

Implementation of Healthcare Waste Management in Manito Municipal Hospital

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Abstract

Healthcare waste management requires the systematic segregation, pre-treatment, collection, transportation, storage, treatment, and disposal of waste generated by health facilities. This study assessed the implementation of healthcare waste management in Manito Municipal Hospital and used the findings as basis for a proposed plan of action. Specifically, it categorized the healthcare waste generated by the hospital as hazardous and non-hazardous and determined the level of implementation of healthcare waste management in terms of segregation, pre-treatment, collection, transportation, and storage. The study employed a quantitative-descriptive design using a survey questionnaire adopted and modified from the Department of Health Health Care Waste Management Manual and profiling assessment tool. Total enumeration was used among 82 active employees of Manito Municipal Hospital. Data were summarized using frequency, percentage, mean rating, and a five-point Likert scale. Findings showed that all respondents identified sharps and infectious waste as hazardous waste and recyclable and biodegradable waste as non-hazardous waste. Pharmaceutical, pathological, chemical, anatomical, and pressurized container wastes were also identified by varying proportions of respondents. The level of implementation was generally interpreted as Implemented across segregation, pre-treatment, collection, transportation, and storage. Highly implemented indicators were observed in the use of separate safe containers for collection, proper waste labeling, and separate placement of infectious, sharps, and special waste in plastic drums. Areas needing enhancement included emergency precautions during segregation, availability and timing of pre-treatment supplies, cleaning of bins after collection, use of personal protective equipment, routine transportation schedules, and storage while awaiting third-party transport. The proposed plan of action emphasizes re-orientation, regular meetings, supply coordination, monitoring, and continued education.

Keywords: Healthcare Waste Management, Healthcare Waste Segregation, Hazardous Waste, Hospital Waste, Manito Municipal Hospital, Infection Prevention, Environmental Health

1. Introduction

Healthcare waste management is a core component of infection prevention, occupational safety, environmental protection, and quality health service delivery. Healthcare facilities generate both hazardous and non-hazardous waste. Hazardous waste may transmit disease, cause injuries, or contaminate the environment when segregation, handling, treatment, storage, and disposal are not properly performed. Non-hazardous waste is comparable to domestic waste, but it still requires appropriate handling because poor segregation can increase cost, workload, and the risk of contamination.

Global evidence shows that most healthcare waste is general or non-hazardous, while a smaller but significant portion is hazardous and requires special control. Sharps, infectious materials, pathological waste, chemical waste, pharmaceutical waste, and pressurized containers are important concerns in health facilities. Improper disposal of sharps and infectious waste can expose health workers, patients, visitors, waste collectors, and the surrounding community to preventable harm.

In the Philippines, healthcare waste management is guided by national environmental and health regulations, including Republic Act No. 9003 and the Joint DENR-DOH Administrative Order No. 02, Series of 2005. These policies emphasize segregation at source, proper collection, treatment, storage, transport, and disposal. In local facilities, compliance depends not only on written policies but also on awareness, supplies, budget support, personnel behavior, and sustained monitoring.

1.1 Background of the Study on Healthcare Waste Management

Manito Municipal Hospital is a healthcare facility where daily operations generate general waste and healthcare waste requiring specific management practices. Waste management in the hospital is connected with both ecological solid waste management and healthcare waste management. The hospital is expected to separate general waste from hazardous healthcare waste, treat infectious waste before collection, use appropriate containers, transport waste safely, and store hazardous waste securely while waiting for authorized collection or third-party transport.

The study was undertaken to assess how healthcare waste management is implemented in the hospital. The results were intended to support improvement of the hospital policy and guide a practical plan of action that can strengthen compliance with Department of Health standards and local waste management requirements.

1.2 Themes and Insights from Related Literature on Healthcare Waste Management

Related literature emphasizes that successful healthcare waste management requires adequate policy, training, segregation, supplies, storage facilities, personal protective equipment, monitoring, and funding. Studies reviewed in the manuscript identify misconceptions, limited awareness, insufficient financial and human resources, weak segregation, inadequate storage, and poor disposal practices as recurring concerns in healthcare waste systems. Literature also

highlights the importance of regular meetings, waste audits, continuing education, and involvement of management, waste handlers, and clinical staff.

The literature further shows that waste management practices differ by country and facility capacity. Treatment options may include chemical disinfection, autoclaving, microwaving, incineration, and other technologies; however, the appropriateness of each method depends on national regulation, environmental standards, cost, and institutional readiness. In the Philippine setting, proper segregation, chemical disinfection, secure storage, and accredited transport remain practical and relevant components of hospital-level implementation.

1.3 Local, National, and Institutional Context of Healthcare Waste Management

The study is situated within the municipality of Manito, Albay, where healthcare waste is incorporated into local solid waste management requirements. Local policy requires medical and dental facilities to provide segregated receptacles and to prevent sharps, pharmaceutical waste, and other materials used in medical or dental procedures from being mixed with general waste. Within this context, Manito Municipal Hospital must maintain daily compliance while protecting patients, staff, waste collectors, the public, and the environment.

