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Knowledge And Practice Of Healthcare Personnel Towards Biomedical Wastes Management At Nemba District Hospital, Rwanda

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Abstract

Hazardous organic and inorganic wastes are categorized as healthcare wastes. A significant health risk to patients, healthcare professionals, and anyone else in contact with it is posed by roughly 10–25% of the overall total of waste in healthcare (HCW) produced by medical establishments across the globe. In developing nations like Rwanda, Medical facilities need to improve their waste management procedures since they are currently insufficient. Thus, this study's objective was to assess the knowledge and practice of healthcare personnel towards biomedical waste management as well as to identify the association between level of knowledge and practice of healthcare personnel towards biomedical waste management at Nemba District Hospital and to explore barriers and opportunities of biomedical waste management among health care personnel. As the significance of the study, the results could be useful for the development of operational guidelines for the management of healthcare waste in health facilities nationwide, and in Gakenke District particularly and the researcher benefited from this study by improving the knowledge and skills about the healthcare waste management. A cross-sectional study was conducted with both qualitative and quantitative methods. The sample size used was 200 and was calculated by using Yamane formula for sample size determination for defined small population (target

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population less than 2000) with confidence of 95% and margin error of 5%(Yamane, 1967). A simple random procedure was used to choose 200 responses from 400 targeted population including nurses, social workers, and cleaners. Data were collected by using structured questionnaire, Participant Observation and In-depth interviews involved one-on-one conversations between the researcher and the participant. Chi-Square test was used to determine the association between the variables and level of significance was set at $p \leq 0.05$. The results of the study found that only 71 (35.5%) demonstrated a good practice towards bio-medical waste management. Age group and knowledge were significantly associated with good practice of bio-medical waste management among healthcare personnel. As conclusion, the level of in both knowledge and practice towards bio-medical waste management among healthcare personnel was low. The researcher recommends continuing education and training programmes to improve the knowledge and practices towards bio-medical waste management among healthcare personnel.

Keywords: *Biomedical waste management, Healthcare personnel, Hazardous waste, Healthcare waste handling, Knowledge and practice, Waste treatment methods.*

Introduction

Globally, about 10–25% of the volume of healthcare waste (HCW) from hospitals and healthcare institutions presents a serious health hazard to patients, healthcare workers, and anybody who comes in contact with it (WHO, 2020). Of the total amount of waste generated by health-care activities, about 85% is general, non-hazardous waste. The remaining 15% is considered hazardous material that may be infectious, toxic or radioactive. This study focuses on Nemba District Hospital, located in a rural and high mountain region, faces unique challenges in waste disposal due to its geographic location. The hospital generates approximately 125 kg of medical waste per week, yet it lacks adequate waste management infrastructure. The steep and inaccessible terrain further complicates transportation and proper disposal of waste. Studies indicate that over 60% of rural hospitals in similar regions experience chronic shortages of waste disposal resources, including proper incineration facilities and landfill options. The results could be useful for the development of operational guidelines for the management of healthcare waste in health facilities nationwide, and in Gakenke District particularly. Employing a cross-sectional design, data were collected using structured questionnaire, Participant Observation and In-depth interviews, analyzed using SPSS (Statistical Package for Social Scientist).

Material and methods

Study Design

The present study employed cross-sectional study design, it was conducted in Gakenke District at Nemba District Hospital. This study also used mixed method both quantitative and qualitative approach to gather information from study variables. The fact to use quantitative research, qualitative research in the present study gave a broadly understanding and the link between studies variables.

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Stratford Peer Reviewed Journals and Book Publishing
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Study Population

The Target Population included nurses, social workers, and cleaners working in selected health facilities Gakenke District.

Sample Design

The sample size was calculated by using Yamane formula for sample size determination for defined small population (target population less than 2000) with confidence of 95% and margin error of 5%(Yamane, 1967). For target population of 400 healthcare personnel, the calculation gives a sample of 200 healthcare personnel including nurses, social workers and sanitary workers (cleaners) in Nemba hospital.

$$n = \frac{N}{1 + N(e)^2} \Leftrightarrow n = \frac{400}{1 + 400(0.05)^2} = 200$$

Where n is the sample size, N is the population size (400), and e is the level of precision (5%) 200 participants took part in this study.

