GLOBAL INFLUENCE OF COVID-19'S WASTE ON HUMAN SECURITY

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ABSTRACT

The COVID-19 pandemic has contributed to increased medical equipment consumption and global waste. Several countries, such as China, the Philippines, Indonesia, Thailand, the USA, Italy, Turkey, Romania, and other countries, have faced the increase of global COVID-19 waste. This issue does not only increase global waste but also the threat to individuals. This research uses qualitative and human security theories as method and theoretical frameworks to understand and analyse the influence of global COVID-19 waste on human security. It aims to know how human security is affected by non-traditional security issues and advances the knowledge of the existence of threats to human security. As a result, this research finds that global COVID-19 waste influences human security by limiting the freedom of want. The consequences of this waste demonstrate a restriction on people's freedoms, particularly concerning the environment and health.

Keywords: Human Security, global COVID-19 Waste, Health and Environment

INTRODUCTION

COVID-19 has contributed to the surge in medical waste during the pandemic, and the World Health Organization (WHO) called for immediate improvement in waste disposal systems to tackle public health concerns (Bateman, 2023; Wise, J., 2022). A recent report by the WHO in favour of better manufacturing and disposal of medical products has indicated the threats human and environmental health face. The forecast for more than 140 million test kits distributed worldwide is to produce as much as 2,600 metric tons of general waste, mainly plastic, and 731,000 litres of chemical waste. Glass vials, needles, and safety boxes are also in this category. In particular, COVID-19 protective equipment (PPE) waste impacts the environment. With improper disposal, landfilling, and cremation methods, enormous amounts of PPE plastic waste have been produced globally, harming aquatic habitats (De-la-Torre and Aragaw, 2021). Besides, China is in the top position, with more

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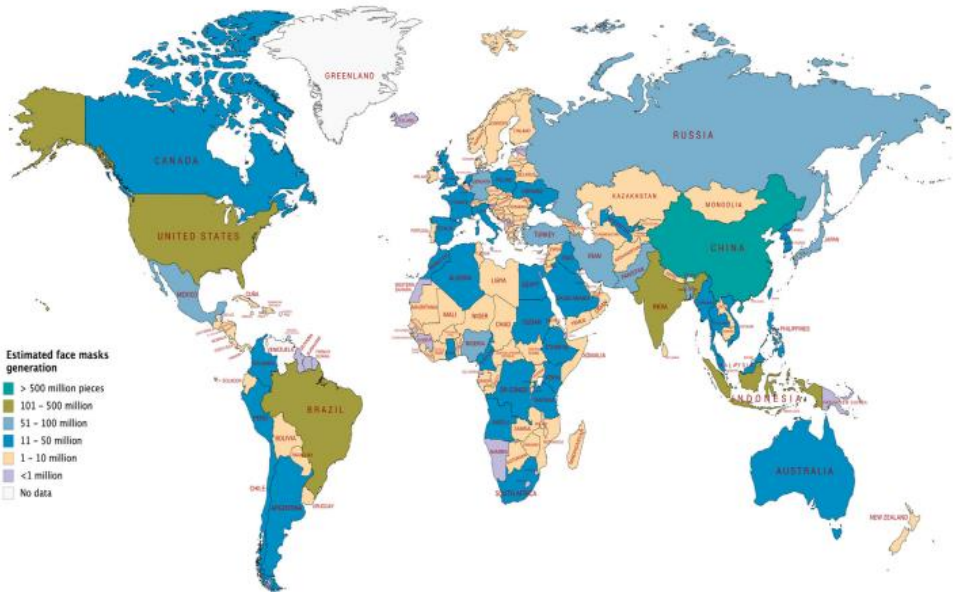
than 500 million pieces of face masks. In addition, most countries have thrown out 11 to 50 million pieces of face masks, while a small group is approximately 1 million (Figure 1).

Figure 1. The estimation of face masks thrown on each continent



Source: Benson, Bassey, and Palanisami, 2021

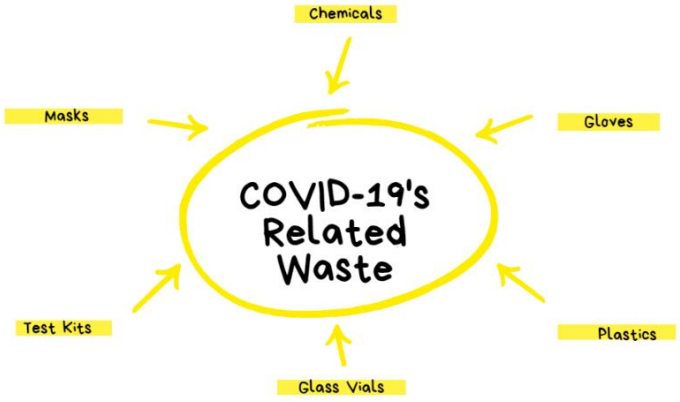
World Health Organization (WHO) analysis claimed that COVID-19 has produced 10 thousand tons of medical waste, significantly burdening the world's healthcare waste management infrastructure and threatening human and environmental health (WHO, 2022). The plastic pollution issue has worsened due to the COVID-19 pandemic, highlighting the need for people to consider the long-term impact of their plastic consumption and disposal habits (Shams, Alam, and Mahbub, 2021). Objects associated with COVID-19 obtained outside the project and waste from the general public, such as disposable medical masks, are not part of the waste management strategy. More than 140 million test kits have been disseminated, potentially resulting in 2,600 metric tons of non-infectious waste, primarily plastic, and 731,000 litres of chemical waste. Furthermore, the global distribution of over 8 billion vaccine doses has resulted in the generation of 144,000 metric tons of medical waste, which includes syringes, needles, and safety boxes (WHO, 2022). In addition, waste production in medical facilities has been a significant challenge in the modern age, along with the COVID-19 pandemic, which accelerated this problem. The need for further safety measures in clinical settings has led to much hazardous waste production, increasing environmental impact (Garlasco et al., 2022).

