

IMPACT OF EDUCATIONAL INTERVENTION ON THE KNOWLEDGE OF BIO-MEDICAL WASTE MANAGEMENT AMONG HEALTH CARE WORKERS IN A TERTIARY CARE HOSPITAL AT BAGALKOT CITYB. S. Mannapur¹, A. S. Dorle², C. H. Ghattargi³, K. R. Kulkarni⁴, U. Y. Ramdurg⁵, L. D. Hiremath⁶, Suma N⁷**HOW TO CITE THIS ARTICLE:**

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ABSTRACT: BACKGROUND: The waste generated from medical activities can be hazardous, toxic and even lethal because of their high potential for diseases transmission and injury that also results in environmental degradation. An adequate and appropriate knowledge of health care waste management among the health care workers is the first step towards developing favourable attitude and practices thereby ensuring safe disposal of hazardous hospital waste. **OBJECTIVES:** To determine the knowledge regarding the bio-medical waste management among health care workers. To evaluate the effect of the intervention program given to health care workers. **METHODS: TYPE OF STUDY:** A cross-sectional study. **STUDY PERIOD:** May-December 2013. **STUDY SETTING & STUDY SUBJECTS:** The present study was conducted at S. Nijalingappa Medical College and HSK Hospital & Research center in Bagalkot city among paramedical workers which includes all the nursing staff and lab-technicians of the hospital (n =122). An identical pre and post-training questionnaire was designed which is pre-tested & structured and given to the above mentioned paramedical staff before and after the training session. The study variables include general information and questions regarding the knowledge about the health hazards, segregation, storage, personal protective devices, prophylactic vaccination, treatment, disposal and the rule of bio-medical waste management. A series of training sessions were conducted by trained community medicine staff along with PGs and training included knowledge about all aspects of biomedical waste with power point presentation and demonstration. **STATISTICAL ANALYSIS:** The data was tabulated by using Microsoft Excel 2010 and analyzed by using Openepi software and chi-square test was used. **RESULTS:** Among 122 participants, 94 (77.05%) were males and 28 (22.95%) were females. Most of them 94 (77.05%) belongs to the age group of 20-29yrs and 24 (19.67%) to the age group of 30-39 years. Majority i.e., 105 (86.07%) were nursing staff and 17 (13.93%) lab technician by occupation. 74 (60.65%) of the study participants belongs to class IV & 31 (25.4%) to class III of socio-economic status. In the present study, there was a highly statistical significant increase in the knowledge in all aspects (segregation, storage, personal protective devices, prophylactic vaccination, treatment, disposal and the rule except health hazards) of bio-medical waste management after training compared to before training. In case of health hazard, there is increase in knowledge, but it is not statistically significant ($X^2= 1.048$, $p=0.307$). **CONCLUSION:** Awareness regarding bio-medical waste management can be increased by conducting interventional training programs periodically by the persons trained in the field of bio-medical waste management.

KEYWORDS: Bio-medical waste management, Intervention, Health care workers, Tertiary hospital.

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INTRODUCTION: Biomedical waste management has recently emerged as an issue of major concern not only to hospitals, nursing home authorities but to the environmental & law enforcement agencies, media and the general public also.¹ Bio-medical waste is forming approximately 1-2% of the total municipal solid waste stream. Some of the wastes are potential threat to the human health and environment.²

In addition to infectivity of the waste; its highly toxic & variable radioactivity has increased public concern about treatment, transportation and ultimate disposal. At many places, authorities are failing to install appropriate systems due to non-availability of technologies, inadequate financial resource and absence of professional training on waste management.³ The awareness is poor among various categories of health workers about environmental health including biomedical waste management.⁴

The management of Bio-medical waste is still in its infancy stage all over the world. There is a lot of confusion among the generators, operators, decision-makers & the general community about the safe management of bio-medical waste. The reason may be due to the lack of awareness. Hence, resource material on bio-medical waste management for hospital staffs including nurses is the need of the hour.⁵

The inappropriate healthcare waste management caused 21 million hepatitis B virus (HBV) infections (32% of all new infections); 2 million hepatitis C virus (HCV) infections (40% of all new cases); 260,000 HIV infections (5% of all new cases) in 2000. Epidemiological studies indicate that a person who experiences one needle stick injury from a needle used on an infected source patient has risks of 30%, 1.8%, and 0.3% respectively of becoming infected with HBV, HCV and HIV.⁶

Infection with blood borne pathogen particularly HIV and Hepatitis B & C virus is considered an occupational risk for health care workers. Clinical laboratory technicians & nurses are the most vulnerable group.⁷

A proper knowledge among the health care workers about the rules and regulations of BMW and a clear understanding of their roles and responsibilities in handling BMW can go a long way towards the safe disposal of hazardous hospital waste and protect the community from various adverse effects of the hazardous waste. Also being a teaching medical college adequate and appropriate knowledge of BMW management among the health care workers can have a pivotal role in dissemination of information to others. With this background this study was undertaken in view of assessing the existing knowledge of the health care workers in a tertiary care hospital regarding the management of BMW.

