

## IMPACT OF HEALTHCARE WASTE MANAGEMENT TRAINING AMONG DOCTORS AND NURSES AT A TERTIARY HEALTHCARE INSTITUTE, LUCKNOW

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### ABSTRACT

Mismanagement of Biomedical waste can be associated with risks to healthcare workers, patients and communities at large. Handling, segregation, mutilation, disinfection, storage, transportation and final disposal are vital steps for safe and scientific management of biomedical waste in any establishment. To assess Impact of training regarding Health Care Waste Management (HCWM) among Doctors and Nurses. The mean score of doctors increases from  $43.5 \pm 26.0$  to  $95.9 \pm 3.5$  and among nurses knowledge increases from mean  $39.3 \pm 32.2$  to  $90.8 \pm 8.3$ . The difference between pre-test and post-test was statistically significant ( $p < 0.0001$ ), after applying paired t test, indicating significant improvement in the knowledge and success of the training programme. Knowledge regarding HCWM was better among doctors as compared to nursing staff which could be attributed to higher level of education among doctors. During pretest there was definite lack in knowledge among the group but after imparting training on various issues regarding HCWM, knowledge has enhanced to a greater extent

**KEYWORDS :** Health care waste management, Kirkpatrick's model, evaluation

Health care waste defines as “The waste resulting from patient's diagnosis prevention, research and treatment procedures as well as waste generated from all other health care establishments, research facilities and laboratories”. Health care sector is one of the fastest growing sectors in India especially in the urban areas with an estimated growth rate of 12% per annum. The concern regarding the medical waste was mainly due to the presence of pathogenic organism and organic substances in hospital wastes significantly in high concentrations. Hospital waste management has been brought into focus in India with notification of the “Bio-medical Waste (Management and Handling) rules 1998” amended on 2<sup>nd</sup> June 2000. (The Gazette of India, 1998) These guidelines are issued by the Central Pollution Control Board (CPCB). (<http://cpcb.nic.in/wast>) The rule makes it mandatory for the health care establishments to segregate, disinfect and dispose their waste in eco-friendly manner. The learning regarding the subject needs proper training sessions including demonstrations. Main emphasis given on segregation of different categories of waste into prescribed color code of bins. Don Kirkpatrick in 1954 at the University of Wisconsin focused to describe how training would lead to learning which would then transcend into on the job application and thus desired results. The training programmes have to define roles and to extend their expertise, influence, impact and value beyond the

classroom and into the business. Kirkpatrick's Model consists of four levels of training evaluation (<http://www.businessballs.com>). Level 1: Reaction is how the trainees felt about the training or learning experience. Level 2: Learning is the measurement of increase in knowledge before and after training. Level 3: Behavior---is the extent of applied learning back on the job implementation. Level 4: Results is the effect on the business environment by the trainee (Desu Rama Mohan and M. Veera Prasad, 2012).

Healthcare workers play key role in the management of bio-medical waste so it is important to train them regarding their safety & harm associated with the mismanagement of bio-medical waste. (Mcveigh, 1993 and Shalini Sharma, 2010).

Hence the objective of the study is to evaluate the knowledge and skill gain during Training program conducted on Health care waste management among Doctors and Nurses. The tools and methods used include pre and post test analysis, feedback forms about training program and trainers, observation and interview over time and management systems reporting.

### MATERIALS AND METHODS

King Georges Medical University, Lucknow is a 100-year old tertiary-care 3500 bedded hospital with about 44 departments and catering to 510,000 OPD and 51,000

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Indoor patients per year. Three days training programme was conducted at King George's Medical University in the year 2011. Participants were doctors (n=35) and nurses (n=25) from clinical/nonclinical departments. Training programme includes lectures, demonstrations, role play on health care waste management. During programme following topic were discussed: Need for health care waste management, existing legislation, roles and responsibility of different health care workers, segregation at source, color coding policy, occupational safety, final treatment and disposal option. The assessment tool basically followed the Kirkpatrick model of training evaluation through close ended questionnaire before and after training. The analysis was done by calculating the number of correct answers. For statistical analysis mean/standard deviation/percentage/t test was used.