During the pandemic, global COVID-19 waste has increased globally. The global output of biological waste was projected to be over 16,649.48 tons per day, much higher than pre-pandemic levels (Ngoc et al., 2022). In regional areas, facemasks alone generated around 1107.980 kg of garbage per day in the Gulf Cooperation Council countries (GCC), with significant contributions from immunization and PCR testing (Al-Omran, Khan, and

Perna, 2023). In addition, the COVID-19 pandemic underlined the urgent need for the development and implementation of Latin American waste management policy and practice, impressing the importance of data acquisition, sustainable approaches, and inclusion of waste management into the national emergency preparedness strategy (Soares da Silva, 2022). Several Asian countries, such as China, the Philippines, Indonesia, and Thailand, are expected to experience a rise in medical waste, with estimates ranging from 210 to 280 tons per day (Tang, 2022). In North America, approximately 63 thousand tons of COVID-19- related PPA ended up as waste in 2020, and its neighbour, the United States of America (USA), reached 7 thousand tons per day (Government of Canada, 2023; Klein et al., 2023). Likewise, several countries in Europe, such as Turkey, Romania, and Italy, have increased the use of COVID-19 waste up to 1 million tons, 4312 tons (March to May 2020), and 46.3 tons per month, respectively.

This waste has a notable effect on the maritime environment, as microplastics in marine ecosystems can carry pathogens, posing risks to human health and marine life due to seafood consumption. Eating seafood can lead to health risks from ingesting small plastic particles (Benson, Bassey, and Palanisami, 2021). Besides, another research study concurs that the incorrect disposal of PPE items and the rise in single-use plastics for packaging and takeout have led to environmental contamination (Shams, Alam, and Mahbub, 2021). The current distribution of plastic presents a notable danger to the environment and provides a compelling motivation to promptly enforce targeted actions to decrease plastic pollution (MacLeod, Tekman, and Jahnke, 2021). Moreover, the pandemic disrupted activities of waste management systems; these disrupted activities further resulted in problems with safely disposing of generated waste, including hazardous medical waste. The safe management of COVID-19 waste could be done by preventing health and environmental risks linked with the release of dangerous substances into the environment to protect patients, healthcare workers, and the community from further risks (Andeobu, Wibowo, and Grandhi, 2022).

Figure 2. The components of COVID-19 waste



Sources: Author

Based on the description above, the COVID-19 pandemic affects the environment by resulting in many kinds of medical waste worldwide, with thousands and even millions of pieces (as shown in Figure 2). This issue has become a concern of

international organizations, such as WHO. The data above indicates that several countries (China, the Philippines, Indonesia, Thailand, the USA, Turkey, Romania, and Italy) have faced an increase in COVID-19 waste, such as WHO. The data above shows that several countries (China, the Philippines, Indonesia, Thailand, the USA, Turkey, Romania, and Italy) have faced an increase in COVID-19 waste. Subsequently, the WHO claimed that this issue threatened human and environmental health. Besides, one of the five broad areas of security identified by the Copenhagen School is the environment, while the others are political, social, economic, and military security (Caballero-Anthony and Emmers, 2017). These two fundamental thoughts in security have led this research to support the idea that COVID-19 waste has threatened the environment and human lives. Thus, there is curiosity about how global COVID-19 waste influences human security.

LITERATURE REVIEW

Many researches have been carried out on the effects of COVID-19 on the environment; most have advocated for an efficient system of managing waste to reduce plastic pollution. The pandemic has thus called for the establishment of sustainable ways of combating environmental degradation due to plastic waste (You, Sonne and Ok, 2020). Different resource recovery technologies are being considered as one of the feasible ways of addressing plastic waste maladies, including hydrogen and carbon nanotubes derived from plastic waste. Conventional practices involving landfilling are equally discouraged due to their severe negative environmental consequences. The COVID-19 pandemic has highlighted the need for sustainable waste management practices, especially concerning medical plastic waste management. This situation gives reason to consider that, in front of any future crisis, effective and environmentally responsible methods are in excellent and immediate need to address current global environmental problems (Harussani et al., 2022; Mihai, 2020).

Nevertheless, action plans for each form of plastic waste and each country's needs are required. The action plans need to be clearly defined within a sustainable, organized, and structured plastic management strategy. More financing and rules are needed from policymakers, and it is critical that the public actively participate in these efforts. In addition, it is vital to incorporate disaster resilience into the planning of initiatives to adhere to the Sendai Framework for Disaster Risk Reduction 2015–2030 (You, Sonne, and Ok, 2020).