Sampling Technique

Participants were selected using random computer generated methods. The list was obtained from administration office. Simple random sampling method gives equal chance to all workers who meet selection criteria to participate in the study (Thomas, 2022).

Data Collection Methods

- **Instruments**
  Data were collected by using structured questionnaire, Participant Observation and In-depth interviews involved one-on-one conversations between the researcher and the participant. Data were recorded on a researcher made questionnaire covering various aspects of biomedical waste management at source of generation of waste in Nemba hospital.
- **Procedures**
  A trained research assistant facilitated data collection, including administering the questionnaire. Data collection sheets were pre-prepared and completed based on collected data.
- **Validity and Reliability**

  To ensure the reliability and cultural relevance of the instruments, a pilot study was conducted in a different patient care area in Gakenke District. During the pre-test, items on questionnaire that are not feasible to observe or administer were identified and deleted. This ensured that only practical and relevant items remained in the instruments.

Data Analysis

Data were checked for completeness and consistency, coded and entered in computer using SPSS (Statistical Package for Social Scientist) version 22 for data analysis. Tables and figures were used for results presentation. Descriptive analysis was used to analyze each

Stratford Peer Reviewed Journals and Book Publishing
Journal of Medicine, Nursing & Public Health
Volume 8||Issue 1||Page 44-56 ||March||2025|
Email: info@stratfordjournals.org ISSN: 2706-6606

study objective. Chi-Square statistical test of significance was used to determine the level of significance of association between variables. Level of significance was set at $p \leq 0.05$.

Results

The findings from this study showed that about a half of respondents 108 (54.0%) had good knowledge about bio-medical waste management process. The study revealed that 108 (54.0%) healthcare personnel use color coding to dispose infectious waste, 115 (56.0%) segregate general waste from bio-medical waste, and 91 (45.5%) daily collect bio-medical waste. The overall practice in this study was very low where only 71 (35.5%) had good practice on bio-medical waste management. Among the socio-demographic factors, only age group was significantly associated with good practice of bio-medical waste management. The age group of 35 to 45 years had significantly more likely to exercise good practice compared to those aged between 18 to 25 years.

Demographic Characteristics of Respondents

68 (34.0%) of respondents were aged between 26 and 35 years. Female healthcare personnel were dominant 122 (61.0%). 97 (48.5%) of respondents were attended secondary level and the highest number 119 (76.5%) were sanitary workers. 75 (37.5%) of the respondents worked for 1-5 years. Of the 200 participants, 83 (50%) of them had training twice in a year.

Knowledge of Healthcare Personnel on Bio-medical Waste Management

More than half 108 (54.0%) of respondents knew about bio-medical waste management process in the hospital, 116 (58.0%) knew about HIV/AIDs, while 112 (56.0%) knew about Hepatitis B and 106 (53.0%) knew about Hepatitis C, transmitted through poor handling of bio-medical waste. Similarly, 76 (38.0%) knew that microwave can be used to handle bio-medical waste management, 107 (53.5%) knew that land can be used correctly to handle bio-medical waste. The results show that nearly a half 102 (51.0%) of respondents demonstrated a good knowledge about bio-medical waste management control.

The Practices of Healthcare Personnel on Bio-medical Waste Management

108 (54.0%) respondents use colour coding to dispose infectious waste, 115 (56.0%) segregate general waste from bio-medical waste, and 91 (45.5%) daily collect bio-medical waste and transport to the designated storage site. A total of 109 (54.5%) temporary treat and dispose hospital waste for one day. Most 117 (58.5%) were using weight handler and keep record of generated waste and 143 (71.5%) use wheeled trolleys for waste transport. The majority of respondents 147 (73.5%) use personal protective equipment (PPE) when handling bio-medical wastes. Regarding the compliance with safety precautions, the highest number 72 (36.0%) always comply with safety precautions.

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Stratford Peer Reviewed Journals and Book Publishing
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Factors Associated with level of knowledge and Practices Towards Bio-medical Waste Management among Healthcare Personnel

Age was the only demographic factor significantly associated with good practices towards bio-medical waste management (p=0.007). Overall knowledge score about waste management was significantly associated with practices of bio-medical waste management (p=0.013) where most of respondents with good practices had good knowledge about bio-medical waste management.

