BKM Public Health & Community Medicine
Berita Kedokteran Masyarakat

Volume 39 **Number** 11, 2023, **Pages** e11777
DOI: 10.22146/bkm.v39i11.11777

When should DIY have a localized healthcare waste management system?

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Submitted:
September 25th, 2023
Accepted:
November 20th, 2023
Published:
November 30th, 2023

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Abstract

Purpose: The 2018 healthcare waste management crisis catalyzed a critical review of the concerns expressed by the Health Office (dinkes) and healthcare facilities regarding healthcare waste management in the Special Region of Yogyakarta (DIY). Due to this crisis, the Ministry of Health hired Universitas Gadjah Mada (UGM) to look into potential solutions and promote DIY government policy responses. This paper examines the management strategy during crisis times and possible alternative solutions. **Methods:** This paper uses focused group discussions reports involving separate groups of (1) environmental health officials from community health centers, (2) hospitals, (3) environment health officials of district health authorities, and (4) cross-sectoral province officials in the Yogyakarta Special Region. It is part of a project 'A case study of strengthening regional-based medical waste management model', fund from the Environmental Health Directorate, Directorate General of Public Health, Ministry of Health (Project KN 01.03/6.1/0198/2019). **Result:** A simulation of policy options based on health facility managers suggests that a province-based system is the most profitable in the long term for DIY, with several possible options. The national policy roadmap was considered inadequate to respond to DIY's urgent local needs. Furthermore, the series of meetings succeeded in forming an informal forum between health facilities, provincial health offices, and associations of hospital environmental sanitation experts, monitoring medical waste management. **Conclusion:** The 2018 medical waste management crisis led to the formulation of policy response choices tailored to the capacity of DIY. These choices considered the expenditures and legal sanctions faced by healthcare facilities and the economic value of a region-based waste system for local government authorities. This comprehensive approach highlights the importance of local capacity. It needs to shape effective and sustainable medical waste management policies, underscoring the necessity of region-specific strategies in the face of national health crises.

Keywords: decentralized systems; healthcare waste management; proximity principle.

INTRODUCTION

The management of medical waste in healthcare facilities represents a formidable challenge, underscored by the threat of operational license revocation due to systemic inadequacies in medical waste management protocols. A notable instance of this challenge was the 2018 crisis, marked by an accumulation of medical waste in healthcare facilities following the cessation of waste collection services. This crisis was triggered by the revocation of a third-party contractor's license, due to their improper disposal practices. The resulting dilemma for healthcare facilities, unable to comply with the environmental impact documentation required by environmental authorities, highlights a critical gap in medical waste management regulations.

Complicating this scenario was the uncertain response from both central and local governments. The Ministry of Environment and Forestry's (KLHK) ban on incinerators within healthcare facilities necessitated a dependence on external contractors, while regional management systems, overwhelmed and lacking effective oversight, struggled to respond effectively. This situation prompted the Ministry of Health to consider region-specific responses, particularly for areas like the Yogyakarta Special Region, aiming to establish a more efficient and safe waste management system for Indonesia's healthcare sector.

This crisis reflects broader issues in Indonesia's governance, where local governments often lack problem-solving capacity, and both central and regional bureaucracies exhibit inflexibility, leading to uncertainty in managing unforeseen crises. Public policy analysis crucially involves examining how responses to crises can prompt policy improvements and exploring new alternatives [1]. This is linked to regional autonomy, which allows for the enhancement of regional income and the fortification of regional health systems. Kingdon's multi-stream framework, which discusses the convergence of problems, solutions, and politics in creating a policy window, offers a valuable perspective in this context, though its application in analyzing crisis responses remains underexplored [2,3].

The emergence of a policy problem-solving agenda often occurs when certain momentum brings the policy into the focus of various stakeholders, whether it be the public, supportive or opposing policymakers, or other contextual factors influencing a policy. Crises are commonly perceived as windows of opportunity for stakeholders to advocate for policy changes or adopt new strategic policies. However, despite the significance of momentum, policy change heavily depends on the presence of policy entrepreneurs who are willing to take the initiative and advocate for solutions amidst uncertainty and high risks, particularly if they fail to manage the change effectively.