The COVID-19 pandemic has affected the frameworks of waste management, creating different problems for the effective administration and proper disposal of infectious waste. Lockdown measures and increased use of sanitary products and PPE have significantly increased food waste, packaging waste, hazardous waste, and infectious waste generation (Sharma et al., 2020). Medical waste- particularly PPE items- has tremendously burdened the waste management infrastructure. COVID medical and household waste has increased manifold during the pandemic period. India generated over 33,000 tons of waste during just seven months of the pandemic, of which 146 tons were COVID-19 waste (Ganguly and Chakraborty, 2021). The spread of the virus through infected wastes has raised awareness among people and policymakers about adopting appropriate waste

management policy responses to the pandemic. The pandemic also seriously disrupted international trade and supply chains, impacting recycling and waste management industries. International trade restrictions reduced recycling activities and increased plastic pollution. The shutdown of recycling facilities, coupled with restricted collection services, has exacerbated the problem of plastic waste, heightening concerns regarding the enduring environmental ramifications of the COVID-19 pandemic (Peng et al., 2021). Disposing of plastic waste linked to the pandemic is expected to have long-term consequences for the world's oceans (Peng et al., 2021). Predictions indicate that a considerable amount of plastic waste linked to pandemics will likely accumulate on the ocean floor and shorelines, posing a threat to marine ecosystems dwelling in the depths.

The increased demand for gloves, disposable face masks, and other types of PPE has significantly increased plastic pollution. During the peak pandemic period, hospitals in Wuhan, China, produced six times more plastic medical waste daily compared to the pre-outbreak period (Sills et al., 2020). Lockdown restrictions have increased the usage of plastic waste due to the rising increase in packaged take-out meals and groceries ordered by household members. The global plastic packaging market rose during the pandemic, which has put an additional burden on plastic pollution. The improper disposal of garbage is becoming progressively more prevalent due to the health crisis, in which the abandonment of face masks and PPE poses a significant risk to marine ecosystems, further exacerbating the challenges associated with microplastic management. This work suggests that the pandemic enhances plastic pollution, adds new pressure to waste management systems, and reverses policies developed to reduce single-use plastics (Sills et al., 2020). To address the challenges associated with environmental security, an urgent and unified dedication to circular economy initiatives is necessary, encompassing recycling methods and rigorous policies aimed at mitigating plastic pollution.

Additionally, the speed of economic recovery and shifts in consumer behaviour significantly influence the overall environmental impact (Klemes et al., 2020). The need for plastic products that find use within personal protective equipment and health-related functions has generated an almost incomprehensible challenge concerning waste management and speeding up plastic waste production. This increase in plastic litter is expected to exacerbate serious environmental issues attributed to plastics. Incessant ecological protection programs, planning system guidelines, and alternative analyses must occur. The present global health emergency has opened a window of opportunity to steer modern product systems onto a more sustainable pathway for the future.

This plastic waste production results from the increase in the usage of SUP and PPE (Silva et al., 2021). Public health protection measures such as social distancing and telemedicine can minimize the generation of PPE and SUP wastes. Changes in design may further reduce plastic usage and utilization of environmentally friendly alternatives. Another indirect impact of the pandemic on the environment is that much of the municipal solid waste in most areas is produced at lower rates when there are several types of lockdown. The COVID-19 pandemic highlights the importance of establishing comprehensive legislation and sustainable initiatives aimed at improving plastic waste management and mitigating its adverse effects on both the environment and public health, such as a case in Bangladesh (Chowdhury et.al, 2021; Silva et al. 2021). Adopting strategies that minimize plastic waste, enhancing recycling efforts, and refining waste

management practices is critical. The emergence of COVID-19 significantly impacted production, recycling, and disposal processes, highlighting the crucial importance of effective waste management strategies during crises and for future sustainability (Tripathi et al., 2020).

Two research studies conducted in 2020 by Saadat, Rawtani, and Hussain debate the environmental impact of wastes generated by COVID-19, with the vast rise in medical waste resulting from the pandemic and subsequent waste management-related issues in mitigating pollution. Besides, the other research discusses the impact of COVID-19 waste on marine ecosystems and seeks an alternative for its management (Dharmaraj et al., 2021). Moreover, the COVID-19 pandemic has also provided a distraction from these environmental issues, including plastic pollution, as governments and organizations allocate much time and resources to addressing the pandemic's immediate health and economic consequences. As such, less attention has been paid to environmental issues (Ebner and Iacovidou, 2021).

Subsequently, several countries have been talked about concerning COVID-19 issues regarding waste. As a result of the ban on plastic waste originating from nonindustrial sources in China in 2017, much plastic waste found its way into Malaysia, Vietnam, the Philippines, and Indonesia (You, Sonne, and Ok, 2020). The increasing production of medical waste during the COVID-19 pandemic has contributed to many problems regarding plastic waste management. In this case, countries like China, India, Pakistan, and Bangladesh have reported struggling to manage plastic garbage produced by their citizens, significantly the unexpected increase in medical waste (Khoo et al., 2021). This is because contaminated medical waste by a potential pathogen or virus is difficult to handle. This is because the waste must first be sterilized before undergoing further processing, which would require an additional procedure cost. During the pandemic, several countries have adopted measures to handle waste, including prioritising waste collection and household waste recycling.

In contrast, others have expanded waste storage facilities to accommodate longer storage times before manual processing (Tripathi, 2020). In addition, several countries have specific guidelines for managing COVID-19 waste (Sharma et al., 2020). In Italy, infectious medical waste is considered to be produced by households hosting individuals isolated or quarantined for COVID-19. In the case of households not hosting COVID-19-positive individuals, waste can follow the standard treatment procedure for municipal waste disposal but with special precautions to ensure maximum care is taken in the separation of tissues, masks, and gloves. In the United States, waste potentially contaminated with COVID-19 is managed similarly to regular municipal waste, employing engineering controls, safe work practices, and PPE to protect workers. In India, guidelines emphasize double-layered bags for waste collection from COVID-19 isolation wards and quarantine camps, as well as the proper labelling and timely disposal of biomedical waste.

