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COVID-19 PANDEMIC: REVIEW ON SOLID WASTE ACCUMULATION AND MANAGEMENT ISSUES - INDIAN SCENARIO

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Abstract: ***Waste can be universally portrayed as a thing, material or substance that is produced by an individual and considered undesirable or futile and to be disposed of at a specific time and place by the individual that has keeping of it and incorporates solids, fluids and gases (Medcities, 2003, Mugambwa, 2009). Although, notwithstanding contemplations of permitted nature and geological area of generation, various descriptions of waste exist dependent on conditions under which they happen (Williams, 2005). The number of wastes positive as microbial habitats and their incubation varied among the types of household wastes and its treatment with reference to pandemic outbreak. 'Household clinical wastes' are main part of waste during pandemic. Used masks, other disposables like gloves, wound dressings etc. Inferable from resistibility and moderate degradability that represents higher habitation time, these materials qualify as potential perilous wastes. Seasonal changes accompanied by pandemic especially rain water allows these wastes to frame a breeding biotope for the reproducing of various vector parasites and cross contamination. Waste management is a basic ecological and human health challenge in developing nations especially during seasonal outbreaks and pandemic period. The waste disposals in developing nations during seasonal disasters and pandemics have been ascribed to the difficulties presented by waste management in many developing nations with high inhabitation. The condition of waste generation in developing nations during pandemics appears not to be efficient in collection and secure dispose of wastes, inside their purview. In any developing nation, the dangers presented by misguided treatment and removal of wastes (however regularly overlooked) add to the elevated level of mortality and horribleness (Medina, 2002). Human and environment wellbeing is likewise undermined because of inappropriate treatment of wastes especially during and post-epidemic period.***

Keywords: *Pandemic, COVID-19, Household, medical solid waste, sustainable solid waste management*

I INTRODUCTION

The dangerous effect of Household Solid Waste cannot be effectively isolated from that of city solid waste; this is because of their interrelatedness and an inadequate number of studies being completed. Be that as it may, despite this, it is imperative to comprehend the caustic effect of solid waste while enlightening sustainability in municipal territories. Solid waste has an unfortunate impact upon the human and regular habitat regarding biological, economical, chemical, physical, mechanical and conceptual methods (European Environment Agency (EEA), 2003; Hanks, 1967).In the interim, cities in developing nations are troubled with an exacerbating solid waste circumstance which ends up being unmanageable and undermine general wellbeing and nature (Baaberey, 2009).

As COVID-19 is as yet spreading in the nation, there is a high-pitched increase in clinical waste. The increase is posing significant challenges to the waste industry, putting authorities, and waste workers under significant pressure. Proper waste management is an essential public service that cannot be overlooked in this time of crisis.

Alongside infection loaded waste from clinics, diagnostic and quarantine facilities, the greater challenge emerge from the household wastes of those revealing negligible or unimportant

indication. An on-going study distributed in the New Britain Diary of Medication demonstrated that the Virus contagion remains on cardboard for around 24 hours and on plastics and stainless steel for around 72 hours. The worry this makes for sanitation labourers and casual division waste gatherers can't be abandoned. An expected waste collector performs waste collection, sorting and recycling. If not educated or their security issues addressed, their health can be put in danger. In this way, there is a critical need for residents to be alerted about segregated and protected removal of household waste.

Solid Waste - Perceptions

Municipal solid waste (MSW) consists of waste springing up from households to that collected wastes, by local authorities from any source. Therefore, Municipal solid waste consists of a part of industrial and non-hazardous industrial waste. It can be described as the domestic waste, waste collected for recycling and composting. Meanwhile, the following objects can additionally be categorized as waste: Domestic hazardous wastes; Bulk wastes derived from households; road sweepings and litter; parks and lawn wastes; wastes from institutions, business organizations and workplaces (Hester & Harrison 2002). Solid waste is a complicated combination of solid substances along with some liquid elements, some of which are innately harmful to health (Nelson et al., 2009). Solid Waste Management is one of the challenges dealing with any urban region in the World (Guerrero, Mass, & Hogland, 2013).

According to the report published by World Bank (2015), 70% global increase in municipal solid waste is expected by 2025, with developing nations dealing with the challenges as their waste is anticipated to greater than double. According to the Central Pollution Control Board (CPCB, 2015), the average waste production in Indian cities is more than five hundred ton per day (Times of India, 2015).

