

## A Systematic Review on Biomedical Waste Management Among Staff Nurses.

YagaJeyanthi M<sup>1</sup>, Monika N<sup>2</sup>, Balaji B<sup>2</sup>, Kushbu V<sup>2</sup>, Vandana V.S<sup>2</sup>,

1. Professor, Department of community health Nursing, Chettinad College of Nursing, Chettinad Academy of Research & Education, Rajiv Gandhi Salai, Kelambakkam, Chengalpattu District, TamilNadu, India.
2. B.Sc Nursing III year students, Chettinad College of Nursing, Chettinad Academy of Research & Education, Rajiv Gandhi salai, Kelambakkam, Chengalpattu District, TamilNadu, India.

Corresponding author: Yaga Jeyanthi M

Professor, Department of Community Health Nursing  
Chettinad College of Nursing, Chettinad Academy of Research & Education,

---

### Abstract

Systematic review on biomedical waste management among staff nurses. The researcher selected qualitative research approach and literature review as research design. The objectives of the study were to find out and conclude biomedical waste management among staff nurses and to review and analysis of current research on biomedical waste management (BMW) among staff nurses. The researchers were divided themselves and started searching through primary and secondary electronic sources like Google search, Google scholar, Pub Med, Medline etc., there they found 215 studies and they selected 25 studies as a quality study. The studies were selected based on inclusion criteria and the quality of the study and only twenty-five studies were taken which was eligible. The studies were tabulated. The table showed that most of the studies done for biomedical waste management wherein the samples were selected by random sampling method. In majority of the studies questionnaire method was used. Result debits that 77.51% of study participants had knowledge about various diseases transmission through BMW. 77% of nurses had adequate knowledge on biomedical waste management. 56.8%, 66.2%, and 77.4% had adequate knowledge, favorable attitude, and adequate practice score on biomedical waste management and associated factors. Knowledge regarding the topic was fresh and adequate and a positive correlation was established between the knowledge and attitude of the novice nurses towards practicing biomedical waste management. 54.39% students were aware that there were different categories of biomedical wastes generated in their hospital. 45.5%, 78.2%, and 80% of the study participants had adequate knowledge, favorable attitude, and adequate practice scores on medical waste management. About 79.9% were aware that BMW management rules apply to dentists. 87.2% of respondents were female. 91.82% of participants had a positive attitude towards safe management of biomedical waste. Regarding the knowledge of BMW management policies, about 83.1% to 98.9% had positive attitude towards the safe management of biomedical waste.

**Key Words:** Biomedical waste management, Literature review.

---

Date of Submission: 05-04-2022

Date of Acceptance: 20-04-2022

---

### I. Introduction

Health care personnel including doctors, nurses and paramedical staffs are the guardians of the community. It is the duty of the entire health care establishments to ensure speedy recovery of their patients by maintaining clean and infection free surroundings, basic sanitation and cleanliness have always been mandatory requirements in the health care establishment; collection and disposal of Bi-medical waste often ignored are directly responsible for the spread of diseases in the community specifically among health care personal.

The Bio-medical waste that is originated in hospitals posses numerous potential health and safety hazards. Infectious waste risk the health of not only the hospital staff, patients and their relatives who are visiting and attending them but municipalities. The quantity of bio-medical waste generated will vary depending on the hospital's policies and practices and the type of care being provided. It can be of high risk to the hospital staff the patients the community public health and the environment, where proper disposal norms are often not followed.

Hospital and other health care institutions are one of the essential commodities of daily life. They generate waste day in and day out which may be the potential health hazards to health workers. While hospital claim to dispose off their wastes as per the stipulated norms, it is shocking to note that much of the infectious waste including needles, syringes, catheters, etc. are being recycle only to find its way back into the market.

waste requiring special attention includes , those that are potentially infectious ,sharps e.g. needle , scalpels , others subjects capable of puncturing the skin , plastic waste establishment , pharmaceutical waste and a variety of chemically hazardous waste used in laboratories .

**STATEMENT OF THE PROBLEM**

A schematic review of biomedical waste management among staff nurses.

**OBJECTIVES:**

To find out knowledge and practice on Biomedical waste management among staff nurses.