1.4 Theoretical or Conceptual Basis of the Study

The study is anchored on Florence Nightingale's Environmental Theory and Icek Ajzen's Theory of Planned Behavior. Nightingale's theory supports the importance of clean surroundings, clean water, proper drainage, ventilation, and environmental control in promoting health and preventing disease. In healthcare waste management, a clean and safe environment depends on proper segregation, treatment, collection, transport, and storage of waste. Ajzen's theory explains that staff behavior is influenced by intention, attitudes, subjective norms, and perceived behavioral control. Compliance with waste policies therefore depends not only on knowledge but also on routine behavior, organizational culture, and the availability of resources that enable correct practice.

1.5 Research Gaps and Rationale

Although healthcare waste management is covered by national and local guidelines, facility-level implementation requires continuous assessment. The manuscript identified the need for a localized study in Manito Municipal Hospital because staff members directly observe and perform the daily routines of segregation, pre-treatment, collection, transportation, and storage. The study bridges a gap by documenting the hospital staff's awareness of waste categories and the perceived level of implementation across operational stages.

1.6 Alignment with Relevant Sustainable Development Goals (SDGs)

The study supports SDG 3 on good health and well-being by promoting safer healthcare environments and reducing preventable exposure to infection and injury. It also supports SDG 6 on clean water and sanitation, SDG 12 on responsible consumption and production, and SDG 16 on strong institutions by emphasizing policy compliance, accountable waste handling, and institutional monitoring.

1.7 Importance of the Study to Multidisciplinary Sustainability

Healthcare waste management is a multidisciplinary concern involving nursing, infection prevention and control, environmental management, occupational safety, local governance, budgeting, and public health. Strengthening implementation in the hospital can reduce risk to staff and patients, prevent environmental contamination, improve compliance with regulatory standards, and support more sustainable health facility operations.

2. Material and methods

2.1 Research Design

The study used a quantitative-descriptive research design. This design was appropriate because the study summarized numerical responses from hospital employees to describe awareness of healthcare waste categories and the level of implementation of healthcare waste management practices. The results were analyzed and presented using descriptive statistics.

2.2 Locale of the Study

The study was conducted at Manito Municipal Hospital in Manito, Albay. The hospital was selected because it is the facility where the daily generation, segregation, collection, transport, and storage of healthcare waste are directly observed and performed by its employees.

2.3 Respondents of the Study

The respondents were all active employees of Manito Municipal Hospital who were directly involved in or exposed to daily hospital operations related to waste generation and handling. Local Government Unit personnel were excluded because they did not directly observe the hospital's daily healthcare waste management routines.

2.4 Sample and Sampling Procedure

Total enumeration was used. From the hospital workforce, detailed employees assigned to other hospitals were excluded, resulting in 82 active employees as respondents. This approach allowed the study to include the full population of available hospital staff relevant to the assessment.

2.5 Research Instrument

The study used a survey questionnaire adopted and modified from the Department of Health Health Care Waste Management Manual, 4th Edition, and the profiling assessment tool. The questionnaire had two major parts. The first part identified healthcare waste categories as hazardous or non-hazardous. The second part assessed the level of implementation in terms of segregation, pre-treatment, collection, transportation, and storage using a five-point Likert scale.

2.6 Data Gathering Procedure

The researcher secured approval from the adviser and obtained the required permissions through formal letters. A dry run was conducted at Pantao District Hospital, an infirmary-level hospital comparable to Manito Municipal Hospital, to test the questionnaire. After approval, the survey questionnaires were distributed to Manito Municipal Hospital employees during their free time from September to October 2025. Completed questionnaires were reviewed, tabulated, and analyzed with confidentiality.

2.7 Data Analysis Techniques

Data were analyzed using descriptive statistics, including frequency, percentage, mean rating, and measures of central tendency. A five-point Likert scale was used to interpret the level of implementation: less implemented, partially implemented, moderately implemented, implemented, and highly implemented.

2.8 Ethical Considerations

The researcher secured informed consent and explained the objectives of the study. Permission was requested from relevant offices, including the hospital, Department of Health, Environmental Management Bureau, Local Government Unit of Manito, and Provincial Government of Albay, before using documents and gathering data. Respondents answered voluntarily, anonymity and confidentiality were maintained, and the data were used only for academic purposes.

3. Results and Discussion

3.1 Healthcare Waste Categories Generated in Manito Municipal Hospital

The study categorized hospital waste into hazardous and non-hazardous waste. Hazardous waste included sharps, infectious waste, pathological waste, anatomical waste, pharmaceutical waste, chemical waste, and pressurized containers. Non-hazardous waste included recyclable, biodegradable, and residual waste.

Results showed that sharps and infectious waste were identified by all 82 respondents, representing 100 percent awareness for these two hazardous categories. Pharmaceutical waste was identified by 55 respondents or 67 percent, pathological waste by 51 respondents or 62 percent, chemical waste by 46 respondents or 56 percent, anatomical waste by 20 respondents or 24 percent, and pressurized containers by 14 respondents or 17 percent. For non-hazardous waste, recyclable and biodegradable waste were identified by all 82 respondents or 100 percent, while residual waste was identified by 80 respondents or 97 percent.

