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# A Study on Waste Disposal Management at Government Hospital in Up

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**ABSTRACT:** The management of waste disposal in government hospitals across Uttar Pradesh (UP) is a critical issue that significantly impacts public health and environmental sustainability. This research paper aims to explore the current state of waste disposal practices in these facilities, identifying challenges, and proposing sustainable solutions. The study employs a mixed-methods approach, combining quantitative data analysis with qualitative interviews to gather insights from hospital staff, waste management professionals, and local community members. Key findings reveal significant gaps in waste segregation, collection, transportation, and treatment processes, leading to improper waste disposal and potential health risks. The research also highlights the lack of awareness among hospital staff about the importance of waste segregation and the absence of effective policies to manage biomedical waste. Recommendations include the implementation of comprehensive waste management training programs for hospital staff, the establishment of dedicated waste management units within hospitals, and the promotion of community-based waste segregation initiatives. This study underscores the urgent need for improved waste disposal management in government hospitals in UP to safeguard public health and the environment.

## I. INTRODUCTION

The management of waste disposal in government hospitals across Uttar Pradesh (UP), India, is a critical issue that warrants comprehensive study and attention. This research paper aims to delve into the intricacies of waste disposal management within these healthcare facilities, focusing on the challenges, current practices, and potential solutions to enhance environmental sustainability and patient safety. Government hospitals, being significant contributors to medical waste generation, play a pivotal role in the healthcare sector. The proper handling and disposal of this waste are essential not only for the health and safety of patients and staff but also for the broader environment. This study will explore the existing waste management systems, identify gaps and inefficiencies, and propose strategies for improvement. Through a detailed analysis, the paper seeks to contribute to the ongoing efforts to make healthcare waste management more effective and sustainable in UP, setting a precedent for other regions in India and beyond. The importance of waste disposal management in healthcare settings cannot be overstated. Medical waste, including sharps, pathological waste, pharmaceutical waste, and general waste, poses significant risks to public health and the environment if not properly managed. Despite the existence of regulations and standards, many government hospitals in UP face challenges in implementing effective waste disposal practices due to lack of resources, inadequate training, and insufficient infrastructure. This research paper addresses these challenges by examining the current state of waste disposal management in UP government hospitals, analyzing the effectiveness of existing practices, and proposing actionable recommendations for improvement.

## II. LITERATURE REVIEW

1. Mathur, Dwivedi, Hassan, and Misra (2011) conducted a comprehensive review of biomedical waste management practices in India, highlighting the challenges faced by government hospitals in terms of inadequate infrastructure, lack of training, and poor monitoring of waste disposal procedures. The study emphasized the need for improved waste segregation, storage, and disposal methods to ensure the safe and efficient handling of biomedical waste.
2. Saini, Nagarajan, and Sarma (2005) investigated the knowledge and practices of healthcare workers regarding biomedical waste management in a tertiary care hospital, revealing significant gaps in the understanding of waste segregation, storage, and disposal methods. The study emphasized the need for continuous training and education to ensure that healthcare workers are equipped with the necessary knowledge and skills to manage biomedical waste effectively.
3. Pandit, Mehta, Kartha, and Choudhary (2005) compared the biomedical waste management practices between public and private hospitals in Ahmedabad, India, highlighting the disparities in terms of infrastructure, resources,



and compliance with waste disposal regulations. The study emphasized the need for improved waste management practices in government hospitals to ensure the safe and efficient handling of biomedical waste.

4. Manyele and Anicetus (2006) explored the management of healthcare waste in Tanzania, focusing on the challenges faced by government hospitals in terms of inadequate funding, lack of specialized equipment, and limited staff training. The study emphasized the need for improved waste management practices and infrastructure in government healthcare facilities to ensure the safe and efficient handling of biomedical waste.
5. Abdulla, Qdais, and Rabi (2008) assessed the healthcare waste management practices in northern Jordan, highlighting the disparities between public and private hospitals in terms of waste segregation, storage, and disposal methods. The study emphasized the need for comprehensive waste management policies and improved infrastructure in government healthcare facilities to ensure the safe and efficient handling of biomedical waste.