Strong policy entrepreneurs can adeptly manage three interrelated issues: the problem, the solution, and the politics. These elements, which often operate independently under normal conditions, can converge at specific moments to create critical opportunities for policy entrepreneurs. This convergence is akin to a crucial moment in a soccer match, where the striker in front of the goal represents the "entrepreneur" who seizes a critical opportunity when the opposing players are assembled in front of the goal, attempting to prevent the striker from scoring. This analogy elucidates how many policies remain undeveloped due to the absence of individuals capable of effectively steering the situation to a successful conclusion.

This analysis focuses primarily on two streams (problem and solution as perceived by actors in the health sector) and the scarcity of local policy entrepreneurs who can capitalize on the crisis of medical waste as a new policy momentum (region-based medical waste management system).

The problem of managing B3 waste and medical waste is not spared. The central government has the authority to manage B3 waste throughout the vast territory of Indonesia, with very different variations in transportation access between island and land areas. Because there are only 10 waste management sites for B3 throughout Indonesia, several provinces experience losses due to distance and transportation factors. Differences in regional capacity and the economic level of the population are not given attention, or everyone is treated the same, so unfair conditions are felt. Areas with high regional capacity receive the same services as areas with low capacity.

If the central government does national functions indiscriminately, waste-generating institutions that try to comply with regulations in densely populated areas will receive excessive supervision. Meanwhile, institutions in areas with limited resources that dispose of waste carelessly are actually "safe" because they are not monitored. Those who try to follow the rules are closely monitored and sanctioned if they do not comply. Meanwhile, other parties who do not

follow the rules are free from the targets of supervision and law.

The involvement of local governments in the final stages of medical waste management in Indonesia is significantly restricted. The central government predominantly controls a large portion of the management affairs, particularly in relation to hardware. This centralization poses challenges for district and municipal governments (pemda kabupaten/kotamadya) that initiate their own waste management processes, as they often encounter considerable difficulties in securing necessary permits. Occasionally, provincial governments, adhering to their roles as representatives of the central authority in their regions, tend to favor solutions that align with central regulations [4]. As a result, the roles of provincial and local governments are essentially reduced to being mere extensions of the central government [5] .

In the Special Region of Yogyakarta (DIY), numerous issues have been discussed concerning the implementation of hospital waste management regulations, highlighting the complexities and challenges in this area [6,7]. Despite the recognition of these issues, the management capabilities of healthcare facilities, including hospitals and health centers, in terms of waste disposal and treatment, remain constrained [8,9]. This ongoing limitation reflects a broader systemic issue where the decentralization of authority, particularly in critical areas such as environmental health and medical waste management, is inadequately realized, underscoring the need for a more equitable distribution of responsibilities and authority between the central and local governments.

Since decentralization, local governments have had the responsibility to solve problems in the regions so that problems do not have to be the work of the central government [8–10]. Apart from that, local governments can invite their residents to participate in making policies for themselves [11]. Regional governments have the motivation to compete with other regional governments in developing their regions and managing resources for their residents [23]

Given this background, our research focuses on the 2018 medical waste management crisis in the Special Region of Yogyakarta (DIY). This paper delves into the responses of stakeholders in the healthcare sector, seeking solutions to the legal challenges confronting healthcare facilities in managing their waste effectively, amidst an evolving landscape of hazardous waste management. This study aims to provide insights into how a crisis can serve as a catalyst for policy enhancement and innovation, offering valuable lessons for healthcare waste management in similar contexts.