**RESULTS AND DISCUSSION**

Well developed Biomedical waste management system in the KGMU, Lucknow started in the year 2011 with workshop orientation and training activities to the doctors and nurses in small batches. There were 35 doctors and 25 nurses in this training batch. The knowledge has been found to be enhanced after training session. The results of pre and post training tests are shown in table 1. Pretest assessment shows 18% of the doctors and 55% of the nurses did not know the average percentage of infectious and hazardous waste generated in hospital but after imparting training, knowledge of both the groups improved

dramatically.

During pretest 59% doctors and 50% of nurses did not know the average quantity of waste generated /bed/day in Indian hospitals, 88% of doctors and 85% of nurses included syringes as waste sharps along with glass vials and needles, 70% of doctors and 80% of nurses did not know the hazards caused by mismanagement of medical waste, 92% doctors did not know the concentration of sodium hypochlorite prescribed by CPCB for treating infected plastics, only 43% doctors and 12% nurses knew the waste storage period before treatment (figure 1).

After imparting training there was definite gain of the knowledge with statistical significance of  $p < 0.0001$ . A similar study was conducted by ramamohandesu from Nellore (Desu Rama Mohan and M. Veera Prasad, 2012) revealed that the Mean marks obtained before training (17.89±2.96) and after training (21.71±2.16) showed statistical significant improvement in the knowledge of biomedical waste management ( $p = 0.0001$ ) among the nurses. The study at Bijapur revealed that the teaching staff gave more correct responses to questions than the non-teaching staff (Yadavannavar et al., 2010), a study was conducted on awareness about bio-medical waste management and infection control among dentists of a teaching hospital in New Delhi, India. The results shows that only half of them observed infection control practices and majority of them were not aware of proper hospital waste management. (Kishor J. et al., 2000).

Mean scores among doctors increases from 43.5 to

**Table 1 : Percentage of Doctors and Nurses Given Correct Answer During Training Session**

S. No.	Questions	Pre-test(n=35)		Post-test(n=25)	
		Doctors(%)	Nurses(%)	Doctors (%)	Nurses(%)
1.	Percentage of infectious and hazardous waste in hospital waste	80	45	98	95
2.	Average quantity of infectious waste generated per bed per day	40	44	92	93
3.	which of the following is a sharp waste	93	90	98	98
4.	International agreement describes BMW as 2 <sup>nd</sup> most hazardous waste	25	8	90	80
5.	Concentration of sodium hypochlorite solution prescribed by CPCB	15	22	100	100
6.	How long the waste be stored before treatment	43	12	98	90
7.	Recommended method for disposal of anatomical waste in a rural PHC /CHC	30	8	90	88
8.	Treatment option prescribed for infected plastics	38	26	100	100