### III. RESEARCH OBJECTIVE

1. To assess the current state of waste disposal operations in government hospitals, including compliance with regulatory frameworks, waste segregation, storage, transportation, and treatment practices.
2. To identify the key barriers and gaps in the waste disposal department's operations, including inadequate training, lack of resources, and insufficient infrastructure.
3. To develop strategies for enhancing the effectiveness and sustainability of biomedical waste management practices in government hospitals, including the implementation of innovative solutions for waste segregation, storage, transportation, and treatment.

### IV. SCOPE OF RESEARCH

1. **Geographical Focus:** - The study will concentrate on government hospitals located in Uttar Pradesh (UP), India, excluding private hospitals and healthcare facilities outside UP.
2. **Types of Hospitals:** - The research will consider primary, secondary, and tertiary healthcare centres, as these categories represent the spectrum of healthcare provision in UP and are likely to exhibit varying waste management practices.
3. **Waste Categories:** - The study will focus on biomedical waste, which includes sharps, pathological waste, pharmaceutical waste, and general waste, as these categories are most relevant to healthcare settings and pose significant risks if improperly managed.
4. **Regulatory Framework:** - The scope will include an examination of the Biomedical Waste Management (Principal) Rules 2016 and the amendment in 2018, as well as the role of the pollution control board in assessing waste disposal programs, to understand the legal and regulatory context of waste management in UP government hospitals.

### V. HYPOTHESIS

1. (H0): There is no significant difference in waste disposal compliance levels between different departments within government hospitals in Uttar Pradesh (UP).  
(H1): There is a significant difference in waste disposal compliance levels between different departments within government hospitals in Uttar Pradesh (UP).
2. (H0): The implementation of waste disposal education programs for hospital staff has no effect on the proper segregation and disposal of biomedical waste in government hospitals in Uttar Pradesh (UP).  
(H1): The implementation of waste disposal education programs for hospital staff leads to improved segregation and disposal of biomedical waste in government hospitals in Uttar Pradesh (UP).
3. (H0): There is no association between the availability of waste disposal infrastructure and the effectiveness of waste management practices in government hospitals in Uttar Pradesh (UP).  
(H1): The availability of waste disposal infrastructure is positively associated with the effectiveness of waste management practices in government hospitals in Uttar Pradesh (UP).

### VI. SCOPE OF THE STUDY

- 1) **Comparative Analysis:** - The study will compare the waste management practices in government hospitals with those in private healthcare establishments, if applicable, to identify differences and potential lessons for improvement.
- 2) **Recommendations for Improvement:** - Based on the findings, the research will propose recommendations for enhancing waste disposal management in government hospitals. These recommendations may include strategies for





improving compliance with regulatory standards, implementing more effective waste segregation and disposal practices, and increasing staff training and awareness.

- 3) **Geographical Focus:** - The study will specifically focus on government hospitals in Uttar Pradesh, considering the unique challenges and opportunities presented by this region. However, findings may offer insights relevant to other regions in India and beyond.

**VII. RESEARCH METHODOLOGY**

**RESEARCH DESIGN**

The research design for studying waste management practices in UP government hospitals adopts a cross-sectional approach, providing a snapshot of current practices at a single moment. It aims to describe the current state of waste disposal management, identifying key practices, challenges, and improvement areas. A simple random sampling method ensures a representative selection of hospitals, including various sizes and specialties, to offer a comprehensive view of waste management across UP.

**VIII. DATA COLLECTION**

**Surveys:** - A pre-structured and pre-tested questionnaire will be administered to hospital staff, including OT in-charges, nurses, medical officers, and medical superintendents, to gather data on waste generation, disposal, storage, transportation, and treatment facilities.