METHODS

This paper is part of a project 'A case study of strengthening regional-based medical waste management model', analyzing medical waste management system and future alternatives in the Yogyakarta Special Region, after the 2018 hospital waste management. The project used Rp 500 million public fund from the Environmental Health Directorate, Directorate General of Public Health, Ministry of Health (Project KN 01.03/6.1/0198/2019). We have received ethical clearance for data collection from the Medical and Health Research Ethics Committee (MHREC), with the approval number KE/FK/0746 /EC/2019." This paper uses focused group discussions reports involving separate groups of (1) environmental health officials from community health centers, (2) hospitals, (3) environment health officials of district health authorities, and (4) cross-sectoral province officials in the Yogyakarta Special Region.

RESULTS

Medical waste management system at the time of crisis 2018

Collecting and storing hazardous materials according to the rules is a worrying task, especially when it needs to be done in compliance with current regulations. Every hospital, community health center (puskesmas), and small clinic must have a temporary storage site for waste and clear it out every two days. These health facilities are required to hire third-party agencies to transport their waste to their designated final disposal site (TPA). There are concerns about transporting the waste over long distances, which the facility management cannot fully monitor, as required by law. For example, the distance to transport waste from Yogyakarta to the TPA in Cileungsi, West Java, is 516 km, which is far beyond the safe standard distance for waste transportation from a region to a TPA.

Economic Considerations in Transportation: Transportation costs are applied based on a particular volume of waste for smaller health facilities. The frequency of waste transportation varies from weekly

to monthly, not aligning with the principle of storage feasibility.

Non-operational Incinerators in Hospitals: Three hospitals possess incinerators but lack operational permits, rendering them non-functional. While hospitals with incinerators could potentially manage their medical waste, obtaining an operational permit is complex and uncertain.

2018 Crisis Due to Permit Revocation: Following the revocation of the operating permit of the final management site that hospitals in the Special Region of Yogyakarta (DIY) had contracted with, a serious crisis arose in 2018. This was due to the lack of waste collection.

Legal Concerns Among Sanitarians and Facility Managers: Sanitarian workers and managers of health facilities express concerns over unlawful conditions potentially affecting operational permits, BPJS (healthcare and social security agency) cooperative licenses, and the risk of criminal charges due to negligence in waste management.

Local Government Initiative Post-2017 Crisis: In response to the 2017 crisis and concerns about job security in health facilities, the local government initiated a medical waste management program integrated with the domestic waste management system in Piyungan.

Government Steps for Waste Management Authorization: The local government has undertaken inter-agency coordination, technical and financial assessments by professional institutions, and a formal process for requesting authorization from the Ministry of Environment and Forestry to manage medical waste.

Financial Implications of Medical Waste: DIY currently produces 4 tons daily. With a cost of Rp. 15,000 per kilogram, the financial burden for health facilities to manage waste amounts to approximately Rp. 22 billion annually.

Reasons for looking for alternatives

The 2018 medical waste crisis created an uncertain situation regarding the transport of medical waste to final disposal sites in West Java, making healthcare facilities feel insecure. This was due not only to fears of improper disposal but also to the high costs associated with the existing system at that time. Additionally, there was a major concern about legal issues if healthcare facilities failed to meet the required environmental and medical waste management standards for operational licenses. As a result, hospitals and community health centers (puskesmas) started looking for new management systems that could be tailored to each facility's needs or organized through the health departments of their respective districts.

Options for region-based healthcare waste management for DIY

The management of medical waste within the Special Region of Yogyakarta (DIY) can be explored through various region-based options. These province-based Medical Waste Systems (MWS) are judged on how easy they are for healthcare facilities and departments to implement (realization), how easy it is to get permits from the Ministry of Environment and Forestry (KLHK) (regulation), how feasible they are for use (operational), how cost-effective they are (economic), and how easy it is for relevant departments to keep an eye on them (supervision). Each variable is scored on a scale of 1-5, ranging from difficult to easy, with a score closer to 5 indicating greater ease. The regulatory variable refers to obtaining permits for the final disposal site (*tempat pembuangan akhir*, TPA) location, including area and safety considerations, permits for hospital waste sites, and technology compliant with legislation. Obtaining permits for TPAs at final disposal sites and hospital locations involves numerous detailed requirements.

