



Biomedical Waste Management – A Tertiary Care Center Study On Knowledge, Attitude, And Practice In Health Care Workers

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Abstract

Background: Biological waste can be classified as nonhazardous and Hazardous wastes. The nonhazardous waste consists of almost 85% of the waste which consists of remnants of feed, fruit peels, wash water, paper cartons, and packaging materials. Hazardous waste is infectious waste that can cause grievous implications for mankind and the ecosystem. Biomedical waste (BMW) is any waste produced during the diagnosis, treatment, or immunization of human or animal research activities pertaining thereto or in the production or testing of biological or health camps. It follows the cradle-to-grave approach which is the characterization, quantification, segregation, storage, transport, and treatment of BMW. AIMS AND

Objectives: To study the Knowledge of staff about the management of biomedical waste as per rule 2016. To assess the training need of staff concerning segregation and disposal of Biomedical waste (BMW). The present prospective study was conducted for six months starting from February 2020 till August 2020, at our tertiary care center, Bengaluru

Methods: The Mode of sample selection - Stratified Random Sampling. The Sample size was 50 -doctors, postgraduate students, interns, nurses, technicians working in the blood bank, central laboratory, pathology, microbiology departments, attendees, and sweepers. Knowledge Attitude and Skills of the study population was assessed through observation, Interview, and questionnaire. The data collection tools we used were the Observation checklist and Questionnaire. Both Structured and Non Structured Questionnaires in one or all stages of biomedical waste segregation were prepared. Pretesting and validation of the questionnaire were done and handed over to the study population involved. An equal time duration was given to all participants to leave no room for bias.

Results: Knowledge assessment showed the doctors were highest at 79% followed by Postgraduates, Interns, and nurses. Technicians were the least at 63%. 93% of doctors' attitude towards BMW management was very positive, followed by postgraduates at 91%. In Practice, doctors were 92% followed by Interns, nurses, and technicians which was 82%.

Conclusion: Our results threw light on Knowledge Attitude and Practice in Biomedical waste management among the above-mentioned participants. A few areas need further improvement. We must concentrate on providing intensive training and orientation classes for all cadres in the hospital. This can be extended to medical students too. Biomedical waste management should be teamwork wherein each person is made responsible for the work.

Keywords: Attitude, Biomedical waste, Knowledge, Practice, Questionnaire

Introduction

The status of health of an individual/community is determined by the interplay and integration of the micro (internal) environment of human beings and the macro(external) environment. An imbalance in these two can have serious repercussions on national well-being.¹ Major source of health care waste are Hospitals, Emergency medical care services, Health care centers, Obstetrics and maternity clinics, Outpatient clinics, Dialysis centers, Transfusion centers, military medical services, Prison hospitals, Related Laboratories and research centers, mortuary, autopsy centers, animal research and testing, blood banks and nursing homes for elderly. The improper management of medical waste causes major environmental problems which result in air, water, and land pollution². Biological waste can be classified as non-hazardous and Hazardous wastes. The non-hazardous waste consists of almost 85% of waste which consists of remnants of feed, fruit peels, wash water, paper cartons, and packaging materials. Hazardous waste is infectious waste that can cause grievous implications on mankind and the ecosystem¹. Biomedical waste (BMW) is any waste produced during the diagnosis, treatment, or immunization of human or animal research activities pertaining thereto or in the production or testing of biological or health camps. It follows the cradle-to-grave approach which is the characterization, quantification, segregation, storage, transport, and treatment of BMW³. Improper disposal of biomedical wastes might result in the transmission of Aerosolization of the pathogen during the grinding

process, physical injuries due to the high temperature of incinerators, and steam sterilizers which release poisonous gases into the atmosphere might occur.¹ A scientific review of literature on global healthcare waste management spanning the period of five years i.e. year 2000 to the year 2005 was undertaken. A scope for improvement was suggested.