**II. Result And Discussion:**

S. No.	Authors Name	Year	Title of the study	Result
1.	Md. Asadullah, et al.	2013	A study on knowledge, attitude and practices regarding biomedical waste management among nursing staffs in private hospitals in Udupi city, Karnataka.	The result revealed that the majority 160(96.4%) of participants were female and mean age of respondents were found to be 28.6 (±9.04) years. Majority 159(95.8%) of nursing staff had considered the biomedical waste as different from general wastes and 150(90.4%) of respondent were agreed for the segregation of BMW at point of generations. The study showed that 77.51% of study participants had knowledge about various diseases transmission through BMW. The overall knowledge 95.8% regarding BMW among nursing staff of hospital no.1 was significantly (p<0.001) higher than other hospitals.
2.	Suganya Panneerselvam	2016	Knowledge on Biomedical Waste Management among Nurses Working in Hospital at Madurai.	The findings revealed that, among 30 nurses 23 (77%) had adequate knowledge, 7 (23%) had moderate adequate knowledge and none of them had inadequate knowledge.
3.	Jyotisrivastava	2013	Knowledge Regarding Biomedical Waste Management among the Staff Nurses Knowledge Regarding Biomedical Waste Management among the Staff Nurses Knowledge Regarding Biomedical Waste Management among the Staff Nurses	Showed that the staff nurses had average knowledge regarding biomedical waste management. The planned teaching programme was found effective because post test knowledge was better than the pre test knowledge score among staff nurses.
4.	TeshiwalDeress et al.	2018	Assessment of Knowledge, Attitude, and Practice about Biomedical Waste Management and Associated Factors among the Healthcare Professionals at Debre Markos Town Healthcare Facilities, Northwest Ethiopia	Among 296 healthcare professionals studied, 168 (56.8%), 196 (66.2%), and 229 (77.4%) had adequate knowledge, favorable attitude, and adequate practice score, respectively. Regarding associated factors, MSc and MD+ (AOR: 4, 95% CI: (1.37, 149.52)), BSc holders (AOR: 2.53, 95% CI: (1.47, 4.38)), and availability of color-coded bins (AOR: 7.68, 95% CI: (3.30, 17.89)) were identified more likely to contribute for adequate knowledge, favorable attitude, and adequate practice scores, respectively.
5.	BaishakhiParia, et al.	2017	Knowledge And Practice Regarding Biomedical Waste in Different Levels of Government Health Care Facilities in West Bengal.	Most of health care institution had no provision for training regarding biomedical waste Management .None provide prophylactic vaccination (pertaining to biomedical waste) to the health care providers.
6.	Kulumina Dash, et al.	2021	Assessment of Knowledge, Attitude, and Practices about Biomedical Waste Management among Nursing Professionals in a Tertiary Care Hospital, Bhubaneswar,Odisha.	Overall, the knowledge, attitudes and practices towards biomedical waste Management among the nursing professionals were satisfactory.
7.	Arjun Saha, et al.	2021	Health Care Waste Management in Public Sector of Tripura, NorthEast India: An Observational Study	Overall, 37.68% of the respondents had fair knowledge regarding HCWM, 8.27% received in service training on HCWM, 66.17% were immunized against hepatitis B and > 90% of the respondents knew about segregation of waste at source but knowledge regarding the use of colored bins for this purpose varied widely across

				different categories of participants. Housekeeping staff were ignorant about most of these issues. The importance of disinfecting the waste before disposal was known to 83.63% of the workers. Proper HCWM was practiced by 39.15% and segregation of waste at source into colored bins was followed by 23.3% of the respondents. The study revealed both waste management facilities and display of waste management policy as poor. Technical qualification and in service training were identified as the statistically significant determinants of knowledge and practice of HCWM ( $P < 0.05$ ).
8.	SadikouAgbere, et al.	2021	State of the art of the management of medical and biological laboratory solid wastes in Togo.	The assessment of BMW management of the prospected centers showed that among the 67.1% of public centers and 32.9% of private centers present in the study sample, only 26.3% present all laboratory units and together in 87.8% of cases. Males predominate in these facilities (85.3%) with an average age of $37.07 \pm 7.34$ years and work experience of $10.24 \pm 5.81$ years. While in 67.0% of the cases, the location of waste storage is available, only 18.3% of these locations meet international requirements.
9.	JaberAlqahtani, et al.	2019	Knowledge, attitude, and practices about Bio-Medical Waste management across Dentists, Dental students and Auxiliary Staff among main cities and towns in Saudi Arabia	The results of this study have demonstrated that despite having knowledge, there is still defect in the day to day practice of BM Waste, this could be because lack of training regarding the subject or could be because of no strict laws regarding the same.
10.	Israt Jahan, et al.	2018	Knowledge, attitude and practices on biomedical waste management among the health care personnel of selected hospitals in Dhaka city.	The results showed that excellent level of knowledge, attitude and practice was found among doctors, nurses and medical technologists except the cleaners. Cleaners also found ignored in terms of training and vaccination.
11.	Khadem Hussain Saedi, et al.	2019	Biomedical Waste Management in Kandahar City.	The result showed that 65.3% newly hired biomedical waste staff not received training or instruction. Furthermore, the result indicates that 44% generated biomedical wastes are regulated by municipality and color coding is not followed accordingly. Current biomedical waste is not appropriate based on designed international standards and the criteria suggested by world health organization.
12.	Frincy Francis, et al.	2019	Novice nurses and biomedical waste management: Assessing the retention and application of their knowledge and attitude regarding biomedical waste management.	The study concluded that their knowledge regarding the topic was fresh and adequate and a positive correlation was established between the knowledge and attitude of the novice nurses towards practising biomedical waste management The study concluded that their knowledge regarding the topic was fresh and adequate and a positive correlation was established between the knowledge and attitude of the novice nurses towards practicing biomedical waste management.
13.	Sudeep C. B, et al.	2017	A KAP study to assess Biomedical Waste Management in a Dental College in South India.	The study result suggested that there was a lack of knowledge among the study participants regarding different aspects of BMW.
14.	Desh Deepak, et al.	2021	Knowledge, Awareness and practice about Biomedical waste management among undergraduate BDS students in Bihar.	423 (94.84%) students were not aware of the biomedical waste management laws in India. 245 (54.39%) students were aware that there are different categories of biomedical wastes generated in our hospital. Only 44 i.e 9.86% of the students knew and 337 (75.56 %) didn't know regulatory body for medical waste transport. Only 36 (8.07%) students said Final disposal of dental care waste is via certified collector. Only 102 (22.8%) could identify the correct sequence of the six effective steps of biomedical waste management. Only 160 (35.87%) students were aware that biomedical waste shouldn't be stored beyond 24 hrs. 267 (59.86%) and 305 (68.38%) students could identify the infected as category for extracted tooth and impression materials and cotton respectively. 316 (70.85%) students knew that excess amalgam is stored in fixer solution. 198 (44.39%) students knew that puncture proof plastic is used to carry infected sharps. 245 (54.9%) students thought that all the health care waste are hazardous. 346 (77.57%) students



