Original Research Article

Effectiveness of Training in Improving Bio Medical Waste handling Practices: A Comparative Study on Knowledge, Attitude and Practices among Interns in a Teaching Hospital, Adilabad, Telangana

Vijayalakshmi Eruva[1*],Vinod Balla[2],Kavya Tarangini[3]

[1]Assistant Professor, Department of Community Medicine, Rajiv Gandhi Institute of Medical Sciences, Adilabad, Telangana, India

[2]Associate Professor, Department of Dentistry, Rajiv Gandhi Institute of Medical Sciences, Adilabad, Telangana, India

[3]Undergraduate Student, III MBBS Part-1, Rajiv Gandhi Institute of Medical Sciences, Adilabad, Telangana, India

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Abstract

Background: India generates approximately 2 kg/bed day of biomedical waste (BMW). It encompasses several kinds of wastes such as anatomical, cytotoxic and treatment apparatus etc. Inadequate segregation of this BMW could cause deadly infectious diseases such as human immunodeficiency virus (HIV), hepatitis B and C, environmental disruption and ecological imbalance. Teaching institutes play a critical role in BMW management as they train future health care professionals and care giving personnel. So there is very much need for awareness among the administrators, doctors, nurses and paramedical staff. Hence this study was taken to assess the knowledge, attitude and practices among interns and to improve the practices of bio medical waste management. **Methods:** This was a cross sectional comparative study conducted among 100 interns working in Rajiv Gandhi Institute of Medical Sciences (RIMS), Adilabad, Telangana during the period of June to October 2018. They were subjected to training sessions regarding the biomedical waste management. The study tool was a semi structured questionnaire which was administered to the participants before and after training session and the observations were noted using a checklist. Proportion of participants who answered correctly was measured. Chi square test was used to assess the statistical significance. **Results:** There was significant improvement 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:** Every employee working in a hospital should be trained for biomedical waste handling and management rules. Lack of proper knowledge about bio medical waste management leads to inappropriate waste disposal and improper infection control in the healthcare center.

Keywords: Knowledge, Attitude, Practice, Interns, Biomedical waste management

Introduction

The term Biomedical Waste is defined as, any waste that is generated during diagnosis, treatment and immunization of human beings, animals or in the research activities of biologically included categories [1]. During the Healthcare delivery process, Health Care establishments can inevitably generate hazardous biomedical waste [2]. With the increasing burden of all kinds of diseases, the production of biomedical waste is also increased many folds. India approximately generates 2 kg/ bed/day and this biomedical waste encompasses wastes like anatomical waste, cytotoxic wastes, sharps, which when inadequately segregated and disposed could cause different kinds of deadly infectious diseases like Human immunodeficiency virus (HIV), hepatitis C and B infections and disruptions in the environment and adverse impact on ecological balance [3-5].

According to WHO report, 10 to 25% of biomedical waste was estimated to be hazardous and can transmit more than thirty dangerous blood-borne pathogens [2]. The WHO report, prepared a biomedical waste management guidelines to ensure safe management of waste from healthcare facilities.

*Correspondence

Dr. Vijayalakshmi Eruva

Assistant Professor, Department of Community Medicine, Rajiv Gandhi Institute of Medical Sciences, Adilabad, Telangana, India.

E-mail: vijaylakshmieruva@gmail.com

According to these guidelines healthcare facility requires to segregate BMW into 4 categories (Blue, Yellow, White and Red) [2]. An appropriate BMW management process includes steps (segregation, storage, transport, treatment, and disposal) [2]. Adequate knowledge amongst the health care employees about the biomedical waste management rules and their understanding of segregation will help in the competent disposal of the waste in their respective organizations [6]. Teaching institutes play a critical role in shaping the future health care professionals and all those persons involved in the care giving to the individuals and community [7]. In teaching hospitals, interns play a key role at all levels in treating the patient; hence their awareness on proper bio medical waste management is very essential [8]. Many studies from our country have shown that there are still deficiencies in knowledge, attitude and practices among the health care professionals in handling the biomedical waste. Hence this present study was taken to assess the knowledge, attitude and practices among interns and to improve the practices of bio medical waste management.

