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EVALUATION OF AWARENESS PROGRAMME ON PRACTICES OF BIOMEDICAL WASTE MANAGEMENT AT TEACHING HOSPITAL, AHMEDABAD

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ABSTRACT

In accordance with the rules of Bio Medical Waste (Management and Handling), every hospital generating BMW needs to set up requisite BMW treatment facilities. Inadequate management of biomedical waste can be associated with risks to healthcare workers, patients and communities at large..Hospital infection control committee & team are responsible for monitoring of proper implementation of biomedical waste management rules. The issue is not only related to quality waste management but also to safety of health care workers i.e. universal precautions and immunization. Objectives: To evaluate Biomedical Waste Management practice at tertiary care hospital and to find out the change, if any, in practice of biomedical waste management after training. Method: Cross sectional interventional study conducted at 48 randomly selected Bio Medical Waste Management (BMW) management stations tertiary care hospital, Ahmedabad during March 2009 to November 2009. Results: There was considerable gain in availability of personal protective devices (20.84%), reduction of over flown bags (18.75%) and availability of bags (8.33%) after training. Regarding manpower there was increased in staff vaccination (68.75% -77.08%) and awareness about post exposure prophylaxis (12.50%). Not only that there was improvement in use of personal protective devices by servants (39.59%) and reduction of sharp /needle prick injury (8.33%) after training. Conclusion: Conduction of training workshops on BMW management for Hospital staff by Infection Control Committee has shown promising results in practicing BMW management. This study recommends periodic training workshop on BMW to reinforce and update knowledge of hospital staff for proper implementation of BMW Act. Keywords: biomedical waste, practice, awareness, evaluation.

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 biological ,and is contaminated with human fluids.⁽¹⁾ World Health Organization 1999 report⁽²⁾ on health care waste composition in Asian countries reported that India generates 0.33 million ton biomedical waste per year, mounting to 1-2 kg per day per bed. The BMW, if not attended properly, amounts to hazard not only to the health personnel in the hospital but also to the patients which leads to an increase in per-capita expenditure in health care system. Though 75-80% of wastes generated from hospitals are non-infectious, 20-25% is hazardous.⁽³⁾ It is a potential health hazard to health workers, public, flora and fauna of the area.⁽⁴⁾ The Government of India has enacted the Bio-medical Waste - BMW (Management and Handling) Rules 1998, in July 1998⁽⁵⁾ under which it is mandatory for all hospitals and health care facilities to ensure that the bio-medical waste be handled and

managed without any harm to the human health and the environment. Thus safe and effective management of waste is not only a legal necessity but also a social responsibility. Handling, segregation, mutilation, disinfection, storage, transportation and final disposal are vital steps for safe and scientific management of biomedical waste in any establishment. Biomedical waste should be segregated into containers / bags at the point of generation in accordance with schedule II of Biomedical Waste (management and handling) Rules 1998. The present study was conducted to evaluate Biomedical Waste Management practice at the largest tertiary care hospital (with more than 2000 beds) and to find out the change, if any, in practice of biomedical waste management after training.

MATERIAL AND METHOD

Civil Hospital, Ahmedabad is one of Asia's largest tertiary care institute having bed-capacity of more than 2000. There are more than 69 BMW management stations at various sites including wards, Operation Theatres (OTs), Laboratories (labs) & Intensive Care Units (ICUs). This cross sectional interventional study was carried out at 48 randomly selected stations on 26th & 27th March,2009 with permission from hospital authority.

An identical pre- and post-training questionnaire was designed and handed over to the volunteers of National Service Scheme (N.S.S.). The questionnaire was based on the guidelines developed by Government of Gujarat for Bio Waste Management. The Medical N.S.S volunteers were trained to conduct various aspects of the survey. These volunteers visited each ward, Operation theatre (OT), Intensive Care Unit (ICU) & laboratory (lab) that was allotted to them and filled up the requisite details in the pre-training proforma. Hospital had arranged training sessions for nursing staff and servants/sweepers associated biomedical wastes management with and cleanliness work from March-April 2009 onwards. Training included knowledge about all aspects of biomedical waste with power point presentation and demonstration of waste segregation in begs, preparation of disinfectants, different devices. personal protective prophylactive vaccination etc by infection control team. A posttraining study was carried out on 13th and 14th November 2009. The collected information was compiled in Microsoft excel and analyzed with the help of Epi Info software.