IDENTIFYING GAP

Based on the elaboration above, COVID-19 waste has threatened human lives, which is related to human health and the environment (ecosystem degradation, pollution, and disease). Several literature claims that COVID-19 waste has increased in several

countries, such as China, the United States, India, Indonesia, Vietnam, the Philippines, Pakistan, and Bangladesh, including medical single-use face masks, gloves, needles, and other PPE. In this part, most of the literature discusses the impacts of COVID-19 on health and environmental problems and the management of COVID-19 waste. Whereas this part shows the evidence of the vulnerability of global COVID-19 waste and the threat to human lives, there is a lack of discussion on the influence of COVID-19 waste towards security issues.

METHODOLOGY AND THEORETICAL FRAMEWORK

Methodology

This research uses a qualitative method to analyze the global COVID-19 waste towards human security. It is carried out to delve into problems or issues requiring exploration, which is utilized to gain a comprehensive and intricate comprehension of the matter (Cresswell, 2013). It is an iterative approach that aims to expand scientific understanding by identifying new distinctions as the phenomenon is examined (Aspers and Corte, 2019). On these thoughts, this research inquires about the global COVID-19 waste issue, analyses it and understands its influence on human security. To conduct this research, it collects data from secondary sources such as books, journals, articles, and other references to strategically gain a broader understanding of global COVID-19 waste. In addition, this research consists of three operational steps. First, the background and literature review have been constructed to find the research gap. Secondary data from books, journals, articles, and other relevant references is collected to understand and analyze global COVID-19 waste cases deeply. Second, human security is described and used to understand and analyze the influence of global COVID-19 waste on human security. Lastly, the results of this research are based on analysis.

Theoretical Framework

The concepts of "freedom from fear" and "freedom from want" are central to the human security framework, which emphasizes the protection and empowerment of individuals. It was initially articulated by development economists like Mahabub ul Haq and Amartya Sen and further supported by Western governments such as Canada and Norway (Baylis, J, 2020). "Freedom from fear" focuses on protecting individuals from violence and conflict. In contrast, "freedom from want" addresses non-military threats like poverty, disease, and environmental degradation, aiming to build human capabilities for decent living and social participation (Baylis, J, 2020). The integration of these two freedoms with the concept of dignity is further supported by the Human Security Network and the UNDP, which advocate for a broad definition of human security that includes material and qualitative aspects, ensuring that individuals can live with dignity (Tadjbakhsh, 2007). This comprehensive approach is essential for sustainable development, as it addresses both immediate threats and the underlying causes of insecurity, such as structural inequalities and the denial of rights (Sandra Jean Maclean).

The concept of human security shifts the focus of security from the state to the individual, emphasizing the protection of fundamental freedoms and the safety of people from critical and pervasive threats, whether military or non-military (Fen Osler). It is defined in narrow and broad terms, with several perspectives focusing on the absence of threats to core human values, such as physical safety. In contrast, others adopt a more expansive view that includes economic, environmental, social, and cultural dimensions (Fen Osler, Descasper, W. Neil Adger). Moreover, one fundamental assumption is that security should prioritize individuals rather than states, emphasizing protecting personal safety and freedom from both direct and indirect threats of violence (Bajpai, 2000). This approach assumes that individuals have agency and should be active participants in defining what makes them feel secure rather than passive recipients of state-defined security measures. Addressing human security issues is essential for actual security, as they can lead to structural violence and inequality, which are seen as threats to human well-being (Martin and Owen, 2014; Tadjbakhsh, 2007). Human security also balances safety and freedom, rejecting the notion that security can be achieved at the expense of fundamental personal liberties (Bajpai, 2000). Furthermore, it assumes that security threats are not limited to military aggression but include a wide range of non-military threats, such as poverty, disease, and environmental degradation (Baylis, J, 2020).

DISCUSSION

This part analyzes the influence of global COVID-19 waste towards human security. In early discussion, non-traditional security claims that this issue is related to security, particularly human security. Subsequently, human security is used to analyze global COVID-19 waste. In the end, this part generates the findings based on analysis.

Non-Traditional Security

Non-traditional security (NTS) issues have recently become the concern of academics, security professionals, and ordinary people alike ever since the attack on the World Trade Center in 2001 and other well-known terrorist attacks. Traditionally, the concept of security threats has been viewed through the prism of interstate military conflict threats relating to state survival. In recent years, there has emerged an increasing recognition of the association between security and non-traditional global challenges related to terrorism, environmental degradation, climate change, transnational crime, illegal immigration, and infectious diseases (Hameiri and Jones, 2013). These challenges are seen to transcend across international boundaries, hence linking them to military threats. NTS does not necessarily represent a direct threat to the state's existence but raises questions about its capability, existence, and protection toward afflicted populations. In recent years, there has been a rise in the importance of NTS issues for policymakers, practitioners, and academics (Hameiri and Jones, 2013). Current critical perspectives in security studies, which seek to elucidate the dynamics of securitization, fall short in understanding the origins of this observable pattern and its diverse aspects due to their oversight of the connection between

securitization and broader social, economic, and political shifts, especially in terms of state evolution.