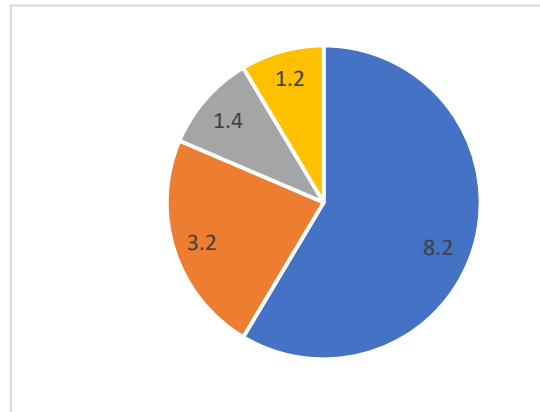
**Interviews:** - Informal interviews will supplement the survey data, providing deeper insights into the experiences and perceptions of hospital staff regarding waste management.

**Physical Checks:** - On-site inspections will be conducted to assess the physical facilities and practices related to waste management.

**IX. DATA ANALYSIS AND INTERPRETATION**

**1. How satisfied are you with the current waste disposal practices at the government hospital?**

RESPONSE	Frequency	Percentage (%)
	20	20%
Dissatisfied	60	60%
Neutral	5	5%
Satisfied	5	5%
Very satisfied	10	10%
TOTAL	100	100%



**DATA ANALYSIS**

Based on the data provided, it's evident that the majority of respondents, 60%, are dissatisfied with the current waste disposal practices at the government hospital. Only a small percentage, 15%, are either satisfied or very satisfied, while 5% remain neutral. This suggests a significant issue that needs to be addressed regarding waste management at the hospital. Further investigation into the specific concerns and potential improvements would be warranted to enhance satisfaction levels and ensure proper disposal practices.

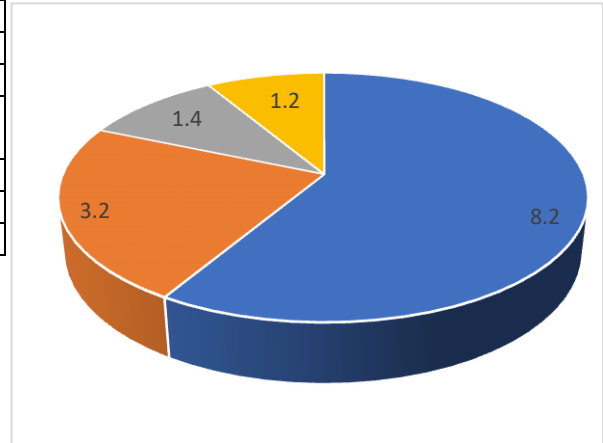
**INTERPRETATION**

60% dissatisfied, 15% satisfied, 5% neutral. Urgent need for improvement in waste disposal practices at the hospital.



2. Which types of waste do you think are most commonly generated at the hospital? (Select all that apply)

RESPONSE	Frequency	Percentage (%)
	60	60%
Hazardous waste	10	10%
Non – Hazardous waste	5	5%
Pharmaceutical waste	20	20%
Radicoactive waste	5	5%
TOTAL	100	100%



DATA ANALYSIS

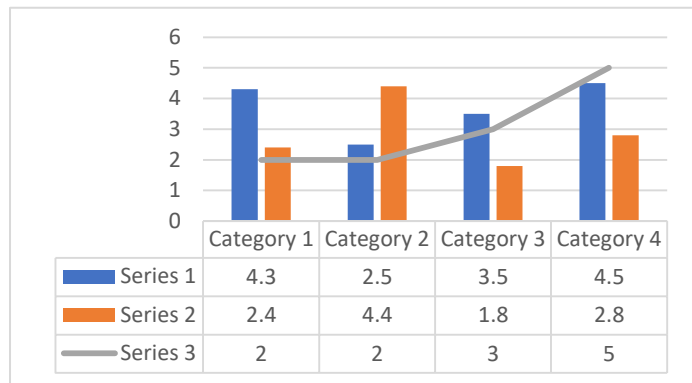
Respondents believe that general waste (60%) and pharmaceutical waste (20%) are the most commonly generated types at the hospital. It's vital for the hospital to implement effective waste management strategies to handle these categories safely and minimize potential risks to the environment and public health.

