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ACCELERATION OF E-WASTE GENERATION DUE TO COVID-19 PANDEMIC

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Abstract

Beginning in 2020, COVID-19 has been circulating over the globe, and the year 2020 has a projected unmatched mandate for COVID-19 medical supplies and equipment. Out of the medical equipment, work from home, online educations, which depends on technology, accelerates at a high speed. The Social distancing and lockdown meant everything, and everyone turned to technology. To enable their staff to work from home, organizations hastened to install a lot of new equipment. To support distance learning, schools, colleges, universities, and other educational institutions looked for digital platforms and regulations. Families and friends twisted to apps on their smart devices to stay connected to avoid social gatherings. The bulk of the techniques, practices, and technologies used today for managing the forward supply chain of COVID-19 medical equipment, as well as waste produced after use, are wasteful. Work from home and online education practices have increased the use of electronic equipment, resulting in more frequent device breakdowns and an increased burden of E-waste on developing nations rather than developed countries. These unavoidable circumstances and pandemics could create a tidal wave of E-waste in the future. In this review paper, the researcher wants to give a general idea of how E-health and COVID-19 accelerate the generation of E-waste and sustainable development.

Keywords: *Covid-19, Pandemic, E-health, Health care instrument, E-waste, and Sustainable development*

Introduction:

The 2019 corona virus disease epidemic (COVID-19) [2] may go down in history as a watershed point in pandemic history, following the Spanish flu in 1918–1920[1]. In December 2019, this virus first surfaced in Wuhan, China, and within two to three months, it had spread throughout the world. Over 150 million cases and 3 million fatalities worldwide as of May 2, 2021 [3]. Since the corona virus illness of 2019 (COVID-19), which had over 178 million verified cases and killed over 3.86 million people by June 21, 2021, it has spread throughout the world [5],International politeness has been involved with the severe acute respiratory syndrome coronavirus-2 (SARS-CoV-2). The worst-affected nations are those in Southeast Asia, Europe, and the United States. Observers consider how the pandemic may alter how we live, study, and work as COVID-19 spreads over the world. Through direct physical contact, such as contacting an infected person and touching their

eyes, nose, and mouth, as well as respiratory droplets from coughing and sneezing, the coronavirus spreads [5]. Increased reliance on technology that promise to automate and digitize daily life appears inevitable, even though there are still many unanswered problems [6]. Advances praised in the anthems of the "Fourth Industrial Revolution" include contact tracing apps, virtual workplaces, and classrooms, as well as necessary labor robots [7], the "Zero Marginal Cost Society" or the "Second Machine Age" [8] are in high demand. The proponents of these big narratives readily acknowledge the problems of economic inequality and the impending climatic catastrophe, but their agendas always converge on technological advancement, particularly in robotics, cloud computing, and digital apps [6,7]. The Anthropogenic thesis, which motivates eco-managerial visions of smart cities and sizable, data-driven logistic projects, conveniently fits along with these postindustrial programmes. In discourses on sustainability, "digital solutions" advocate for more and better methods to control the movement of people, things, and information, making the environmental costs of information economies targets for future innovation [9].

By 2020, there will be a big need for COVID-19 medical supplies and equipment. The bulk of the approaches, practices, and technology used today to manage the forward supply chain of COVID-19 medical equipment as well as waste produced after usage are wasteful. All of the following are lacking: traceability, dependability, operational transparency, security, and trustworthiness. They give information on the COVID-19 medical equipment forward supply chain and waste management, and they are also centralized, which could result in a single point of letdown [10].

According to the literature review, the present COVID-19 pandemic [2] has influenced end-user electronic device usage patterns and the informal repair and recycle market [11, 12]. Extended use of electronic devices has emerged from work from home, and online education practices [13,14], resulting in frequent equipment failure. The epidemic has had a significant influence on worldwide waste treatment systems. Poor medical waste management could speed the spread of COVID-19, especially in developing countries where waste disposal regulations are less strict [15]. Open landfills are common in the furthermost emerging Asian countries (Bangladesh, Cambodia, India, Indonesia, Malaysia, Palestine, Philippines, Thailand, and Vietnam), which lack solid waste management [3]. Inadequate garbage disposal practices in developing nations in Africa and elsewhere may result in significant disease outbreaks and environmental concerns [4]. As a result, the goal of this initiative is to encourage proactive planning for the appropriate discarding of COVID-19 waste created in evolving nations. We likewise check to see if there are any links.

