Quality of Medical Waste Management to Enhance Public Trust in Healthcare Facilities

Abstract

Healthcare facilities serve as providers of health services for individuals or groups. Healthcare services involve activities that require materials or equipment, generating medical waste that must be recorded and reported. Public trust in medical waste management forms the foundation for maintaining clean healthcare facilities. A clean organization starts with honest and ethical personnel, as reflected in the routine and periodic quality of their work reports. High-quality medical waste management reports can serve as an evaluation and productivity tool for healthcare personnel handling and managing medical waste. This research is crucial as public health relies on clean healthcare facilities. Moreover, the sustainability of medical waste management depends on proper and continuous reporting. Hence, this study explores the quality of medical waste management in enhancing public trust in healthcare facilities. Using a qualitative, descriptive-analytic approach, this research involves informants such as the head of the sanitation department, the head of nursing wards, cleaning service staff, and medical waste handlers. Data collection tools include surveys, interviews, and documentation. Findings reveal that nursing wards producing medical waste need more work reports on medical waste management. Nursing wards must know the volume of materials or medical waste produced. Reports from the sanitation department are partial and not comprehensive, often failing to comply with standard operational procedures for proper medical waste management.

Keywords: Medical Waste, Environment, Waste Management, Healthcare Facilities, Health Services

A. INTRODUCTION

Healthcare facilities are institutions that provide health services to individuals and groups. Activities within these facilities significantly impact human health and the environment (Huda et al., 2022). Health services are often linked to various health conditions, including hepatitis B and C, tetanus, HIV/AIDS, and dengue fever (Cassemiro et al., 2021). For this reason, it is critical to increase awareness of health issues and the use of personal protective equipment within healthcare facilities (B. Malik et al., 2020). However, heightened vigilance also increases medical waste, as materials often become contaminated or infected due to the diseases being treated (Sharma et al., 2020). According to Owojori (2020), landfill disposal is a common method of waste management. However, this approach is often plagued by weak environmental regulations, inadequate funding, and poor or unplanned infrastructure development (Owojori et al., 2020). Improving waste management requires careful monitoring to ensure sustainability (Ojuri et al., 2024).

Providing healthcare services involves using equipment, materials, and supplies that generate medical waste. Improper disposal of this waste, without segregation or treatment, can lead to soil and groundwater contamination by microorganisms, chemicals, or hazardous pharmaceuticals (Janik-Karpinska et al., 2023). To assess the environmental impact, inspections must be conducted in every facility room (A. Malik et al., 2024). Healthcare facilities often use disposable medical equipment to maintain hygiene standards, contributing significantly to the volume of medical waste generated (Ivanović et al., 2022).

To mitigate health risks, it is crucial to raise awareness among healthcare workers and the public through communication and socialization efforts (Janik-Karpinska et al., 2023). A lack of understanding and technical or economic knowledge among healthcare workers remains a major barrier to effective medical waste management (Sharma et al., 2020). Ensuring waste collection, transportation, and disposal is essential to minimize occupational health and safety risks while protecting environmental health.

Public trust in medical waste management is fundamental to maintaining clean healthcare facilities. Effective medical waste management is key to building public confidence in these facilities and fostering sustainable health development (N. Liu, 2024). Studies have shown that access to accurate information can alleviate public concerns about risks and impacts, increasing support and trust in policies and initiatives (Anastasiou et al., 2014; Sun & Zhu, 2014; Hou et al., 2021).

A clean healthcare organization is built on the integrity of its staff. Transparency and openness in sharing information significantly increase public willingness to accept waste disposal facilities (N. Liu, 2024). However, the need for more detailed information about the composition of medical waste produced by hospitals hampers the adoption of sustainable management practices (Harris & McCabe, 2024). For example, at Bima General Hospital, there needs to be more information about the composition of medical waste, highlighting the need for more consistent handling and management processes to prevent waste leakage and improve environmental awareness among healthcare workers.

