

# Knowledge of Biomedical Waste Management among the Students of Rural Dental College, Maharashtra, India

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## ABSTRACT

**Objectives:** To determine the current knowledge and awareness of undergraduate dental students of Rural Dental College regarding the biomedical waste management.

**Materials and methods:** This cross-sectional observational study was conducted on students of Rural Dental College, Maharashtra, India. They were asked to fulfill a predesigned questionnaire. The variables assessed were their knowledge and awareness toward biomedical waste management.

**Results:** A total of 150 students participated. The male to female ratio was 1:2; mean age of respondents was  $20.66 \pm 1.01$ . On an average, 59.23% are correct and 40.67% are incorrect for knowledge about biomedical waste management. 81.55% are correct and 18.45% are incorrect for their awareness about the same.

**Conclusion:** Results indicate that students had good awareness and perception level about awareness of biomedical waste management.

**Keywords:** Biomedical, Hospital, Waste, Rural, Management.

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## INTRODUCTION

The biomedical waste (BMW) means any solid, liquid waste material, generated during the process of diagnosis, treatment and immunization of human being or animal. This waste material could cause serious hazards to health and environment in case of indiscriminate management. All the hospital personnel are at a risk to get many fatal infections like HIV, HBV, HCV and injuries by these infectious materials. To avoid these hazards, discriminate waste management system should be implemented in hospital infrastructure.<sup>1</sup> Most of this waste is not more dangerous than regular household waste. However, some types of health care waste represent a higher risk to health. These include infectious waste (15-25% of total health care waste) among which are sharps waste (1%), body part waste (1%), chemical or pharmaceutical waste (3%), and radioactive and cytotoxic waste or broken thermometers (less than 1%). BMW generated in the hospital falls under two major categories—nonhazardous and biohazardous. Constituents of nonhazardous waste are noninfected plastic, cardboard, packaging material, paper, etc. Biohazardous waste again

falls into two types: (a) Infectious waste—sharps, nonsharps, plastics disposables, liquid waste, etc. (b) noninfectious waste—radioactive waste, discarded glass, chemical waste, cytotoxic waste, incinerated waste, etc. Hospital waste management has been brought into focus in India recently, particularly with the notification of the BMW (management and handling) rules, 1998. The rules make it mandatory for health care establishments to segregate, disinfect and dispose their waste in an ecofriendly manner.<sup>2</sup> A major issue related to current BMW management in many hospitals is that the implementation of biowaste regulation is unsatisfactory as some hospitals are disposing of waste in a haphazard, improper and indiscriminate manner. Handling, segregation, mutilation, disinfection, storage, transportation and final disposal are vital steps for safe and scientific management of BMW in any establishment. Health care associated infections result in increased length of stay, mortality and health care costs.<sup>3</sup> Present study was designed to determine the knowledge and awareness of practice for hospital waste management among the undergraduate students of rural dental college.

## MATERIALS AND METHODS

A cross-sectional observational study was conducted in the year 2010 among the students of Rural Dental College, Maharashtra, India. One hundred and fifty students voluntary participated in the study and subjects were fully informed about the design and purpose of the study. A written informed consent was obtained from each participant and anonymity of the participants was maintained throughout the study. The data were collected on a pretested structured questionnaire distributed among these students in the classroom, and they were asked to fill the questionnaire. The questionnaire consisted of questions to assess the knowledge and awareness of practice toward BMW management. The statistical tools like Z-test of difference between two proportions mean and standard deviation (SD) values were employed.

## RESULTS

One hundred and fifty students completed the questionnaire, of these students 66.67 % were female and 33.33% were the males. The male to female ratio was 1:2; mean age of total respondent was 20.66 years (for males: 21.14 years and for females: 20.18 years), shown in Table 1. The study

finds the significant difference in terms of age in years of male and female patients ( $p < 0.01$ ). After applying Z-test for difference between two sample proportions there is a significant difference between knowledge of BMW management for all statements in regards to correct and incorrect (i.e.  $p < 0.05$ ) as shown in Table 2. On an average, 59.23% are correct and 40.67% are incorrect. While, after applying Z-test for difference between two sample proportions there is a significant difference between awareness for practice of BMW management for all statements in regards to correct and incorrect (i.e.  $p < 0.05$ ). On an average, 81.55% are correct and 18.45% are incorrect

for their awareness about practice of BMW management, shown in Table 3.