OBJECTIVES:

1. To determine the knowledge regarding the Bio-medical waste management among health care workers.
2. To evaluate the effect of the intervention program given to health care workers.

MATERIALS AND METHODS:

Study Design, Place & Period of Study: A descriptive cross-sectional study was conducted at S. Nijalingappa Medical College and Sri Hanagal Kumareshwar Hospital & Research center in Bagalkot city. The study period was between May-December 2013, for duration of eight months.

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Study Subjects & Setting: The study participants were paramedical workers which includes all the nursing staff and lab-technicians of the hospital. A total of 122 subjects were participated in the study. An informed oral consent has been taken from the study subjects. An identical pre and post-training questionnaire was designed which was pre-tested & structured and also validated by a pilot survey. They were administered to the above mentioned paramedical staff.

The filled Pre-test questionnaire was collected before starting the training sessions. At the end of the training sessions the post test was conducted. Both the pre and post-test questionnaire were evaluated. The questionnaire had two parts. The first part contained the information on socio-demographic characteristics such as age, sex, place of residence, occupation and per capita income and the second part contained questions regarding the knowledge about the health hazards, color coding for segregation, storage, personal protective devices, prophylactic vaccination, treatment, disposal and the rule of Bio-medical waste management. The knowledge was assessed by 12 item questionnaire.

A series of training sessions were conducted by trained community Medicine staff along with PGs and training included knowledge about all aspects of biomedical waste with power point presentation and demonstration. The participants were divided into three batches and each batch was trained on a separate day. The total training duration was for three days. Those who remained absent on the specified training day was included for the next training session.

Statistical Analysis: The data was tabulated by using Microsoft Excel 2010 and analyzed by using Openepi software and chi-square test is used to test the statistical significance of the difference observed in the knowledge of Bio-medical waste during pre-test & post-test.

RESULTS:

Characteristics	Number (N=122)	%
Age (In years)		
20-29	94	77.05
30-39	24	19.67
40-49	04	03.28
Total	122	100.00
Gender		
Male	94	77.05
Female	28	22.95
Total	122	100.00
Occupation		
Nursing staff	105	86.07
Lab. Technician	17	13.93
Total	122	100.00
Socio-economic status		
I	NIL	0
II	02	01.64
III	31	25.41
IV	74	60.66
V	15	12.29
Total	122	100

Table 1: Socio-demographic profile of study subjects

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Majority of the study subjects are in the age group of 20-29 years and very few are in 40-49 years age group. 77.05 % of the study participants were male. Most of them (86.07%) are nursing staff by occupation. 13.93% of the subjects are laboratory technicians. 60.66% of them belonged to the socio-economic class IV (Upper lower) followed by class III (25.41%).

Variables	Pre-test		Post-test		X ² value	P- value
	Aware	Unaware	Aware	Unaware		
Health hazards due to improper Bio-medical waste management	87 (71.31%)	35 (28.69%)	94 (77.05%)	28 (22.95%)	1.048	0.307
Segregation of Bio-medical waste	28 (22.95%)	94 (77.05%)	98 (80.33%)	24 (19.67%)	80.41	0.0000001
Color coding system	55 (45.08%)	67 (54.92%)	98 (80.33%)	24 (19.67%)	32.4	0.0000001
Storage of Bio-medical waste	76 (62.30%)	46 (37.70%)	107 (87.70%)	15 (12.30%)	21.01	0.0000004
Vaccinations to the Bio-medical waste handler	63 (51.64%)	59 (48.36%)	85 (69.67%)	37 (30.33%)	8.312	0.0039
Treatment of Bio-medical waste	100 (81.97%)	22 (18.03%)	119 (97.54%)	3 (2.46%)	16.09	0.000060
Disposal of Bio-medical waste	39 (31.97%)	83 (68.03%)	69 (56.56%)	53 (43.44%)	14.95	0.00011
Bio-Medical waste (Management & handling) rule	57 (46.72%)	65 (53.28%)	114 (93.44%)	8 (6.56%)	63.51	0.0000001

Table 2: Awareness of health personnel regarding Bio-Medical waste management

Table 2 shows that, majority (71.31%) of the respondents were already having prior knowledge about health hazards due to improper management of Bio-medical waste such as transmission of HIV, Hepatitis B and other infections. There is increase in knowledge after training, but it is not statistically significant.

