

Knowledge and Attitude Regarding Biomedical Waste Management among Dental Students and Practitioners in Chennai, India: A Cross Sectional Study

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Abstract

Purpose: To assess the Knowledge and Attitude regarding Biomedical Waste Management among dental students and practitioners in a dental college in Chennai. **Materials and Methods:** This Cross Sectional study was carried out among 150 subjects including 50 interns, 50 post graduates, 50 practitioners in a dental college in Chennai. The self-administered questionnaire comprised of 10 knowledge based and 10 attitude based questions. **Results:** About 14(22.5%) interns, 28(50.9%) post graduates, 13(23.6%) practitioners answered correctly for the question related to regulation of safe transport of medical waste. Regarding question on disposal of waste sharps 17(43.6%) interns, 6(15.4%) post graduates and 16(41.1%) practitioners answered correctly. Regarding the 10 aptitude based questions, all participants agreed that the biomedical waste should be segregated into different categories and should be sterilized before autoclaving. **Conclusion:** The attitude about biomedical waste management was positive among the interns, post graduates and practitioners, though the knowledge was comparatively low.

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Introduction

Waste management is all the activities and actions required to manage waste from its inception to its final disposal.¹ "Swachh Bharat Abhiyan (SBA)" meaning clean India mission is one such national campaign by Government of India under the leadership of the Prime Minister, covering 4,041 statutory cities and towns, to clean streets, roads and infrastructure of the country.²

The biomedical waste (BMW) including solid and liquid waste material generated during the process of diagnosis, treatment and immunization of human being or animals.³ This waste material could cause serious hazards to health and environment, in case of indiscriminate management.

Biomedical waste is claimed to be more hazardous than other waste as its improper management from hospitals, clinics and other facilities may pose risks to patients, health workers, waste handlers and general public. It may also lead to contamination of air, water & soil, which may affect all forms of life.⁴ In addition, if waste is not disposed properly members of community have an opportunity to collect disposable equipment and to resell these materials which may cause dangerous disease.⁵

Hence, there is always a need for proper disposal of biomedical wastes. There are certain rules for proper disposal of biomedical waste according to act of biomedical waste (management & handling) 1998.⁴ The clinical establishment (registration and regulation) Act 2010 has been enacted by the Central Government to provide for registration and regulation of all clinical establishment in the country with a view to prescribe the minimum standards or facilities.⁶ Proper handling and disposal of biomedical waste management has also been emphasized in this law for recognition / registration of establishing a clinic.⁶

With this background, this study was conducted to assess the knowledge and attitude regarding biomedical waste management among dental students and practitioners in a dental college in Chennai, Tamil Nadu.

Materials and Methods

This study was done to assess the knowledge and attitude regarding biomedical waste management among dental students and practitioners (Interns, post graduates & practitioners) in a dental college in Chennai, Tamil Nadu. Ethical clearance was granted by the Institutional review board, Ragas Dental College and Hospital, Chennai, Tamil Nadu. Informed consent was obtained from all participants who expressed their willingness to practice in this study.

A convenience sampling method was used to select the study subjects. This survey was conducted amongst total of 150 subjects including 50 interns, 50 post graduates and 50 practitioners of a dental college to understand their knowledge and attitude regarding biomedical waste management.

Every subject who participated in this study was approached individually and the questionnaire was administered. Each individual took around 15 to 20 minutes to complete the questionnaire. Only completed questions were used for analysis.

Data was collected using a closed ended questionnaire which composed of 20 questions. Among them 10 questions were designed to assess knowledge and the rest regarding the attitudes. The latter was assessed on a 5 point Likert scale with the former constituting of 4 questions with four responses, one among them being correct to be chosen from.

The collected data was entered in Microsoft excel sheet and then statistically analysed using SPSS version 20. Descriptive statistics such as percentages, frequencies were calculated. Chi square analysis was used to find

out where a statistical significance difference existed among the study groups with a level of significance at 0.05.

Results

A total of 150 subjects in the dental institution constituting of 50 interns, 50 post graduates and 50 practitioners participated in this study. Among them 14 (22.5%) interns, 28 (50.9%) post graduates, 13 (23.6%) practitioners answered correctly for the question related to regulation of safe transport of medical waste. For the question on disposal of waste sharps 17 (43.6%) of interns, 6 (15.4%) of post graduates and 16 (41.1) of staffs answered correctly. Regarding the 10 aptitude based questions, all participants agreed that the biomedical waste should be segregated into different categories and should be sterilized before autoclaving. They were also of the view that organising separate classes to upgrade the knowledge about biomedical waste management at regular basis should be done to update their knowledge regarding biomedical waste.

