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Knowledge, Attitude and Practices about Biomedical Waste Management among Healthcare Personnel at Healthcare Facilities of Bhavnagar District, Gujarat - A Cross-sectional Study

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ABSTRACT

Background: The waste generated in the hospital and improper handling of waste has significant health impact not only on the healthcare workers but also the risk of water, air & soil pollution thereby adversely affecting the environment and community at large. Bio medical waste (BMW) collection and proper disposal has become a significant concern for both the medical and general community.
Objectives: Assessing knowledge, attitude and practices of health care personnel regarding biomedical waste management.
Materials and Methods: This was a cross-sectional study. Study participants included- doctors, staff nurses, laboratory technicians, pharmacists and sanitary staffs who were dealing with BMW of various PHCs & CHCs of the district. The study included 33 doctors, 33 staff nurses, 33 laboratory technicians, 33 pharmacists and 33 sanitary staffs. So total 165 study participants were interviewed in the study. The study was conducted by using pretested, semi-structured proforma. The data was tabulated and interpretation was done by using percentages through Epi Info 7 software.
Results: Doctors, nurses and laboratory technicians have better knowledge than sanitary staff regarding biomedical waste management. Practices regarding color coding and waste segregation at source was found to be better among nurses and laboratory staff as compared to doctors. Only 38.8% study participants had received training for bio medical waste management. There was significant association between practice of waste segregation and training of study participants.
Conclusion: Health care personnel had good knowledge and attitude about BMW management. Periodic training of health care personnel on BMW management needs to be emphasized to have a significant impact on BMW disposal and practices.
Key words: Biomedical waste, health care personnel, knowledge, attitude, practice

INTRODUCTION

Health care services produce biomedical waste (BMW), which is defined as any waste, which is generated during the diagnosis, treatment or immunization of human beings or animals or in research activities pertaining there to or in the production or testing of biological and including categories for the same [1] Majority of waste (75-90%) produced by the healthcare providers is non-risk or general and it is estimated that the remaining (10-25%) of healthcare waste is regarded as hazardous the potential for creating a variety of health problems [2]

In country like India, where there is big and complex health care system, mixed economy, private and government hospital working together. The waste generated in the hospital has significant health impact not only on the healthcare workers but also on the general public. Improper handling of waste not only poses significant risk of infection due to pathogens like HIV, Hepatitis B & C virus but also carries the risk of water, air & soil pollution thereby adversely affecting the environment and community at large [3]

The waste produced in the course of healthcare activities carriers a higher potential for infection and injury than any other type of waste. Inadequate and inappropriate knowledge of handling of healthcare waste may have serious health consequences and a significant impact on the environment as well [4] However, lack of awareness has led to the hospitals becoming a hub of spreading disease rather than working toward eradicating them. 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 [5]

In order to improve biomedical waste (BMW) management, it is important to understand and evaluate the current practices in BMW management, to identify the gaps and to address them. With this background, this study was conducted with the objective of assessing knowledge, attitude and practices of health care personnel's working at the health care facilities of Bhavnagar district regarding biomedical waste management.

MATERIALS & METHODOLOGY

The study is an observational cross sectional study. The study was conducted from December 2015 to August 2016. The study employed random sampling. The rural area of Bhavnagar district is divided into nine Talukas. From these, two Primary health centers (PHC) were randomly selected from each taluka and all Community health centers (CHC) of Bhavnagar district were selected. Thus total 18 PHCs and 15 CHCs of Bhavnagar district were selected for the study. The study participants included doctors, staff nurses, laboratory technicians, pharmacists and sanitary staffs. During the visit, five healthcare personnel from each healthcare facility were randomly selected for the study. Total 165 healthcare personnel were participated in present study. It included 33 doctors, 33 staff nurses, 33 laboratory technicians, 33 pharmacists and 33 sanitary staffs. Data was collected using pre-designed, semi structured questionnaire from study participants by interviewing them after informed consent was taken. All the study participants were assured about their confidentiality and anonymity.