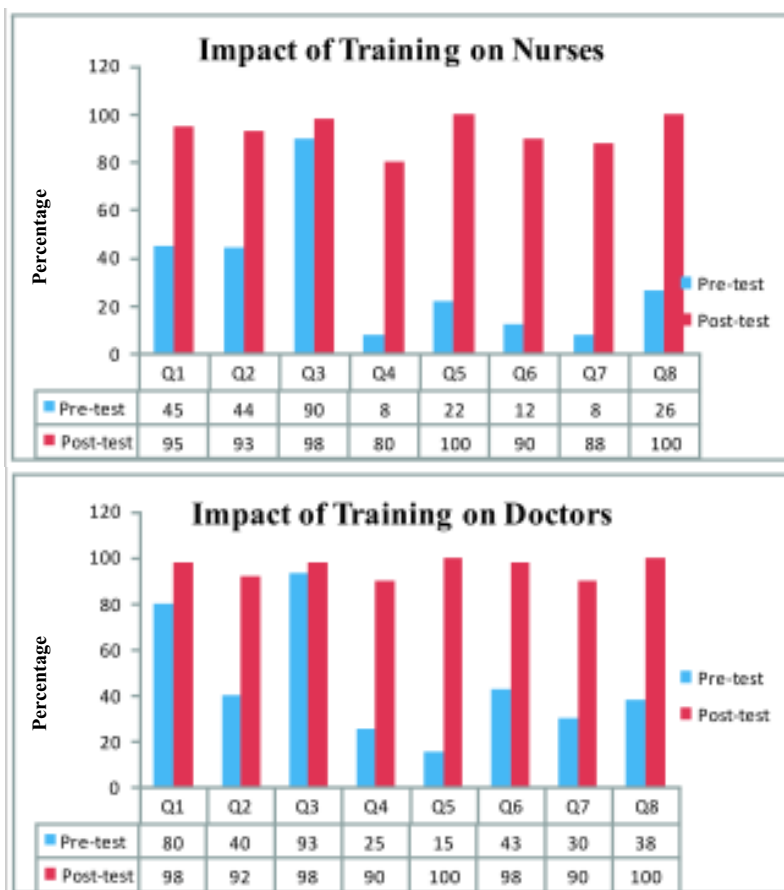


Figure 1 : Impact of Training on Doctors & Nurses

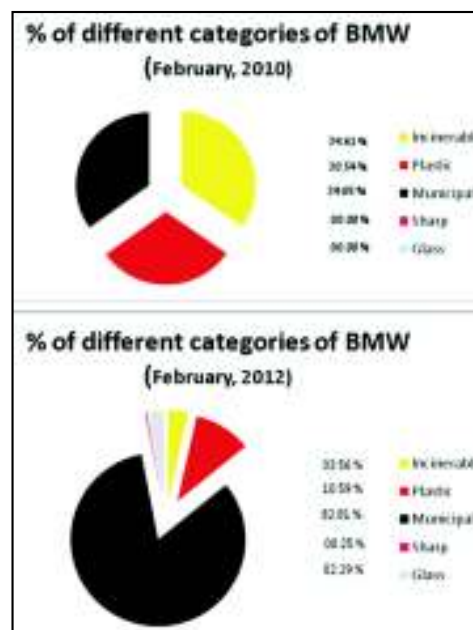


Figure 2 : Different Categories of Waste Generated, Year 2010 & 2012

Table 2 : Paired t-test Results of Percentage of Correct Answers by Doctors and Nurses Regarding BMW Management

Statistical test	Doctors		Nurses	
	Pre-test	Post-test	Pre-test	Post-test
Mean cores	43.5	95.9	39.3	90.8
S.D.	26.0	3.5	32.2	8.3
P value	<0.0001		<0.0001	
t value	6.580		6.050	
Df	12		12	

95.9 and for nurses mean score increases from 39.3 to 90.8. Trainer evaluation-after training session Feedback forms analysis revealed that 84.2% (n=32) of trainees felt that the sessions were excellent, 7.8% felt very good and another 4.8% felt good in the 5 point Likert scale (excellent, very good, good, fair and poor). For Kirpatrick's level 3 (behavior) regular intensive monitoring and supervision activities are going on in each department regarding segregation at point

of generation of waste and results are encouraging, there is drastic change in behavior and attitude of the workers & for level 4 (results) after rigorous training there were extraordinary results seen as segregation at the point of generation and following color coded bins policy in majority of the department has improved a lot (figure 2) and revenues are being generated through recyclable waste. A lot of intensive activities are going on in the Institution regarding level 3 and 4 Kirkpatrick's model indicating successful evaluation technique of the training.

### CONCLUSION

In the field of medical practice statutory public health guidelines for biomedical waste management and close monitoring of its compliance alone cannot achieve the ultimate goal, if it is not accompanied by social science approach of mass education motivation and change of

mindset in all strata of medical practice. Continuous logistic support and user friendly approach is equally important while implementing in the process of any rules, regulations concerning the medical practice other than the core mandate they are assigned to. From this study we concluded that knowledge regarding HCWM was better among doctors as compared to nursing staff which could be attributed to higher level of education.

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