Table 1 shows the distribution of correct responding of the study subject regarding knowledge about Bio Medical Waste Disposal

Questions	Intern (n=50)	Practitioners (n=50)	Post graduate (n=50)	P value
Related to BMW rules	34 (35.8%)	32 (33.7%)	29 (30.5%)	NS
Related to storage of BMW	17 (36.8%)	16 (31.6%)	16 (31.6%)	NS
Related to safe transport of BMW	14 (25.5%)	13 (23.6%)	28 (50.9%)	0.002
Related to health hazards	32 (30.8%)	33 (31.7%)	39 (37.5%)	NS
Related to disposal of anatomical waste	27 (30.7%)	27 (30.7%)	34 (38.6%)	NS
Related to disposal of excess amalgam	29 (35.4%)	23 (28.0%)	30 (36.6%)	NS
Related to disposal of sharps	17 (43.6%)	16 (41.0%)	6 (15.4%)	0.021
Related to disposal of developer/fixer	10 (26.3%)	17 (44.7%)	11 (28.9%)	NS
Related to disposal of human tissue	23 (33.8%)	20 (29.4%)	25 (36.8%)	NS
Related to recap of used needles	31 (32.0%)	32 (33.0%)	34 (35.1%)	NS

Table 2 show the distribution of responses regarding the attitudes of study subjects towards biomedical waste management

		Aptitude questions answered			P value
Questions		Intern (n=50)	Staff (n=50)	PG (n=50)	
Related to biomedical waste segregation	A	45(90.0%)	47(94.0%)	44(88.0%)	NS
	D	5(10.0%)	3(6.0%)	6(12.0%)	
Related to health care waste hazards	A	41(82.0%)	40(80.0%)	38(76.0%)	NS
	D	9(18.0%)	10(20.0%)	12(24.0%)	
Related to biomedical	A	44(88.0%)	48(96.0%)	46(92.0%)	

waste is the team	D	6(12.0%)	2(4.0%)	4(8.0%)	NS
Related to transport of biomedical waste	A	47(94.0%)	44(88.0%)	43(86.0%)	NS
	D	3(6.0%)	6(12.0%)	7(14.0%)	
Related to BMW management is extra burden	A	20(40.0%)	30(60.0%)	24(48.0%)	NS
	D	30(60.0%)	20(40.0%)	26(52.0%)	
Related to sterilization of infected waste	A	40(80.0%)	40(80.0%)	36(72.0%)	NS
	D	10(20.0%)	10(20.0%)	14(28.0%)	
Related to treatment plan for disinfection of infected water	A	45(80.0%)	45(80.0%)	45(80.0%)	NS
	D	5(20.0%)	5(20.0%)	5(20.0%)	
Related to disposal of waste in wrong bins	A	45(90.0%)	46(92.0%)	43(86.0%)	NS
	D	5(10.0%)	4(8.0%)	7(14.0%)	
Related to BMW in institutions	A	45(90.0%)	45(90.0%)	42(84.0%)	NS
	D	5(10.0%)	5(10.0%)	8(16.0%)	
Related to separate class needed for dental colleges	A	49(98.0%)	47(94.0%)	47(94.0%)	NS
	D	1(2.0%)	3(6.0%)	3(6.0%)	

A=Agree | D=Disagree

Discussion

It is the "Prime duty " of hospitals and other health care establishments in making effort for disposing the waste they produced.⁷ Recently there is an increase in the quantity of biomedical waste due to introduction of disposables, which has lead to many problems related to inappropriate recycling, unauthorized and illegal reuse. The practice of dentistry involves use of many disposals and this calls for proper segregation and disposal of biomedical waste.⁸ The hazards of waste disposal from dental practices can be divided into two main areas. First, there is wider environmental burden due to a variety of hazardous products and secondly, the more immediate risk of potentially infectious materials that can be encountered by individuals handling the waste.⁹

The Ministry of Environment and Forests, Government of India has notified the new draft Bio-Medical Waste (Management and Handling) Rules, 2011 under the Environment Protection Act, 1986 to replace the earlier Bio-medical waste(Management and Handling) Rules, 1998 and has authorized 8 categories of waste for proper disposal with colour coding bins.¹⁰ Regarding the maximum time limit for storage of biomedical waste according to national guidelines, about 131 (87.33%) admitted that they were not aware of the time limit and only 19 (12.66%) were aware of facts that it was 48 hrs. This awareness is lower than the result conducted among dental health care personnel in a dental college in Kothamangalam by Sanjeev et al.¹¹

Regarding the safe transport of medical waste, about 95 (63.33%) were not aware of proper methods. 71.33% of the student believed that risk associated with hospital waste include HIV, Hepatitis B, injuries etc. This awareness was comparatively similar to the results of the study done by Rajiv. S et al.¹²

Regarding the disposal of waste sharp only 39 (26%) were aware of fact and methods of disposal. This

awareness was comparatively low than the study conducted among dental in West Bengal.¹³

Regarding the attitude based questions, about almost 83.8% of the respondents were aware of biomedical waste management methods & express a positive attitude. This awareness was better than the result conducted among dental health care professional by Sanjeev et al.¹¹

This study results also indicated that there was an urgent need to train the dental professionals regarding the Biomedical Waste Management rules and methods.

Conclusion

This study revealed that although the attitude about biomedical waste management was high among the interns, post graduates and dental practitioners, though the knowledge levels were comparatively lower. The dental practitioners had slightly better knowledge scores than dental students. Further this study indicated that there was an urgent need for creating awareness among dentist regarding biomedical waste management. Continuing dental education programs should be conducted on regular basis for imparting awareness regarding Bio-medical waste disposal among the dental practitioners.

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