

Original Research Article

<https://doi.org/10.20546/ijcmas.2018.712.315>

## Awareness and Practises on Biomedical Waste Management among the Health Care Workers in a Tertiary Care Hospital in Kanyakumari District, India

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### ABSTRACT

Biomedical waste (BMW) is generated in every health facility, which if not disposed off properly poses a risk for health and environment. Handling, segregation, mutilation, disinfection, storage, transportation and final disposal are vital steps for safe and scientific management of biomedical waste in any establishment. The objective was to assess the biomedical waste management (BMWM) practices and knowledge regarding BMWM in a tertiary care hospital. A hospital based cross-sectional study was done from 20 September to 20 October 2018 in Sree Mookambika Institute of Medical Sciences, Kulasekaram, Kanya Kumari district, Tami Nadu. A total of hundred questionnaires containing 20 questions based on knowledge and practises on biomedical waste management were given to doctors, nurses and technicians. Out of 100 questionnaires given 82 were returned back. The results showed that there was a good level of knowledge and awareness of biomedical waste definition, vital steps in the management of biomedical waste and generation hazards among health care personal. It can be concluded from the present study that there is quite a good levels of knowledge and awareness about BM waste generation hazards, legislation and management among health care personnel in Sree Mookambika Institute of Medical Science, Kulasekharam Kanyakumari district. However regular monitoring and training are required at all levels to improve the knowledge and practises regarding biomedical waste.

#### Keywords

Bio medical waste,  
Segregation,  
Questionnaires,  
Hazards

#### Article Info

*Accepted:*  
20 November 2018  
*Available Online:*  
10 December 2018

### Introduction

Biomedical waste has been defined as the "waste generated in the diagnosis, treatment or immunization of human beings or animals in research or in the production of testing of biological products including all categories of infected and toxic waste that is potential threat to human being and environment (Government of India 1998)<sup>1</sup>. Only 10-25% of the waste produced at health care

establishments is hazardous; whereas 75-90% of wastes are non-hazardous to health and the environment<sup>1</sup>. Indiscriminate disposal of BM or hospital waste and exposure to such waste poses a serious threat to the environment and to human health. BM waste requires specific treatment and management prior to its final disposal<sup>2</sup>.

Handling, segregation, mutilation, disinfection, storage, transportation and final

disposal are vital steps for safe and scientific management of biomedical waste in any establishment. The key to minimization and effective management of biomedical waste is segregation and identification of the waste<sup>3</sup>. The general waste is treated by local municipality in same way as house-hold waste, but special precautions and treatment modalities are required for BMW, so that it does not cause any harm to human beings and environment<sup>4</sup>. Though as many as 40 pathogens have been documented to be transmitted by BMW, its well documented propensity to cause transmission of 3 pathogens namely Human Immunodeficiency Virus (HIV), Hepatitis B Virus (HBV) and Hepatitis C Virus (HCV) makes it essential that due care is exercised while handling and disposing it<sup>5-7</sup>.

The scientific study of hospital waste management is necessary as its improper management poses risks to the health care workers, waste handlers, patients, community in general and largely the environment. Also, it is highly desirable for a Hospital Administrator to know the weak points in the chain of waste management so that these could be addressed appropriately. This is the reason why the present study is being undertaken to assess the knowledge and practices of biomedical waste management amongst the staff of Sree Mookambika Institute of Medical Sciences, Kulasekharam, a tertiary care hospital in Kanya kumari District, Tamil Nadu, India.

### **Materials and Methods**

A hospital based cross-sectional study was done from 20 September to 20 October 2018 in Sree Mookambika Institute of Medical Sciences, Kulasekaram, Kanya Kumari district, Tami Nadu. A questionnaire consisting of 20 self- structured questions based on knowledge and practises on

Biomedical waste management was prepared. The questions were based as per Bio-medical waste management guidelines, 2018. A total of 100 questionnaires were given to the health care personnel of this institute which included doctors, nurses and technicians. The study was conducted after receiving ethical clearance.

### **Inclusion criteria**

Doctors, nurses, technicians of Sree Mookambika Institute of Medical Sciences, who are working in this institution for more than 6 months.

### **Exclusion criteria**

Those who are not willing to participate in the study.

### **Results and Discussion**

Out of 100 questionnaires given to the medical personnel 18 were non-respondents. Out of the 82 health care personnel included in our study, majority were doctors 42 (51.2%) followed by nurses 27 (32.9%) and 13 (15.9%) lab technicians.