RESULTS

		Before	After	
	OBSERVATIONS (YES RESPONSE ONLY)	Training	Training	% Gain
		(N=48)	(N=48)	
1	Color coded Bins & Bags were in place as per guideline	42 (87.50)	46 (95.83)	08.33
2	Segregation is done as per color coding of bins & bags	40 (83.33)	45 (93.75)	10.42
3	Over flown bags ($> 3/4^{\text{th}}$ full) present	18 (37.50)	09 (18.75)	18.75
4	Needle & Syringe cutters-present & working properly	46 (95.83)	46 (95.83)	00.00
5	Sodium Hypochlorite solution prepared as per guidelines	44 (91.67)	47 (97.92)	06.25
6	Personal Protective Devices available**	37 (77.08)	47 (97.92)	20.84

Table-1-Availibility of materials and practices of biomedical waste management at study place

* Figure in the parenthesis shows percentages, ** p value significant

Table -1 shows that out of 48 BMW station, 42 (87.5%) had color coded bins and bags placed as per guidelines before training which was 46 (95.83%) after training, means 8.33% gain. Biomedical waste was segregated as per color coding of bag at the place of origin at 40 (83.33%) BMW stations before training which was 45 (91.67%) after training meaning 10.42% gain. The over flown bags (more than 3/4th full) were found

at 18 (37.5%) BMW stations before training which was 9 (18.75%) after training means 18.75% gain. Sodium hypochlorite solution was prepared as per the guideline at 47 (97.92%) BMW stations after training means 6.25% gain. Before training at 37(77.08%) BMW stations personal protective devices were available as compared to 47(97.92%) BMW stations after training meaning 20.84% gain.

Table-2-Availability of materials and practices of biomedical waste management according to workplace in hospital

	OBSERVATIONS (YES RESPONSE ONLY)	WARDS		O.T.,I.C.U. & Lab.		
		Before	After	Before	After	
		Training	Training	Training	Training	
		(n=26)	(n=26)	(n=22)	(n=22)	
1	Color coded Bins & Bags were in place as	23	25	19	21	
	per guideline	(88.46)	(96.15)	(86.37)	(95.46)	
2	Segregation is done as per color coding of	23	24	17	21	
2	bins & bags	(88.46)	(92.31)	(77.27)	(95.46)	
3	Over flown bags(>3/4 th full) present	9	6	9	3	
5	over nown bags(>3/4 Tun) present	(34.62)	(23.08)	(40.91)	(13.64)	
4	Needle & Syringe cutters-present & working	26	26	20	20	
	properly	(100)	(100)	(90.90)	(90.90)	
5	Sodium Hypochlorite solution prepared as	25	26	19	21	
	per guidelines	(96.15)	(100)	(86.37)	(95.46)	
6	Personal Protective Devices available	18	25	19	22	
		(69.23)	(96.15)	(86.37)	(100)	

* Figure in the parenthesis shows percentages

Table -2 shows that out of 48 BMW stations, 26(54.17.5%) were in different wards and 22 (45.83%) were in operation theaters, Intensive Care Units and in Laboratories. Biomedical waste was segregated as per color coding of bag at the place of its origin at 23(88.46%) wards BMW stations and 17 (77.27%) O.T./ I.C.U./Lab. BMW Stations before training which was 24(92.31%) for ward BMW stations 21(95.46%) for O.T./I.C.U./

Lab. BMW station after training. Over flown bags was reduced from 9 (34.62%) to 6 (23.08%) BMW stations at wards and 9 (40.91%) to 3 (13.64%) BMW stations at O.T./I.C.U./Lab. after training. Availability of personal protective devices increased from 18 (69.23%) to 25 (96.15%) at ward BMW stations and 19(86.37%) to 22(100%) at O.T./ I.C.U./Lab. BMW Stations after training.

	OBSERVATIONS (YES RESPONSE ONLY)	Before Training (N = 48)	After Training (N =48)	% gain
1	Sharp injury/needle prick reported in last 7 days in concerned staff	6 (12.5)	2 (4.17)	08.33
2	Knowledge about Post-exposure Prophylaxis in concerned staff	33 (68.75)	39 (81.25)	12.50
3	Staff nurses using Personal Protective Devices	45 (93.75)	45 (93.75)	00.00
4	Servants using Personal Protective Devices**	23 (47.91)	42 (87.5)	39.59
5	Staff nurse Vaccinated against Hepatitis B **	15 (31.25)	48 (100)	68.75
6	Servants vaccinated against Hepatitis B **	8 (16.67)	45 (93.75)	77.08

 Table 3 -Preparedness of staff and practices of biomedical waste
 management at study place

* Figure in the parenthesis shows percentages, ** p value significant

Table-3 shows that out of 48 BMW stations, sharp injury / needle prick within last seven days were reported in 6 (12.5%) BMW stations before training which was reported at 2 (4.17%) BMW stations after training means 8.33% gain. The utilization of personal protective devices in staff nurses and servants were 45 (93.75%) and 23 (47.91%) respectively before training which was 45 (93.75%) and 42 (87.5%) in same health professionals after training meaning 39.59% gain in servants after training. Hepatitis B vaccination in staff nurses was completed in 15 (31.25%) BMW stations before training which was rose to 48 (100%) after training means 68.75% gain. The same figure in servants were 8 (16.67%) before training and 45 (93.75%) after training mean 77.08% gain.

 Table 4- Preparedness of staff and practices of biomedical waste management according to workplace at hospital.