The data was coded and double checked into a work sheet on Microsoft excel 2013. Data compilation and analysis was done using software Epi info 7. Proportions and percentage were used to interpret the result. The results were analyzed with different statistical parameters like standard deviation, *P* value and analysis of variance (ANOVA). For better comparison, a Knowledge, Attitude and Practice (KAP) Score was devised. The questionnaire included total 37 questions; a score of 2 was given for correct answer, 1 for partial answer and 0 for incorrect answer.

RESULTS

Total 165 health care personnel were participated in present study. Only 38.8% study participants had received training for bio medical waste management.
Awareness about bio medical waste management and other particulars related to BMW act, handling and management were presented in table 1. It included details of any health hazard and transmission of disease by BMW, knowledge about color coding of BMW management bags, identifies the correct color of bag for different categories.

Detailed information was collected regarding practice of BMW handling and management (table 2). Details regarding received any training for BMW, record of BMW, disinfection at work place, use of personal protective measures for handling, availability of hub cutter, practice regarding different categories disposal were collected from the health care personnel.

Table 1: Knowledge and attitude regarding bio-medical waste among health care personnel (n=165)

Sr.No	Knowledge regarding biomedical waste management	Doctors	Nurses	Lab tech	Pharmacist	Sanitary staff
		n=33(%)	n=33(%)	n=33(%)	n=33(%)	n=33(%)
1	Knowledge about bio-medical waste generation and legislation	30(90.9)	28(84.8)	21(63.6)	23(69.7)	16(48.5)
2	Any health hazard occur due to improper waste handling.	29(87.8)	25(75.7)	22(66.6)	25(75.7)	18(54.5)
3	Biomedical waste is segregated at source	29(87.8)	27(81.8)	22(66.6)	23(69.7)	18(54.5)
4	As per BMW rules, waste should not be stored beyond 48 hours	30(90.9)	28(84.8)	21(63.6)	23(69.7)	16(48.5)
5	Awareness of separate colour coding containers	29(87.8)	25(75.7)	22(66.6)	25(75.7)	18(54.5)
6	Identification of Bio-hazard symbol	24(72.7)	20(60.6)	18(54.5)	16(48.5)	10(30.3)
7	Awareness about universal/standard precautions	30(90.9)	28(84.8)	21(63.6)	23(69.7)	16(48.5)
8	Reporting of accidental injury to medical officer/infection control doctor	28(84.8)	25(75.7)	18(54.5)	23(69.7)	10(30.3)

Table 2: Practice of health care personnel on bio-medical waste management (n=165)

Sr.No	Practices for safe bio medical waste management.	Doctor	Nurse	Lab tech	Pharmacist	Sanitary staff
		n=33(%)	n=33(%)	n=33(%)	n=33(%)	n=33(%)
1	Training of Bio medical waste	16(48.5)	14(42.4)	10(30.3)	14(42.4)	10(30.3)
2	Using personal protective measures while handling BMW	16(48.5)	20(60.6)	18(54.5)	15(45.5)	11(33.3)
3	Segregation of BMW done at work place	18(54.5)	23(69.7)	21(63.6)	13(39.4)	10(30.3)
4	Maintaining BMW records at work place	16(48.5)	20(60.6)	18(54.5)	15(45.5)	11(33.3)
5	Correct method for collecting human anatomical waste	22(66.6)	25(75.7)	20(60.6)	20(60.6)	15(45.5)
6	Correct method for collecting sharp waste	24(72.7)	27(81.8)	25(75.7)	16(48.5)	10(30.3)
7	correct method for collecting soiled dressings/plaster casts/linen	22(66.6)	27(81.8)	22(66.6)	18(54.5)	12(36.5)
8	Correct method for collecting infected plastic waste	20(60.6)	25(75.7)	22(66.6)	16(48.5)	10(30.3)

Table 3: Association between Training of biomedical waste management and practice of waste segregation. The Chi square table is given below (n=165)

Training of biomedical waste management	**Practice of waste segregation**		**Total**
	Yes	No	
Yes	40 (63%)	24(37%)	64 (100%)
No	45 (46%)	56(54%)	101 (100%)
Total	85 (52%)	80 (48%)	165 (100%)