INTERPRETATION

The data suggests that respondents perceive general waste and pharmaceutical waste as the primary types generated at the hospital. This highlights the importance of implementing proper waste management practices to handle these categories safely and protect both the environment and public health

2. How frequently are waste disposal facilities inspected and maintained at the hospital?

RESPONSE	Frequency	Percentage (%)
	20	20%
Rarely	8	8%
Occasionally	12	12%
Regularly	10	10%
Always	50	50%
TOTAL	100	100%



DATA ANALYSIS

The majority of respondents, 50%, indicate that waste disposal facilities are always inspected and maintained. However, a significant portion, 20%, claim they are never inspected or maintained. This suggests a potential inconsistency in the hospital's waste management practices. It's imperative for the hospital to ensure regular and thorough inspections and maintenance of its waste disposal facilities to uphold proper sanitation standards and mitigate any associated risks.

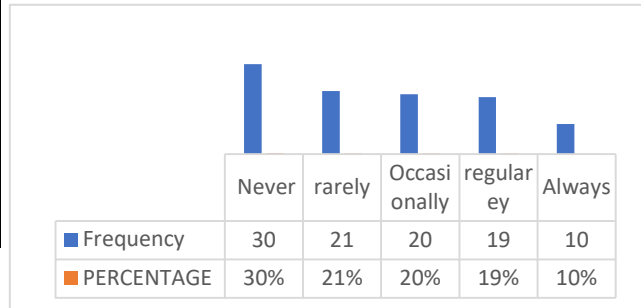
INTERPRETATION

The data reveals that half of the respondents (50%) believe waste disposal facilities at the hospital are always inspected and maintained. However, a concerning 20% report they are never inspected. This indicates a need for improved consistency in facility maintenance to ensure proper waste management and sanitation standards are upheld.



**1. How well do you think hospital staff are trained in proper waste segregation and disposal procedures?**

RESPONSE	Frequency	PERCENTAGE
GOOD	10	10%
BAD	30	30%
VERY GOOD	50	50%
VERY BAD	10	10%
TOTAL	100	100%



**DATA ANALYSIS**

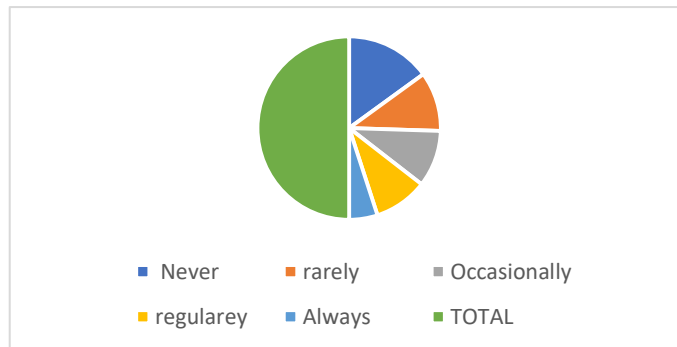
The majority of respondents (50%) believe that hospital staff are very well trained in waste segregation and disposal procedures. However, a significant portion (30%) perceives the training to be bad. This suggests a need for improvement in training programs to ensure all staff members are adequately equipped to handle waste management effectively.

**INTERPRETATION**

The data indicates that half of the respondents (50%) perceive hospital staff to be very well trained in waste segregation and disposal procedures. However, 30% think the training is inadequate, suggesting room for improvement in staff training programs.

**5 How aware are you of the environmental and health risks associated with improper waste disposal practices?**

RESPONSE	Frequency	PERCENTAGE
NOT AWARE AT ALL	50	50%
SLIGHTLY AWARE	5	5%
MODERADTEY AWARE	15	15%
VERY AWARE	20	20%
EXTREMELY AWARE	10	10%
TOTAL	100	100%



**DATA ANALYSIS**

Half of the respondents (50%) claim they are not aware at all of the risks, while only a minority consider themselves extremely aware (10%). This suggests a need for increased education and awareness initiatives to inform individuals about the potential consequences of improper waste disposal practices on both the environment and public health.