The integrity of healthcare workers is reflected in the quality of their work reports. Gary Milne emphasizes the importance of maintaining workforce competence to adhere to safety protocols ("SABIC Enhances Workforce Skills with Academy of Joint Integrity Training," 2018). However, there are significant variations in healthcare service delivery and a lack of comprehensive records regarding service safety and costs. This underscores the need for centralized and harmonized data collection to understand better the scope of work within healthcare facilities, including outcomes, safety, costs, and their impact on workforce training opportunities (Najafi et al., 2024).

Regular and periodic submissions characterize high-quality work reports. These documents are primarily designed to provide a procedural outcome series, including complications, to guide quality improvement practices (Najafi et al., 2024). In the face of intense competition and unstable conditions in the healthcare sector, healthcare facilities continuously strive to maintain their competitiveness, quality, performance, and reputation (Das et al., 2023).

Medical waste management, supported by quality reports, can serve as an evaluation tool for the productivity of healthcare workers in handling and managing medical waste. Reports are submitted manually, with individuals responsible for data collection, performance measurement, and process evaluation (Najafi et al., 2024). However, wards producing medical waste often need more comprehensive work reports on waste handling and management. Existing reports must be completed accurately and frequently and noncompliant with standard operational procedures for effective medical waste management. Furthermore, many wards must know the amount or volume of medical waste generated.

Given these issues, this research formulates the following problem: How does the quality of medical waste management enhance public trust in healthcare facilities?

B. METHODOLOGY

This study employs a descriptive-analytic qualitative approach. The informants involved in this research include the head of the sanitation department, ward supervisors,

cleaning service staff, and medical waste handlers. These individuals were selected to provide insights into the quality of medical waste management and its role in enhancing public trust in healthcare facilities. Data collection techniques utilized in this research include surveys, interviews, and documentation. Surveys were conducted to gather quantitative and qualitative data from the selected informants. Interviews were conducted to obtain in-depth information regarding medical waste management practices, challenges faced by healthcare workers, and their perceptions of public trust in healthcare facilities. Documentation involved reviewing existing reports, guidelines, and other relevant materials related to medical waste management at the selected healthcare facilities.

C. RESULTS AND DISCUSSION

The quality of medical waste management in healthcare facilities can be assessed based on several aspects: the presence of healthcare facilities as public service providers and medical waste generators, the implementation of medical waste management activities, the role of healthcare organizations in waste management, the integrity of healthcare workers involved in waste management, and the availability of medical waste management reports.

1. Public Trust *in Medical Waste Management*

Handling and managing medical waste are fundamental activities that maintain the cleanliness of the environment within healthcare facilities. These efforts aim to ensure safety and comfort while fostering public trust. However, inadequate medical waste management within healthcare facilities is the primary issue. For example, medical and non-medical waste is often mixed in the same container. Improper placement of medical waste poses significant risks to health, safety, and the comfort of the working environment. Medical waste includes various components such as used gauze, surgical masks, diagnostic specimens, and syringes (Li et al., 2024).

Figure 1. Documentation of Medical Waste Placement in the Treatment Room at RSUD Bima

The figure illustrates that medical waste, such as masks, gloves, and gauze, is mixed with non-medical waste, including food wrappers, water bottles, and other packaging materials. This waste is not disposed of in the designated containers. Improper waste management threatens human health and exacerbates environmental pollution, already burdened by the high volume of plastic waste generated daily (Purnomo et al., 2021). Not properly processed medical waste poses risks not only to human health but also to the environment and workplace safety, necessitating careful handling and management.

To address these issues, it is essential to implement proper Standard Operating Procedures (SOPs) for medical waste handling, establish effective internal communication between departments, schedule medical waste transport to Temporary Storage Sites (TPS),

designate collection points, provide larger waste bins, and ensure adequate facilities. Additionally, documenting waste management activities and prioritizing effective communication are crucial. Effective stakeholder communication is essential to ensure clear and efficient information exchange (Hasiana et al., 2020).