In India, every family normally produces about 1kg of trash every day that arrives at the street side canisters or stores of trash. Rural India produce about 7000 million metric ton amounts of natural waste each year which is either burnt or land filled. Thickness estimations of waste in towns varied from 300 to 500kg/m. Generation of trash is expanding a lot quicker than the earlier decades in a comparable phase of monetary development. The situation is more terrible in the village. The earth is contaminated beyond imagination (Dhanuja, 2006).

The Household Solid Waste (HSW) is the primary supporter (75%) of municipal solid waste gathered in many developing nations (Coffey and Coad, 2010; Wijayapala, 2003). It is critical to supervise and plan Household solid waste because of the magnitude of the issue and its relevance to the society. The Household is similarly as significant as the individual is critical to a society. Things that are tossed into the area may not rot, regardless of how long have passed. Solid waste has an unfortunate impact upon the human and common habitat as far as natural, cost-effective, chemical, physical, mechanical and physiological methods are concerned (European Environment Agency [EEA], 2003; Hanks, 1967). These wastes are reflected as one of the most significant solid waste in the nation. As a "family" is worked as a unit, the waste generation and removal practices of a specific family are distinctive and its individuals are focused on a specific arrangement of waste related practices (production, segregation and removal). Along these lines, handling HSW requires an alternate methodology and ought to be focused independently from municipal solid waste so as to limit the effects of HSW on the ecology and humanity.

Solid issues in managing solid waste

In India, a large amount of the municipal solid waste is deserted in an assorted appearance in an irrational manner on open waste land or stumpy areas which do not meet the norms of disposal specified in the Municipal Solid Waste Rules. These discarding grounds affect the environment by air, water and soil pollution (R.K.Sinha, 2000). During pandemic used gloves and masks are showing up in places other than the garbage across streets, and also being found in parking lots, on streets and in grassy fields. Furthermore, the measure of clinical waste being created is increasing intensely. A few urban communities are not equipped with facilities for safe treatment and removal of clinical waste, bringing about open burning or dumping of the same. Along these lines anybody, even children, can without much of a stretch access it. Urban communities in low to middle income nations, where waste management arrangement is immature and with a high level of unconcern in the waste and recycling economy are especially at high risk.

Incomplete removal of waste interrupts human wellbeing, causes monetary disasters and harms the physical and natural environment (UNEP, 2002). Destruction of the landscape, poor odor, and tainted soils spilling to ground water prompts medical issues for people and represent an undeniable threat to numerous different species and creatures (Kalin and Skoog 2012). For the overall population, the fundamental dangers to wellbeing are aberrant and emerge from the breeding of disease vectors, basically flies and rodents (Pervez and Kafeel, 2013). There is explicit threat of merging of vast metals in the food chain (Pervez and Kafeel, 2013).

As per Ogawa (2005), usual solid waste management system in a developing nation shows a variety of issues, including low collection and sporadic collection amenities, rough vulnerable dumping and burning without air and water contamination control. Contamination and diseases, human-incited environmental change is progressively perceived as a vital danger and environmental inconstancy. Environmental change

is modifying transient species patterns, causing coral fading, and so on. (Subramani, 2012). Biological systems keep up worldwide natural equivalence. Anything that adjusts the capacity of biological systems makes an awkwardness that influences all life on Earth (www.ehow.com, 2013). In the event that, these squanders are appropriately arranged with the goal that it do not add to the issue of contamination (Sundari and Mathew, 2010).

In India particularly in rustic zones, leftover is an extreme risk to the public wellbeing concern and neatness. The nonappearance of removal of solid and fluid waste are driving through vector borne ailments, for example, diarrhea, malaria, polio, dengue, cholera, typhoid, and other water conceived infection, for example, schistosomiasis. 88% of the overall sickness burden is because of absence of clean water and sanitation and the misguided solid and fluid waste management which heighten their happening. (http//:www.indiasanitationportal.org).

Environmental hygiene and pandemic

Environmental hygiene is a significant public health problem in India. Waste that is not appropriately managed, particularly excreta and other fluid and solid waste containing disposable PPEs from family units and the community, are a genuine wellbeing risk and lead to the spread of contagious ailments. Unattended waste lying around draws in flies, rodents, and different animals that thus spread ailment. Typically it is the wet waste that decays and discharges an awful smell. This prompts unhealthy surroundings and results in an upsurge of medical issues. Specifically, ordinary household waste represents a genuine danger, since they mature, making conditions good for the endurance and development of infectious pathogens. Direct treatment of solid waste can bring about different kinds of contagious and ceaseless sicknesses with the waste workers and the rag pickers being the most unprotected.