In the 1980s, the security agenda was a noticeable expansion (Waever, 1993). This shift involved moving away from solely focusing on state security (national security) to a broader perspective encompassing the security of individuals and the security of the global or international community. Economic stability, environmental challenges, cultural identity, and political rights are more commonly crucial in this context than military ones and can all impact someone's sense of security (Waever, 1993). Determining where to draw the line is the main challenge with this strategy because, absent intervention, the world's security grows to mean everything desirable or sound from a political standpoint.

Since the beginning of the 1990s, there has been a significant redefinition in security studies (Caballero-Anthony and Emmers, 2017). Even the word security has come under question. The notion has undergone several interpretations, and its traditional definition has been debatable. Historically, security was associated with military aspects of interstate relations. The contemporary perspectives identify societies or human collectives as an integral part of the referent object of security and thus expand the traditional framework of state defence against military dangers from outside. As a result, urgent challenges with security implications, such as contagious illnesses, environmental degradation, trafficking in illegal narcotics, people smuggling, and trafficking, are being explored in academic circles. These non-military issues are referred to as non-traditional security (NTS) difficulties in the security studies field.

An alternate definition of security, developed by Johan Galtung and Jan Berg, is based on four sets of laudable objectives relating to human needs, such as development, survival, freedom, and identity (Waever, 1993). This definition defines security as the combined defence policy for each need category, the totality of the human-societal organization's defence endeavours. The result is a comprehensive plan for global civilisation's growth, welfare, and other aspects. The leading players and theorists in the field undoubtedly are not threatened or affected by this framework. Furthermore, besides being a correction to or mirror image of the conventional definition, this broader conception of security lacks any fundamental logic.

Additionally, the individual level serves as the baseline for the Galtung or Berg idea. All remaining goals have been established personally and are vulnerable to risks that could jeopardize these requirements, making every aspect a potential security concern. As a result, security is linked to all other objectives. There are at least three connected issues that come next. First, the idea of security becomes all-encompassing and consequently devoid of meaning. Second, the connotative core of traditional security is not explicitly addressed; the Galtung or Berg approach unwittingly aids in the reproduction and even growth of securitization. Last, there is no political impact on "security," as it is traditionally understood.

NTS Politicians and security experts are portraying and treating non-traditional security challenges as dangers to nation-states' territorial integrity and national sovereignty, as well as to the health of their own cultures and people (Caballero and Emmers, 2017). This definition gives an understanding of the transformation of security in the world, which used to be security concerning the military, such as the development of military weapons. Then, it becomes dynamic, and security is about the army and everything. NTS is coming from anything that threatens the people and the country itself. The seven security dimensions are food security, health security, economic security, environmental security, personal security, community security, and political security (Hadiwinata, 2017). In ASEAN, NTS problems like pandemics provide transnational security concerns in this region that strengthen regional security cooperation. However, many existing programs will remain ineffective until a more comprehensive human security strategy supports regional efforts to confront NTS risks like pandemics (Caballero-Anthony, 2008). Furthermore, in the past decade, Asia has confronted several noteworthy non-traditional security issues, such as the financial crisis of 1997–1998, the haze pollution problems in Southeast Asia, the rise of infectious diseases like SARS and avian influenza, international terrorism, and the catastrophic tsunami that occurred in December 2004 (Caballero-Anthony and Emmers, 2017). In the 21st century, national security encounters heightened challenges from non-state entities in contrast to conventional military forces, stemming from the emergence of non-state actors, domestic conflicts, environmental degradation, demographic shifts, and cyber warfare (Srikanth, 2014).

Drawing from the preceding discussion, this part proceeds with the argument that developments in security studies have moved further away from their previous preoccupation with military threats and toward a more all-encompassing approach, allowing for the inter-linking of various global challenges such as terrorism, environmental deterioration, and public health. It thereby signals the need for a holistic approach in which multi-dimensional security strategies are targeted, reflecting dynamic characteristics of modern society threats affecting nations and communities. The COVID-19 pandemic has highlighted the importance of this approach, as it threatens human life and dignity globally, necessitating local and national responses that secure both freedoms through community empowerment and respect for human dignity (Dwinantoaji and Sumarni, 2020). It is seriously exacerbating the current crisis of medical waste internationally by creating an unprecedented spike in hazardous waste that is dangerous for human health and environmental integrity, pressing the WHO and broader ramifications in terms of global security. This situation underlines the urgent need to investigate human vulnerability to this threat. Therefore, comprehensive understanding is required, as it deals with non-traditional security regarding people's lives being threatened due to the after-effects of waste produced during COVID-19.

COVID-19 Waste and Human Security

The human security framework views the need to safeguard individuals from various military and non-military threats. It promotes “freedom from fear” and “freedom from

want". Freedom from fear means that human security is fundamentally about safeguarding individuals from violent conflicts linked to poverty, inadequate state capacity, and various forms of inequity. In contrast, freedom from want suggests that the threats to human security should encompass topics like hunger, poverty, disease, and natural disasters, as these factors are interconnected in tackling the underlying causes of insecurity (Hanlon and Christie, 2016). This perspective highlights the importance of addressing underlying social and economic factors to enhance individual safety and security. This approach is crucial for sustainable development, as it addresses urgent dangers and confronts the underlying causes of insecurity, ultimately fostering individual empowerment and well-being. Hence, "freedom from fear" and "freedom from want" are two conceptions of human security used to analyze global COVID-19waste.