Chi-square = 5.051 DF = 1 p value = 0.0123

Table 4: One-way Analysis of Variance (ANOVA) between KAP score and staff category (n=132)

Descriptive statistics and ANOVA between KAP score and staff category								
					95% Confidence Interval for Mean			
Staff category	N	Mean	Std. Deviation	Std. Error	Lower Bound	Upper Bound	Minimum	Maximum
Doctor	33	59.06	4.227	0.735	57.56	60.56	52	69
Staff Nurse	33	51.51	3.624	0.630	50.23	52.81	45	66
Lab. Tech	33	50.15	3.734	0.650	48.82	51.48	44	64
Pharmacist	33	51.24	4.555	0.793	49.62	52.86	42	64
Total	132							
Test of Homogeneity of Variances								
Bartlett's Statistic	df1		df2	P-value				
2.186	3		128	.05346*				
ANOVA								
			Sum of Squares	Df	Mean Square		F	P-value
Between Groups			1654.6	3	551.52		33.578	0.0001
Within Groups			2102.4	128	16.425			
Total			3757.0	131				

*Equality of variances assumed as Bartlett's test p-value >0.05

Table-3, shows the association between training of biomedical waste management and practice of waste segregation by the chi-square test. Out of 64 trained professionals, 63% practiced segregation of bio medical waste at the point of generation, while 37% did not practiced segregation in spite of getting trained. This difference was statistically significant. ($p<0.05$) O.R. =2.07, 95% CI= (1.09-3.93). So there was 2.07 times higher practice of waste segregation at point of generation in trained health care personnel compared to non-trained health care personnel.

In Table-4, The descriptive statistics associated with KAP score across the staff categories are reported. In order to test the hypothesis that the staff category (Doctor, Staff nurse, Lab tech, Pharmacist) had different levels of KAP score, between-groups ANOVA was performed. Prior to conducting the ANOVA, the assumption of normality was evaluated and determined to be satisfied. The independent between-groups ANOVA yielded a statistically significant effect, F (3,128) =33.578, p=0.0001. There was significant association between KAP score and staff category.

DISCUSSION

The present study was conducted among health care personnel of different level working at a PHCs and CHCs of Bhavnagar district. The study participants included doctors, nursing staffs, laboratory technicians, pharmacists and sanitary staffs. Total 165 health care personnel were participated in the study.

Majority participants had heard about the BMW and its management rule but less than half of the study participants have actually received training for BMW management. Only 38.8% study participants know correct categories of BMW. Doctors, nurses and laboratory technicians have better knowledge than sanitary staff regarding biomedical waste management. Practices regarding color coding and waste segregation at source was found to be better among nurses and laboratory staff as compared to doctors. The present study findings are in agreement with other study [6]

Overall assessment about practices related to BMW management suggested that they again need good quality training. Emphasis should be given to good quality training of health care personnel's working in the hospitals at regular time interval [7,8]

The concept about the maintenance of records related to injuries due to BMW is not prevailing very much. Similar findings were observed in other study also [9,10]

The healthcare workers who took training on biomedical waste were 2.07 times more likely to practice biomedical waste management than their counter parts who didn't take training on biomedical waste management [11]

Low reporting of injuries may be attributed to the fact that most of the doctors and other technical and nontechnical staff are unaware about a formal system of injury reporting which should be established within all the health facilities [12]

CONCLUSION

Based on the observation, the importance of training regarding bio medical waste management cannot be overemphasized, lack of proper and complete knowledge about bio medical waste management impacts practices of appropriate waste disposal. A mechanism of injury reporting in the hospital needs to be established.

To improve overall knowledge and practice related to BMW management and its handling following steps can be taken like strict implementation of bio medical waste management rules; it should be made compulsory for health care facilities to get their health care personnel trained from accredited training centers, it should be ensured that the injuries happening to the health care personnel are reported to the person in charge of bio medical waste management or to the bio medical waste management committee. Training and retraining on biomedical waste should be planed and implemented.

Conflict of interest- None declared

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Ethical approval: The study was approved by the Institutional Ethics Committee

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