUCTION

The corona virus disease (COVID-19) is a highly transmittable and pathogenic viral infection that spreads through humans rapidly. The mode of spread has been proven in various studies even though the mode and mechanism of spread is still a topic of debate in the scientific community. The recent pandemic caused by SARS-CoV-2 infected more than10 million people and causing more than 50 thousand deaths worldwide reported as on June end, 2020 (W.H.O,2020). There are abundant obstacles for medical and governmental authorities to competently manage the spread of this infection, treat and manage waste generated while treating and preventing the spread of this virus in the community . The challenges faced due to the COVID-19 pandemic are numerous and one of the most important being biomedical waste management. Biomedical waste has been a great challenge over the years, and now during this ongoing pandemic, an increase in demand for universal precautions to be followed to prevent cross-infection is leading to higher demand for disposable barriers and instruments production. The biological waste is also generated during the development of diagnostic kits and research on vaccines in laboratories is of a greater concern globally. In addition to this, household solid waste such as mouth masks, gloves, face shields, plastic aprons, etc., disposed by an infected individual or family during self-isolation or as a preventive measure could be a potential source of generation of biowaste (J. Shi & W. Zheng, 2020). With the previous experience of handling the infectious epidemics and pandemics, biowaste management is a concern to be addressed by the health authorities by educating the community at large about the potential harm caused by these waste products (CDC, 2019).

BACKGROUND

Worldwide waste management systems have been dealing with the biggest challenge of disposing plastic. Varying and disparities in standardization of procedures in waste disposal among the nations with the the impending outpour in the volume of waste from the COVID-19 pandemic threatens to devastate existing waste management systems along with healthcare capacities. The demand trend is expected to match the global pandemic curve as personal protective equipment (PPE) such as gloves and masks for health workers, disposable components for life support equipment, respirators, and general plastic supplies including syringes (Caniato, M et al., 2015). The widespread use of protective gear throughout the world during this pandemic will be causing the waste disposal a bigger challenge. Utilized disposable products are frequently pathogen-contaminated, and ought to be handled as hazardous waste will always threatening and a challenge we ought to overcome (W.H.O, 2020).

BIOMEDICAL WASTE

The requirement in a hospital to dispose off their hazardous waste is very essential. This has overloaded the healthcare waste (HCW) capacity of the hospital, creating a demand and challenge for sudden rise in cautious collection, disposal, and treatment of the bio-waste products. Segregation of infectious and non – infectious waste is the key component of solid waste management (Amin R et al., 2013). Earlier the sanitary health care workers were handling waste contaminated with various infectious microbial components that cause

tuberculosis, HIV, hepatitis , hepatitis, salmonella, etc., form hospitals but now due to pandemic this has exposed the scarcities in the bio waste management. If waste is shifted from the site of collection it becomes more crucial to understand where and how it will be treated and destroyed, requiring traceability measures to register and ensure its suitable destination. Currently, the treatment facilities are designed to handle and dispose of medical waste at a foreseeable average flowrate. Various treatment technology options are based on thermal processes such as incineration, steam treatment (autoclaving), plasma treatment, and microwave treatment. The rapid increase in waste volume crumbles systems that are designed for steady-state conditions (J.J. Klemes et al., 2020).

The associated problem is to decide if new facilities should be built to handle the increased waste volume. The relevant aspects include economics, emissions, safety, regulatory issues, and public acceptance. However, at the onset of the pandemic, it is too late for such opinions. Experience in Wuhan shown that optimization models can be used for the reverse supply chain problem of hospital waste management (Windfeld ES & Brooks MS-L, 2015).

Challenges of sanitary care workers during current pandemic

Sanitation Health care workers risk their health every day on the streets with an increase in their work due to the current pandemic with daily and gradual increase in isolation and quarantine cases in the whole population. It is necessary to safeguard the health and safety of sanitary workers as they are one of the most important sanitary barriers to keep cities and people safe from several diseases, including COVID-19.The waste management at the main facilities handling the COVID-19 cases and individuals exposed play a key role for the prevention of the of potential cross-contamination to control the community spread (Vaccari, M et al., 2018).