Figure 3. Two Conceptions of Human Security

	Freedom from want	**Freedom from fear**
Original proponents	Development economists, Mahbub ul Haq, Amartya Sen	Western governments (Canada, Norway)
Main stimulus	Dissatisfaction over orthodox growth-oriented development models; 'guns versus butter' concerns	End of the cold war; rise of complex emergencies, ethnic strife, state failure, humanitarian intervention
Type of threats addressed	Non-military and non-traditional security concerns: poverty, environmental degradation, disease, etc.	Armed conflicts, violence against individuals
Main policy goal	Promoting human development, defined as 'building human capabilities—the range of things that people can do, and what they can be ... The most basic capabilities for human development are leading a long and healthy life, being educated and having adequate resources for a decent standard of living ... [and] social and political participation in society'. These capabilities are undermined by poverty, disease and ill-health, illiteracy, discrimination, threat of violent conflict, and denial of political and civil liberties.' *(UNDP 2005: 18–19)*	Protecting people in conflict zones; reducing the human costs of conflict through a ban on landmines and child soldiers; protecting human rights; developing peacebuilding mechanisms

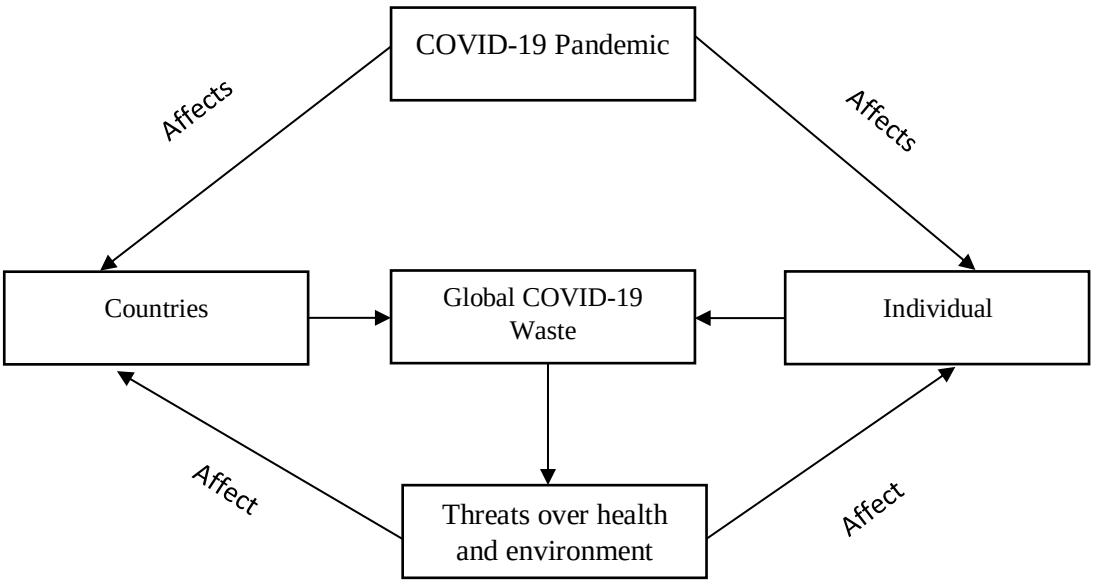
Source: Baylis, 2020

Based on Figure 1, "freedom from want" is more relevant than "freedom from fear" in analyzing global COVID-19 waste. On the one hand, freedom of fear focuses on armed conflict and violence against individuals, which is not relevant to this issue. On the other hand, "freedom from want" focuses on the opposite. It views that issue from both non-military and non-traditional security, which has threatened human lives. The use of single-use face masks has brought an emerging issue onto the globe, which rapidly developed into economic, social, and ecological environmental threats (Wang et al., 2023). The impact of global COVID-19 waste affects the environment and human lives, which is a threat to individuals worldwide (Baylis, 2020). Several literature mainly discussed the impact of global COVID-19 waste and its management in several such as China, the Philippines, Indonesia, Thailand, Canada, USA (Tang, 2022; Government of Canada, 2023; Klein et al., 2023). It becomes proof that global COVID-19's waste contributed to problems in human development. Besides, this issue concerns about ill-health caused by global COVID-19 waste. In this case, health issues become crucial because the problem resulting from global

COVID-19 waste contributes to it. Hence, global COVID-19 waste limits freedom of want, and individuals have faced problems in health and the environment. These aspects have resulted in a threat to human lives.

The analysis above indicates that "freedom from want" is a more pertinent framework for understanding the implications of global COVID-19 waste, as it highlights the significant economic, social, and ecological threats posed by gloves, disposable face masks, and other types of PPE, which ultimately jeopardize human health and development worldwide. This underscores the urgent need to understand what dimensions have been affected by global COVID-19 waste. Figure 3 shows the case that began with the outbreak of COVID-19 during the pandemic around the world, in which individuals need medical equipment to prevent them from contracting the virus while countries have managed the pandemic. Subsequently, it contributes to increased waste because of poor waste management in many countries. Third, the threat of global COVID-19 waste appears to come from health problems and environmental degradation in their lives, such as ecosystem degradation, pollution, and disease. Fourth, these security problems threaten countries and individuals because. Overall, the discussion results in the finding that global COVID-19 waste influences human security by limiting human development (diseases and environmental degradation). This issue has resulted in a threat to individuals in their activity in life (freedom from want). The 1994 Human Development Report listed seven essential dimensions of human security: food, health, personal, politics, environment, economy and community (Gomez and Gasper, 2016). In this case, global COVID-19 waste has threatened both countries and individuals in dimensions of human security such as health and the environment.