The current option (Option 1) requires an alternative for three reasons. First, the cost becomes significantly high if waste collection is carried out every two days. Second, in current practice, waste collection by third parties, ranging from 2 to 4 weeks for small hospitals and community health centers (Puskesmas), places healthcare facilities at legal risk for not adhering to existing laws.

Option 2, involving a TPA within the DIY region, would only require a permit for the TPA. Each healthcare facility could manage its waste transportation independently with specific waste packaging. Options 3 and 4 could be more challenging and costly, as they require creating new depot facilities, albeit potentially offering closer alignment with healthcare facilities. Options 6 and 7 are considered priorities since larger hospitals already have incinerator systems, which act as a cost-saving factor.

These options illustrate the varied approaches to managing medical waste in a region-based system, each with its own challenges and benefits. Evaluating these options involves balancing regulatory

compliance, operational feasibility, economic considerations, and ease of oversight, all crucial for an effective and sustainable medical waste management system in DIY.

Table 1. Strategy used at the time crisis (no 1) and 7 options for provincial HWM system

No	Policy options	Need of depo	Evaluation Criteria*					Score
			1	2	3	4	5	
1	All health facilities use 3rd party contracts, waste was dumped to the West Java Cileungsi TPA	No	4	2	2	1	1	10
2	TPA health facilities	No	5	4	4	4	3	20
3	Fasyankes depot TPA Health Office	Health Department	4	4	4	4	2	18
4	Fasyankes Depo (centroid) TPA	Centroid location	3	3	4	3	3	16
5	Bantul and Yogya are like 1 Sleman, GK and KP like 3.	Location centroid	3	3	4	3	3	16
6	TPA Hospital, PKM Depot, TPA Health Office	Health Department	2	3	5	5	4	19
7	RS (Type A&B) TPA, RSK Depo TPA; PKM Depo TPA;	RS Type C Health Department	2	3	4	5	5	19
8	RS (Type A&B) TPA, RSK Depo TPA; PKM (Dinkes) to TPA	RS Type C	2	4	3	4	2	15

* Evaluation criteria: 1. Realization; 2. Regulation, 3. Operationability, 4. Controlling, 5. Economic gain

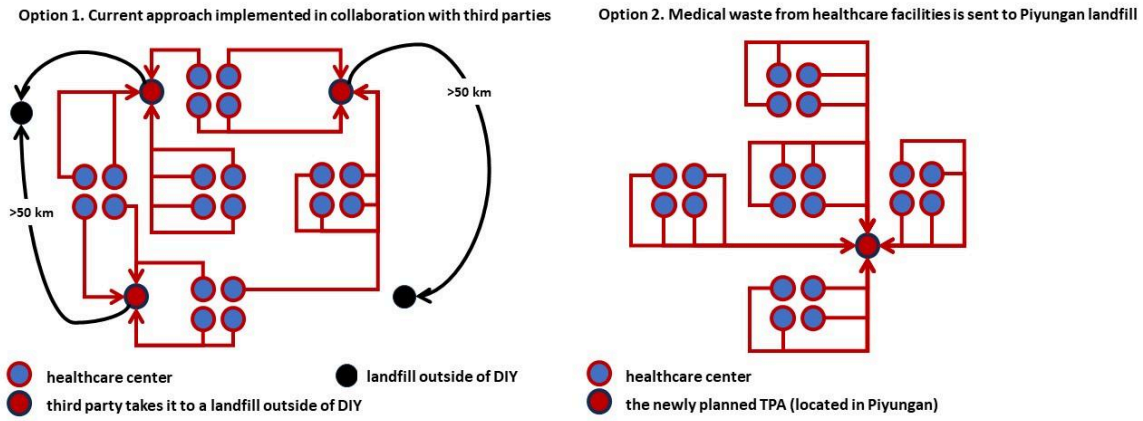

Figure 1. Illustration of two approaches to medical waste management

DISCUSSIONS

This research explores the paradox that emerges in Indonesia's public policy dynamics, particularly in crisis moments. While crises are often perceived as windows of opportunity for policy reform and innovation, this study reveals that local policy agendas remain stagnant even in crisis conditions. The research identifies three primary factors limiting policy responses: the absence of 'policy entrepreneurs' who can leverage the crisis momentum to drive change. Second, there is a lack of proven and manageable solutions. The failure of local government-owned enterprises (BUMDs) in their implementation, which lessens the likelihood of adopting similar approaches, further supports this. Third, the influence of stringent central regulations, often filled with legal sanction threats, creates fear and frustration among local health facility managers. A case study regarding the use of incinerators in hospitals exemplifies how central regulations can restrain local initiatives.