Barriers and opportunities of biomedical waste management among health care personnel

The results showed that 34 (17%) of respondents reported that they had not received comprehensive training on biomedical waste management. Among those who have received training, 45 (27%) had received training once a year, 83 (50%) had received training twice a year and 38 (23%) had received training thrice a year. 92 (46%) of the participants identified a lack of color-coded waste bins.

Discussion

The overall objective of this study was to assess the knowledge and practice regarding bio-medical waste management among healthcare personnel at Nemba District Hospital. The findings from this study showed that about a half of respondents 108 (54.0%) had good knowledge about bio-medical waste management process. This is in agreement to a study conducted in India among 100 nurses where 47% had excellent knowledge about bio-medical waste management (Shivalli & Sanklapur, 2014). The study revealed that 108 (54.0%) healthcare personnel use color coding to dispose infectious waste, 115 (56.0%) segregate general waste from bio-medical waste, and 91 (45.5%) daily collect bio-medical waste. These findings are supported by a systematic review of six studies which reported that color coding of wastes was not done by 67% of the subjects (Kapoor et al., 2014). This shows that there is a need of refresher trainings to ensure sustainability and further improvement.

The overall practice in this study was very low where only 71 (35.5%) had good practice on bio-medical waste management. This was similar to the study done in Ethiopia which reported 31.5% (Azage et al., 2013). However, the result is lower than the study done in Pakistan where 94.3% of the study participants had adequate practice (Ajmal & Ajmal , 2017). This difference could be explained due to low enforcement or monitoring by the regulatory body in the health facilities. Bio-medical waste management knowledge and bio-medical waste management practices were significantly associated in the present study where adequate practice was higher among respondents with good knowledge. This is similar to a study carried out in India, which revealed lack of knowledge about waste management significantly affects the safe practices for management (Shivalli & Sanklapur, 2014). This demonstrates that improved knowledge can lead to as accepted practice. Among the socio-demographic factors, only age group was significantly associated with good practice of bio-medical waste management. The age group of 35 to 45 years had significantly more likely to

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Stratford Peer Reviewed Journals and Book Publishing
Journal of Medicine, Nursing & Public Health
Volume 8||Issue 1||Page 44-56 ||March||2025|
Email: info@stratfordjournals.org ISSN: 2706-6606

exercise good practice compared to those aged between 18 to 25 years. This could be indirectly related to the years of experience as it is believed that increased experience will increase safer practices.

In summary, the barriers identified in this study reflect structural and educational limitations, while the opportunities point toward a need for systemic interventions, such as training programs, better infrastructure, and fostering a safety-conscious work environment.

Conclusion

This study found that the knowledge and practice about bio-medical waste management were low at 54.0% and 35.5% respectively. Age group and knowledge were significantly associated with good practice of bio-medical waste management among healthcare personnel.

Recommendation

The researcher recommends that the Ministry of health should undertake vigorous and regular training programs on bio-medical waste management for healthcare personnel. Much improvements and efforts should be made in strengthening and enforcing sanitation policies and practices whereby availing bio-medical waste management regulations and guidelines and their accessibility at all levels. Increase regular inspection and awareness about Bio-medical waste management.

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Disclosure

The authors declare no conflicts of interest related to this study. This research received no external funding. Ethical approval was obtained from both Mount Kenya University Ethical Research Committee and Nemba District Hospital Ethical Research Committee under approval numbers MKU/ETHICS/23/01/2024 and N^{0}184/HJB/HRM/2024 respectively, and all participants provided informed consent. The data supporting the findings of this study are available upon request from the corresponding author. The authors acknowledge Mukamanzi Donatille / Nemba District Hospital, Ngendakumana Adrien / Nemba District Hospital for their support in data collection and analysis.

References

Ajmal S., Ajmal M. Knowledge and Practices of Bio-medical Waste Management among Paramedic Staff of Jinnah Hospital, Lahore. Biologia. 2017;63:59–66.Al-Emad, A. A. (2011). Assessment of medical waste management in the main hospitals in Yemen. *East Mediterr Health J, 17*(10), 730-737.

Azage M., Haimanot G., Mesafint M. Healthcare waste management practices among healthcare workers in healthcare facilities of Gondar town, northwest Ethiopia. Health Science Journal. 2013;7:15–26.

Bdour, A., Altrabsheh, B., Hadadin, N., & Al-Shareif, M. (2007). Assessment of medical wastes management practice: a case study of the northern part of Jordan. *Waste Manag, 27*(6), 746-759.

