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ORIGINAL ARTICLE

KNOWLEDGE ASSESSMENT OF HOSPITAL STAFF REGARDING BIOMEDICAL WASTE MANAGEMENT IN A TERTIARY CARE HOSPITAL

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ABSTRACT

Background: Biomedical waste (BMW) is waste generated during diagnosis, treatment or immunization of human beings or animals. Approximately 10-25% of the Bio-Medical waste is hazardous and can be injurious to humans or animals and deleterious to environment. It is estimated that annually about 0.33 million tones of hospital waste are generated in India.
Objectives: To assess the knowledge regarding hospital waste management amongst hospital staff.
Material and Methods: The study comprises of assessment of the knowledge regarding BMW management. For this purpose, a 10% sample of each of the 4 categories of staff on roll was randomly selected for the study; the sample consisted of 110 respondents: 38 doctors, 44 nurses, 21 Lab-technicians and 7 waste handlers/supporting staff.
Results: The knowledge of doctors about BMW management & handling rule was much better (92.1%) as compared to nurses (54.5%) and Lab-technicians (47.6%) and it was statistically significant (p-value < 0.05).
Conclusion: The doctors where observed to be good in theoretical knowledge. While in case of nurses and lab-technicians the reverse was true.
Recommendation: The need of comprehensive training programs regarding Bio-Medical waste management is highly recommended to all hospital staff.

Key words: biomedical waste, tertiary care hospital, knowledge, hospital staff

INTRODUCTION

Biomedical waste (BMW) is waste generated during diagnosis, treatment or immunization of human beings or animals, or in research activities pertaining thereto, or in the production and testing of biologicals, and is contaminated with human fluids.[1] The waste produced in the course of health care activities carries a higher potential for infection and injury than any other type of waste.[2]

Approximately 75-90% of the bio-medical waste is non-hazardous and as harmless as any other municipal waste. The remaining 10-25% is hazardous and can be injurious to humans or animals and deleterious to environment. It is important to realize that if both these types are mixed together then the whole waste becomes harmful.[3] It is estimated that annually about 0.33 million tons of hospital waste is generated in India and, the waste generation rate ranges from 0.5 to 2.0 kg per bed per day.[4]

All Bio-medical waste generated in the hospital should be disposed off strictly in accordance with Bio-medical waste management & handling rule 1998. Schedule I of which describes the categories of Bio-medical waste their treatment and disposal methods.[2]

Schedule II of which describes the colour coding and type of container for disposal of Bio-medical waste.[2]

Most importantly there is no mechanism to ensure that all waste collected and segregated in hospital is disposed of according to schedule I &

II of Bio-medical waste management & handling rules. There is also no mechanism for ensuring waste treatment within prescribed time limits. Bio-medical waste if not handled properly and within the stipulated time period could strike in the form of fatal infection. Additional hazard includes pilferage during transport and recycling of disposables without even being washed.[5]

In some hospital there is no proper training of the employees in hazardous waste management. This indicates the lack of even basic awareness among hospital personnel regarding safe disposal of Bio-Medical waste.

Keeping in view the above scenario, the present study has been undertaken to assess the knowledge regarding different aspects of Bio-medical waste amongst staff of a large 1110 bedded tertiary care hospital in Bhopal.

MATERIALS AND METHODS

The study comprises of assessment of the knowledge regarding BMW management amongst doctors, nurses, Lab-technicians and waste handlers/supporting staff of a large tertiary care hospital in Bhopal. For this purpose, a 10% sample of each of the 4 categories of staff on roll was randomly selected for the study. The sample consisted of 110 respondents: 38 doctors, 44 nurses, 21 Lab-technicians and 7 waste handlers/supporting staff.

The information was obtained from the respondents through a pre-designed self administered questionnaire. The questionnaire consists of knowledge regarding Biomedical Waste Management & Handling rule 1998. Colour coding, biohazard symbol, category of biomedical waste, hazardous and non-hazardous waste, waste treatment and disposal methods etc. The results were analyzed by using z test of proportion.

RESULTS

Table-1 shows result in percent of hospital staff having knowledge about BMW management, whereas table- 2 shows the result of Z-test of proportion. The knowledge of doctors about BMW management & handling rule was much better (92.1%) as compared to nurses (54.5%) and Lab-technicians (47.6%) and it was statistically significant (p value < 0.05). The knowledge about disease spread by improper waste management was more in doctors (92.1%) as compared to nurses (84%) and Lab-technicians (52.3%) and the difference in knowledge between doctors and Lab-technicians was found to be statistically significant (p value < 0.05). Knowledge of colour container used in hazardous waste & storage time of waste was higher in nurses (72.7%) as compared to doctors (47.4%) but the difference was not statistically significant. The knowledge of nurses was better for waste segregation (70.5%) as compared to doctors (52.6%) The knowledge correct method of disposal & treatment of waste was more in nurses (77.3%) as compared to doctors (50%) which was statistically significant (p value < 0.05). The knowledge of waste handlers/supporting staff was good for identification of biohazard symbol (85.7%) as compared to nurses (81.8%) & doctors (68.4%) which was not statistically significant.