CoV-2 existence on surfaces is like that of SARS-CoV-1, the contagion that causes severe acute respiratory syndrome (SARS) is with staying power on surfaces stretching from 2 hours to 9 days. The resilience period relies upon numerous reasons, including the nature of surface, temperature, relative dampness and the strain of the virus. (WHO 2019). As per WHO, the arrangement of non-toxic water, sanitation and clean surroundings are vital for securing human wellbeing during all irresistible illness occurrences, including of coronavirus pandemic 2019 (COVID-19). Guaranteeing proof based and regularly applied WASH and waste management rehearses in society, homes, schools, commercial centres, and health care facilities will help inhibit human-to-human transmission of, the virus that causes COVID-19. Maintaining suggested water, sanitation and biomedical waste rehearses in the home and in the society is significant for weakening the spread of COVID-19.

Taking note of that the COVID-19 pandemic is proceeding to spread and its effects upon human wellbeing and the economy escalating step by step, the UN Environment Program asked governments to treat waste management, including of clinical, household and different hazardous waste, as an insistent and crucial public service so as to limit conceivable additional effects upon wellbeing and nature. The present pandemic of the novel coronavirus, COVID-19, brings up issues and brings difficulties with respect to municipal waste management practices and systems.

Numerous kinds of additional medical and dangerous waste are produced during this out-break, including contaminated masks, gloves and other protective equipment, along with a higher volume of non-contaminated things of a similar sort. Countries which had experienced COVID-19 outbreaks before the rest of the world have already begun witnessing a huge pile up of used masks, made of materials including polypropylene, in public spaces. Unsound management of this waste could cause unexpected blow on consequences for human wellbeing and the earth. The safe management and disposal of this waste is consequently a crucial component in a viable crisis reaction.

Considering the existing pandemic scenario in the country, Central Government and all the state governments are encouraging the public to use face masks. The Kerala government announced that wearing face masks in public places and work place is mandatory in the state. Governments in Madhya Pradesh, Punjab, Odisha and Rajasthan issued orders making the use of masks mandatory for citizens while stepping out of their houses in a bid to contain the spread of coronavirus, a day after Delhi, Maharashtra and Uttar Pradesh governments had issued similar orders. Post government announcements, Municipalities across India have been burdened with one more sort of waste, particularly in enormous amounts – single-use face masks and gloves, which are frequently found dumped in public places.

Another issue found during this outbreak is the people working from their homes to prevent the spread of the coronavirus are generating more residential waste than normal. And there is also no mechanism for collection and disposal of masks and medical waste generated people who are under ‘home-quarantine’ having a travel history or showing COVID-19 symptoms. While some home-quarantined individuals are burning the masks, others have no option but to dump them in the garbage. The removal of bio-clinical waste created at homes and high rises, presently has a disturbing issue within reach: discarding clinical waste produced as a piece of measures taken to battle Covid 19 pandemic. Without incinerators and prepared specialists to deal with clinical wastes, masks and gloves end up alongside food waste and

plastic throw away at the trash dump. Residents and apartment complexes, which do not have an appropriate system to treat bio-clinical waste, concede they dump clinical wastes alongside different dissipates. Not all the individuals have the space to dispose the wastes as rapt.

Sustainability in solid waste management

Safeguard of public health is commonly the most essential encouragement for municipal solid waste management in developing nations. Solid waste management suggests to the material movement of waste from source to last disposal (Melaku 2010). The current pandemic of the novel coronavirus, COVID-19, raises many questions and brings numerous challenges regarding municipal waste management practices and procedure (Safety and health measures for safe handling and disposal of solid waste including households, waste treatment requirements, general procedures due to coronavirus for waste sector). Use of masks as a precaution against Covid-19 has become common but their unscientific disposal has made the waste collectors nervous. Studies suggest that coronaviruses (including preliminary information on the COVID-19 virus) may persist on surfaces for a few hours or up to several days. This may vary under different conditions (e.g. type of surface, temperature or humidity of the environment) and is where those in the Waste Management Industry should take caution. It is important to protect oneself, as well as it is to protect others by properly disposing of waste and reporting it correctly.Waste production is profoundly reliant on singular inclinations. Furthermore, people's mentality and responsiveness to ecological effect of waste influences the individual waste generation and managing (Ermias 2011).