Potential risk facilities and individuals:

- Medical facility cleaners
- Cleaners working in industrial& commercial complexes
- Waste collection crews
- Workers working on sorting lines for waste management facility
- Laborers in recycling sorting facilities
- Individual collectors of cardboard and other recyclables for their livelihood activity.

The experience of earlier pandemics stresses on the importance of the active role played by the individual in controlling the pandemic is very crucial

Responsibilities of the infected individual regarding proper waste disposal

- All personal waste such as handkerchief, PPE other disposables should be disposed in plastic garbage bags Bag 1.
- The Bag 1 is three-quarters full, this bag should be firmly closed, leaving as little air has possible and Pets should be kept away from waste bags.

- This Bag 1 should be placed in a second plastic bag (Bag 2).
- Bag 2 should not be too full to ensure that it can be firmly closed and does not break; the waste should not be pressed with hands to make additional space.
- People should wash their hands or disinfect them before and after manipulating the waste bags, before and after closing bags.
- Bag 2 should be firmly closed before being delivered for collection.

It's very much necessary of the health authorities to safe Guard the health and measure that need to be take by the sanitary workers by educating and making them aware more than the regular times those who handle bio waste .

Following Precautionary measure need to be taken while to collect the waste at individual level by Sanitary worker

- Uniforms should be cleaned thoroughly and changed daily to minimize the possibility of dispersing the virus and limiting its transmission.
- The bio-waste collected from individuals infected with corona virus under compulsory quarantine should be collected safely .
- Direct contact of waste with bare hands with waste carrying containers and bags should be avoided with bare hands.in any case.
- If mixed with other waste, then the waste should be treated properly according to the guidelines and safely stored for a sufficiently long period before processing.

Its is the very much important for the governing local bodies to take necessary steps at every level form household collection to health facilities, segregation and dispatching and proper treatment of the Bio- waste

Precautions to be taken while collecting the waste at community level

- The waste collection and treatment services should be ensured at regular scheduled periods.
- The authorities should create awareness about the impact of a high consequence of infectious disease and waste management systems .
- The effectiveness of different waste management practices on maintaining hygiene and public health during a pandemic should be evaluated regularly.
- The waste material collected should be incinerated or safely disposed of in controlled landfills.
- The people in the community should be educated to take precautionary measures when handling their waste, and it is appropriate that all citizens are encouraged to follow instructions on safe handling and delivering of waste for collection as recommended –

2. WASTE DISPOSAL – A GLOBAL CHALLENGE

Proper waste disposal is not only developing countries unfortunately but also faced by the most developed countries , still lack the infrastructure to treat healthcare and other infectious and hazardous waste separately in developing and under developing countries is a environment hazard that is not still not addressed . Now due to the pandemic the exceptional increases in waste production at the in-healthcare facilities and household infectious waste is opening up the short comes in the system. Most countries are sending then stored biowaste produced during the present pandemic is landfills in distinct areas, isolated from the regular waste, and with immediate daily cover without proper treatment due to lack of resources and proper guidelines . The main purpose of such a measure is to ensure that healthcare waste won't be exposed nor mixed to non-infectious waste. The waste management workers are at risk during disposal activities, and once waste is dumped, no human or animal will contract the infection (Doremalen. N et al., 2020). Certain guidelines that have been prescribed by the World Health Organization (WHO) 2020 recommend that best practice need to be practiced for the management of potentially infectious Covid-19 infected waste . Segregation and waste management systems need to be properly defined and waste associated with COVID-19 is managed no differently than other infectious waste .

- Proper and suitably color-coded waste bin, with a liner need to be made mandatory at every potential risk bio waste generating centers

- System should be developed for collection of the waste at least daily, proper care need to be taken for transport to be leakproof and the containers used are puncture-proof containers with biohazard symbol labeled

- Well defined designated storage areas that is clean, secure, and protected from the elements, pests, and disease vectors

- Best recommended practices indicate that waste should be disinfected by non-incineration methods, especially steam-based treatment such as autoclaving or microwaving.

- After disinfection, waste can be sent for disposal or recycling. Any material that could potentially be reused should be mutilated.

- Proper care of people working in Waste Management and responsibility towards to protect the health and safety of workers and providing them assurance about the risks related to the COVID-19 crisis are essential for increasing workers' confidence and ensuring continuity of waste management services (Zarook M. & Shareefdeen , 2012).

