

A Comparative Study of Knowledge, Attitude and Practice Regarding Biomedical Waste Management Before and After Training among Doctors

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Abstract

Introduction: Effective management of biomedical waste is not only responsibility of hospital but also an individual working in hospital. Hence, there is a need for awareness among the administrators, doctors, nurses and paramedical staffs.

Methodology: The study was carried out in S.R.T.R.G.M.C, Ambajogai. The population included fifty participants who were medical graduates working as an interns in the same hospital. They were subjected to a short training session regarding the Biomedical Waste management. The participants were also subjected to the questionnaire before and after the session. The scores of both the assessment (before and after training session) were compared and statistically analysed.

Result: There was significant improvement found in the scores of the participants after training session regarding all of the areas, i.e. knowledge, attitude and practicing methods for biomedical waste management. The difference in the score was statistically significant.

Conclusion: Such kind of studies should be conducted at regular interval at every tertiary care center. Every employee working in a hospital should be trained for every aspect of biomedical waste handling and management rules, as lack of proper knowledge about bio medical waste management leads to inappropriate waste disposal and hence improper infection control in the healthcare center.

Keywords: Knowledge, Attitude, Practice, Biomedical waste management

I. Introduction

Biomedical or hospital waste refers to any waste generated while providing healthcare, performing research and undertaking the investigations or related procedures on human beings and animals in hospitals, clinics laboratories or similar establishments.^[1]

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.^[2] It is also estimated that, 10-25% of the healthcare waste generated is hazardous & causes serious health problems.^[3] 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.^[4]

Since biomedical waste can be serious pollutants of soil, water and air, unless carefully managed, governments across the world have been forced to introduce legal restrains in this area. The Government of India has promulgated the Medical Waste Management and Handling Rules (1998).^[5]

Effective management of biomedical waste is not only responsibility of hospital but also an individual working in hospital. Hence, there is a need for awareness among the administrators, doctors, nurses and paramedical staffs. The purpose of BMW is mainly to reduce waste generation, to ensure its efficient collection, handling, as well as safe disposal in such a way that it will help for infection control as well as safety of employees working in a hospital.

Therefore present study was undertaken to assess the knowledge, attitude and practice among the Medical graduates working in our tertiary care center.

II. Aim & Objectives

The aim was to study the impact of training regarding the Biomedical waste management among the medical graduate employees working in a tertiary care center.

III. Objectives-

1. To assess the knowledge about Biomedical waste management among the study participants
2. To survey the attitude towards Biomedical waste and its management among the study participants.
3. To know about the methods practised by participants during the handling and disposal of biomedical waste.
4. To analyze the improvement in knowledge, attitude and practice among participant after training.

IV. Material And Methods

The study was carried out in Swami Ramanand Teerth Rural Govt. Medical College, Ambajogai. The population included fifty participants who were medical graduates working as an interns in the same hospital.

They were subjected to a short training session regarding the Biomedical Waste management. The training included the information about biomedical waste handling, disposal methods, Medical waste management and handling rules promulgated by relevant competent authorities.

To study the impact of training session, the participants were also subjected to the questionnaire before and after the session. The identity of the participants was kept confidential. The questionnaire consisted of the series of questions related to the knowledge, attitude and practice regarding Biomedical Waste and its management. The percentage was calculated from the number of participants who answered correctly. The scores of both the assessment (before and after training session) were compared and statistically analysed.

V. Observations & Result

The study population consisted of 50 medical graduates, who were subjected to questionnaire before and after the training session, and their scores were observed as below.

In knowledge questionnaire, the knowledge of participants for biomedical waste management was assessed. 90 % of the participants were aware of 'what biomedical waste is' before training session. This score was improved further to 100% after training. 78% of the participants were aware of Biomedical waste management strategies followed in their institute before session, which improved the score up to 100% after training intervention.

To our surprise, only 10% of these Medicos were known of the Government authority that provides the guidelines for Biomedical waste management which again upgraded to 76% score after educational session.