Key activities to mitigate these risks include properly segregating and placing medical and non-medical waste into designated containers. Medical waste, which refers to infectious and toxic materials generated during medical care, treatment, and related activities, requires stricter handling than non-medical solid waste (H. Liu et al., 2024). Medical waste is typically designed for single use to prevent cross-contamination and is unsuitable for recycling due to its potential infectious nature. Unprocessed medical waste negatively impacts public health, safety, societal well-being, and environmental governance (Chen et al., 2024).

Incineration is the standard disposal method for medical waste, with the resulting ash often sent to landfills. Effective medical waste management contributes to achieving the United Nations Sustainable Development Goals (UN SDGs), particularly SDG 3: Good Health and Well-Being, SDG 7: Affordable and Clean Energy, and SDG 13: Climate Action (Kim et al., 2024).

Figure 2. Documentation of accumulation of medical waste at temporary medical disposal sites.

The figure also shows the condition of medical waste inside and outside the Temporary Storage Site (TPS) and the waste collection equipment that is uncovered, dirty, and difficult to clean. According to the cleaning service staff, "We line the solid medical waste bins with yellow plastic, while non-medical waste is placed in black plastic" (Cleaning service staff, 2023). However, in practice, black plastic is also used for medical waste, which could lead to mixing medical and non-medical waste in the same container, increasing medical waste volume.

Waste collected from medical waste-producing areas is not immediately placed in the TPS but left outside, with dirty floors and uncovered waste collection equipment. Additionally, the plastic used to package medical waste is mixed, with both black and yellow plastic bags being used. Temporary storage for medical waste must have a proper lid, ensure the separation of medical and non-medical waste, restrict access to authorized personnel, and use appropriate labeling (Mayang et al., 2018).

Proper storage involves collecting medical waste before incineration and ensuring the safety and health of waste management personnel by preventing transmission through air,

direct contact, or animals. Ongoing and well-maintained waste management can support the safe and efficient handling of medical waste (Paramita, 2007).

Waste is placed outside the room as a collection point for transportation staff to retrieve. In one image, yellow plastic waste is shown outside the waste bin, while another image shows an overfilled waste bin left open. Improper and irregular medical waste storage at RSUD Bima poses risks of environmental contamination, disease transmission, and occupational health hazards. Due to its rapid growth and potential for pollution, medical waste must be disposed of safely. In recent years, medical waste management has received significant attention. Thermal treatment methods, such as incineration, carbonization, pyrolysis, and gasification, are promising methods for sterilizing and decontaminating infectious medical waste (Purnomo et al., 2021). High-temperature treatments can eliminate pollutants and enhance energy recovery (Mayang et al., 2018).

Figure 3. Documentation of medical waste bins in the Bima Regional Hospital treatment room

The figure also shows that medical waste bins at RSUD Bima are labeled with symbols and color-coded plastic bags to facilitate identification and prevent mixing with other types of waste. Labeling ensures proper waste segregation, reducing the risks associated with improper disposal. The image further illustrates that the condition at Bima Regional Hospital is concerning, which can erode public trust in healthcare services. This is reflected in the statement of one patient's family member, who said, "Sometimes we worry about the current condition of the hospital because of the smell and its dirty appearance." This statement reflects the growing decline in public trust in the hospital, which is evident from field observations.

Poor medical waste management causes anxiety among patients or hospital visitors as a healthcare facility since the hospital environment appears dirty, making visitors feel uncomfortable receiving treatment. To address medical waste issues in healthcare facilities, special attention is required from the government and hospital leadership to restore public trust in using healthcare services to address health problems. A clean environment will provide safety and comfort for patients, their families, other visitors, and healthcare workers. A poor environment in healthcare facilities can endanger human health and the environment, making proper environmental management crucial.