Figure 4. The Influence of Global COVID-19 waste towards human security



Source: Author

CONCLUSION

This research concludes that global COVID-19 waste threatens human security by impeding human progress (diseases and environmental deterioration). This issue has posed a danger to individuals' ability to live their lives freely. It also finds that "freedom from want" is more appropriate than "freedom from fear" for tackling the hazards posed by worldwide COVID-19 waste since it emphasizes the substantial economic, social, and ecological concerns that endanger human health and well-being. The effects of this waste highlight a significant constraint on people's liberties, notably in terms of health and environmental safety. Like other NTS issues such as infectious diseases (SARS), avian influenza, and haze pollution, global COVID-19 waste results in a significant impact on human lives and becomes a threat to human security. Furthermore, state, regional, and international actors have to collaborate in managing global COVID-19waste. Global waste cooperation is crucial for preventing the influence of global disease or pandemic on the security of individuals or human security.

REFERENCES

Al-Omran, K., Khan, E., & Perna, S. (2023). Medical waste generation during COVID-19 pandemic in selected member countries of Arabian Gulf region; Google trend analysis. *Arab Journal of Basic and Applied Sciences*, *30*(1), 79-91.

Andeobu, L., Wibowo, S., & Grandhi, S. (2022). Medical waste from COVID-19 pandemic—a systematic review of management and environmental impacts in Australia. *International journal of environmental research and public health*, *19*(3), 1381.

Aspers, P., & Corte, U. (2019). What is qualitative in qualitative research? *Qualitative sociology*, *42*, 139-160.

Bajpai, K. P. (2000). *Human security: concept and measurement* (pp. 1-64). Notre Dame: Joan B. Kroc Institute for International Peace Studies, University of Notre Dame.

Bateman, Kayleigh (2023, February 17). *COVID-19 has caused a surge in medical waste. Here's what needs to be done*. World Economic Forum. https://www.weforum.org/agenda/2022/02/medical-waste-plastic-environment-covid/

Baylis, J. (2020). *The globalization of world politics: An introduction to international relations*. Oxford University Press, USA.

Benson, N. U., Bassey, D. E., & Palanisami, T. (2021). COVID pollution: impact of COVID-19 pandemic on global plastic waste footprint. *Heliyon*, *7*(2).

Caballero-Anthony*, M. (2008). Non-traditional security and infectious diseases in ASEAN: Going beyond the rhetoric of securitization to deeper institutionalization. *The Pacific Review, 21*(4), 507-525.

Caballero-Anthony, M., & Emmers, R. (2017). Understanding the dynamics of securitizing non-traditional security. In *Non-Traditional Security in Asia* (pp. 13-24). Routledge.

Chowdhury, H., Chowdhury, T., & Sait, S. M. (2021). Estimating marine plastic pollution from COVID-19 face masks in coastal regions. *Marine Pollution Bulletin*, *168*, 112419.

Cresswell, J. (2013). *Qualitative inquiry & research design: Choosing among five approaches*. SAGE Publishing, Longdon, UK.

De-la-Torre, G. E., & Aragaw, T. A. (2021). What we need to know about PPE associated with the COVID-19 pandemic in the marine environment. *Marine pollution bulletin*, *163*, 111879.

Dharmaraj, S., Ashokkumar, V., Hariharan, S., Manibharathi, A., Show, P. L., Chong, C. T., & Ngamcharussrivichai, C. (2021). The COVID-19 pandemic face mask waste: a blooming threat to the marine environment. *Chemosphere*, *272*, 129601.

Dwinantoaji, H., & Sumarni, D. W. (2020). Human security, social stigma, and global health: the COVID-19 pandemic in Indonesia. *Journal of the Medical Sciences (Berkala Ilmu Kedokteran)*, *52*(3).

Ebner, N., & Iacovidou, E. (2021). The challenges of Covid-19 pandemic on improving plastic waste recycling rates. *Sustainable Production and Consumption*, *28*, 726-735.

Emmers, R., Caballero-Anthony, M., & Acharya, A. (2006). *Studying non-traditional security in Asia: Trends and issues*. Marshall Cavendish Academic.

Ganguly, R. K., & Chakraborty, S. K. (2021). Integrated approach in municipal solid waste management in COVID-19 pandemic: Perspectives of a developing country like India in a global scenario. *Case Studies in Chemical and Environmental Engineering*, 3, 100087.

Garlasco, J., Canepari, A., Giacobone, G., Funicelli, G., Kozel, D., Bernini, L., & Cotroneo, A. (2022). Impact of COVID-19 on healthcare waste generation: Correlations and trends from a tertiary hospital of a developed country. *Waste Management & Research*, *40*(9), 1450-1457.

Gomez, O., & Gasper, D. (2016). A thematic guidance note for regional and national human development report teams. *United Nations Development Programme Human Development Report Office*.

Government of Canada. (2023, October 6). *The government of Canada launches new COVID-19–related challenges to help reduce the environmental impact of PPE in Canada*. https://www.canada.ca/en/innovation-science-economic-

development/news/2020/10/government-of-canada-launches-new-covid-19-challenges-to-help-reduce-environmental-footprint-of-ppe-in-canada.html

Hadiwinata, B. (2017). Poverty and the Role of NGOs in Protecting Human Security in Indonesia. In *Non-Traditional Security in Asia* (pp. 210-236). Routledge.

