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ESTABLISHING THE LINK BETWEEN LAW, CULTURE AND INFRASTRUCTURE FOR PANDEMIC WASTE MANAGEMENT

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ABSTRACT

Managing infectious and medical waste remains a significant challenge, particularly during pandemics like COVID-19. Poor waste management has led to environmental pollution and public health risks. Numerous publications and research studies have documented an increase in the volume of infectious and medical waste during the COVID-19 pandemic. However, ineffective waste management systems in developing countries have exacerbated the issue. Existing waste management laws in many nations often fail to account for pandemic scenarios adequately. Although the COVID-19 pandemic has ended, it is crucial to acknowledge the shortcomings in infectious waste handling during this period. To prevent similar problems in the future, governments ought to be better prepared. Many countries, including Indonesia, responded promptly by drafting quasi-legislation, such as technical recommendations or government circulars, to address the challenges of managing COVID-19 waste. This article reviews the relevant laws and policies in Indonesia and other countries through a legal doctrinal study. It concludes that effective infectious waste management requires more than just legislation. Adequate waste management facilities, funding, and a supportive legal culture – characterised by consistent compliance and understanding of the law by both the government and community – are essential. When governments can provide and oversee the necessary infrastructure, resources, and workforce, achieving this objective becomes easier.

Keywords: COVID-19, legal culture, quasi-legislation, waste management.

INTRODUCTION

Waste management has been a persistent issue during the COVID-19 pandemic, which began in 2020 and was officially declared over by the World Health Organization (WHO) in mid-2023. The volume of waste, particularly infectious and medical waste, increased significantly during this period (Jayasinghe et al., 2023). To mitigate environmental pollution and safeguard public health during the pandemic, governments needed to establish robust and reliable waste management systems underpinned by a robust legal framework (Andeobu et al., 2022; Nghiem et al., 2020; Hakiim & Hartini, 2024).

However, laws and policies have encountered specific challenges due to the increase in waste volumes, especially infectious and medical waste generated from COVID-19-related operations. Alrawi et al. (2021) investigation across multiple countries revealed that governments updated their laws and technical manuals for handling infectious waste, particularly from households and healthcare facilities. While some countries created new regulations, others followed guidelines from international agencies such as the WHO, the Asian Development Bank, the World Bank, the International Solid Waste Association, the United Nations Environment Programme and the United Nations Human Settlements Programme (UN-Habitat) (Alrawi et al., 2021).

Like many other developing countries, Indonesia faces significant challenges in handling an effective waste management system. The large volume of waste, combined with inadequate waste management technologies in many cities, requires urgent attention. The environmental burden was exacerbated by the accumulation of infectious and medical waste during the COVID-19 pandemic. Although the Indonesian government declared the end of the pandemic in June 2023, the country still needs to find a solution to its infectious waste management issues (Sedana et al., 2022; Sholihah & Sjaaf, 2022; Sari et al., 2021; Sutrisno & Meilasari, 2020).

To effectively respond to pandemics in the future such as COVID-19, governments must implement appropriate waste management laws that prioritise both environmental and human safety. A robust legal framework is necessary to address the issues brought on by the increasing volumes of hazardous and infectious waste. Emergency response legislation should include provisions for safe waste management during crises (Sharma et al., 2020).

Although legal and policy aspects are crucial, few studies have explored the legal dimensions of COVID-19 infectious waste management in Indonesia. Existing research primarily focuses on issues such as individual freedoms during lockdowns, challenges in education, virtual legal proceedings or public health concerns in general (Nelson et al., 2023; Hakiim & Hartini, 2024; Shader et al., 2021).

Indonesia's Environmental Protection and Management Law (Law No. 32 of 2009) addresses hazardous and toxic waste in general but lacks specific provisions for more nuanced categories of hazardous waste, according to Purwanto et al. (2020). In response to the COVID-19 pandemic, the Indonesian government implemented several policies to curb the spread of the virus, including waste management measures for healthcare and self-isolation facilities (Subadi, 2022). These regulations are often issued as ministerial circulars, such as the Minister of Environment and Forestry Circular Letter SE.3/Menlhk/PSLB3/PLB.3/2021 on Hazardous and Infectious Waste Management from Corona Virus Disease-19 Handling. This type of directive, a form of quasi-legislation or *beleidsregel* in Dutch, became prevalent during the pandemic in Indonesia, reflecting the increased reliance on policy guidelines for managing urgent public health challenges.