Methodology:

The present prospective study was conducted for six months starting from February 2020 to August 2020, at our tertiary care center, in Bengaluru. The Mode of sample selection - Stratified Random Sampling. The Sample size was 50 -doctors, postgraduate students, interns, nurses, technicians working in the blood bank, central laboratory, pathology, microbiology departments, attendees, and sweepers. Knowledge Attitude and Skills of the study population was assessed through observation, Interview, and questionnaire. The data collection tools we used were the Observation checklist and Questionnaire. Both Structured and Non Structured Questionnaires in one or all stages of biomedical waste segregation were prepared. Pretesting and validation of the questionnaire were done and handed over to the study population involved. An equal time duration was given to all participants to leave no room for bias.

Results:

The total number of participants involved in the present study was 50. Among these are doctors and postgraduates consisted 10 each. Interns, nurses, and technicians were 4, 18, and 8 respectively. (Table 1, Fig 1).

Table 1: Distribution of various strata of participants

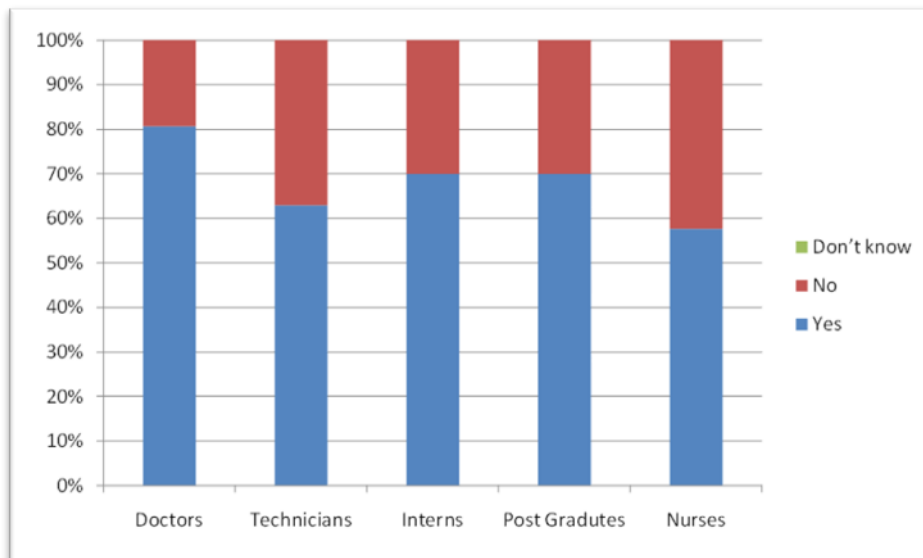
Strata	Number of Participants (n =50)	Percentage (%)
Doctors	10	20
Postgraduates	10	20
Intern	04	8
Nurses	18	36
Technicians	08	16

Knowledge assessment showed the doctors were highest at 79% followed by Postgraduates, Interns, and nurses. Technicians were the least at 63%. (Table 2, Fig 2)

Table 2: Participants' knowledge of Biomedical waste management

Sl No	Participants	Yes		No	
		Number	%	Number	%
1	Doctors	79	79	19	19
2	Technicians	51	63	29	37
3	Interns	28	70	12	30
4	Postgraduates	70	70	30	30
5	Nurses	135	70	45	55

Fig 2: Participants' knowledge of Biomedical waste management



93% of doctors' attitude towards BMW management was very positive, followed by postgraduates at 91%. In Practice, the doctors were 92% followed by Interns, nurses, and technicians which was 82% (Table 3,4 Fig 3,4)

Table 3: Participants' attitude on Biomedical waste management

Sl No	Participants	Yes		No	
		Number	%	Number	%
1	Doctors	93	93	07	07
2	Technicians	70	87	10	13
3	Interns	35	87	05	13

4	Postgraduates	91	91	09	09
5	Nurses	157	87	23	13

Fig: 3: Participants' attitude on Biomedical waste management:

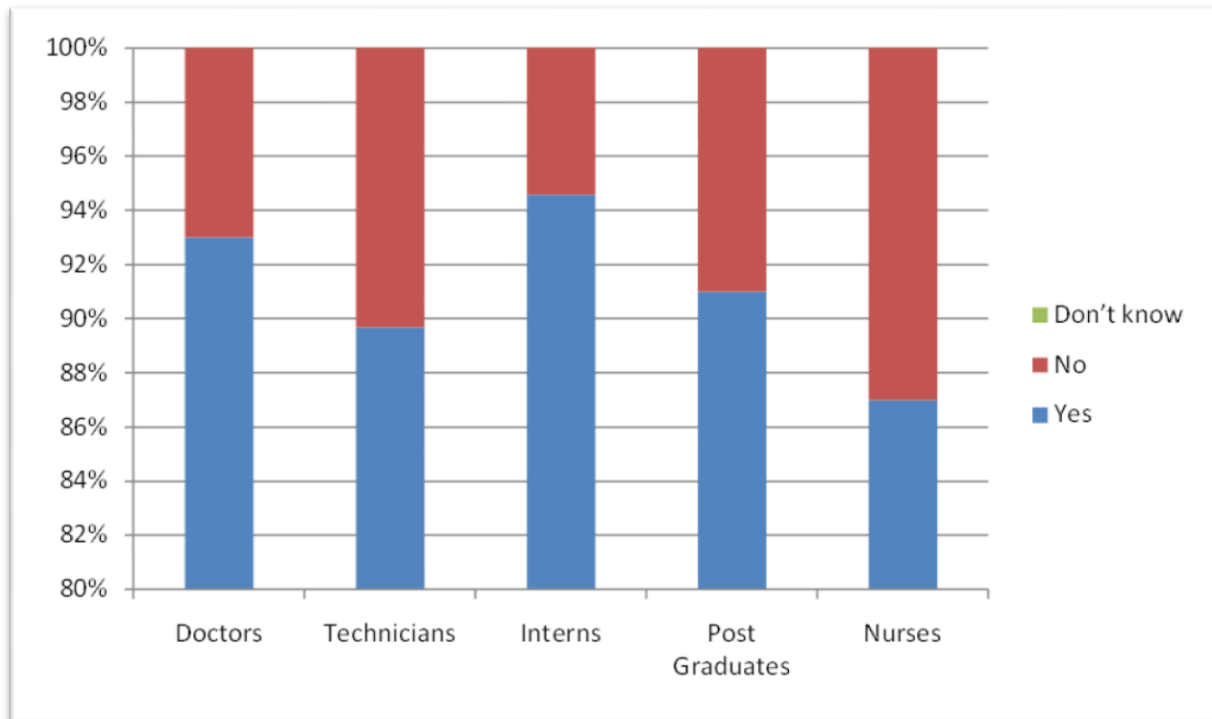
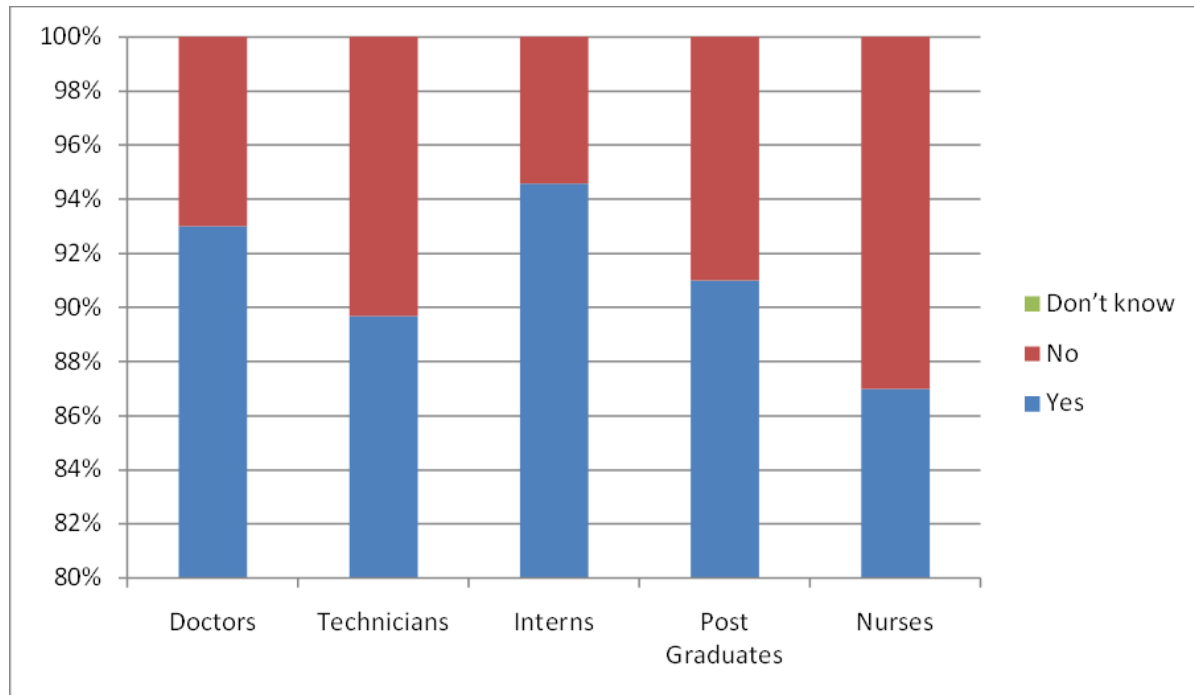