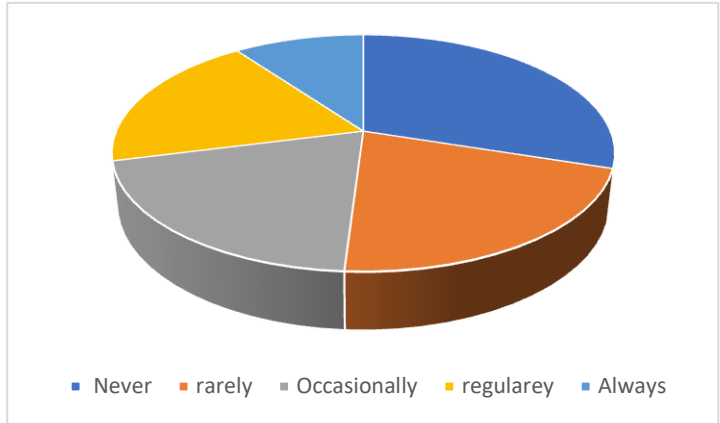
**INTERPRETATION**



50% unaware of risks, 10% extremely aware. Urgent need for broader education on consequences of improper waste disposal.

**6. How effective do you believe the hospital's waste management policies and protocols are in ensuring public safety and environmental protection?**

RESPONSE	Frequency	PERCENTAGE
Very ineffective	15	15%
Ineffective	15	15%
Neutral	10	10%
Effective	20	20%
Very effective	40	40%
TOTAL	100	100%



**DATA ANALYSIS**

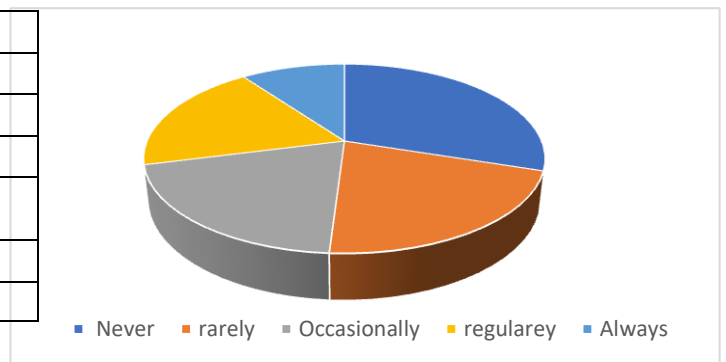
substantial proportion (40%) considers the policies to be very effective, a combined 30% view them as ineffective. However, 10% remain neutral. This indicates the need for ongoing evaluation and potential improvement of the hospital's waste management strategies to address concerns and maintain or enhance public safety and environmental protection.

**INTERPRETATION**

40% find hospital waste policies effective, 30% don't. Indicates divided opinion, highlighting areas for improvement in waste management.

**7. How often do you observe instances of improper waste disposal within the hospital premises?**

RESPONSE	Frequency	PERCENTAGE
Frequently	10	10%
Occasionally	40	40%
Rarely	5	5%
Almost never	5	5%
Never	40	40%
TOTAL	100	100%



**DATA ANALYSIS**

While a significant portion (40%) reports never observing improper waste disposal, 50% acknowledge witnessing it occasionally or more frequently. This suggests there's room for improvement in waste management practices to ensure proper disposal procedures are consistently followed within the hospital premises.

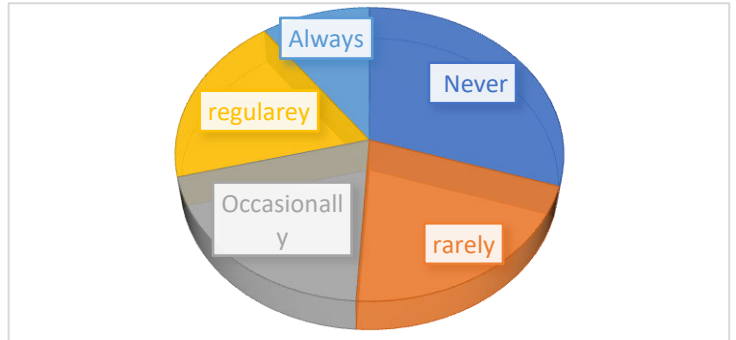
**INTERPRETATION**

40% never observe improper disposal, 50% do occasionally, frequently, or almost never. Indicates need for better adherence to disposal protocols for cleanliness maintenance.