Even though a pandemic has long been a plausible scenario and concern, there were insufficient actual measures in place when it struck the world. Furthermore, looking back yielded no assistance. Individual liberty was suddenly threatened by societal well-being. Even essential human factors like nourishment and a social network are no longer self-evident. Every step outside one's door generates concerns about whom one should meet, where one should go, and how close one should go to another human being. The dangerous circumstance brings on stress and unease. Often, the only person one can trust is oneself and common sense. Many people have become reliant on technological gadgets for jobs, schooling, and relationships. Simultaneously, establishments in many nations have monitored people's lives through their smartphones and other digital devices. Many individuals have been moved by the situation to explore the need for a different path toward a more sustainable lifestyle that uses fewer resources and considers both current and future generations. Education has a crucial role in such a severe circumstance.

E-Health care and E-waste:

E-waste is generated by the electronics goods (laptop, mobile, tablet, printer, and scanner…etc.) and generated by the discarded instruments operated by electricity [16]. Electrical and electronic equipment (EEE) continues to modernise the globe in a number of industries, including business, entertainment, development, and health (sometimes known as E-health due to the usage of Information and Communications Technology (ICT) in the health sector). [17, 18, 19, 20, and 21]. The vast field of ICT application is possibly the world's fastest expanding activity. A substantial surge in creating new electronic items has resulted from extraordinary technological advancement and customer demand. This, along with customers' constant and surprisingly quick switching, has caused a new and extensive problem of dumping vast volumes of 'old' technology, or E-waste. White products, brown goods, and ICT scraps are the three primary kinds of e-waste. According to the literature review, E-health is only one use of ICTs [19, 20]. Though E-health grows in popularity and new technical resolutions are produced, the health and healthcare businesses unknowingly contribute to environmental and human health damage. Diagnostic, monitoring, and laboratory equipment are just a few examples of the types of EEE that have historically been used in the healthcare sector. Possibly the concluding is the greatest concerning of them, especially considering the accompanying transboundary movement worldwide, mostly from developed to underdeveloped nations. Planned obsolescence and "ever greening" of equipment (customer need for the most up-to-date technology) have substantially decreased the usable life of mobile gadgets (Computers (now about three years old) and electronics (about 18 months old), as well as higher turnover and hurriedly increased E-waste capacity [22]. Therefore, the COVID-19 pandemic's impact on e-health has a big impact on how much E-waste is produced in the future.

Numerous possible environmental hazards, as well as valuable mechanisms, may be found in e-waste due to the occurrence of toxic materials (e.g., metals like lead, cadmium, and mercury, as well as polymers like polyvinylchloride (PVC) [23]. E-waste has the potential to pollute the air, land, and water, causing harm to the ecosystem. As a result, if E-waste is not correctly handled and disposed of, it poses a risk to human health. To avoid environmental harm and health hazards, E-waste disposal must be managed in an environmentally sound manner [23, 24, and 25].

Telemedicine and E-waste:

Through the COVID-19 pandemic, the importance of telemedicine in health care service delivery became apparent in both poor and industrialized nations [16-17]. Telemedicine's usefulness in battling the COVID-19 epidemic has also been extensively demonstrated in several other nations, including China, the United States, and Singapore, where telehealth infrastructure is well developed. Furthermore, the rising number of COVID-19 cases has put pressure on most countries' healthcare systems. Patients involved in treating these patients' found trips to hospitals for other problems unappealing since health care workers are at increased risk of COVID 19 infection [15]. During the COVID-19 pandemic, telemedicine was effectively employed to address several services and delivery elements of health care. According to a literature review and studies, it is used in triaging and screening COVID-19 symptoms, contact tracing, COVID-19 symptom monitoring, providing specialized care for COVID-19 patients who are hospitalized, providing mental health services and support to COVID-19 patients, caregivers, and frontline health care workers with psychological issues, and monitoring. During the COVID-19 pandemic, many developed and developing countries adopted telemedicine for better medical treatment. Telemedicine is an ICT-driven field requiring electronic equipment such as computers, cellphones, printers, speakers,

laptops, tablets, routers, and cameras. With the adoption of telemedicine in many nations, the demand for these electrical gadgets will undoubtedly rise, as will the development of E-waste. This is expected to exacerbate the existing e-waste problem, particularly in underdeveloped nations. There is little question that is relying on telemedicine has significant health risks. Nations, particularly developing countries, must be careful not to bite off more than they can chew in the future by exposing their populations to further health risks while attempting to treat current health issues.

E-Waste and COVID-19:

Agriculture, industry, healthcare (from here on "healthcare"), electronics, municipal waste, radioactive waste, and food wastes are just a few of the wastes produced by human activity [26]. Before the pandemic, E-waste was considered the waste generated domestically and industrially by discarded electronic goods, electrical goods. Medical radioactive, municipal, and electronic wastes, for instance, are or could pose a health danger to people. The most important challenges faced by the urban municipalities and healthcare providers during the COVID-19 pandemic (Ilyas et al., 2020; Manupati et al., 2021) and the following 2–5 years is the disposal of healthcare wastes, particularly thermal guns, pulse oximeters, ventilators, oxygen concentrators, and other electronic goods.