Kapoor, D., Nirola, A., Kapoor, V., &Gambhir, R. S. (2014). Knowledge and awareness regarding bio-medical waste management in dental teaching institutions in India- A systematic review. J ClinExp Dent., 6(4), e419-424. doi: 410.4317/jced.51565. eCollection 52014 Oct.

Komilis, D., Fouki, A., & Papadopoulos, D. (2012). Hazardous medical waste generation rates of different categories of health-care facilities. *Waste Manag, 32*(7), 1434-1441.

Shivalli, S., & Sanklapur, V. (2014). Healthcare waste management: qualitative and quantitative appraisal of nurses in a tertiary care hospital of India. *ScientificWorldJournal, 2014*, 935101.

Thomas, L. (2022). *Simple random sampling: Definition, steps & examples*. Scribbr. Published on May 3, 2022, and revised on December 18, 2023.

WHO. (2022). World Health Organization. Standard precautions: Waste management.

Yamane, T. (1967). Statistics: An Introductory Analysis, 2nd Ed., New York: Harper and Row.

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Table 1 Demographic characteristic of the respondents

This table presents the information related to age, gender, marital status, educational level, professional, work experience (years), received training about waste management and number of training of respondents.

Variable	Frequency	Percentage %
Age in years		
18-25	57	28.5
26-35	68	34
36-45	54	27
46-55	15	7.5
55+	6	3
Gender		
Male	78	39
Female	122	61
Marital status		
Single	90	45
Married	97	48.5
Divorced/separated	7	3.5
Widower	6	3
Education level		
None	0	0
Primary	28	14
Secondary	97	48.5
University	75	37.5
Professional		
Nurses	28	18
Lab Scientist	9	5.5
Sanitary worker	119	76.5
Work experience (years)		
1-5	75	37.5
6-10	65	32.5
11-15	28	14
16-20	22	11
20+	10	5
Received training about waste management		
Yes	166	83
No	34	17
Number of training (n=166)		
Once a year	45	27
Twice a year	83	50
Thrice a year	38	23

Source: Primary data (2025)

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Stratford Peer Reviewed Journals and Book Publishing
Journal of Medicine, Nursing & Public Health
Volume 8||Issue 1||Page 44-56 ||March||2025|
Email: info@stratfordjournals.org ISSN: 2706-6606

Notes: Table 1 indicates that the highest percentage 68 (34.0%) of respondents were aged between 26 and 35 years. Female healthcare personnel were dominant 122 (61.0%). About half 97 (48.5%) of respondents were married. The highest percentage 97 (48.5%) of respondents were attended secondary level and the highest number 119 (76.5%) were sanitary workers. According to work experience, 75 (37.5%) of the respondents worked for 1-5 years. Of the 200 participants, majority 166 (83%) had received training about waste management and 83 (50%) of them had training twice in a year.

Table 2 Knowledge of Healthcare Personnel on Bio-medical Waste Management

Indicators of knowledge	Frequency	Percentage %
Knowledge about bio-medical waste management process in the hospital		
Yes	108	54
No	92	46
Knew about diseases which can be transmitted through poor handling of bio-medical waste		
HIV/AIDs (yes)	116	58
Hepatitis B (yes) Hepatitis C (yes)	112 106	56 53
Knew the correct method used to handle bio-medical wastes based on their categories		
Microwave	76	38
Incineration Land Chemical Autoclave	78 107 80 87	39 53.5 40 43.5
Knew storage time for infectious waste		
10 to 11 minutes	132	66
Don't know	68	34
Level of knowledge		
Good knowledge	102	51
Average knowledge Poor knowledge	41 57	20.5 28.5

Source: Primary data (2025)

Notes:

Table 2 shows that more than half 108 (54.0%) of respondents knew about bio-medical waste management process in the hospital. Of 200 participants 116 (58.0%) knew about HIV/AIDs, while 112 (56.0%) knew about Hepatitis B and 106 (53.0%) knew about Hepatitis C, transmitted through poor handling of bio-medical waste. Similarly, 76 (38.0%) knew that microwave can be used to handle bio-medical waste management, 107 (53.5%) knew that land can be used correctly to handle bio-medical waste. Majority 132 (66.0%) also knew that the storage time for infectious waste can be 10 to11 minutes. The

Stratford Peer Reviewed Journals and Book Publishing
Journal of Medicine, Nursing & Public Health
Volume 8||Issue 1||Page 44-56 ||March||2025|
Email: info@stratfordjournals.org ISSN: 2706-6606

results show that nearly a half 102 (51.0%) of respondents demonstrated a good knowledge about bio-medical waste management control.

