AWARENESS ABOUT BIOMEDICAL WASTE AMONG THE MEDICAL POST GRADUATE STUDENTS AT MIMS MEDICAL COLLEGE, VIZIANAGARAM, ANDHRA PRADESH

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ABSTRACT

Medical post graduates are supposed to know about Biomedical Waste (BMW) and its management as a part of learning during their MBBS study. After post graduation in various capacities they are likely to handle BMW. Hence they should be thoroughly aware about BMW. Objectives were- 1. To assess awareness among post graduate medical students about BMW, its hazards and management. 2. To know the effectiveness of the training in improvement of awareness about BMW. A descriptive cross sectional study was conducted among post graduate medical students at the MIMS medical college, Vizianagaram. Study group included 48 first year post graduate students from various departments attending the Orientation- Training conducted by the Community Medicine Department on the topic of BMW. A predesigned printed questionnaire with close ended questions regarding BMW was given to the students before and after the training session to obtain their awareness as a pretest and post test. These questionnaires were collected and the data was analysed to calculate percentages and mean. Comparison of the pretest and post scores was done with the help of Z test. All the study participants had a fair knowledge about BMW. Most of the students (72%) had less awareness about details such as composition of BMW from hospitals, disposal methods of various categories of BMW as obvious from the pretest. However this awareness level increased after the training reflected in increase in the post test scores. The mean post test scores of the students were significantly more than their pretest scores. Thus the training proved to be effective in improving their knowledge on the subject. Since BMW is a sensitive issue with serious hazards in case of improper handling, the knowledge about it should be updated by continued training and medical education programmes.

Keywords: Biomedical Waste, Awareness, Post Graduate, Medical

INTRODUCTION

Biomedical Waste (BMW) is the term applied to waste generated during the diagnosis, treatment or immunization of human beings or animals or in the research activities pertaining thereto or in the production or testing of biological materials. BMW includes categories such as General waste, Pathological waste, Radioactive waste, Chemical waste, Infectious waste, Sharps, Pharmaceutical waste, Pressurized containers etc (Government of India, Biomedical Waste Management and Handling Rules, 1998). About 10-25% of the health care wastes are hazardous with the potential for creating a variety of health problems (Pruss *et al.*, 1999). The Medical post graduate students during and after completing their studies are at potential risk for hazards due to Biomedical Waste because of their coming in contact with those in the hospitals. Medical post graduates are supposed to know about BMW and its management as part of learning during their MBBS study. After post graduation they are likely to handle BMW while working in various capacities. Hence post graduate students should be thoroughly aware about BMW. Considering these facts the current study was conducted with the main objectives of assessing the awareness about hazards and management of BMW among post graduate medical students and knowing the effectiveness of the training in improving their awareness about BMW.

MATERIALS AND METHODS

The study was conducted at the Maharajah's Institute of Medical Sciences (MIMS), medical college, Vizianagaram, during September 2013. All first year post graduate students from various departments of MIMS present for the Orientation-Training programme conducted by the Community Medicine Department of the college on the topic of BMW were included in the study and the study participants were total 48 students. The type of study was descriptive cross sectional. The data collection was done by a pretested, predesigned self administered questionnaire containing 20 closed ended questions on various aspects of BMW such as its hazards, management, the colour coding for segregation and methods used for disposal etc. Training on BMW was given to students about Biomedical Waste management. Both pre and post test data was collected and analysed. Comparison of scores was done with Z test. Data was analyzed on a computer using SPSS (Statistical Package for Social Sciences) version 15.0. Descriptive statistics like percentage, mean, and SD (standard deviation) were computed for data presentation. Chi-square test was used to compare frequencies at 95% confidence interval.

RESULTS

Out of the total 48 study participants, male students were 21 (43.75%); and female students were 27 (56.25%). The mean age of the students was 26.97 years (SD = 2.57 years). The post graduate students were asked to identify the biohazard symbol. During pre test 46 (95.83%) students identified it correctly. During the post test all the students identified the biohazard symbol correctly. The awareness about various hazards of BMW such as infections, injury, toxicity, radiation etc. was present in 45 (93.75%) study participants during pre test. During post test the awareness about hazards of BMW was increased to hundred percent with all the 48 study participants giving the correct answer. The awareness about at risk personnel for hazards due to BMW is shown in detail in graph 1.



Graph 1: At risk people due to BMW

On an average the distribution of health care waste in developing countries like India reveals that hospital waste consists of 80% of general health-care waste, 15% of pathological and infectious waste; 1% of sharps waste; 3% of chemical and pharmacological waste and <1% of special waste². The details of awareness regarding this are represented in table 1.

Tuble 1. Awareness present about average composition of nospital waste				
Hospital waste	Pre test Number (%)	Post test Number (%)	p-value	
Gen health care	9 (16.7%)	39 (81.3%)	< 0.0001*	
Pathological	9 (16.7%)	36 (75%)	< 0.0001*	
Sharp	15(31.3%)	30 (62.5%)	0.0014*	
Chemical	9 (16.7%)	24 (50%)	0.0003*	
Special	12 (25%)	30 (62.5%)	0.0001*	
*indicates significant p-v	alue			

Table 1: Awareness present about average composition of hospital wa

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The quantity of solid wastes generated in hospitals and nursing homes generally varies from 1/2 to 4 kg per bed per day in Govt. hospitals (Rao HVN, 1995). During pre test it was observed that 18 (37.5%) of the study participants were aware about this. During post test all the 48 (100%) study participants could answer correctly regarding the same. The correct awareness regarding maximum storage time of hospital waste before disposal as 72 hours (Pruss *et al.*, 1999) was present in 30 (62.5%) of the participants during pre test, which showed a significant (p-value=0.0278) increase to correct awareness in 42 (87.5%) participants during post test.