Materials and Methods

A hospital based cross sectional comparative study was carried out among 100 interns at Rajiv Gandhi Institute of Medical Sciences (RIMS), Adilabad, Telangana, India. All (total100) interns of 2014 MBBS batch, who were willing to participate were included in the study. This study was conducted from June 2018 to October 2018. Firstly the purpose of the study was explained to the study participants and informed written consent was taken. All the consenting participants were interviewed using the pre-tested, semi-

structured questionnaire, prior to any training on biomedical waste management and the observations regarding BMW handling were noted. The questionnaire contained questions regarding the knowledge, attitude and practices regarding biomedical waste management along with identification details of study participants.Institutional ethics committee permission was taken prior to data collection.

The training sessions were conducted on BMW handling rules as technical session on knowledge by using power point in the lecture hall and the practical sessions in the ward by demonstration of bio medical waste segregation in to the color coded bins, bio medical waste storage and proper handling of bio medical waste at source. After the training sessions, the study participants were interviewed using the same questionnaire and the observations regarding BMW handling were noted.

Statistical analysis

The Data was entered in MS excel 2010 and analyzed by using SPSS-16. The proportions were calculated from the number of participants who answered correctly. Chi square test was used to assess the statistical significance.

Results

Table 1: Demographic details of the study participants

Characteristics	Number	Percentage (%)
Age		
22yr	11	11%
23yr	27	27%
24yr	48	48%
25yr	12	12%
29yr	02	2%
Gender		
Male	38	38%
Females	62	62%
Place of posting		
Ward	60	60%
Outpatient department	40	40%

The demographic details of the study participants are given in the **Table 1**.A total of 100 interns were included the study and they were subjected to questionnaire before and after the training session, and their scores were observed as below. Among the total 100 interns, 67% were female and33% were male. Mean age of the participants was 23.7 years with the standard deviation of 1.14 years.

Table 2: Comparison of knowledge regarding bio-medical waste management among participants before and after training

Knowledge regarding bio-medical waste management	Score before training (percentage of participants)	Score after training (percentage of participants)	Chi square value	P-value
Aware of what is BMW	89%	100%	9.62	p=0.001
Aware of appropriate colour coding of BMW	66%	94%	24.5	p=0.0007
Aware of BMW hazard symbol	84%	100%	17.3	p=0.0008
Aware of BMW management in our institution	36%	92%	68.06	p<0.0001
Aware of which government authority provides guidelines about BMW management	48%	96%	54.7	p<0.0001

Comparison of knowledge regarding bio medical waste management among participants before and after training is shown in the **Table 2**.In the assessment of knowledge regarding biomedical waste management, 89% of the participants were aware of 'what is biomedical waste' before the training session. This score was improved further to 100% after training. Sixty six percent of the participants were aware of appropriate colour coding of biomedical waste management before the training session, 84% of the participants were aware about bio medical waste hazard symbol, only 36% were aware about the system of biomedical waste available in our college and 48% were aware about the monitoring government authority of biomedical waste management. All the parameters of knowledge were tremendously improved after the training sessions and the improvement was statistically significant.

Table 3: Comparison of attitude regarding biomedical waste management among participants before and after training

Attitude regarding bio-medical waste management	Score before training (percentage of participants)	Score after training (percentage of participants)	Chi square value	P-value
Feel that segregation of BMW according to colour codes is possible at our institution	26%	90%	84.07	p<0.00001
Feel that segregation of BMW is extra burden to self and to the institute	86%	0%	107.7	p<0.00001
Feel that BMW management Plan will be helpful for patients attending the health care facility and as well as community	84%	100%	9.81	p=0.001
Feels that there is a need of such awareness program about BMW management	37%	100%	81.37	p<0.00001

There was significant improvement in the attitude regarding the biomedical waste management after educational intervention as shown in the **Table 3**.