*A Systematic Review On Biomedical Waste Management Among Staff Nurses.*

				respectively.
20.	PensiriAkkaji, et al.	2020	Assessment of Knowledge, Attitude, and Practice in respect of Medical Waste Management among Healthcare Workers in Clinics Assessment of Knowledge, Attitude, and Practice in respect of Medical Waste Management among Healthcare Workers in Clinics.	The results showed that the majority of respondents (87.2%) were female of whom 36.9% were aged (20-29), 52.0% had more than 5 years working experience, and 51.2% had participated in at least one training course regarding medical waste management. The overall scores for knowledge, attitude, and practice were at a high level (89.5%, 91.9%, and 92.2%, respectively). Significant and positive correlations were found between knowledge and attitude ( $r = 0.464$ ), knowledge and practice ( $r = 0.396$ ), and practice and attitude ( $r = 0.519$ ). Statistical analysis using t tests and one-way analysis of variance showed that working experience and its duration were significant factors influencing good medical waste management practice.
21.	Tanuja Singh, et al.	2018	Awareness of Biomedical Waste Management in Dental Students in Different Dental Colleges in Nepal.	Majority (91.82%) of participants had a positive attitude towards safe management of biomedical waste. Regarding the knowledge of BMW management policies, majority of the students (83.1% to 98.9%) had positive attitude towards the safe management of biomedical waste, whereas more than 50% of the students were unaware of the guidelines laid down by Government of Nepal. Regarding biomedical waste disposal technique in the hospital, only 29.9% to 79.8% are aware; this shows that there is lack of strict protocol in the BMW management. Association between different responses and colleges for "improper waste management causes various health hazards" ranged from 93.3% to 98.9%.
22.	Malini A, et al.	2015	Knowledge, Attitude and Practice of Biomedical waste management among health care personnel in a tertiary care hospital in Pondicherry.	It showed that <50% of nursing staff and <25% of MPWs had the knowledge of colour coding and segregation. There was also poor knowledge regarding disposal of sharps among technicians and MPWs. It also brought to our notice that only 50% of the doctors (residents) and nursing staff and 26% of the laboratory technicians have undergone training in BMW management. None of the MPWs had received training regarding BMW management. They had good knowledge regarding the diseases transmitted through improper bio medical waste handling.
23.	TadoNabamHina, et al.	2021	Knowledge, attitude and practice regarding biomedical waste management amongst healthcare workers in a teaching hospital from a north eastern state of India.	Study results show that the average knowledge score was highest amongst nurses ( $10 \pm 2.6$ ) and least in class IV staffs ( $7.2 \pm 1.9$ ). Amongst all participants laboratory technicians were mostly average or poor on the attitude score. Overall only 23 percent ( $n=73$ ) of the healthcare workers were found to be performing good BMW management practice.
24.	Maneesh Bhatt, et al.	2020	Knowledge, Attitude and Practice of Biomedical Waste (BMW) Management among Health Care Providers in a Tertiary Care Hospital: A Cross Sectional Study from Haldwani, Uttarakhand.	Maximum HCPs were known about all colour coded bins except white puncture proof container which was known only by 30% participants. 98.3% reported that BMW should be segregated whereas 53% said that BMW management is not an issue at all. Practice of HCPs regarding bio-medical waste management was poor.
25.	JutikaOjah, et al.	2020	Awareness and practices of biomedical waste management in government health care facilities in Kamrup District, Assam.	About one-fourth of 218 respondents belonged to age group 26-30 years. Half of the respondents were nurses, 17.9% were doctors, 12.8% were pharmacists and 8.3% were waste handlers. Majority (78.4%) were aware of BMW rules. Awareness on hazardness of healthcare waste, segregation of waste, maximum storage time of hospital waste, awareness about availability of training on healthcare waste management were found to be more among the doctors (84.6%, 79.4%, 56.4%, 82.1% respectively) and less among waste handlers (44.4%, 33.3%, 38.9%, 44.4% respectively). Only 40.8% were trained. The practice of disposing BMW in specified colour coded containers were done by 56.4% HCW. Out of 18 waste handlers, only 16.7% had the practice of wearing all the personal protective equipments (PPE) while handling BMW. All total 59.6% HCW had been vaccinated against Hepatitis B. Tetanus vaccination was taken by 77.5% HCW.