## DISCUSSION AND CONCLUSION

In present study 73% students knew that BMW is an occupational hazard and 94% of the participants believe that segregation is the key step in waste management. Seventy-five percent of the students believe that risk associated with hospital waste includes HIV, hepatitis B, injuries, etc. In general analysis of students indicates that they have relatively a good level of knowledge about BMW and related infections and hazards. Regarding awareness of students toward the practice of BMW management, the overall average percentage of correct answer was 81.55%. Eighty-eight percent of students confirm that red bag is used to discard the human tissue organs, animal waste, blood and body fluids. Ninety-five percent of participants believe that orange bag is used to discard the animal house waste and blue bag is used for waste sharps. Seventy-six percent of the students knew that segregation of waste must be done at the point of waste generation. The overall awareness of students was high as per the knowledge regarding information of BMW and awareness toward its practice.

**Table 1:** Data presentation of participants

Statistics	No.	Percentage
Total students	150	100
Males	50	33.33
Females	100	66.67
<i>Mean and standard deviation (SD) of age</i>		
Male participants (n = 50)	21.14 ± 1.04	
Female participants (n = 100)	20.18 ± 1.15	
Total participants (n = 150)	20.66 ± 1.01	

**Table 2:** Results regarding the respondent's knowledge about BMW management

No. Statement regarding knowledge	Correct (%)	Incorrect (%)
1. Biomedical Waste Management and Handling law established by Government of India in 1998	31	69
2. 20% of waste generated by health-care activities is hazardous	49	51
3. Biohazard sign was developed by Dow Chemical's in 1966	50	50
4. Biomedical waste is an occupational hazard	73	27
5. About 0.33 million tons of waste are generated annually from hospitals in India	23	77
6. Universal blood and body fluid precautions were originally devised by the Centre for Disease Control and Prevention (CDC) (USA) in 1985	35	65
7. Risk associated with hospital waste includes HIV, hepatitis B, injuries, etc.	75	25
8. Waste survey is the first step in waste management	56	44
9. Health care-related waste is categorized into 10 types	80	20
10. Medical waste should be completely free of pathogenic bacteria before disposal	45	55
11. Segregation is the key step in waste management	94	6
12. Incinerator and autoclaving is the key process for deactivating biological waste	71	29
13. One needle-stick injury from a needle used on an infected source patient has risks of 30% become infected with HBV	88	12
Average	59.23	40.67

**Table 3:** Results regarding the respondent's awareness about practice of BMW management

No. Statement regarding awareness	Correct (%)	Incorrect (%)
1. Red bag is used to discard the human tissue organs, animal waste, blood and body fluids	88	12
2. Orange bag is used to discard the animal house waste	95	5
3. Yellow bag is used to discard the microbiological and biotechnological waste	92	8
4. Blue bag is used for waste sharps	95	5
5. Black bag is used for discarded medicines and disposables	94	6
6. Biomedical waste under category 5 is discarded medicines	68	32
7. Biomedical waste under category 7 is disposable	95	5
8. Incineration and other high temperature waste treatment systems are sometimes described as thermal treatment	31	69
9. Segregation of waste must be done at the point of generation	76	24
Average	81.55	18.45

This research was administered among 150 undergraduate students only; therefore one could argue that the findings are not necessarily a generalization of all the undergraduate students' knowledge and awareness about the same. There should be essential need for better education to further improve the knowledge of BMW management by well designed seminars, programs and workshops.

## REFERENCES

1. Saraf Y, Shinde M, Tewari SC. Study of awareness status about hospital waste management among personnel and quantification. *Indian J Community Med* 2006;31:111.
2. Sharma M. Hospital waste management and its monitoring (1st ed). New Delhi: Jaypee Brothers Medical Publication 2002:1-2.
3. Saini S, Munshi N. In: Saini S, Saini R (Eds). Hospital infection control: Clinical guidelines (1st ed). Hyderabad: Paras Medical Publisher; 2012:1-2.

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