Table 3 The Practices of Healthcare Personnel on Bio-medical Waste Management

Variables	Indicators	Frequency	Percentage %
Use of color coding to dispose the non-infectious waste	All the time	50	25
	Sometimes	48	24
	Rarely	86	43
	Not at all	16	8
Use of color coding to dispose infectious waste	Yes	108	54
	NO	92	46
Segregation of general waste from bio-medical waste	Yes	115	56
	No	85	44
Daily bio-medical waste collection and transport to the designated storage site	Yes	91	45.5
	No	109	54.5
Temporarily treatment and disposal of hospital waste	Yes(1day)	109	54.5
	No	91	45.5
Weight handler and keep record of generated waste	Yes	117	58.5
	No	83	41.5
The use of waste transport	Wheeled trolleys	143	71.5
	Carts	11	5.5
	Containers	46	23
Use of personal protective equipment in handling bio-medical wastes	Yes	147	73.5
	No	53	26.5
Compliance with safety precautions	Always	72	36
	Often	56	28
	Sometimes	24	12
	Never	48	24
Use of safe disposal of sharps	Always	87	43.5
	Often	81	40.5
	Sometimes	32	16
Wear overall safety protection while handling wastes	Always	75	37.5
	Often	63	31.5
	Sometimes	27	13.5
	Never	35	17.5
Wear gloves while handling bio-medical waste	Always	79	39.5
	Often	65	32.5
	Sometimes	22	11
	Never	34	17
Wear gowns	Always	90	45
	Often	75	37.5
	Sometimes	16	8
	Never	19	9.5
Wear caps	Always	72	36
	Often	64	32
	Sometimes	25	12.5
	Never	39	19.5
Wear masks	Always	96	48
	Often	49	24.5
	Sometimes	27	13.5
	Never	28	14
Hand washing with bactericidal agent after handling wastes	Always	74	37
	Often	63	31.5
	Sometimes	23	11.5
	Never	40	20
Overall practices towards waste management	Good practices	71	35.5
	Poor practices	129	64.5

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Stratford Peer Reviewed Journals and Book Publishing
Journal of Medicine, Nursing & Public Health
Volume 8||Issue 1||Page 44-56 ||March||2025|
Email: info@stratfordjournals.org ISSN: 2706-6606

Source: Primary data (2025)

Notes: The Table 3 presents the practices of healthcare personnel on bio-medical waste management. Only 50 (25.0%) use colour coding all the time. Out of 200 participants, more than half 108 (54.0%) respondents use colour coding to dispose infectious waste, 115 (56.0%) segregate general waste from bio-medical waste, and 91 (45.5%) daily collect bio-medical waste and transport to the designated storage site. A total of 109 (54.5%) temporary treat and dispose hospital waste for one day. Most 117 (58.5%) were using weight handler and keep record of generated waste and 143 (71.5%) use wheeled trolleys for waste transport. The majority of respondents 147 (73.5%) use personal protective equipment (PPE) when handling bio-medical wastes. Regarding the compliance with safety precautions, the highest number 72 (36.0%) always comply with safety precautions.Concerning the use of safe disposal of sharps, 87 (43.5%) always use safe disposal of sharps, 81 (40.5%) do it often while 32 (16.0%) do it sometimes. Respondents were also asked when they wear overall safety protection while handling wastes and about one third which are 75 (37.5%) do it always. Regarding the types of PPE used by respondents, 79 (39.5%) always wear gloves, 90 (45.0%) always wear gowns, 72 (36.0%) always wear caps, and 96 (48.0%) always wear masks when handling bio-medical waste. The highest percentage 63 (31.5%) used to wash their hands always with bacterial acid agent after handling bio-medical waste. Regarding the overall practice score, only 71 (35.5%) demonstrated a good practice towards bio-medical waste management.