Awareness on bio-medical waste was assessed by questions focused on definition of biomedical waste, identification of colour coding and the symbol of Bio-waste and knowledge about legislation on bio-medical waste management. A set of four questions regarding definition and process flow of biomedical waste was given. All the doctors were able to give the correct definition of bio medical waste. Only 85.2% of nurses and 84.6% of technicians were able to give the correct definition of biomedical waste. The waste segregation was done at collection sites by the sweepers. Daily disinfection of all bins was done. Waste was collected once in 24 hours. About 88% of doctors had knowledge regarding segregation of waste generated.

Regarding colour coding of bio-medical waste mean score was 87.8%. 76.2% of the doctors were able to identify the hazard symbols of biomedical waste.

The paramedical staff, 48% of nurses and 69.2% of technicians had knowledge about the diseases transmitted through contact with the health care waste. 73.8% of the doctors said that they do not allow the waste to be kept for more than 24 hours in their ward. About 80.9% of the doctors, 29.6% of nurses, 46.1% of technicians were aware of legislations

regarding Biomedical waste management policy 2018. About ten questions were asked regarding the practices of collection, segregation and discarding of biomedical waste. Overall awareness regarding use of different colour bags to collect and dispose biomedical waste is 64.6% and 59.7% for the red bag and yellow bag respectively. About 92.8% of doctors, 81.5% of nurses, and 82.9% of technicians were aware of the precautions to be followed following contact with blood and body fluids (Fig. 1).

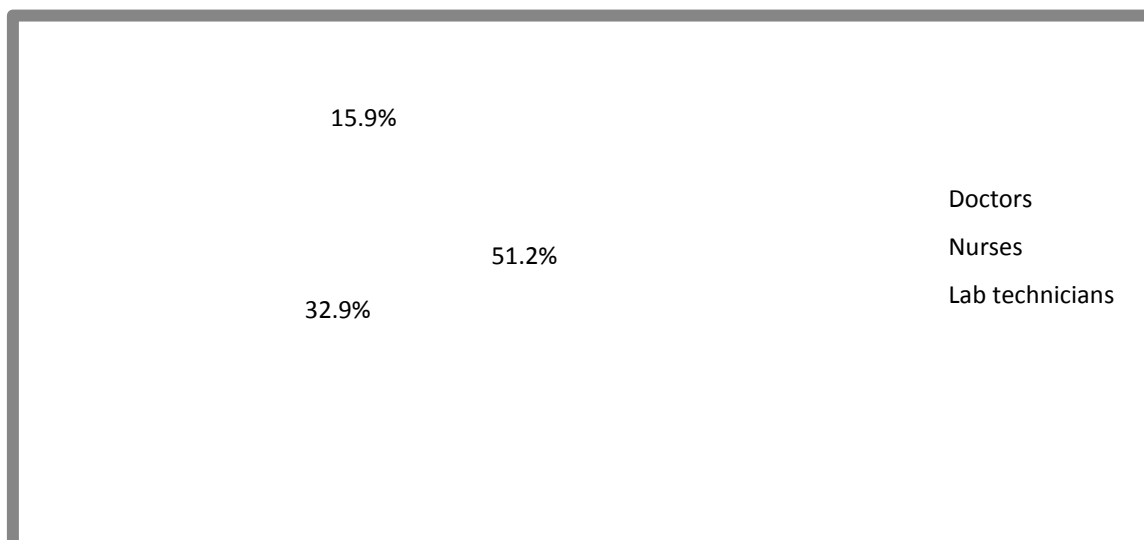
**Table.1** Distribution of study subjects according to their correct responses towards awareness on biomedical waste management

Questions	Doctors (n=42)		Nurses (n=27)		Technicians (n=13)		Total (n=82)	
	N	%	n	%	n	%	n	%
<b>Definition of biomedical waste</b>	42	100	23	85.2	11	84.6	76	92.7
<b>Which of the following is not included as biomedical waste</b>	40	95.2	18	66.7	10	76.9	68	82.9
<b>Process flow of biomedical waste management</b>	36	85.7	15	55.5	10	76.9	61	74.4
<b>For, segregation of biomedical waste, how many colour bags are used and what are they</b>	37	88.1	17	63	12	92.3	66	80.5
<b>Can identify radiation hazard symbol</b>	32	76.2	10	37	9	69.2	51	62.2
<b>Chairperson of biomedical waste management committee</b>	34	80.9	8	29.6	6	46.1	48	58.5
<b>Approximate proportion of infectious waste among the total waste generated in a health care facility</b>	30	71.4	5	18.5	5	38.5	40	48.8
<b>Diseases transmitted through contact of health care waste</b>	40	95.2	13	48.1	9	69.2	62	75.6
<b>Maximum time of biomedical waste could kept in the hospital premises</b>	31	73.8	11	40.7	4	30.8	46	56.1
<b>Awareness of guidelines provided for colour coding at work area</b>	38	90.4	21	77.8	13	100	72	87.8