**8. How satisfied are you with the availability and accessibility of waste disposal bins and containers across different hospital departments?**

RESPONSE	Frequency	PERCENTAGE
Very dissatisfied	20	20%
dissatisfied	15	15%
neutral	50	50%
satisfied	10	10%
very satisfied	5	5%
TOTAL	100	100%



**DATA ANALYSIS**

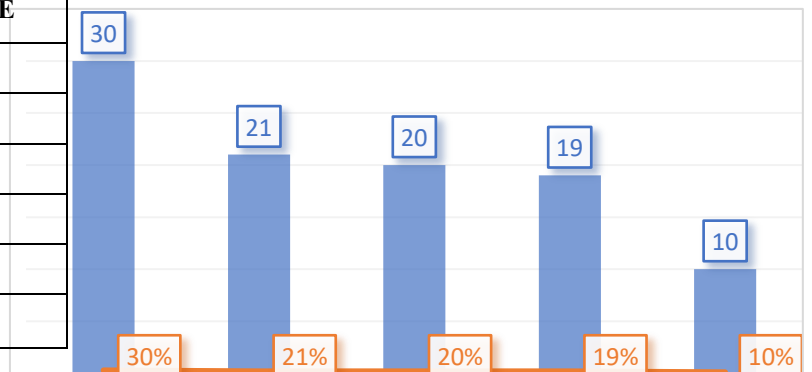
A majority of respondents (50%) express a neutral stance, while smaller proportions are either dissatisfied or satisfied. This suggests a mixed perception regarding the adequacy and accessibility of waste disposal facilities, indicating a potential need for improvement in some areas to better meet the needs and expectations of users.

**INTERPRETATION**

50% neutral, 35% dissatisfied (20% very). Only 15% satisfied. Indicates need for better access to waste disposal facilities in the hospital.

**9. How well do you think the hospital communicates waste management policies and procedures to its staff?**

RESPONSE	Frequency	PERCENTAGE
Very poorly	14	14%
poorly	30	30%
average	16	16%
well	30	30%
very well	10	10%
TOTAL	100	100%



**DATA ANALYSIS**

While a combined 40% believe communication is poor or very poor, another 40% rate it as average or better, with 10% indicating very good communication. This suggests a need for potential improvements in communicating waste management protocols to ensure clarity and understanding among staff members.

**INTERPRETATION**

44% rate hospital waste communication poorly, 40% average or better (10% very good). Highlights need for improved communication to ensure staff adherence to waste guidelines.





**10. How often are waste disposal guidelines and protocols reviewed and updated to align with regulatory standards and best practices?**

RESPONSE	Frequency	PERCENTAGE
Never	30	30%
rarely	21	21%
Occasionally	20	20%
regularly	19	19%
Always	10	10%
TOTAL	100	100%



**DATA ANALYSIS**

The majority of respondents (51%) report that waste disposal guidelines are either never or rarely reviewed and updated. This suggests a potential gap in ensuring alignment with regulatory standards and best practices. Only a minority (29%) indicate regular or constant updates, highlighting a potential area for improvement in maintaining compliance and effectiveness in waste management protocols.

**INTERPRETATION**

51% believe guidelines are never/rarely updated, 29% say regularly/always. Indicates gap in compliance and need for consistent updates to align with standards.