Hameiri, S., & Jones, L. (2013). The politics and governance of non-traditional security. *International Studies Quarterly, 57(3),* 462-473.

Hanlon, R. J., & Christie, K. (2016). *Freedom from fear, freedom from want: An introduction to human security*. University of Toronto Press.

Harussani, M. M., Sapuan, S. M., Rashid, U., Khalina, A., & Ilyas, R. A. (2022). Pyrolysis of polypropylene plastic waste into carbonaceous char: Priority of plastic waste management amidst COVID-19 pandemic. *Science of The Total Environment, 803,* 149911.

Khoo, K. S., Ho, L. Y., Lim, H. R., Leong, H. Y., & Chew, K. W. (2021). Plastic waste associated with the COVID-19 pandemic: Crisis or opportunity?. *Journal of hazardous materials, 417,* 126108.

Klein, K., Saber, D., Trumbo, J., & Kakkad, A. (2023). The Potential Environmental Implications of Infection Control Prevention During the COVID-19 Pandemic: Waste Generation from a Level 2 Trauma Center in Maine, USA. *Prehospital and Disaster Medicine, 38(S1),* s66-s66.

Klemeš, J. J., Van Fan, Y., Tan, R. R., & Jiang, P. (2020). Minimising the present and future plastic waste, energy and environmental footprints related to COVID-19. *Renewable and Sustainable Energy Reviews, 127,* 109883.

MacLeod, M., Arp, H. P. H., Tekman, M. B., & Jahnke, A. (2021). The global threat from plastic pollution. *Science, 373(6550),* 61-65.

Martin, M., & Owen, T. (Eds.). (2014). *Routledge handbook of human security*. London: Routledge.

Mihai, F. C. (2020). Assessment of COVID-19 waste flows during the emergency state in Romania and related public health and environmental concerns. *International Journal of Environmental Research and Public Health*, *17*(15), 5439.

Ngoc, S. M. V., Nguyen, M. A., Nguyen, T. L., Thi, H. V., Dao, T. L., Bui, T. M. P., & Chu, D. T. (2022). COVID-19 and environmental health: A systematic analysis for the global burden of biomedical waste by this epidemic. *Case Studies in Chemical and Environmental Engineering*, *6*, 100245.

Peng, Y., Wu, P., Schartup, A. T., & Zhang, Y. (2021). Plastic waste release caused by COVID-19 and its fate in the global ocean. *Proceedings of the National Academy of Sciences*, 118(47), e2111530118.

Saadat, S., Rawtani, D., & Hussain, C. M. (2020). Environmental perspective of COVID-19. *Science of the Total environment*, 728, 138870.

Shams, M., Alam, I., & Mahbub, M. S. (2021). Plastic pollution during COVID-19: Plastic waste directives and its long-term impact on the environment. *Environmental advances*, *5*, 100119.

Sharma, H. B., Vanapalli, K. R., Cheela, V. S., Ranjan, V. P., Jaglan, A. K., Dubey, B., ... & Bhattacharya, J. (2020). Challenges, opportunities, and innovations for effective solid waste management during and post COVID-19 pandemic. *Resources, conservation and recycling*, 162, 105052.

Sills, Jennifer; Yudell, Michael; Roberts, Dorothy; DeSalle, Rob; Tishkoff, Sarah (2020). NIH must confront the use of race in science. *Science*, 369(6509), 1313–1314. doi:10.1126/science.abd4842

Silva, A. L. P., Prata, J. C., Duarte, A. C., Barcelò, D., & Rocha-Santos, T. (2021). An urgent call to think globally and act locally on landfill disposable plastics under and after COVID-19 pandemic: Pollution prevention and technological (Bio) remediation solutions. *Chemical Engineering Journal*, 426, 131201.

Soares da Silva, A. (2022, September). Covid-19 related waste management in the LAC region. In *ISEE Conference Abstracts* (Vol. 2022, No. 1).

Srikanth, D. (2014). Non-traditional security threats in the 21st century: A review. *International Journal of Development and Conflict*, 4(1), 60-68.

Tadjbakhsh, S. (2007). Human Security: Concepts and Implications.

Tang, K. H. D. (2022). Medical waste during COVID-19 pandemic: Its types, abundance, impacts and implications. *Industrial and Domestic Waste Management*, *2*(2), 71-83.

Tripathi, A., Tyagi, V. K., Vivekanand, V., Bose, P., & Suthar, S. (2020). Challenges, opportunities and progress in solid waste management during COVID-19 pandemic. *Case Studies in Chemical and Environmental Engineering*, 2, 100060.

Waever, O. (1993). *Securitization and desecuritization* (Vol. 5). Copenhagen: Centre for Peace and Conflict Research.

Wang, L., Li, S., Ahmad, I. M., Zhang, G., Sun, Y., Wang, Y., ... & Li, D. (2023). Global face mask pollution: threats to the environment and wildlife, and potential solutions. *Science of The Total Environment*, *887*, 164055.

WHO. (2022, February 4). *Tones of COVID-19 health care waste expose urgent need to improve waste management systems.* https://extranet.who.int/sph/news/tonnes-covid-19-health-care-waste-expose-urgent-need-improve-waste-management-systems

Wise, J. (2022). Covid-19: Pandemic waste threatens human and environmental health, says WHO.

You, S., Sonne, C., & Ok, Y. S. (2020). COVID-19: Resource recovery from plastic waste against plastic pollution. *Cogent Environmental Science, 6(1)*, 1801220.