Good practices in the waste management sector that may be implemented for better and faster process of controlling the current pandemic could be as follows :

- Physical distancing among individuals to be maintained at workplace to prevent cross infection and reducing the work force working in the waste management chain.

- Availability and adequate quantity of personal protective equipment (PPE) with proper training is the need of the hour.

- Ensuring strict adherence to enhanced hygiene protocols, repeatedly washing and sanitizing facilities and vehicles transporting the bio-waste should be effective.

- Elderly workers and persons with specific chronic health problems should be avoided at the moment .

- Bio- wastes and Covid-19 infected individual house hold waste are highly harmful and put people under risk and a thorough understanding of medical waste management and control techniques is extremely important (Zheng J & Suh S, 2019).

- Public health and proper sanitaization over all other considerations during this pandemic needs to be prioritized .

A significant concern is to address the present pandemic controlling and dealing with surging cases learning from this crisis and translating into long-term waste management strategies. The current problem stems from the failure to anticipate the occurrence of a pandemic of this scale (Hong J et al., 2019).

3. CONCLUSION

The focus should not only be targeted on waste management, but also waste prevention needs to be the first priority. With the inspiration from the pandemic disease and the analytics of energy and environmental footprints, better trade-offs between medical/healthcare plastics and regular single-use plastics need to be performed to control the total amount and elevate the flexibility for future uncertainties. The community needs to work towards a safer and greener planet, every single step considering the complexity of various issues becomes an important goal of humankind. The government and the world health agencies should come up with more holistic and practical and implementable solution for the proper disposable of the this bio waste keeping in view about the present situation of pandemic and making prepared our communities to handle better further any such challenges with much scientific and preparation . Future work should be directed by post-pandemic development and extend the concepts discussed in this contribution subject to country-specific conditions keeping in view the ground situation and the economic limitations and other demographic challenges faced at the ground level .

4. REFERENCES

[1] World Health Organization (WHO). Rolling updates on coronavirus disease (COVID-19).
[2] J. Shi and W. Zheng. 2020. Coronavirus: China struggling to deal with mountains of medical waste created by the epidemic. 5 March.
[3] CDC (2019) - centers for disease control and prevention <www.cdc.gov/infectioncontrol/
[4] /environmental/background/medical-waste.
[5] Caniato, M.; Tudor, T.; Vaccari, M. International governance structures for healthcare waste management: A systematic review of scientific literature. J. Environ. Manage. 2015, 153, 93–107.
[6] WHO (2020) Rational use of personal protective equipment for coronavirus disease 2019 (COVID-19).

[7] Amin R, Gul R, Mehrab A. Hospital waste management; practice in different hospitals of Distt. Peshawar. Professional Med J 2013;20(6): 988-994.
[8] J.J. Klemes et al.Renewable and Sustainable Energy Reviews 127 (2020)
[9] Windfeld ES, Brooks MS-L. Medical waste management – a review. J Environ Manag 2015;163:98–108.
[10] Vaccari, M.; Tudor, T.; Perteghella, A. Costs associated with the management of waste from healthcare facilities: An analysis at national and site level. Waste Manage. Res. 2018, 36, 39–47.
[11] Doremalen, N. et al. (2020) Aerosol and Surface Stability of SARS-CoV-2 as Compared with SARS-CoV-1.
[12] Vaccari, M.; Perteghella, A.; Stolfini, M.; Tudor, T. Overcoming public health risks to staff during the management of waste from healthcare facilities: Case studies from Italy. Int. J. Technol. Health. Care Qual. Assess. 2018.
[13] Water, sanitation, hygiene, and waste management for the COVID-19 virus: interim guidance April 23, 2020.
[14] Zarook M. Shareefdeen Medical waste management and control Journal of Environmental Protection, 2012, 3, 1625-1628.
[15] Zheng J, Suh S. Strategies to reduce the global carbon footprint of plastics. Nat Clim Change 2019;9(5):374–8.
[16] Hong J, Zhan S, Yu Z, Hong J, Qi C. Life-cycle environmental and economic assessment of medical waste treatment. J Clean Prod 2018;174:65–73.