Biohazard symbol was known to 86% and 100 % of the study population before and after training respectively. Also 80 % of the subjects were aware of the various waste treatment methods which was gone up to cent percent after educational intervention. 94% medicos were aware of the chances of inflicting injuries while using needles in medical procedures before the training session which was upgraded up to 100%.

Table No. 1-Analysis of knowledge regarding Biomedical waste management among participants.

Sr no	Questions	Score before training(%)	Score After training (%)	Chi square value	P value
1	Are you aware what Bio-Medical Waste [BMW] is?	90	100	5.2632	0.021
2	Are you aware about the Bio-Medical Waste Management done in your institution?	78	100	12.35	0.00
3	Which is the government authority that provides guidelines for biomedical waste management?	10	76	44.43	0.00
4	Do you know the Bio Hazard symbol?	86	100	7.5269	0.006
5	Are you aware about the various waste treatment methods?	80	100	11.11	0.0008
6	Do you know that there are chances of inflicting injuries while using needles in medical procedures?	94	100	4.1667	0.041
7	Soiled waste (cotton swab/dressings contaminated with blood and body fluids) comes under which category number of biomedical waste?	2	88	74.70	0.00
8	Which of following colour is not included in colour coding of different biomedical waste categories ?	100	100	-	-

Similarly there was considerable positive change in the attitude regarding the biomedical waste management after educational intervention as shown in the **table no 2**.

We also asked them, 'who should take the responsibility for maintaining Biomedical waste management'. Before training, 70 % of the participants answered that, it is responsibility of both individual as

well as institute, while 14% felt that it is the responsibility of institute only. After the training program, these rates were changed to 90% and 6% respectively after training. All of these improvements were statistically significant by Chi Square test.

Table No. 2-Analysis of attitude regarding Biomedical waste management among participants.

Sr No	Question	Before training				After training			
		D	N	A	SA	D	N	A	SA
1	Do you feel that there is a need of such awareness programs about BMW management?	0	6	24	70	0	0	26	74
2	Do you feel that segregation of BMW material according to different colour codes is possible in your institution?	10	0	60	30	2	0	64	34
3	Do you feel that safe management of Health Care waste is an extra burden on you/the institution?	70	12	18	0	86	10	4	0
4	Do you feel that BMW management plan will be helpful for patients attending the health care setting as well as the community?	0	0	60	40	0	0	54	46

(D- Do not agree, N- Neutral, A- Agree, SA- Strongly agree)

94% of the participants were practicing the universal safety precautions before training. Our intervention made to increase the practicing rate up to 100%. Twenty four per cent of the medicos were not following the color codes assigned for different categories of biomedical waste before the training session. This rate was reduced to 4 %. Forty eight per cent of the participants were not disposing the sharps in a puncture proof container. This rate reduced to 10 % after training session.

Table no. 3- Analysis of practice regarding Biomedical waste management among participants.

Sr No	Question	Score before training	Score after training	Chi square value	P value
1	Do you practice universal safety precautions?	94	100	4.1667	0.041
2	Do you follow colour codes for different categories of BMW management?	76	96	8.3056	0.0039
3	Do you dispose waste sharp in a puncture proof container?	42	90	25.66	0.00

VI. Discussion

India generates around three million tonnes of medical wastes every year and the amount is expected to grow at eight per cent annually.^[6] Increasing population and increasing health awareness has led to increase in the number of health care facilities and increased generation of health care waste. Government of India has notified the Biomedical Waste (Management and Handling) rules 1998 with subsequent amendments (2003 and 2011).^[7] Ours is 500 bedded hospital in which hundreds of medical and paramedical staff work round the clock.

Biomedical waste management is a key for successful infection control in a hospital and for safety of patients as well as doctors. Keeping this thing in mind, biomedical waste management training was carried out in SRTR Govt. Medical College and Hospital. Fifty medical interns, who were the study participant, were subjected to questionnaire for assessing their knowledge, attitude and practicing methods regarding biomedical waste management before as well as after training program.