Numerous countries, including Indonesia, have employed policy guidelines or quasi-legislation as regulatory approaches. For instance, Australia and several European nations adopted such measures to provide a legal foundation for the government's prompt actions (Boschetti & Poli, 2021; McLeod, 2022). Similarly, the Chinese government utilised this approach. Although China's 'hard law' instruments are well-equipped for combating infectious diseases, the government believes that they are insufficient for managing the uncertainties brought by the pandemic, which require accurate scientific judgment and flexibility (Cheng, 2021).

At the time of this research, few scientific studies explored the effectiveness of quasi-legislation or policy rule instruments in managing infectious waste in Indonesia. A legal opinion conducted by Yasin (2020), for instance, recognised the existence of several COVID-19-related quasi-legislations in Indonesia but did not analyse their effectiveness. While the availability of various legal frameworks is important, evaluating the efficacy of these laws requires consideration of societal culture and the resources available to support implementation.

This article investigates the factors influencing the effectiveness of laws in various forms for handling pandemic-related waste in Indonesia. It highlights the interplay of legal frameworks, cultural factors, and infrastructure in shaping an effective waste management system, particularly during outbreak periods. Additionally, the article can be seen as a reminder that infectious waste management remains a pressing issue even after the pandemic status has been lifted.

The author discusses six key issues in this article. The first section explains the trend of waste management issues during the COVID-19 pandemic. The second section discusses waste management regulations in Indonesia. The third section describes the trend of policy rules for handling COVID-19 waste in Indonesia and other countries. The fourth section explores the status of policy rules within the framework of rule of law theories. Finally, the article analyses the influence of legal culture and waste disposal infrastructure on the implementation of infectious waste management laws**.**

METHODOLOGY

This article is based on the author's dogmatic legal research on various waste management regulations in Indonesia and other countries. A literature review was also conducted to examine trends and the impacts of the COVID-19 pandemic on medical and infectious waste generation in several countries, including Indonesia, to supplement the analysis. The initial research was conducted in 2021 and was subsequently updated with an analysis of comparative regulatory developments and other relevant literature.

Primary legal materials were obtained from Indonesian laws and regulations, including Law No. 32 of 2009 on Environmental Protection and Management, Law 23/2014 on Local Government, Government Regulation No. 22 of 2021 on the Implementation of Environmental Protection and Management, Minister of Environment and Forestry Regulation P.56/Menlhk-Setjen/2015 on Guidance of Hazardous and Infectious Waste Management in Healthcare Facilities, Minister of Environment and Forestry Circular Letter SE.3/Menlhk/PSLB3/PLB.3/2021 on Hazardous and Infectious Waste Management from Corona Virus Disease-19 Handling, and Minister of Health Decree HK/01.07/Menkes/537/2020 on Guidance of Medical Waste Management in Healthcare Facilities and Waste from Communities' Self-Quarantine Facilities during the COVID-19 Outbreak.

To a limited extent, several global guidelines for handling COVID-19 waste were also studied, including a document published by the Basel Convention Regional Centre for Asia and the Pacific. Given that this study compares regulations in various countries, data sources included a wide range of literature, particularly journal articles that review laws and policies in multiple nations. The comparison focused on identifying how different quasi-legislative frameworks provide guidance on COVID-19 waste handling procedures and the facilities that must be established.

The author has not had the opportunity to conduct any empirical studies specifically related to this topic due to funding limitation. However, an important contribution to the development of the arguments presented in this article is the author's previous experience in drafting regulations on waste management and observing their implementation.

RESULTS

The Effect of the Pandemic on Waste Management

Reports from the Indonesian government stated that during the COVID-19 pandemic, the volume of medical and infectious waste increased by 30% to 50%. A similar situation occurred in other countries: waste volume increased by 80% in Bangladesh, 27% in Malaysia and 61.8% in Iran (Jayasinghe et al., 2023). Obviously, waste management systems faced greater challenges due to the pandemic. Therefore, national governments must prioritise efficient waste management programmes, as the pandemic has created significant struggles in disposing of medical waste such as face masks, personal protective equipment (PPE) and vaccine-related items (Asim et al., 2021; Benson et al., 2021; Mallick et al., 2021; Sangkham, 2020).