	OBSERVATIONS (YES RESPONSE	WADD (N - 26)		O.T.,I.C.U. & LAB.		
	ONLY)	WARD ($\mathbf{N} =$	- 20)	(n = 22)		
		Before	After	Before	After	
		Training	Training	Training	Training	
1	Sharp injury/needle prick reported in last 7	5	2	1	0	
	days in concerned staff	(19.23)	(7.69)	(4.55)	(0.00)	
2	Knowledge about Post-exposure Prophylaxis	20	23	13	16	
	in concerned staff	(76.92)	(88.46)	(59.09)	(72.72)	
3	Staff nurses using Personal Protective Devices	25	25	20	20	
	Starr nurses using reisonal riolective Devices	(96.15)	(96.15)	(90.90)	(90.90)	
4	Servents using Personal Protective Devices	10	23	13	19	
	Servants using reisonal riolective Devices	(38.46)	(88.46)	(59.09)	(86.36)	
5	Staff numer Vaccineted against Hanstitis D	7	26	8	22	
	Starr nurse vaccinated against riepartits B	(26.92)	(100)	(36.36)	(100)	
6	Servents vaccinated against Hanatitis B	2	23	6	22	
	Sei vants vacemateu agamst nepattis D	(7.69)	(88.46)	(27.27)	(100)	

* Figure in the parenthesis shows percentages

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Table-4 shows that utilization of personal protective devices in servants has increased more at wards than at O.T./I.C.U./Lab after training, from 10(38.46%) to 23(88.46%) at ward BMW stations and from 13(59.09%) to 19(86.36%) at O.T./I.C.U./Lab BMW stations. Similarly servant vaccination was completed from 2(7.69%) to 23(88.46%) at wards BMW stations and 6(27.27%) to 22(100%) at O.T./I.C.U./Lab BMW stations.

DISCUSSION

Public hospitals in developing countries have sanitary inspectors and other staff for biomedical waste management, but due to lack of periodic training, waste management is not up to the mark. The results of this interventional study highlighted that the practice of BMW management was satisfactory at most of the BMW stations which is in agreement with the study of Yadavannavar et al ⁽⁶⁾. In our study segregation of waste improved from 83% to 93% at BMW stations after training. Shahida Rasheed et al⁽⁷⁾ in her study reported that only 25% hospitals were segregating waste at source. In our study, over flown bags were reduced to 18.7% from 37.5% at BMW stations after training. This may be due to eagerness of the staff to follow what they have learnt from the training. Needle and syringe cutters were present at 95% of BMW stations. Mathew et al ⁽⁸⁾ reported 59% availability of needle and syringe cutters in his study. Rao⁽⁹⁾ reported 70% of the healthcare facilities used a needle cutter/destroyer for sharps management. This is an issue of material management. In our study sharp / needle prick injury was reduced from 12.5% to 4.17% after training. Sharma S.⁽¹⁰⁾ in her study reported that 10.00% handlers suffered waste with injury/puncture/ infection in the past six months but no one reported to higher authorities. Practices of BMW management were stricter at operation theatres, I.C.U. and laboratories in compared to wards. Saini S. et al (11) also reported similar finding and attributed it to strict instructions by authorities and fear for punitive actions. It was observed that fear coupled with awareness about the risk could be responsible for positive attitude of staff located at these places.

There was considerable gain in availability of personal protective devices (20.84%), reduction of over flown bags (18.75%) and availability of bags (8.33%) after training, Ideally BMW items should be included in the essential stock items in the Hospital and provided on demand immediately without loss of time. Regarding manpower, there was increased in staff vaccination(68.75% -77.08%) and awareness about post exposure prophylaxis (12.50%). Not only that there was improvement in use of personal protective devices by servants (39.59%) and reduction of sharp /needle prick injury (8.33%) after training. Sharma S. in her study reported that 41.43% of waste handlers/sweepers were aware of the risk involved in bio-medical waste handling, none received any special training on this topic. When health care providers are specifically protected against tetanus, hepatitis-B etc by vaccination coupled risk reduction by utilization of personal protection devices, hospitals will become good heaven for them.

CONCULSION AND RECOMMENDATIONS

Most of the BMW stations were compliant to the BMW management guidelines to a satisfactory level. Conduction of training workshops on BMW management for hospital staff by Infection Control Committee has shown promising results in practicing BMW management. The level of Hepatitis B vaccination amongst the nursing staff and class IV servants has also improved drastically.

This study recommends periodic training workshop on BMW to reinforce and update knowledge of hospital employees on the subject and motivate them to comply with the rules and guidelines regarding BMW management. Ideally it should be the part of induction training for each novice. For old hands, this should be Dinesh Rathod et al

carried out periodically before or after the completion of their shift without affecting hospital work. Regular supervision by hospital administrators and members of Infection control committee coupled feedback (positive or negative) can help in proper implementation of BMW Act.

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