In knowledge questionnaire, the knowledge of participants for biomedical waste management was assessed. 90 % of the participants were aware of 'What biomedical waste is' before training session. **Singh G.P et al (2014)** have found in their study that 83.3% of the Medical doctors had knowledge about 'what biomedical waste is'.^[8] After training session, all of the participant responded correctly in this study.

In our study group, 78% of the participants were aware of that, waste management is being done in our hospital. Similarly **Chudasama RK et al (2013)** have found that 96.5% of their study participant knew that their hospital generates biomedical waste.^[9] In present study, 100 % of our participants could respond correctly to this question after educational intervention.

Before training, only 10 % of the participants were aware of the Government authority which provides the guidelines on biomedical waste management. This score has gone up to whopping 76% after training. The

poor knowledge about such authorization is really big problem of concern. Therefore such educational interventions are really helpful for updating knowledge among the medical personnel.

Before training, 86 % of the study participant had knowledge about biohazard symbol. **Chudasama RK et al (2013)**,^[9] in their study have found that 87.5 % of the participants were aware of the biohazard symbol. All the respondents have responded correctly after the training. Also, 80 % of the participants in our study were aware about the various waste treatment methods before training. **Sharma et al (2008)** mentioned that doctors awareness about every aspect of BMW management ranged from 57.7% to 96.2 %.^[10] There was 20% gain in score after training. Every employee working in medical institute which directly or indirectly involves in handling of biomedical waste should know every aspect of biomedical waste management.

In our study, 94% of the study population were aware that, there are chances of inflicting injuries while using needles in medical procedures. The average number of needle stick injury per healthcare workers per year ranged from 0.2-4.7%.^[11] The training of healthcare workers regarding this issue will be lifesaving. In our study, 100 % of the medicos responded the question correctly after training.

In our study, 70 % of the participants strongly felt that there is need of such awareness programs. This rate has gone up up to 74 % after training session. In another study revealed that most of the healthcare centres had unsatisfactory practices with regard to waste management. Globally, 16-84% of the hospitals did not stick to norms. This might be due to lack of awareness, inadequate resources and inappropriate disposal practices.^[12] Such training interventions will help to change this scenario.

Also 60 % of the participants agree that, 'segregation of BMW material according to different colour codes is possible in our institution.' This score has gone upto 64%. Also 70 % and 86% the participants disagrees with the notion that 'safe management of Health Care waste is an extra burden on you/the institution' before and after training respectively. **Malini A et al (2015)** shows that, 44.4 % of the doctors agrees that, this is an extra burden of work. In our study, participants had positive attitude after an intervening session.^[13] **Saini et al** in their study observed that, attitude towards scientific processes of BMW management nurses scored 95-100% as compared to 63-96% in resident doctors.^[14]

94% of the participants in our study were practicing the universal safety precautions before training. **Chudasama et al** quote that Universal safety precautions are followed by 84.8% health care personnels.^[9]

In our study, 24% of the medicos were not following the color codes assigned for different categories of biomedical waste before the training session. This rate was reduced to 4% after training. **Malini et al** reported that colour codes were correctly followed by more than 79% individuals.^[13] We observed that 76% subjects did the same, hence the observations are similar.

Malini et al mentioned in their study that the proper handling and disposal of waste sharps was observed in more than 82% participants.^[13] This percentage was on a bit lower side in our study [42%] before the programm which upgraded it to 90%. **Chudasama et al** mentioned this percentage ranging from 63% to 86%.^[9]

The scores of participants for the questionnaire was improved after the training program. Most of the findings were statistically significant by Chi Square test.

VII. Conclusion

The purpose of training program was to assess the knowledge, attitude and practicing methods among the doctors regarding the biomedical waste management methods and to see whether training program could affect and modify the same in a positive way. The score of the participants was definitely improved after training session. Such kind of studies should be conducted at regular interval at every tertiary care center. Every employee working in a hospital should be trained for every aspect of biomedical waste handling and management rules, as lack of proper knowledge about bio medical waste management leads to inappropriate waste disposal and hence improper infection control in the healthcare center. Effective management of biomedical waste is not only a legal necessity but also a social responsibility. This will definitely ensure the patient's safety and control of healthcare associated infections.

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