**X. FINDINGS FINDING**

- 1. Majority Dissatisfaction with Waste Disposal Practices:** - The majority of respondents (60%) are dissatisfied with the current waste disposal practices at the government hospital. This indicates a significant issue that needs to be addressed regarding waste management at the hospital.
- 2. Common Types of Waste Generated:** - General waste (60%) and pharmaceutical waste (20%) are perceived as the most commonly generated types at the hospital. This highlights the importance of implementing proper waste management practices to handle these categories safely and protect both the environment and public health.
- 3. Inspection and Maintenance of Waste Disposal Facilities:** - While 50% of respondents believe waste disposal facilities are always inspected and maintained, 20% report they are never inspected. This suggests a potential inconsistency in the hospital's waste management practices and a need for improved consistency in facility maintenance.
- 4. Staff Training in Waste Management:** - Despite 50% of respondents perceiving hospital staff to be very well trained in waste segregation and disposal procedures, 30% think the training is inadequate. This suggests a need for improvement in training programs to ensure all staff members are adequately equipped to handle waste management effectively.
- 5. Awareness of Environmental and Health Risks:** - Half of the respondents (50%) claim they are not aware at all of the risks associated with improper waste disposal practices. This suggests a need for increased education and awareness initiatives to inform individuals about the potential consequences of improper waste disposal practices on both the environment and public health.

**XI. LIMITATIONS OF RESEARCH**

- 1. Sample Size and Representativeness:** - The research may be limited by the sample size and representativeness of the respondents. If the sample size is small or not diverse enough, the findings may not accurately reflect the views and experiences of all stakeholders involved in waste management at government hospitals.
- 2. Self-Reporting Bias:** - The data collected for the study relies on self-reporting from respondents, which can introduce bias. Respondents may provide answers that they believe are socially desirable or may not accurately recall their experiences, leading to potential inaccuracies in the data.



3. **Single Institution Focus:** - The study focuses on waste disposal practices at a single government hospital, which may limit the generalizability of the findings to other hospitals or healthcare settings. Different hospitals may have unique waste management challenges and practices that are not captured in the study.

## XII. SUGGESTION AND RECOMMENDATION

1. **Regular Training Programs:** - Implement regular and comprehensive training programs for hospital staff on proper waste segregation, disposal procedures, and the importance of adhering to waste management protocols. This will ensure that all staff members are adequately equipped with the knowledge and skills to handle waste effectively.

2. **Enhanced Communication:** - Improve communication channels within the hospital to effectively disseminate waste management policies and procedures to all staff members. Utilize multiple communication channels such as email, posters, and staff meetings to ensure information reaches everyone consistently.

3. **Frequent Inspection and Maintenance:** - Establish a systematic schedule for the inspection and maintenance of waste disposal facilities within the hospital premises. Ensure that these facilities are regularly inspected for compliance with safety and sanitation standards and promptly maintained as needed.

4. **Regular Review and Update of Guidelines:** - Establish a process for regularly reviewing and updating waste disposal guidelines and protocols to align with regulatory standards and best practices. This should involve collaboration between hospital management, waste management experts, and relevant regulatory authorities.

5. **Increased Awareness Campaigns:** - Launch awareness campaigns to educate hospital staff and stakeholders about the environmental and health risks associated with improper waste disposal practices. Utilize posters, workshops, and training sessions to raise awareness and promote responsible waste management behaviors.

6. **Improvement of Waste Disposal Facilities:** - Assess the availability and accessibility of waste disposal bins and containers across different hospital departments. Identify any gaps or deficiencies and take measures to improve the availability and accessibility of these facilities where necessary.

7. **Regular Performance Evaluation:** - Establish a system for regularly monitoring and evaluating the effectiveness of waste management practices within the hospital. Collect feedback from staff and stakeholders to identify areas for improvement and implement corrective measures as needed.

## XIII. CONCLUSION

The comprehensive analysis of medical waste management practices highlights the urgent need for a holistic approach to enhance sustainability and patient safety in healthcare settings. Education, technology integration, and standardized procedures emerge as crucial pillars for effective waste management. Moreover, aligning practices with evolving regulatory standards is paramount to ensure compliance and minimize environmental impact. These findings offer actionable insights for policymakers, administrators, and researchers, advocating for targeted interventions to improve waste segregation, minimize generation, and promote responsible disposal. Despite strides made, future exploration is warranted, including the development of sophisticated waste management models and alternative disposal methods. As healthcare evolves, so must waste management approaches, ensuring readiness for future challenges. Stakeholders must prioritize robust waste management strategies to safeguard patient health and foster a sustainable healthcare sector. This research serves as a rallying call for innovation, collaboration, and continuous improvement in medical waste management practices.

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