In February 2022, the WHO released a report detailing the staggering amount of waste generated globally by COVID-19-related activities. For example, the distribution of more than 140 million test kits had the potential to generate 2,600 tons of plastic waste and 731,000 litres of chemical waste—equivalent to about one-third of an Olympic-sized swimming pool. In Indonesia, vaccination was made mandatory during the pandemic, with legal sanctions applied to government officials and the general population (Hakiim & Hartini, 2024). However, many people were unaware of the environmental impact of the vaccination programme. The use of more than 8 billion vaccine doses worldwide generated an additional 144,000 tons of waste. Yet, many healthcare facilities lacked the resources necessary to manage this surge in waste. According to WHO estimates, up to 60% of healthcare institutions in less-developed countries and 30% of healthcare facilities globally are ill-equipped to handle their current waste loads (WHO, 2022).

These shortcomings put communities living near waste disposal sites and healthcare workers in jeopardy. When waste management systems lack adequate technology, the consequences can include water contamination and air pollution from waste burning. To address these issues, it is crucial to establish strict policies and procedures for waste management, particularly for infectious items. Hospitals and other healthcare facilities must prioritise efficient waste management plans that involve proper sorting, storage, transportation and disposal of waste (Chen et al., 2021; Mihai, 2020).

Indonesian Waste Management Regulations During the COVID Pandemic

The primary Indonesian legislation governing waste management and environmental pollution mitigation is Law No. 32 of 2009 on Environmental Protection and Management. Government Regulation No. 22 of 2021, concerning the Implementation of Environmental Protection and Management, and the Minister of Environment and Forestry's Regulation No. 56 of 2015 on the Process for Handling Hazardous and Toxic Waste from Healthcare Institutions, provide further details. The Environmental Law defines hazardous and toxic materials (Bahan Berbahaya dan Beracun, B3) as substances, energy sources or other components that, due to their inherent properties, concentration or quantity, pose a direct or indirect threat to environmental integrity, human health or even survival. The law classifies B3 waste as any byproduct of commercial or industrial activities containing such hazardous and toxic materials. Waste is typically categorised as hazardous and toxic if it exhibits characteristics such as explosivity, flammability, reactivity, infectiousness, corrosivity and/or toxicity.

A comprehensive approach to hazardous waste management encompasses various stages, including minimising waste generation, safe storage, efficient collection and transportation, appropriate transfer procedures, potential utilisation or processing methods, and secure temporary storage solutions. Depending on the circumstances, managing B3 waste also requires acquiring a permit from the relevant governing body, which may include the minister, governors, mayors or district heads (*bupati*). All waste managers are required to closely adhere to the strict environmental standards and obligations outlined in this permit. It is imperative that the government maintains transparency, and the granting of such permits must be made public.

B3 waste producers are required to ensure that the waste is disposed of safely and responsibly. If they are unable to manage hazardous and toxic waste independently, they must collaborate with authorised waste handlers. When certain hazardous wastes are released into the environment untreated, they pose serious threats to human health, ecosystems, and all living organisms. Therefore, all waste producers must have a strict and all-encompassing management plan, which includes accurately identifying waste, determining which hazardous waste classification exemptions apply, and implementing efficient waste reduction, safe storage, safe collection and transportation, potential utilisation, suitable processing, safe temporary storage and environmentally friendly final disposal techniques.

According to Government Regulation No. 22/2021, hazardous waste producers are also obligated to prioritise waste reduction. This reduction can be achieved through various means, such as substituting materials, modifying production processes and/or adopting environmentally sound technologies. The regulation also emphasises the importance of B3 waste segregation, which can be achieved by categorising waste based on its type, group and characteristics, followed by storage in designated containers specific to its B3 waste classification. Storage of waste prior to disposal must comply with legal requirements, including placing it in a specific location and equipping it with facilities according to the type and characteristics of the waste. Furthermore, the waste generator must take steps to control environmental pollution and provide emergency response equipment.