These results indicate that employees are highly aware of common hospital waste categories, particularly sharps, infectious waste, recyclable waste, and biodegradable waste. However, the lower identification of anatomical waste, pressurized containers, chemical waste, pathological waste, and pharmaceutical waste suggests the need for regular re-orientation. Strengthened awareness is important because misclassification can lead to improper segregation, unsafe handling, unnecessary exposure, and increased cost.

3.2 Level of Implementation in Terms of Segregation

The level of implementation for segregation was interpreted as Implemented. Respondents reported that hospital staff segregate waste, place segregated waste into color-coded trash bins, perform handwashing after segregation, and understand color coding and proper tagging of containers. The indicator on emergency precautions for unexpected events such as injuries and accidental exposure obtained the lowest mean within this stage. This finding suggests that while daily segregation is practiced, emergency response reminders and protocols should be continuously emphasized.

3.3 Level of Implementation in Terms of Pre-treatment

The level of implementation for pre-treatment was also interpreted as Implemented. Hospital workers were aware of proper pre-treatment of infectious waste, and chemical disinfection was reportedly done before collecting infectious waste. However, lower mean ratings were observed for the availability of pre-treatment supplies and completion of pre-treatment 30 minutes prior to infectious waste collection. The findings imply that supply availability and adherence to the required pre-treatment timing should be strengthened so that infectious waste can be handled safely before collection.

3.4 Level of Implementation in Terms of Collection

The level of implementation for collection was interpreted as Implemented, with one indicator rated Highly Implemented. Waste collectors reportedly used separate safe containers and did not mix them with other types of waste. Other indicators showed that waste was collected regularly, collectors followed the proper route, containers such as trolleys were closed, and trash bins and areas were cleaned after collection. The lowest mean rating in this stage related to cleaning bins and areas after collection, indicating the need for reminders and monitoring after daily waste collection activities.

3.5 Level of Implementation in Terms of Transportation

Transportation was interpreted as Implemented. Respondents indicated that waste was transported using a leak-proof trolley, waste handlers were aware of hazardous waste transport requirements, waste collection was performed in a manner

that did not endanger the public, and routine schedules were followed. The indicator on waste collectors wearing proper personal protective equipment obtained the lowest mean in this stage. This result highlights the need to ensure PPE availability and strict compliance during internal waste transport.

3.6 Level of Implementation in Terms of Storage

Storage was interpreted as Implemented, with highly implemented indicators on proper labeling of waste and separate placement of infectious, sharps, and special waste in plastic drums. Respondents also reported that waste was stored properly, covered in the storage area, and stored while waiting for third-party transport. The lowest mean rating involved proper storage while awaiting third-party transporter collection. This finding emphasizes the need for regular monitoring of the storage area, secure access, proper ventilation, and continued compliance with Department of Health requirements while infectious waste remains on-site.

3.7 Proposed Plan of Action

Based on the findings, the proposed plan of action focuses on maintaining awareness of hazardous and non-hazardous waste categories, improving emergency preparedness during segregation, ensuring availability of pre-treatment supplies, strengthening collection practices, improving PPE compliance during transportation, and maintaining safe storage practices. Recommended activities include annual re-orientation with resource persons from concerned agencies, integration of healthcare waste management in monthly general meetings, regular meetings with institutional workers and waste collectors, walkthrough monitoring, demonstration of proper handling practices, and coordination with supply and budget officers for continuous availability of supplies.

4. Conclusion and Recommendations

The study concludes that respondents are generally well oriented on healthcare waste categories in Manito Municipal Hospital, particularly sharps, infectious waste, recyclable waste, and biodegradable waste. Nevertheless, awareness of other hazardous waste categories such as anatomical waste, chemical waste, pharmaceutical waste, pathological waste, and pressurized containers needs reinforcement. The level of implementation of healthcare waste management in terms of segregation, pre-treatment, collection, transportation, and storage was interpreted as Implemented. Selected indicators were Highly Implemented, especially the use of separate safe containers, proper waste labeling, and separate storage of infectious, sharps, and special waste in plastic drums.

The hospital may strengthen healthcare waste management by sustaining regular awareness activities, re-orientation seminars, monthly integration of healthcare waste management topics, and practical monitoring of segregation, pre-treatment, collection, transportation, and storage procedures. Supply and budget coordination should ensure the availability of pre-treatment materials, containers, PPE, and related supplies. Waste collectors should be continuously reminded and monitored regarding PPE use, cleaning after collection, routine schedules, and safe transport routes. Future studies may assess healthcare waste management practices in other facilities in Albay or evaluate treatment and final disposal options, including the policy and environmental implications of available technologies.

budget officers for continuous availability of supplies.

Compliance with ethical standards

This study complied with applicable academic and institutional ethical standards. The researcher obtained permission from the hospital and relevant agencies before data gathering. Participation was voluntary, informed consent was secured, and respondents were assured that their answers would remain confidential and anonymous. Data were used only for academic purposes and were reported in summary form.

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