Table 1: Knowledge of Hospital staff about some important aspects of Waste Disposal

Questions	Doctors (%)	Nurses (%)	Lab-technicians (%)	Waste handlers (%)
Existence of BMW management & handling rule 1998	92.1	54.5	47.6	0.0
Categories of waste	60.5	59.0	57.1	14.3
Storage of hazardous waste	47.4	72.7	62.0	42.8
Bio-hazard symbol	68.4	81.8	76.2	85.7
Waste segregation in colour containers	52.6	70.5	62.0	28.6
Maximum storage time of hazardous waste	57.9	72.7	71.4	42.8
Waste disposal methods	60.5	75.0	62.0	57.1
Disease spread by improper hospital waste management	92.1	84.0	52.3	14.3
Non-hazardous waste storage	52.6	81.8	57.1	42.8
Correct method of treatment & disposal	50.0	77.3	52.6	42.8

DISCUSSION

The present study was conducted in tertiary care hospital in Bhopal city to find out the Knowledge regarding biomedical waste management in the hospital. Knowledge among health care workers is essential for the adequate management of biomedical waste. The overall awareness about biomedical waste management was highest among medical professionals. The knowledge about biomedical waste management & handling rule was much better in doctors (92.1%) as compared to nurses (54.5%) and other staff as well as knowledge about disease spread by improper waste management was more in doctors (92.1%) as compared to nurses (84%).

Knowledge of colour container used in hazardous waste & storage time of waste was higher in nurses (72.7%) as compare to doctors (47.4%). Similar observations were noted in other studies. Saini et al. in his study shows that Consultants, Residents and the Scientists respectively have (85%, 81 % and 86%) knowledge about the biomedical waste management rule as compared to nurses (60%), and that of sanitary staff, operation theatre and Laboratory staff have respectively (14%, 14% and 12%). This shows that the people with higher education have more awareness about the biomedical waste management and the rules prescribed there in.[6]

Table 2: Comparison of knowledge level of hospital staff. (By using of Z- test of proportion)

Knowledge assessed		Doctors v/s Nurses	Doctors v/s Lab-Technicians	Nurses v/s Lab-Technicians
Existence of BMW (M & H)	Z value	3.7783	3.8464	0.5208
rule1998	P value	**0.0002 ***	**0.0001***	0.6025
Categories of waste	Z value	0.1381	0.2545	0.1453
	P value	0.8902	0.7991	0.8844
Storage of hazardous waste	Z value	2.342	1.0753	0.8742
	P value	**0.0192***	0.2822	0.382
Bio-hazard symbol	Z value	1.4086	0.6333	0.5278
	P value	0.1589	0.5265	0.5977
Waste segregation in colour	Z value	1.667	0.6963	0.6856
containers	P value	0.0955	0.4862	0.4929
Maximum storage time of	Z value	1.4092	1.0267	0.1095
hazardous waste	P value	0.1588	0.3046	0.9128
Waste disposal methods	Z value	1.4069	0.1131	1.078
	P value	0.1595	0.9099	0.281
Disease spread by improper	Z value	1.1157	3.5297	2.7167
hospital waste management	P value	0.2645	**0.0004***	**0.0066***
Non-hazardous waste storage	Z value	2.8329	0.3322	2.1184
	P value	**0.0046***	0.7398	**0.0341***
Correct method of treatment &	Z value	2.5786	0.1913	2.0194
disposal	P value	**0.0099***	0.8483	**0.0434***

*Significant

In study by Mathur et al. at Allahabad city, 75 doctors, 60 nurses, 78 lab-technicians and 70 sanitary staff where included. Doctors, nurses, and laboratory technicians have better knowledge than sanitary staff regarding biomedical waste management. Knowledge regarding the color coding and waste segregation at source was found to be better among nurses and laboratory staff as compared to doctors.[7] these findings are similar with our study.

In study by Bansal et al. conducted on "Biomedical waste management: awareness and practices in a district of Madhya Pradesh" awareness about biomedical waste was maximum among doctors (100%) followed by Para-medical workers (95.83%) and least among non medical workers (43.10%) and awareness regarding colour coding and segregation was

more among Para-medical workers (51.38%) than doctors (44.82%).[8]

Pandit et al. in Gujarat found that all the doctors were aware about risk associated with hospital waste. 74% of all visited doctors said that HIV and Hepatitis-B are the two diseases, from which one should be careful. But awareness of the auxiliary health personnel about this fact was poor. 57% ward-boys or Ayabens did not know about the risk associated with hospital waste. So this subordinate staffs, who actually handles the waste, is at higher risk and needs to be educated.[9]

Deo et al. in his study found that knowledge regarding segregation was more among para-medical staff like nurses and lab-technicians (90%) than medical staff like doctors (80.6%).[10] these findings are also in consonance with our study.

CONCLUSION

The doctors where observed to be good in theoretical knowledge like rules, legislation & public health importance of improper waste management than in the more practical aspects of BMW management which was proved statistically is our study While in case of nurses and lab-technicians the reverse was true, i.e., though their theoretical knowledge lagged behind that of doctors, their practical knowledge regarding waste segregation in colour bins, disposal methods & biohazard symbol was better, but statistically not significant.

RECOMMENDATION

Waste management is every body's concern starting from doctor up to supporting staff Waste management is not a waste of time. It is worth while giving few minutes of time to make hospital environment clean, healthy and free from infection.

Hence, the need of comprehensive training programs regarding handling, segregation, transportation, storage of waste in colour bins until final disposal and treatment for all hospital staff is highly recommended to deal with this burning issue of bio-medical waste management.

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