Hazardous waste includes a significant portion of medical waste. According to the WHO, any item discharged during medical, dental, veterinary or research activities that poses a considerable risk to human health is considered medical waste. There are two types of medical waste: non-hazardous and hazardous. Approximately 80% of the waste generated by healthcare activities is classified as general waste, with the remaining 20% consisting of hazardous materials that may be radioactive, poisonous or contagious. This information is based on observations of various medical wastes. For example,

approximately 16 million injections are administered annually, and the waste generated from these must be disposed of appropriately. In a similar vein, a large portion of medical waste containing dangerous pathogens that hospital patients, healthcare professionals and the public can contract is improperly disposed of.

COVID-19 medical waste consists of non-reusable residual materials from patients and/or healthcare personnel who have come into contact with the virus and may be contaminated with infectious agents. This waste is classified as hazardous since it is considered infectious medical waste. Hazardous waste management in Indonesia is required by law to obtain a license from the government, as noted earlier. However, due to the lengthy licensing process, it was difficult to respond quickly enough to the COVID-19 pandemic. In response, the Minister of Environment and Forestry released a regulation that permits healthcare facilities to manage hazardous waste even in the absence of an operating license. These medical establishments are provided with shredder-equipped incinerators that operate at temperatures of at least 800°C.

The Environmental Regulation also mandates the development of emergency response systems to mitigate hazardous incidents. According to Article 428 of Government Regulation No. 22/2021, every hazardous waste producer—whether a collector, transporter, user, processor or hoarder—must have an emergency response system. This system must cover emergency response, readiness and prevention, including the preparation of trained human resources. During the COVID-19 pandemic in Indonesia, hazardous and toxic waste management was governed in connection with disaster management. Since the COVID-19 pandemic is categorised as a non-human disaster, utilising this emergency response strategy to handle hazardous and toxic waste from COVID-19-related activities was especially pertinent.

A Comparative Analysis of COVID Waste Management Regulations

As indicated in the introduction, many nations have chosen to address COVID-19 and its related issues through policy rules, which are also known by various terms such as ‘quasi-legislation’, ‘quasi-law’, ‘grey-letter law’ or ‘tertiary legislation’. Throughout this article, the author uses these terms interchangeably with the same intent. These rules refer to a variety of regulatory instruments created by the government, acting as the executive or administrative branch of the state, which are not enacted by or subject to the authority of parliament. These guidelines aim to influence people’s behaviour, even though they are not legally binding (Asshiddiqie, 2010; Dimock, 2016; Hadjon et al., 1994). A policy rule is necessary to provide efficient governance because the traditional legal system’s reliance on primary and secondary legislation often makes it difficult for the government to act quickly and effectively, particularly during emergencies or crises.

The Government of Indonesia also employed policy rule instruments for handling medical waste governance during the COVID-19 pandemic. For example, the Minister of Health has enacted a decree that provides guidance on managing medical waste from healthcare facilities and places used for isolation or self-quarantine (Decree Number HK.01.07/Menkes/537/2020). This ministerial guidance governs the procedures for waste removal from self-quarantine and isolation locations, as well as healthcare facilities. Local governments at various levels, such as provincial or municipal authorities, use this recommendation as the basis for managing COVID-19 infectious waste in their regions. The Minister of Health’s Decree regulates how different types of waste should be managed based on their origin—whether from households, clinics, health centres or other healthcare facilities. According to this Decree, to dispose of waste from medical facilities, infectious materials must first be collected in a specific container and transported to a hazardous waste storage location.

Another example of quasi-legislation or policy rules concerning COVID-19 waste management is the Circular Letter of the Minister of Environment and Forestry on the Management of B3 Waste and Solid Waste from Handling COVID-19 (Circular Number SE.3/Menlhk/PSLB3/PLB.3/3/2021). This letter provides practical guidance to local governments on managing COVID-19 waste. This quasi-legislation regulates the types and sources of COVID-19 waste, its management, and the responsibilities of local governments in handling waste. One reason for the enactment of this policy rule was the increased generation of hazardous waste due to the mandatory COVID-19 detection tests and vaccinations. The Circular states that COVID-19 waste includes hazardous, toxic and solid waste. The COVID-19 B3 waste category covers waste produced during the treatment of confirmed COVID-19 patients, randomised testing and immunisations. Drug residues from COVID-19 patients or expired medications are also classified as COVID-19 hazardous waste. Used masks, medical gloves, headgear, eye protection (goggles), facial protection, used medical garments (Hazmat suits), used needles, food scraps, and other waste contaminated by patient droplets are just some of the infectious waste products generated by COVID-19 patients. Even gloves and face masks not belonging to COVID-19 patients are considered COVID-19 waste. These materials can originate from homes, businesses, industries and public or social spaces, even if they are not directly related to COVID-19 suspects.