**Table.2** Distribution of study subjects according to their correct practices towards biomedical waste management

Questions	Doctors (n=42)		Nurses (n=27)		Technicians (n=13)		Total (n=82)	
	n	%	n	%	n	%	n	%
Which of the following does not go in red bag	30	71.4	14	51.8	9	69.2	53	64.6
Which of the following does not go in yellow bag	29	69	12	44.4	8	61.5	49	59.7
Steps to be followed after contact with blood or body fluids	39	92.8	22	81.5	7	53.8	68	82.9
Knowledge about hazardous waste containers	34	80.9	19	70.3	10	76.9	63	76.8
Have you been vaccinated against Hepatitis B	42	100	26	96.3	13	100	81	98.8
Have you been vaccinated against Tetanus	42	100	22	81.5	10	76.9	74	90.2
You will do the following while handling blood spills, except	35	83.3	20	74.1	9	69.2	64	78
Precautions while handling hospital waste	42	100	25	92.6	10	76.9	77	93.9
Expired or discarded drugs goes into	34	80.9	18	66.7	9	69.2	61	74.4
Segregation of infectious and non infectious waste	32	76.2	17	63	10	76.9	59	71.9

**Fig.1** Distribution of study subjects according to their profession



All the doctors were vaccinated against Hepatitis B and tetanus. Overall 94% of the medical and paramedical staff under study was well versed with personal protective measures used before handling bio-medical waste.

In our study, out of 82 health care personals, 76(92.7%) are aware of definition of Biomedical waste. Our findings are similar to the study of Madhavi *et al.*, in their study 94.78% had heard about biomedical waste management<sup>8</sup>. Regarding segregation of waste at source, which is the golden rule in management of biomedical waste, 88.1% of the doctors answered correctly which is more than that that reported in a study by Basu *et al.*, (78.8%).<sup>9</sup> However in a study by Kanchi 93% of their population had correct knowledge about segregation of waste<sup>10</sup>.

It was observed, in our study, that there was a lack of knowledge about colour coding in biomedical waste management that needs to be addressed. Regarding colour coding, 87.8% (Table 1) of the participants answered that it is essential but, when asked about exact categories, only 64.6% and 59% (Table 2) could answer and the rest could not tell which category of waste belonged to which colour container.

This is very surprising since it is in contrast to the study done by Kanchi in which 86% of the participants had knowledge of the colour coding<sup>10</sup>. However study done by Deo *et al.*, also reported poor knowledge among the medical staff (20%)<sup>11</sup>.

In present study, only 58.5% of our study population had awareness regarding administrative aspects of biomedical waste management. In other studies also respondents were not aware of the existence of a legislation and majority not aware of authorization<sup>12,13</sup>. Higher knowledge than our

study regarding existence of Biomedical Waste Management and Handling Rule, 1998 in health care workers reported in others<sup>14</sup>.

If health care professionals are not sensitised about the disease transmission by biomedical waste they will put themselves and the community at the risk of various hazards. Diseases mainly transmitted by biomedical waste are Hepatitis B, Hepatitis C and HIV. About 99% and 90% (Table 2) of the study subjects were vaccinated against Hepatitis B and tetanus respectively. In study conducted by us more than 75% of study population (Table 1) are aware of different diseases transmitted through contact with biomedical waste and also the things to be done when there is a blood spill (Table 2). A study done in tertiary care hospital of Bijapur, North Karnataka, India<sup>15</sup> had coequal results with our study.

About 64% and 65.2% of the respondents were aware of the correct Biohazard symbol in studies by Sanjeev *et al.*,<sup>16</sup> and Madhavi *et al.*,<sup>17</sup> respectively, which is similar to 62.2% response rate from this study (Table 1).

In conclusion, implementation of biomedical waste management rules is the need of the hour, so that it can improve the collection, segregation, processing, treatment and disposal of these bio-medical wastes in an environmentally sound management thus, reducing the bio- medical waste generation and its impact on the environment.

Improper management of waste generated in health care facilities causes a direct health impact on the community, the health care workers and on the environment. Every day, relatively large amount of potentially infectious and hazardous waste are generated in the health care hospitals and facilities around the world. It should be made compulsory for healthcare facilities to get

their healthcare personnel trained from accredited training centers. It should be a continuous process depending upon the patient input in different healthcare facilities.

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**How to cite this article:**

Vidhya, V.R. and Jossy John. 2018. Awareness and Practises on Biomedical Waste Management among the Health Care Workers in a Tertiary Care Hospital in Kanyakumari District, India. *Int.J.Curr.Microbiol.App.Sci.* 7(12): 2779-2785.  
doi: <https://doi.org/10.20546/ijcmas.2018.712.315>