Table 4 Factors Associated with level of knowledge and Practices Towards Bio-medical Waste Management among Healthcare Personnel

Variables	Practices towards bio-medical waste management		Chi-Square	P-value
	Good, n(%)	Poor, n(%)		
Age group in years			**25.47**	**0.007**
18-25	**13(19.4)**	**24(18.0)**		
26-35	**8(11.9)**	**51(38.3)**		
36-45	**38(56.7)**	**40(30.1)**		
46+	**8(30.7)**	**18(69.2)**		
Gender			**1.83**	**0.176**
Male	**25(37.3)**	**63(47.4)**		
Female	**42(62.7)**	**70(52.6)**		
Marital status			**6.17**	**0.123**
Single	**18(26.9)**	**70(52.6)**		
Married	**43(64.1)**	**51(38.3)**		
Divorced/separated/ Widower	**6(33.3%)**	**12(66.7)**		
Work experience (years)			**4.27**	**0.37**
1-5	**17(25.4)**	**33(24.8)**		
6-10	**12(17.9)**	**14(10.5)**		
11-15	**26(38.8)**	**68(51.1)**		

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Stratford Peer Reviewed Journals and Book Publishing
Journal of Medicine, Nursing & Public Health
Volume 8||Issue 1||Page 44-56 ||March||2025|
Email: info@stratfordjournals.org ISSN: 2706-6606

16-20	6(9.0)	7(5.3)		
20+	6(9.0)	11(8.3)		
Received training about waste management			0.98	0.322
Yes	55(82.1)	101(75.9)		
No	12(17.9)	32(24.1)		
Knowledge about waste management			8.62	0.013
Good knowledge	28(41.8)	70(52.6)		
Average knowledge	20(29.9)	17(12.8)		
Poor knowledge	19(28.4)	46(34.6)		

Source: Primary data (2025)

Notes:

The findings presented in Table 4 showed that age was the only demographic factor significantly associated with good practices towards bio-medical waste management (p=0.007). Overall knowledge score about waste management was significantly associated with practices of bio-medical waste management (p=0.013) where most of respondents with good practices had good knowledge about bio-medical waste management.

Table 5 Barriers and opportunities of biomedical waste management among health care personnel

Variables	Indicators	Frequency	Percentage %
Received training about waste management	Yes	166	83
	No	34	17
Number of training (n=166)	Once a year	45	27
	Twice a year	83	50
	Thrice a year	38	23
Use of color coding to dispose the non-infectious waste	All the time	50	25
	Sometimes	48	24
	Rarely	86	43
	Not at all	16	8
Use of color coding to dispose infectious waste	Yes	108	54
	NO	92	46
	No	83	41.5
The use of waste transport	Wheeled trolleys	143	71.5
	Carts	11	5.5
	Containers	46	23
Use of personal protective equipment in handling bio-medical wastes	Yes	147	73.5
	No	53	26.5
Compliance with safety precautions	Always	72	36
	Often	56	28
	Sometimes	24	12
	Never	48	24
	Often	63	31.5
	Sometimes	27	13.5
	Never	35	17.5
	Often	65	32.5

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Source: Primary data (2025)

Notes:

The findings indicate several key barriers that interfere with effective biomedical waste management among healthcare personnel.

The findings presented in Table 5 showed that 34 (17%) of respondents reported that they had not received comprehensive training on biomedical waste management. Among those who have received training, 45 (27%) had received training once a year, 83 (50%) had received training twice a year and 38 (23%) had received training thrice a year. This lack of training was cited as a major barrier, leading to improper handling, segregation, and disposal of waste. Many healthcare workers mentioned that they rely on informal on-the-job training, which may not always cover the necessary protocols in detail.

Table 5 shows that approximately 92 (46%) of the participants identified a lack of color-coded waste bins. These infrastructural deficiencies were cited as significant obstacles to proper biomedical waste management. Respondents noted that when appropriate disposal containers were unavailable, they resorted to using improvised methods that compromised safety.

Despite these barriers, the study also identified opportunities to enhance biomedical waste management practices:

The findings presented in Table 5 showed that 72 (36%) Respondents suggested that clearer, well-disseminated protocols, accompanied by regular monitoring and evaluation, could improve compliance. They recommended the use of waste management audits and feedback mechanisms to track adherence to procedures and identify areas for improvement.

Abbreviations: AWCS: Automated Waste Collection System; Healthcare Waste Management; Healthcare Waste; WHO: World health Organization