In Indonesia, local governments play a key role in managing COVID-19 waste. They are responsible for waste management in general, and the Environment Ministerial Circular mandates that local governments provide facilities for waste collection, including special bins for COVID-19 waste. Furthermore, local governments are advised to document and report their waste management activities. The district or city is responsible for tracking the hazardous COVID-19 waste (B3 waste) collected from shelters, bins, medical facilities and isolation/quarantine sites, and submitting a report to the provincial government at least once a week. The provincial administration will summarise the report and forward it to the Ministry of Forestry and Environment.

As reviewed by Andeobu et al. (2022), various countries and international organisations have developed policy frameworks to address waste management during COVID-19. The WHO, for example, created guidelines for COVID-19 waste management. These guidelines emphasise that providing safe water, sanitation, waste management, and hygienic conditions is crucial to preventing and protecting human health during outbreaks of infectious diseases, including COVID-19. Implementing regular water, sanitation, hygiene (WASH) and waste management practices in communities, healthcare facilities, homes, schools, markets, and other public places is key to preventing the transmission of infectious agents. Although WASH measures alone cannot prevent COVID-19 transmission, the WHO stresses the importance of following standard WASH-related practices, such as frequent hand hygiene, regular environmental cleaning and disinfection, and safe management of medical waste generated from COVID-19 cases (Andeobu et al., 2022).

Guidelines for managing infectious diseases like COVID-19 have also been developed by the European Centre for Disease Prevention and Control (ECDC). One directive is to place trash bags in the rooms of patients who are self-isolating or under home quarantine. Items such as tissues, gloves, masks and other discarded materials should be immediately placed in these bags. Extra trash bags ought to be available for the disposal of used masks and gloves. Afterwards, these bags should be placed in additional trash bags. Medical waste from laboratories, healthcare facilities and other operations involving COVID-19 patients should be handled according to EU regulations.

In the United States, the Occupational Safety and Health Administration (OSHA) has issued guidelines for managing medical waste, including waste related to COVID-19. OSHA recommends that medical waste be contained in leak-proof, sturdy biohazard bags for disposal. Additionally, OSHA emphasises the importance of following safety standards, work practices and the use of PPE to prevent workers from being exposed to infectious waste or contaminants. The policy also states that contaminated or potentially infectious general (municipal) waste should be managed as non-contaminated municipal waste.

The Basel Convention Regional Centre for Asia and the Pacific released a comprehensive handbook titled *Emergency Medical Waste Disposal and Management Handbook* to assist with the handling of medical waste during the COVID-19 outbreak. The Centre advises that waste be appropriately labelled, packed, sealed and placed in double-layered bags. Waste produced during the treatment and diagnosis of COVID-19 patients in clinics and inpatient rooms should be collected according to recognised medical waste classification. Used masks, gloves, tissues and other household waste produced by COVID-19 patients should be disposed of as medical waste, sealed in bags and incinerated. During a pandemic, waste should be categorised and disposed of in an emergency, while medical waste should be handled through centralised facilities during non-emergency situations. PPE waste from COVID-19-related operations must be collected and disposed of within 24 hours, handled and managed as medical waste, and separated according to guidelines.

The Central Pollution Control Board (CPCB) guidelines detail the responsibilities and duties of stakeholders involved in medical waste management, from waste generators to regulatory bodies. General waste generated by healthcare facilities should not be mixed with biomedical waste; it should be collected and managed separately. Only used masks, gloves, swabs, tissues, syringes and similar items should be treated as biomedical waste and stored in yellow bags for quarantine facilities. Isolation wards and temporary medical treatment sites should provide separate, colour-coded, foot-operated bins to segregate biomedical waste, including COVID-19 waste. Special bins labelled 'COVID-19 Waste' should be used, and double-layered bags should be employed to collect medical waste.