Our paper also provides critical insights into public policy dynamics, especially in the context of crises,

offering a critical perspective on the challenges faced in fostering local government policy innovation. It also highlights the importance of the role of 'policy entrepreneurs' and a supportive regulatory environment to facilitate effective and responsive policy change that caters to local needs.

A critical realization in this process is that waste is an issue that concerns all parties. The current dynamics of the national medical waste disposal system necessitate synchronized efforts from the DIY regional government. This involves aligning the need to reduce permit barriers for the region with the participation of all local and central stakeholders in the medical waste industry. Such a collaborative approach promises to yield a safe system and allows local governments and healthcare facilities to actively engage in efficiency measures for enhancing healthcare service quality.

The Ministry of Environment and Forestry (KLHK) also has plans aligned with region-based medical waste management, ensuring each province can effectively manage its medical waste. The proposed regional system, including DIY within the Central Java system, suggests that the central government should consider initiatives from regional governments that can work synergistically with KLHK's plans.

Furthermore, synchronizing regulations between ministries and central and regional governments is paramount. Current regulations for hazardous waste (B3) management often present unfeasible requirements for healthcare facilities. This regulatory gap places healthcare facility directors at risk of legal liability. Therefore, synchronization between the existing regulations of KLHK and the problem-solving efforts of healthcare facilities requires consideration of local wisdom to ensure that healthcare services are not disrupted. This approach advocates for a regulatory environment that is effective in managing medical waste and sensitive to the operational realities of healthcare providers.

Waste management rules come with legal punishments [5]. This has become a way for police and law enforcement to find faults and extort people [17]. Rules from the central government make healthcare facility managers afraid of punishment, leading them to manage medical waste correctly. However, transporting and handling this waste at dump sites isn't always done well. Sometimes, companies focused on profit hire less skilled workers who may not do the job properly [18]. This can create problems for health facilities. For instance, if the police find out that medical waste is dangerously disposed of in public places, like being thrown on the roadside or in dumpsites, hospitals can be called out for it.

Policymaking in important health areas is unclear between the national and local levels. Local areas have very little say in the waste management system. This might be because the central government limits local government to generating revenue from local healthcare waste management, which has become a national interest.

Local governments often rely on easy funding from the central government instead of finding their own solutions. This reliance makes it difficult for them to develop innovative ideas to address health and environmental challenges, including healthcare waste management. Even though managing this waste at a provincial level could be more effective, local governments hesitate to adopt such solutions. They fear acting independently might be seen as going against the central government's directives. This fear also prevents them from investing in local capabilities, which would allow for more activities to be funded and managed locally. A significant part of this issue is that local bureaucrats are generally not interested in working as policy entrepreneurs. This lack of interest also renders strategic studies on alternative solutions that could benefit the local area useless.

CONCLUSION

Efforts by environmental health officers and healthcare facility management have yielded several solutions aimed at enhancing healthcare waste management policies. However, these efforts have not been sufficiently influential in persuading provincial policymakers to engage 'policy entrepreneurs', a move that could provide local governments with opportunities to invest more significantly in healthcare waste management. It is imperative for local policy advocates to continue refining these solution options specifically for the Yogyakarta Special Region (DIY), in anticipation of a political moment when a policymaker is willing to seize the opportunity to implement a region-based healthcare waste management system. This proactive approach could catalyze the adoption of more effective waste management practices tailored to local needs, thereby contributing to more sustainable healthcare environments.

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