Environmental management in healthcare facilities requires specific regulations or policies and Standard Operating Procedures (SOPs) to address medical waste handling and management issues. Currently, medical waste collection and transportation need to be

improved, with incomplete Personal Protective Equipment (PPE), the use of thin gloves that easily tear, improper storage of waste packages left in open spaces, and overcrowded, uncovered waste collection points. This increases the risk of medical waste spillage, air pollution, and infections such as hepatitis or HIV from sharp objects. Hazardous waste (B3) poses serious risks to the environment and living organisms if improperly disposed of (Salman et al., 2022).

Medical waste generated by healthcare facilities includes chemical, pharmaceutical, heavy metal, infectious, pathological, sharp, and genotoxic waste, all of which can harm public health. Infectious and sharp waste can cause injuries or infections through punctures, cuts, mucous membrane contact, inhalation, or ingestion. Poorly managed healthcare facilities appear dirty, run-down, and smelly, leading to discomfort for patients, their families, and healthcare workers while increasing the risk of accidents, such as needle stick injuries, which can transmit infections like hepatitis or HIV. Improper waste management also leads to cross-infections between patients, healthcare workers, and the broader community.

2. Healthcare Organizations in Medical Waste Management

A clean healthcare organization starts with honest staff with integrity and sufficient knowledge regarding handling and managing medical waste. Key personnel involved in medical waste management at RSUD Bima include healthcare workers, cleaning staff, waste handlers, sanitation staff, and third parties. Based on the results of surveys and interviews, the following points were revealed: "First, healthcare workers are responsible for selecting, sorting, storing, and placing medical waste. Second, cleaning service staff handle collection, packaging, replacing full plastic bags with new ones, lining waste bins with plastic, transporting, and placing medical waste at designated waste collection points. Third, medical waste handlers are responsible for the collection, transportation, and storage at the medical waste TPS (Temporary Storage Site). Fourth, sanitation staff are responsible for documentation, reporting, and weighing, in collaboration with third parties. Fifth, third-party personnel are responsible for weighing, transporting, reporting, and disposal" (Survey and interview results, 2023).

Patient care activities at RSUD Bima generate large amounts of single-use medical waste due to contamination. If not properly managed, this medical waste can pose serious risks to health, the environment, and workplace safety. Poorly managed medical waste can spread diseases within healthcare facilities through air, water, surfaces, and equipment (Masruddin et al., 2021). To address this, infectious waste must be separated from non-infectious waste, and each room must have durable, rust-resistant, waterproof bins lined with plastic bags. The plastic bags should be color-coded according to the type of medical waste, such as yellow bags for infectious waste, and sharp objects should be placed in special containers before being disposed of in plastic bags. Infectious waste must be incinerated (Nursamsi et al., 2017).

A major issue identified by Kusumawati is that healthcare workers often need more knowledge about waste management in healthcare facilities (Kusumawati et al., 2018). This lack of knowledge impacts the management of solid medical waste (Maharani et al., 2017), making the involvement of healthcare workers crucial in the overall waste management process.

Healthcare organizations must adopt a transparent communication approach in medical waste management as part of their responsibility to patients and visitors. This includes providing health education, such as counseling or socialization on medical waste. However, surveys show that health education, including posters or informational stickers, needs to be

more adequately implemented, leaving visitors with insufficient information about the dangers of medical waste (Survey results, 2022). Educational efforts like counseling can significantly influence knowledge, attitudes, and practices regarding waste management (Maghfiroh et al., 2018; Ayu et al., 2021; Sumiarsih & Sarumi, 2021). Counseling is one of the most effective methods for achieving behavioral change (Ashari & Askur, 2022). Here is the hierarchy pyramid of responsibility for medical waste management in healthcare facilities:

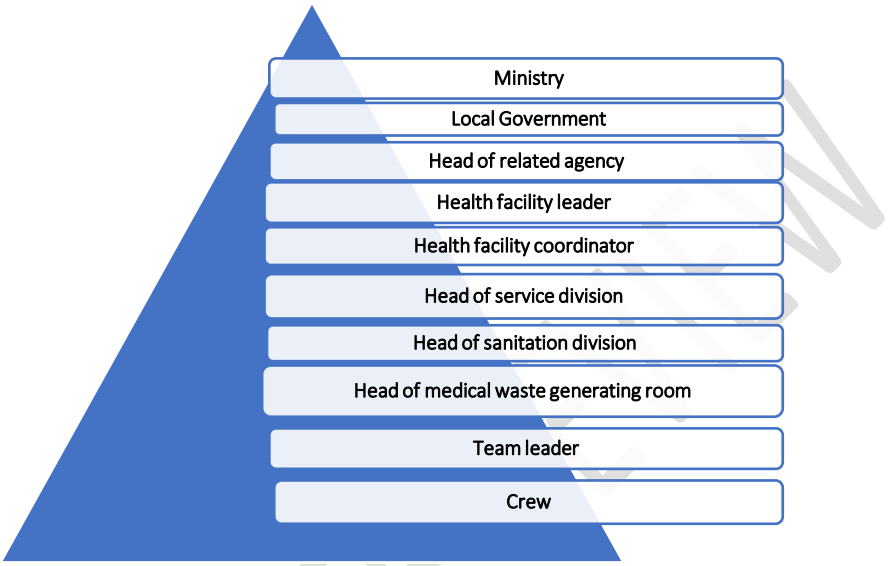

Figure 4. Hierarchical pyramid of responsibility for medical waste management

Waste management in healthcare facilities must follow a hierarchical model, where accountability is shared among all internal and external stakeholders. Effective medical waste management depends on good organization, clear communication, and well-defined responsibilities, ensuring that staff members can effectively complete the tasks assigned to them (Wahyu Widiarti et al., 2019).

3. Integrity and Reporting of Healthcare Workers in Medical Waste Management

The integrity of healthcare workers is reflected in the quality of their work reports in medical waste management. The current challenge lies in understanding the characteristics of activity planning so that future literacy can adopt evidence-based practices through comprehensive reporting. Behavioral change interventions are most effective when developed using a theoretical foundation and a formative approach with the target group (Armanasco et al., 2017). According to the survey results, "All treatment rooms that generate medical waste do not have reports related to medical waste" (Survey, 2023). This is further supported by the head of the nursing ward, who stated, "We do not know the volume of medical waste we generate, nor do we record the amount of materials and items that become medical waste, such as used gloves, masks, gauze, cotton, syringes, infusion sets, and catheters" (Head of Nursing, 2023). This is confirmed by the Head of the Sanitation Department, who said, "We are the only ones who document medical waste, as we are responsible for the hospital's environmental health" (Head of Sanitation, 2023).

Medical waste management documentation should consist of three parts: (a) information filled out by the generator or collector of waste, (b) details from the waste

transportation company, and (c) records kept by the company that processes, collects, or utilizes the waste. This documentation is crucial to ensure accountability in safeguarding public health and environmental safety.

a. **Information to be completed by the generator or collector of hazardous waste (B3):**
   Name and address of the waste generator; 2) Loading location; 3) Registration number of the generator; 4) Waste shipment data, including types of B3 waste, waste characteristics, B3 waste code, UN/NA code, packaging groups, unit size (weight and volume), total packaging quantity, and packaging container details such as numbers and types; 5) Additional remarks for B3 waste; 6) Special handling instructions and additional remarks; 7) Emergency contact phone number; 8) Transport destination with records and statements from the waste generator and collector; 9) Name; 10) Signature; 11) Position; 12) Date.

b. **Information to be completed by the waste transportation company:**
   Name and address of the medical waste transportation company; 2) Phone number; 3) Fax number; 4) BAPEDAL registration number; 5) Vehicle identification details, such as truck number, ship name, and transport permit; 6) Name; 7) Signature; 8) Position; 9) Transport date; 10) Date of signature.

c. **Information to be completed by the processing, collecting, or utilizing company:**
   Name and address of the company; 2) Phone number; 3) Fax number; 4) Registration number; 5) Statement from the waste collection/processing/utilizing company; 6) Name; 7) Signature; 8) Position; 9) Date; 10) Statement of non-compliance with B3 waste; 11) Type of waste; 12) Quantity; 13) Registration number; 14) Reason for rejection; 15) Return date; 16) Signature.