The Waste Management and Resource Recovery Association of Australia (WMRR), as part of the Australian National Biohazard Waste Industry (BWI) Committee, has created supplementary guidelines for waste management. These guidelines, based on WHO recommendations, aim to help hospitals, aged care facilities and healthcare providers manage COVID-19-affected materials and support those handling medical waste both inside and outside of these facilities.

In Malaysia, the Solid Waste and Public Cleansing Management Act of 2007 has been a notable regulation for waste management. This Act emphasises the obligation of waste separation at the source, overseen by the Solid Waste Management and Public Cleanliness Corporation (SWCorp) (Chuah et al., 2023; Abd Rahim & Kasim, 2016). The Malaysian Solid Waste Act also seeks to create a zero-waste society by encouraging efficient municipal solid waste management. The local waste management system addresses the handling of infectious waste in hospitals, which has become a critical concern in preventing the spread of diseases and protecting healthcare personnel, waste managers, and the public. Additionally, the Malaysian government allocates substantial funding each year for waste management (Maan et al., 2023; Badrum, 2021). However, challenges persist, such as low public awareness, inadequate infrastructure and the need for stronger policy regulations to support alternative waste management systems. The transformation of solid waste management policies in Malaysia has led to significant changes, including mandatory source separation to enhance recycling practices and improve waste management efficiency (Moh & Manaf, 2017).

Policy Rules and the Rule of Law

The above-mentioned criteria suggest the need for specific yet flexible rules to control medical waste associated with COVID-19. Therefore, utilising policy rules or quasi-legislation is logical, given their flexibility, which permits prompt and necessary revisions. However, scholarly debates persist regarding the consistency of such norms with the principles of the rule of law. The notion of policy rules highlights how rules and codes of conduct can practically influence behaviour, even if they are not legally binding. In Indonesia, the government can quickly establish policies, exercise discretion, and address legal gaps by using policy rules or quasi-legislation, which are products of administrative law (Al-Fatih & Muluk, 2023; Hadjon et al., 1994). Lang (2015) who uses the term 'soft law' for such policy rules, explains well, "the soft law not only can be used as a hard leading law, but also can be an appropriate way to explain the hard law. Both can be of mutual transformation and be of complementary advantages in coordinated with governance functions into full play" (Lang, 2015).

The coercive enforcement mechanisms commonly associated with traditional legal tools are absent from policy rules. Nonetheless, there is a growing need for practical effectiveness in using policy rules to influence behaviour and promote compliance, even in the absence of legal binding (Cowan, 2021). For some, the widespread use of quasi-legislation is a cause for concern. Frohnen and Carey (2016), for instance, highlighted the extensive use of quasi-laws in the US government, emphasising the threat they pose to the Constitution's moral authority in regulating citizens' lives. According to Frohnen and Carey, quasi-laws, a pervasive issue in the US administrative state, may be promulgated by various offices and bodies. These laws are often specific rather than general, tailored to benefit particular individuals or interest groups. However, their promulgation frequently fails to achieve its intended purpose of providing clear notice of their requirements. This lack of clarity grants broad discretion to powerful government officials (Frohnen & Carey, 2016).

In environmental law, policy regulations are often necessary due to the nature of the law, which frequently has dynamic effects and necessitates technological modifications. Fisher (2017) argued that the concepts of 'power' and 'accountability' are crucial in this context. Regarding accountability, it is imperative to acknowledge and understand the substantial influence that science and technology exert in moulding and implementing these regulations. Meanwhile, power, to some extent, is required to enable rapid responses aimed at mitigating environmental destruction or pollution (Fisher, 2017).

Considering the debate on aligning policy rules with the principles of the rule of law, it is essential to ensure that these rules clarify citizens' legal rights and responsibilities. Consequently, good governance must promote citizen participation in the political process. Participation within the framework of good governance implies that citizens can easily access official information, the government actively improves transparency and public engagement is facilitated through town hall meetings and other forums to discuss the implementation and evaluation of policy rules. In this context, the government must carefully consider the freedom of information, ensuring that citizens can obtain official documents concerning policy rules (Kamal & Mahmod, 2013).