The present resource utilization and contamination are unmanageable on the grounds that it has exceeded the rate at which resources can be recovered and consumed by the Earth's typical system (Gertsakis and Lewis, 2003). Manageability indeed, the production procedure is sustainable however our utilization is irrational because of the huge measure of products we consume and make. Waste evasion is the principal choice to be considered for maintainability since it does not make any effect to the landfill and the whole product life cycle. In manageability terms, it empowers us to accomplish more with less' and improves the utilization of resource proficiently (Gertsakis and Lewis 2003, p.11).

Waste Management must be manageable for the shield of earth, society and the economy (Troschintez, 2005). In this way, the expression "Environment friendly waste Management" was displaced by the expression "sustainable solid waste management" (SSWM). This idea comprises a waste chain of importance with following stages: Waste minimization and source reduction; reuse; recycle; and safe disposal.

Source is the originator of solid waste, for example, family units and business institutions. Waste production is profoundly reliant on singular inclinations. Furthermore, people's mentality and responsiveness to ecological effect of waste influences the individual waste generation and managing (Ermias 2011). Waste minimization is another idea in the developing world. Be that as it may, tending to this issue legitimately might be the most financially savvy approach to address waste management in the developing nations (UNEP, 2007:225). Shirking and minimization of waste require the least exertion but present the best returns. In this manner the most noteworthy importance ought to be to prevent waste generation at the source (Gyagenda 2010).

Following the order, the finest choice for SWM is re-use and this incorporates the usage of a thing after its basic use, either for a reason like what it was planned or for a completely new one (Williams, 2005). As indicated by the European Commission (2010, s. 48), reuse alludes to any activity by which an item or its segments, having arrived at the finale of their main use, are utilized for a similar purpose for which they were perceived, including the continual utilization of an item which is returned to an assortment point, distributor, recycler or producer, just as reuse of an item following renovation.

In that capability, the shrinkage of solid waste reaches out to reuse as the latter slackens down the arrival of a thing into the waste stream, just as avoids the measure of substances that sooner or later turn into waste (European Commission, 2010). In the end, such outcome in the decrease of virgin materials and energy used in creation of things, nonetheless, it additionally implies that things must be made robust so as to be utilized more than once; consequently the use of more assets during production stage. These furthermore energy consumed on gathering and moving such items may have negative impact on the environment (Williams, 2005).

Post-customer textile waste comprises of a pieces of clothing or family unit fabric materials, (for example, sheets or towels) that the purchaser does not require anymore and chooses to dispose of, either on the grounds that they are exhausted, damaged, worn out of, or have left style. This classification has normally been of sensible to great quality material of clothing that can be recuperated and hence recycled for utilization as masks. As in present pandemic context, wearing the mask is compulsory, the fabric cover can be made effectively in home itself, it tends to be utilized a few times by washing and steam decontamination or immersing in boiling water. It drops the requirement for the large scale manufacturing of masks from pre- buyer materials and there by lessens the volume of solid waste produced in households.

Appropriate waste removal is important because of the way that particular kinds of wastes can be risky and can infect nature if not took care of aptly. Distinct rules and guidelines

have to set up for how explicit kinds of waste ought to be discarded. Tailing them takes into account poisonous waste to be securely disposed of without the threat of natural defilement

The size of clinical precarious waste during the COVID 19 flare-up is anticipated to raise particularly used PPE. Consequently, it is imperative to expand capacity to deal with and treat these hazardous wastes. Additional waste treatment facility, ideally through different treatment innovations, for example, autoclaving or high temperature incinerators, may should be acquired and systems may should be set up to guarantee their sustained activity.

II CONCLUSION

The world is sincerely busy fighting one of the world's deadliest infection flare-ups. In this season of suffering, the significance of proficient waste-management strategies cannot be over stressed, particularly for a nation like India, where in excess of 163 million individuals lack clean drinking water and just 50 percent of the family units reported utilizing sanitation lavatories. The essential objectives of sustainable waste management are to guard human well-being and the surroundings and to preserve resources. Additional intentions encompass prevention of the spread of waste associated issues into the future. ***"Viruses have the great advantage of surprise on their side. But viruses are not smart. We are"*- WHO**.

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