Only 22.95% of the participants were aware about segregation of waste at the point of generation and it was significantly increased (77.05%) after creating awareness through training. About half of the subjects were not knowing about color coding system, precautions while handling Bio-medical waste and Bio-medical waste Management & handling rules. The knowledge was significantly increased after giving training and it is found to be statistically significant.

62.30% and 81.97 % of the study subjects knew about storage of Bio-medical waste (up to 48 hours) and different treatment methods (eg., disinfection by using 1% sodium hypochloride solution) of Bio-medical waste respectively. The knowledge was increased after creating awareness and it is statistically significant.

Only 31.97% of the training participants were aware about disposal methods of Bio-medical waste and the awareness was increased up to 56.56% after training session and the increase in knowledge was found to be statistically significant.

There was a highly statistical significance increase in the knowledge in all aspects of Bio-Medical waste management after training when compared to before training except health hazard.

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DISCUSSION: The present study was conducted to find out the knowledge of Bio-medical waste management as well as to know the impact of intervention training programme in increasing the knowledge. In this study, the knowledge of Bio-medical waste management was poor in many aspects before obtaining training because of lack of training in the past. The study conducted by Sain S e tal⁸ in a tertiary hospital showed that 85% of the nurses had knowledge about Bio-medical waste management. The increased knowledge can be due to either prior training or increased literacy status.

In the present study, there is increase in knowledge of health hazards due to improper management of Bio-Medical waste such as transmission of HIV/AIDS, Hepatitis B etc. after training, But it is not significantly increased because 71.31% (Majority) of the study subjects were already having knowledge about health hazards. Similar findings were observed in a study conducted by Asadullaha etal⁹ wherein majority (77.51%) of the paramedical workers were having knowledge about various disease transmissions due to unscientific way of management of Bio-medical waste. In contrast to this study, Pandit et al¹⁰ in their study found that Paramedical staff had poor knowledge about health hazards.

The segregation of Bio-medical waste at the point of generation is very important for the disposal of waste. This study showed that the knowledge about segregation of Bio-medical waste was very less (only 22.95%) among the participants. After training session the knowledge was significantly increased and was found to be statistically significant. The study done by Madhukumar S and Ramesh G¹¹ at Bangalore showed that 87.5%of the study subjects were in favor of segregation.

The study revealed that more than half (54.92%) of the study subjects were unaware about color coding of Bio-medical waste. After training the awareness was raised to 80.33% and the increase was found to be statistically highly significant. In one of the study by Asadulla et al⁹ it was found that only 28.9% of the nurses had complete knowledge regarding color coding and different categories of Bio-medical waste.

The present study observed that nearly half (48.36%) of the participants were not having knowledge about the precautions taken while handling Bio-medical waste.

The study also showed that 53.28% of the subjects did not know about the Bio-Medical waste (Management & handling) rules before the training and the knowledge was significantly increased to 93.44% after having training and was found to be statistically highly significant. Similar findings were reported in the study conducted in Bhopal by Bathma et al¹² showed that 54.5% of nurses were aware about the existence of BMW management and handling rules 1998 (2012).

In this study it was seen that 62.30 % of them knew about the storage of Bio-medical waste upto 48 hrs. and the knowledge was significantly increased after training, In a study conducted by Radha R ¹³ at B G Nagara showed that 37.3 % of the nurses were having knowledge about storage.

About half (51.64%) of them had knowledge about vaccines to be taken. After training 69.67% of the participants became aware about it. In case of treatment and disposal of Bio-medical waste also the knowledge was significantly increased after training and was found to statistically highly significant.

LIMITATIONS OF THE STUDY: This present study was carried out among paramedical staff such as nurses & Laboratory personnel only. In the future training sessions, it was decided to include Doctors & non-technical persons.

CONCLUSION: From this educational interventional study, it is concluded that the paramedical staff was lacking in the correct knowledge in various aspects of Bio-medical waste management before training. The knowledge was significantly raised after the training session. This indicates that regular updating about Bio-medical waste management should be carried out among all the types of health care personnel. This requires motivation & interest of the concerned authority in the Government as well as private health care facilities. By increasing the awareness about Bio-medical waste management it is possible to prevent the transmission of many diseases and protect the healthcare workers.

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