E-waste is the most widespread sort of household garbage all around the world. The World Health Organisation (WHO) reports that 53.6 million tonnes of e-waste were generated globally in 2019, an increase over previous years20. Africa is the world's fourth most populated continent, and it generates a substantial amount of E-waste20. The lack of importation standards meant to check the quality of imported products, the smuggling of commodities across boundaries, and the donation of inferior or outmoded technical equipment are all distinct components that contribute to this burden. Because e-waste contains dangerous substances such as poisonous metals and organic compounds, it must be appropriately managed and disposed of. A direct influence might cause the negative impacts of e-waste on human health.

Sustainable Development:

Deep considerations of aims and epistemology and carefully selecting methodologies, equipment, and technology are essential in sustainable education. It is all about ethics. Many educators believe that digital learning is the answer to the Covid-19 challenge. Even if many people have become dependant on online learning and working through digital gadgets, no one can claim this is a long-term solution. You may save money and time by using digital tools. They minimize travel (mostly in wealthier countries); nevertheless, they have a dark side and do not promote sustainability under present international law. However, there is a strong possibility that this may widen the difference between winners and losers on a worldwide scale and within pupils. E-waste created by technological devices may be detrimental to one's health and the environment—the E-waste scavengers in developing countries agree to receive the used E-waste [24,25].Prior to COVID-19, the world already had a significant issue with the management of solid waste, particularly E-waste, and after COVID-19, the production of E-trash increased in developing countries relative to developed countries worldwide. So, on sustainability concern, the developing countries try to develop such infrastructures to reduce the burden of E-waste through proper disposal, dismantling and treating improperly, and training the people involved in these industries.

The scenario of India in Pre and Post COVID-19:

With about 3.23 million metric tonnes of e-waste produced each year, India is now the third-

largest producer of e-waste in the world, behind the US and China.Computer equipment makes up more than 70% of India's e-waste, followed by telecom/phones (12%), electrical equipment (8%), and medical equipment (2%), according to a survey of the literature. India is currently in the worst 10 nations out of 180 in the World Economic Forum's 2018 Environmental Performance Index. While almost nothing ends up in a landfill, the informal sector is handling 95% of E-waste, a significant concern source. Between 2018 and 2020, India's e-waste creation increased by about 43%. The COVID-19 epidemic, which has increased electronic and electrical equipment usage, is expected to bring this issue to light shortly.

According to a literature review, India has been the only country in South Asia since 2011 to have a dedicated legislative framework for dealing with e-waste. This law was passed in India in 2011 and went into force in 2012. The E-waste standards were revised twice more in 2016 and 2018. While the legislation of 2012 required takebacks, they did not set a target or provide incentives—some adjustments made in 2016 increased regulatory clarity by establishing progressive and increasingly tighter collection objectives. The most recent modifications in 2018 increased EPR collection objectives by 10% per year through 2023. Following that, the aim was set at 70% of the total amount of E-waste created.

The requirement for ecologically suitable e-waste management, as well as its transportation, storage, and recycling, is covered by the E-waste (Management and Handling) Rules. Additionally, they proposed the concept of "extended producer responsibility" (EPR). The Producer Responsibility Organisation (PRO) and buy-back, deposit refund, and exchange programmes were added to the statutes in 2016. However, because of high handling and procurement expenses, low margins, and underutilization of capabilities, the majority of E-waste handlers in the official sector or recognised by the pollution control board are battling serious problems. The epidemic has an impact on the game as well because more equipment is added as work and schooling go online.

Conclusion

The e-waste catastrophe is not impending; it has already arrived. A developing country's ability to modernize society and technology-dependent enterprises is critical. All through the COVID-19 widespread, the government and the PPP model private sector scrambled to rebuild health facilities. On the contrary hand, laws should be created and strictly enforced by governments to control the standard of imported electronics. The environment should be made favourable for e-waste recycling activities by the government, or at the very least encouraged. This ensures that unstructured actions are well-regulated and environmentally friendly. The general public should be taught about the potential health dangers associated with E-waste and recycling, particularly unmanaged versions. However, social responsibility and healthcare ethics require that we ignore the negative effects of e-health on the environment (including telehealth, e-learning, knowledge translation, storage of health data, cloud computing, and other application extents) and that we instead concentrate our creative energies on finding ways to lessen these effects, particularly the e-waste produced by enabling health and healthcare.. Aside from the health sector, it also made sure that E-waste generated by was recycled and put the right rules and legislation into place to reduce the environmental impact and landfills.

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