The procedural norms of the rule of law are disregarded in many policy guidelines, which poses a significant challenge to good governance. Kamal and Mahmod (2013) emphasise that the components of effective governance should be integrated into the fundamentals of the rule of law. These components include accountability, transparency, responsiveness, equity, inclusivity, efficiency, efficacy and public participation. Regarding accountability, the government must exercise its authority with sincerity and within permissible limits. Adjudicative processes and judicial authority ought to be impartial and

autonomous. Transparency is achieved when laws are predictable and readily accessible. The government demonstrates responsiveness when individuals' legal rights and obligations are determined by legislation rather than by executive orders. Furthermore, the government should prioritise inclusivity and equity, ensuring equal treatment under the law and distinguishing individuals only when necessary. Efficiency in governance is evident in the effective resolution of civil disputes. Ultimately, a participatory approach, vital to effective governance, can be achieved through transparent and open institutions and processes that safeguard the rights to free speech, opinion and access to information (Kamal & Mahmod, 2013).

The quasi-legislation option remains relevant for the responsiveness element of good governance; however, there is room for improvement in other aspects of good governance and the rule of law. The COVID-19 pandemic, along with potential future outbreaks, underscores the need for more effective legal solutions to enable governments to respond promptly. The question is not whether quasi-legislation is the answer, but rather how to ensure that such legislation is implemented in accordance with the rule of law.

Daly's (2021) framework offers valuable insight into addressing this issue. According to Daly, for a policy regulation to comply with the rule of law, it must meet five key criteria. First, it must accurately inform the public and help them understand the legal ramifications of their conduct. Second, it must not be at odds with the fundamental legislation. Third, it should be predictable and unambiguous. Fourth, soft law must be accessible to everyone. Fifth, supervision of rule instruments is crucial to enhance their accuracy, clarity and accessibility. Ultimately, citizens are entitled to rely on these rules to guide their behaviour (Daly, 2021). To ensure accountability and the protection of citizens' rights, McLeod argued that "the most effective remedies for maladministration involving soft law are also 'soft', suggesting a greater role for administrative complaint mechanisms such as ombudsman recommendations" (McLeod, 2022).

Thus, as long as power abuse can be mitigated, the use of policy guidelines is permissible in specific contexts, including emergencies and pandemics. Public oversight plays a critical role in ensuring the success of such measures. However, for this oversight to be effective, the public's awareness and education must be sufficiently advanced.

Legal Culture and Facilities Matter

Observations by the author regarding the handling of COVID-19 infectious waste in Indonesia indicate that the law alone is insufficient to ensure effective COVID-19 waste management practices. Non-legal factors, including quasi-legislation, are also essential to support the effectiveness of legal frameworks. In this context, legal culture—both external and internal, as theorised by Friedman—is crucial (Nelken, 2004). External legal culture refers to the values and behaviours of communities in obeying the law, which relates to public awareness of waste management regulations. Internal legal culture, on the other hand, pertains to the behaviours of government officials and law enforcers in implementing laws. Both external and internal legal cultures are vital but insufficient on their own to ensure the effectiveness of quasi-legislation. Adequate waste management facilities are another essential factor.

A survey conducted by Pratama et al. (2021) on residents in Greater Jakarta revealed that while 58% of respondents were familiar with the transmission media of COVID-19 and 81% always wore masks when outside the home, only 39% knew that mask waste is classified as medical waste. Moreover, just 31% were aware of the proper disposal methods for mask waste, and 36% admitted to rarely disinfecting mask waste.

These findings suggest that the public's alleged lack of legal knowledge about handling infectious waste may not be entirely accurate. Legal awareness is a multifaceted concept encompassing knowledge, understanding, attitude and behaviour (Hutabarat, 2022). According to a survey conducted by Pratama et al., individuals may exhibit strong knowledge and comprehension of legal requirements. However, this does not always align with their beliefs and actions. The disconnect between practical behaviour and cognitive awareness warrants further investigation.