The waste generator, collector, transportation company, and waste processing and utilization companies must complete these three parts to protect human health and the environment from the dangers of medical waste, which is in line with sustainable health development. This document is a record that must be held by the generator, collector, transporter, processor, and user of medical waste as part of the report for accountability.

Good performance is demonstrated through periodic and consistent reports. However, based on survey results and interviews with department heads, medical waste handlers, and evacuation staff, records regarding medical waste currently need to be kept. As a result, treatment rooms need more data to evaluate and reduce the amount and volume of medical waste produced.

Medical waste recording and reporting must be done consistently and continuously, as healthcare facilities generate medical waste daily. Important information in these records should include the room generating the waste, the type and volume of waste, the materials involved, the name of the collector and transporter, the date, and the signatures of personnel handling and managing the waste. Unfortunately, these practices are not followed, and even the head of the sanitation division needs to be fully aware of the amount and volume of medical waste produced in each room because the waste is not weighed.

Awareness and cooperation from all stakeholders involved in medical waste management are essential to address this issue. This must be approached as a cross-sector collaboration within healthcare facilities, as improper medical waste handling and management can pose serious risks to human health and the environment. Based on survey results, the condition of medical waste at RSUD Bima is concerning, as waste disposed of

outside the bins can pose hazards to health, safety, and the comfort of the working environment. To prevent these issues, it is important to establish Standard Operating Procedures (SOPs) for medical waste handling, ensure effective communication between internal sectors, set schedules for medical waste transportation to temporary storage (TPS), designate specific collection points, provide more facilities, and provide larger waste bins to prevent waste from being stored in open areas, as well as consistently record waste management activities. Communication is crucial so stakeholders can exchange information clearly and efficiently (Hasiana et al., 2020).

The quality of medical waste management reports is vital for evaluating healthcare worker productivity and the effectiveness of medical waste handling activities. Based on field findings and interviews, the quality of medical waste reporting at RSUD Bima is still incomplete. Although the hospital has several important documents, such as 1) medical waste documents, 2) business license approval for B3 waste management, 3) monthly medical waste volume reports, and 4) cooperation agreements with PT Putra Restu Ibu Abadi, daily documentation of medical waste generation has not been properly maintained. The lack of proper documentation hinders evaluation efforts. It increases the risk of medical waste leakage, as evidenced by field findings showing that medical waste is mixed with non-medical waste and scattered around the hospital, particularly near the TPS area.

D. CONCLUSIONS

The quality of medical waste management reporting at RS Bima must be improved, as reflected in the limited daily reports and specific evaluations for each treatment room. Existing reports, prepared monthly and annually by the sanitation department, need more detail for effective evaluation and improvement, hindering efforts to enhance public trust in the hospital. To address this, it is essential to clarify the sources and types of medical waste, particularly sharp and infectious waste generated from inpatient wards, outpatient departments, emergency rooms, laboratories, and operating rooms, with significant contributions from the pharmacy department. Restoring public trust requires improving the collection and transportation of medical waste and ensuring appropriate personal protective equipment (PPE) use. Furthermore, effective medical waste management requires the active involvement of all staff, including nurses, cleaning personnel, waste handlers, and sanitation workers, to maintain a clean and safe environment. The integrity and transparency of reporting by healthcare workers are crucial for evaluating performance and ensuring compliance with health and environmental regulations. Improved and consistent documentation will facilitate more effective evaluation, enhance waste management practices, and restore the hospital's public image. Therefore, improving medical waste management at RS Bima must be prioritized to support sustainable health development and ensure a safer, more comfortable environment for patients, healthcare workers, and the community.

DISCLAIMER (ARTIFICIAL INTELLIGENCE)

The author(s) state that no generative AI tools, including Large Language Models (such as ChatGPT, Copilot) or AI-based image generators, were employed in drafting or revising this manuscript.

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