Different categories of Biomedical Waste should be collected in the specified containers/ bags at the site of generation. BMW management involves different colour coding and type of container for disposal of bio-medical wastes. Depending on this the treatment options are decided (Acharya DB and Singh M, 2008). The correct awareness regarding the treatment options are shown in Table 2

Tuble 2. The archess present about colour coung and ir cament options for Divive				
Colour code	Pre test Number (%)	Post test Number (%)	p-value	
Yellow	12 (25%)	36 (75%)	< 0.0001*	
Red	18 (37.5%)	27 (56.3%)	0.057	
Blue	9 (16.7%)	33 (68.8%)	< 0.0001*	
Black	12 (25%)	42 (87.5%)	< 0.0001*	

Table 2: Awareness	present about (colour coding	and treatment of	ptions for	BMW
		coroar coarra			

**indicates significant p-value*

The study participants were asked regarding the disposal methods for various categories of Biomedical Waste. The correct method for immediate disposal of used needle is to burn the needle head and then cut the syringe tip by the syringe shredder. The awareness regarding this during pre test is shown in graph 2. The post test results showed that all the 48 (100%) study participants had a correct awareness regarding it.



Graph 2: Awareness present about immediate disposal of used needle

The details about other parameters such as sharp wastes should be collected in puncture proof containers and method of choice for disposal of hazardous health care waste(HCW) being incineration are shown in table 3.

Disposal method	Pre test Number (%)	Post test Number (%)	p-value	
Sharp waste	30 (62.5%)	42 (87.5%)	0.008*	
Choice for HCW	24 (50%)	42 (87.5%)	0.001*	

*indicates significant p-value

The legislative measures for management of Biomedical Waste is called as The Biomedical Waste management and Handling Rules, 1998 of India. The correct awareness about this was present in 30

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(62.5%) of the study participants during the pre test. During the post test it was observed that the awareness about the legislative measure was present in 42 (87.5%) of the study participants.

The study participants were given marks out of 20. The details of the pre test and the post test scores and the increase in the scores are shown in graph 3. During pre test the scores ranged from 9 to 17. During the post test the scores of the study participants were between 11 and 20. The scores of all the students increased during post test. The increase in the scores was from 2 to 9. The mean and standard deviation (SD) of these scores is shown in table 4. The scores arranged in ascending order and these are represented in graph 4.



Graph 3: Pre test, post test and increase in scores of each study participant



Graph 4: Pre test, post test and increase in scores (ascending order) of the study participants

Scores	Mean	Standard deviation (SD)	p-value
Pre test	12.2	2.5	< 0.0001
Post test	16.6	2.7	
Increase	4.4	1.9	-

DISCUSSION

The awareness of first year medical post graduate students about BMW management was assessed in this study. Although the handling of Biomedical Waste is minimal in medical students during their graduation study and internship training, a thorough knowledge about the subject is of immense importance in deciding their practices during the post graduate course. Hence, the present study was limited only to awareness assessment. In the present study almost all the students identified the biohazard symbol correctly and were also aware about the hazards of BMW. Literature review did not reveal any comparison of pre test and post test results on awareness about BMW. An online study (Mohapatra *et al.*,

2012) amongst medical graduate and post graduates on related topic revealed awareness about biohazard symbol in almost 60% of their study participants.

The correct awareness that health care personnel are amongst the at risk personnel due to hazards of BMW was present among around three-fourths of the study participants during pre test. This was increased significantly (Z=3.33, p-value=0.0004) during post test. The correct awareness about the hazards of BMW and the personnel at risk plays a key role in decreasing the hazardous effects of BMW. Proper management of BMW can solve the problem of hazards to a large extent. There is a need for education on the hazards associated with improper waste disposal (Ramesh *et al.*, 2009).

The awareness present about average composition of hospital waste was present in one-fourth of the study participants which showed a significant increase during post test where around three fourths of the study participants were right. The correct awareness regarding the quantity of solid wastes generated in hospitals and nursing homes also increased from among one third students during pre test to all of them being correct during post test. A significant increase in correct awareness about maximum storage time of hospital waste from collection to disposal was also observed during post test in comparison with the pre test scores. The awareness regarding the colour coding for segregation and treatment options of BMW was observed to be correct in about one forth study participants during pre test. It showed an overall significant increase with about three fourth of the study participants showing the correct awareness during post test. Another study revealed the awareness about colour coding was present in about half of the participants (Mohapatra *et al.*, 2012).

The awareness about correct disposal method of a used needle was present in about one half of the study participants during pre test. The post test results showed that all the study participants could mention the correct method of disposal of used needle. The awareness about method of choice for disposal of Health care waste was present in half of the study participants during pre test which increased significantly during the post test. A study in dentists including post graduate students also revealed similar results (Bala and Narwal, 2013). The correct awareness about legislative measures for BMW management also increased significantly during post test as compared to pre test.

There was a statistically significant rise in the post test scores (55-100%) of the study participants in comparison with the mean pre test scores (45-85%). Wide range of results (0-75%) has been reported by other studies (Mathur *et al.*, 2011; Mostafa *et al.*, 2009) regarding BMW management.

Conclusions

The present study concludes that overall majority of the post graduate students were aware about the general aspects of BMW. But details about BMW such as composition of hospital waste, colour coding, quantity of wastes generated per bed, methods of disposal were not known to many. In addition it was observed that the awareness regarding these details of BMW increased during the post test after the training on BMW. Thus the training was effective as obvious from the significantly higher post test scores for most of the subtopics. Based on this it can be recommended that such training sessions should be frequently organized to improve the awareness and update knowledge on BMW.

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