Table 4: Participants' practices on Biomedical waste management:

Sl No	Participants	Yes		No	
		Number	%	Number	%
1	Doctors	92	92	08	08
2	Technicians	71	88	09	12
3	Interns	33	82	07	18
4	Postgraduates	74	74	26	26
5	Nurses	149	82	31	18

Fig 4: Participants' practices on Biomedical waste management

Discussion

Every hospital has biomedical waste generation and segregation is an important prerequisite in the process of waste management. The amended rules of 2016 are being followed at our center. This is done under the direct supervision of the Infection control committee. Frequent lectures and interactive sessions are conducted to bring about awareness among the staff. Does a question arise who are the beneficiaries in the entire process? The answer is very simple: All the stakeholders in the hospital i.e. the patients, the doctors, the nursing staff, the students, technician management, and everyone who is involved in managing, running, and administration of the hospital. Our study was to assess the Knowledge, Attitude, and Skills of the staff at our hospital concerning BMW management. The results showed that 93% of doctors' attitude towards BMW management was very positive, followed by postgraduates at 91%. In Practice, doctors were 92% followed by Interns nurses, and technicians which were 82%. Knowledge assessment showed the doctors were highest at 79% followed by Postgraduates, Interns, and nurses. Technicians were the least at 63%. The statistics were almost similar to the other studies by Javeed Ahmad *et al* 2019.⁵ The studies conducted by Tanmayet. *al* 2018⁶ showed the

findings about doctors having better knowledge as compared to nurses and technicians. In our study nurses were having a positive attitude toward Biomedical waste management. They are aware but lacking in knowledge. The study by Madhu kumar *et.al* 2017⁷ which included MBBS students showed that the knowledge of first-year students about biomedical waste disposal was less compared to final-year students. The majority of the participants were aware of the color coding of biomedical waste disposal. That is a basic step toward Biomedical waste management.

Conclusion: Our results threw light on Knowledge Attitude and Practice in Biomedical waste management among the above-mentioned participants. A few areas need further improvement. We must concentrate on providing intensive training and orientation classes for all cadres in the hospital. This can be extended to medical students too. Biomedical waste management should be teamwork wherein each person is made responsible for the work. Let us live in a safe, healthy environment. Newer technologies in the field of medical science would help in reducing the generation of non-biodegradable products. Society would be greatly benefitted if the improved rules in 2016 are followed by everyone involved in healthcare units.

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