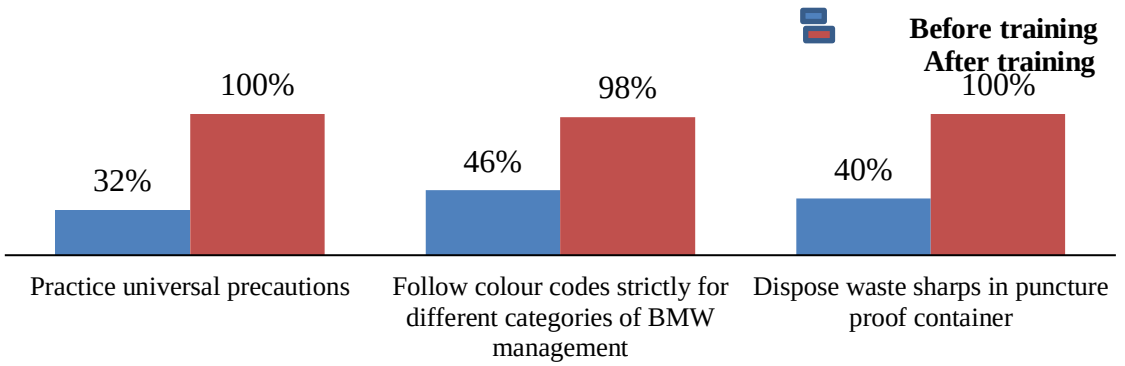

Fig. 1: Comparison of BMW handling practice

Comparison of BMW handling practice before and after training was shown in the **Fig.1**.In the assessment of practices of biomedical waste management, only 32% of the participants were practicing the universal safety precautions before training, 46% were following the colour codes and only 40% were disposing the sharps in the puncture proof containers. The training regarding biomedical waste management showed significant improvement in the biomedical waste handling practices.

Discussion

According to WHO report, 10 to 25% of biomedical waste was estimated to be hazardous and can transmit more than 30 dangerous blood-borne pathogens [2]. India generates around three million tons of medical wastes every year and the amount is expected to grow at eight per cent annually [6]. Ours is 500 bedded hospital in which hundreds of medical and paramedical staff work round the clock, there is significant amount of bio medical waste is generated every day. Proper knowledge amongst the health care employees about the biomedical waste management rules and their understanding of segregation is very much needed for competent disposal of the waste in their respective organizations. Keeping this in mind this study was conducted among the 100 interns who are currently working in RIMS Adilabad.Firstly, the self-administrative questionnaire was given to the study participants to assess the baseline knowledge, attitude and practices regarding the management of biomedical waste. After assessing it the training sessions were conducted regarding all aspects of bio medical waste management and again the same questionnaire was administered, the improvement was assessed.In this study, 89% of the participants were aware 'what biomedical waste is' before the training session. Similarly in the study done by Singh GP et al.[9] have found that 83.3% of the medical doctors had knowledge about what is biomedical waste. After training session, the entire study participants responded correctly about what is biomedical waste. In our study, 66% of the participants were aware of the appropriate colour coding of biomedical waste prior to training. Before training, 86% of the study participants had knowledge about biohazard symbol. Similarly a study by Chudasama RK et al.[10], have found that 87.5% of the participants were aware of the biohazard symbol. Before training only 48% of the participants were aware of the government authority which provides the guidelines on biomedical waste management and only 36% were aware of BMW management system present in our institution. The percentages were significantly improved in all the aspects of knowledge about biomedical waste management after training. Similar findings were reported in a study done by Kulkarni VL et al [11]. These kinds of trainings regarding biomedical waste management are really helpful for addressing the challenges of BMW management.In our study, majority of the participants felt that segregation of BMW according to colour codes is not possible at our institution and after training 90% of participants understood and felt that segregation of BMW according to colour codes is easy and possible and 86% participants felt that segregation of BMW is extra burden prior to the training, but after the training there was a positive attitude regarding bio medical waste management. In this study only 32% of the participants were practicing the universal safety precautions and only 40% were disposing the sharps in the puncture proof containers prior to training, after the training 100% of the participants gave correct response regarding universal precautions and disposing the sharps in the puncture proof containers. The average number of needle stick injury per healthcare workers per year ranged from 0.2-4.7% [12]. The training of healthcare workers regarding universal precautions will be lifesaving. In our study, 100 % of the medicos responded the question correctly after training. Globally, 16-84% of the hospitals did not stick to norms of bio medical waste management. This might be due to lack of awareness, inadequate resources and inappropriate disposal practices [13]. In our study, the overall knowledge, attitude and practices were improved after training and most of the findings were statistically significant, the findings were similar to other studies also [11,13].

Conclusion

The purpose of this training to improve BMW management practices was fulfilled. There was significant improvement of knowledge, attitude and practicing methods for biomedical waste management among interns after training session. Every employee working in a hospital should be trained for every aspect of biomedical waste handling and management rules. To ensure sustainability, continuous training sessions at regular intervals need to be conducted for all the health care workers including interns.

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