A more compelling discussion would explore the factors contributing to this gap. Listiningrum et al. (2021) argued that legal awareness can be improved through education and the enforcement of legal sanctions. They emphasised the need for a hard law framework to enforce such sanctions effectively. However, the author contends that another significant factor affecting the knowledge-behaviour gap is the lack of necessary facilities and information. For instance, government guidelines advocate for waste sorting at home and in healthcare facilities, which requires the availability of specialised waste bins. Unfortunately, these resources are not always accessible. Even when available, they may not be conveniently located for community use. Similarly, although hospitals are permitted to manage their waste, only a limited number are equipped with incinerators, and there is an inadequate number of hazardous and toxic (B3) waste management service providers in some cities. According to Listiningrum et al. (2021), of the 132 COVID-19 reference hospitals in Indonesia, only 20 are equipped with incinerator facilities.

The capacity of municipal governments is another important issue. As mentioned in the preceding section, local administrations in Indonesia are legally required to actively manage COVID-19-related waste. However, Subadi's (2022) investigation revealed significant inadequacies in local infrastructure, such as temporary waste dumps. Due to limited funding and personnel, local governments struggle to provide adequate oversight of medical waste management.

This is particularly concerning because, within the framework of environmental law in Indonesia, environmental affairs are largely the responsibility of local governments. Article 12, paragraph 2 of the Indonesian Local Government Law (Law 23/2014) stipulates that environmental affairs are one of the mandatory non-basic services that local governments must administer. As a result, local governments play a crucial and mandatory role in waste management (Sidik, 2021). While all cities in Indonesia share equal roles and responsibilities in waste management, the effectiveness of these efforts varies. Only approximately 50% of local governments demonstrate the capability to manage waste issues effectively (Azizah et al., 2021).

The need for increased capacity among local governments to manage waste arises from several factors. As discussed in the previous section, budget constraints and limited human resources are among the key challenges. However, a significant issue is the lack of strong commitment by many local governments to prioritise waste management. Additionally, local governments often fail to actively promote waste segregation at the household level. In Indonesia, the typical waste management approach relies heavily on the 'collect and transport' principle. This method involves collecting all types of waste without segregation and transporting it directly to landfills. Such practices are highly inadequate in the context of the COVID-19 pandemic, where infectious and medical waste must be handled with particular care.

The issue of legal culture, therefore, extends beyond the community to include government officials themselves. This represents a significant challenge for Indonesia, both during the pandemic and in its aftermath. Strengthening the capacity and resources of local governments, including providing access to user-friendly technology, is crucial. Without such measures, even well-designed policies will likely fail to effectively address the management of infectious waste.

CONCLUSION

Proper management of infectious waste is increasingly crucial, particularly amidst the challenges posed by infectious diseases. This was notably evident during the COVID-19 pandemic, which resulted in a significant increase in medical and plastic waste generation, further exacerbating existing challenges in infectious waste management. The pandemic has highlighted the urgent need for comprehensive strategies to address this issue, especially in developing countries, where waste management infrastructure is often inadequate.

A multifaceted strategy that considers the interaction of culture, law and the availability of suitable facilities is essential for effective infectious waste management. From a legal perspective, enacting efficient quasi-legislation or policy rules to control the processing, storage and disposal of infectious waste is crucial. Whether the application of quasi-legislation aligns with the rule of law remains a topic of contention. This is due to the regulation-making process often overlooking the formal requirements of the rule of law. However, some suggest that the rule of law can still be safeguarded when enacting quasi-legislation, such as by tightening oversight from ombudsman-like state agencies and increasing citizens' participation in the implementation and evaluation of such policies.

Beyond concerns related to the rule of law, the effectiveness of quasi-legislation is intrinsically linked to the cultural beliefs and actions of the populace. Enhancing the effectiveness of infectious waste management necessitates community education. The availability and upkeep of adequate waste disposal facilities are also essential, alongside legal and cultural factors. However, improving the legal culture of the community is not enough; the attitude of government officials is equally important. This research reveals that local governments, which hold key responsibilities and authority in waste management, still harbour unfavourable perceptions and attitudes, such as regarding waste segregation at the source and the provision of safe storage. It is crucial to emphasise the significant role of local government officials in waste management and empower them to take responsibility for these crucial tasks.

Finally, for infectious waste management to succeed, a comprehensive strategy that balances robust waste management facilities, cultural awareness from both the public and government officials, and regulatory frameworks is necessary. The development of specialised strategies that address these interrelated factors must be prioritised in developing nations to help them overcome the challenges posed by infectious disease pandemics and protect the health and welfare of their citizens.

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