**MANJOR FINDINGS OF THE SYSTEMATIC REVIEW**

1. 77.51% of study participants had knowledge about various diseases transmission through Biomedical Waste.
2. 77% of nurses had adequate knowledge on biomedical waste management.

3. 56.8%, 66.2%, and 77.4% had adequate knowledge, favorable attitude, and adequate practice score on biomedical waste management and associated factors.
4. 37.68% of the respondents had fair knowledge regarding Health Care Waste Management.
5. Knowledge regarding the topic was fresh and adequate and a positive correlation was established between the knowledge and attitude of the novice nurses towards practicing biomedical waste management.
6. 54.39% students were aware that there were different categories of biomedical wastes generated in their hospital.
7. 41% had knowledge; regarding practice 28.1% HCPs used and discarded PPE while handling biomedical wastes. Additionally, 34.4% followed proper hand hygiene before and after each procedure and whenever needed.
8. More than half were males (59.1%) and 44.7% were aged 18-29 years. The mean ( $\pm$ standard deviation) score for overall knowledge (0-15) was 11.42 ( $\pm$ 4.33), and 5.62 ( $\pm$ 3.96) for overall practice.
9. 87.2% of respondents were female. The overall scores for knowledge, attitude, and practice were at a high level (89.5%, 91.9%, and 92.2%, respectively).
10. About 79.9% were aware that BMW management rules apply to dentists.
11. None of the class IV workers had complete knowledge about color coding and segregation of bio medical waste.
12. Regarding the knowledge of BMW management policies, about 83.1% had positive attitude towards the safe management of biomedical waste.
13. <50% of nursing staff and <25% of MPWs had the knowledge of color coding and segregation.
14. Only 23% of the healthcare workers were found to be performing good Biomedical Waste Management practice.

### **III. Conclusion**

The conclusion is intended to help the reader understand why your research should matter to them after they have finished reading the paper. A conclusion is not merely a summary of points or a re-statement of research problem but a synthesis of key points. However, the nature of being introspective about the research you have done will depend on the topic and whether your professor wants you to express your observations in this way. The planned teaching programme was found effective because post test knowledge was better than the pre test knowledge score among staff nurses. 45.5%, 78.2%, and 80% of the study participants had adequate knowledge, favorable attitude, and adequate practice scores on medical waste management. 91.82% of participants had a positive attitude towards safe management of biomedical waste.

### **References**

- [1]. Md. Asadullah, Karthik G.K. et al . A study on knowledge ,attitude and practices regarding biomedical waste management among nursing staffs in private hospitals in Udupi city , Karnataka. International Journal of Geology , Earth and Environmental Sciences .January-April2013:Vol.3(1).
- [2]. Suganya Panneer selvam .Knowledge on Biomedical Waste Management among Nurses Working in Hospital at Madurai. International Journal of Health Sciences and Research .August 2016.Vol.6;Issue:8.
- [3]. Jyoti Srivastava . Knowledge Regarding Biomedical Waste Management among the Staff Nurses Knowledge Regarding Biomedical Waste Management among the Staff Nurses. International Journal of Science and Research . July2016.Volume5Issue7.
- [4]. Teshiwal Deressetal .Assessment of Knowledge ,Attitude ,and Practice about Biomedical Waste Management and Associated Factors among the Health care Professionals at Debre Markos Town Health care Facilities ,Northwest Ethiopia's Environ Public Health.2018October2;2018:7672981.
- [5]. Baishakhi Paria, et. al. Knowledge And Practice Regarding Biomedical Waste in Different Levels of Government Health Care Facilities in West Bengal. R Journal of Dental and Medical Sciences.February2017.Volume16, Issue2 Vol.I.