Research Article

# Effect of training among health care workers on change in knowledge regarding biomedical waste management according to new rules of 2016

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## ABSTRACT

**Background:** Adequate knowledge about the health hazards of hospital waste, proper techniques and methods of handling the waste, and practice of safety measures can improve the safe disposal of hazardous hospital waste and protect the community from various adverse effects. **Objectives:** A study was conducted to see the effect of training on change in knowledge regarding biomedical waste (BMW) management according to new rules of 2016 among health care workers. **Materials and Methods:** A hospital-based, cross-sectional study was conducted in a 760-bedded teaching hospital in Bhopal (M.P). The study consisted of 100 health care workers as participants, which included 75 nurses, 15 laboratory staff, and 10 sanitary staff. A predesigned structured questionnaire consisting of 15 questions was administered to the participants before and after 1-day modular training conducted in two sessions. Data collected were analyzed using paired *t*-test. **Results:** Knowledge of correct color coding for waste disposal in pretest was 42%, and in posttest, it increased to 83%, and awareness about risk of transmission of diseases through BMW if not managed properly was known to 63% in pretest which increased to 97% of the participants in posttest. The knowledge about needlestick injury prophylaxis protocol was 52% before session and increased to 88% after training session. Knowledge about the new categories of BMW disposal was found to be 9% in pretest and increased to 46% after training sessions. The change in the knowledge about different aspects of BMW handling and management after training was statistically significant. **Conclusion:** Training on all aspects of BMW management will lead to a further improvement in BMW management in the hospital.

**KEY WORDS:** Biomedical Waste; Segregation; Handling; Management

## INTRODUCTION

Inadequate knowledge regarding the health hazards of hospital waste, improper methods of handling the waste, and practice of inadequate safety techniques can have bad effects on public health and environment. The waste produced in daily health-care activities carries a greater risk of hazard than any other types of waste; therefore, it is essential to have safe methods for its adequate and appropriate handling.

The biomedical wastes (BMW) are wastes that are generated during the diagnosis, treatment or immunization of human beings or animals, or in research activities pertaining thereto, or in the production or testing of biological.[1]

Studies have shown that non-hazardous or general waste accounts for 75–90% in health-care establishments and about 10% infectious and hazardous, and the remaining 5% is non-infectious and hazardous waste[2] which create a variety of health risk. In India, yearly, 0.33 million tons of hospital waste is generated and 0.5–2.0 kg of BMW is being generated per bed every day.[3] In1998, Government of India has formulated rules for BMW (management and handling) which enforces

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on all hospitals to ensure proper handling, disposal, and management of BMW. In spite of increased global awareness among health professionals about the health hazards due to BMW and its disposal, the level of awareness, among HCWs in India, is found to be unsatisfactory.[4,5] Appropriate management of health-care waste is thus an essential and crucial part of environment protection, and it should be the biggest responsibility of health-care services.

The present study was conducted to assess the effect of training on change in knowledge of health care workers who have undergone a single day training session, regarding BMW management according to new rule (2016).

### Objectives

A study was conducted to see the effect of training on change in knowledge regarding BMW management according to new rules of 2016 among health care workers.

## MATERIALS AND METHODS

This is a hospital-based, cross-sectional study which was conducted in a 760-bedded teaching hospital in Bhopal (M.P). The study consisted of 100 health care workers as participants, which included 75 nurses, 15 laboratory technicians, and 10 housekeeping staff who has undergone a training session. A predesigned structured questionnaire was prepared consisting of 15 questions and was administered to the participants before (pre-session test) and after (post-session test) 1-day training conducted in two sessions for assessing change in knowledge. After obtaining their consent and briefing them about the study, the structured questionnaire was administered to the study participants before and after the training session. Ethical approval was taken from the ethical institutional committee before starting the study.

### Inclusion and Exclusion Criteria

A list of staffs available in the above-mentioned categories was obtained from the hospital, and all were asked for their voluntary participation in the study. Those who were unwilling were excluded from the study.

### Statistical Analysis

Paired *t*-test was used to analyze the data.

## RESULTS

The findings on change in the knowledge of health care workers regarding BMW management according to amended rule 2016 are shown in Table 1. It shows that the knowledge of risk from BMW if not managed properly was 54% in pre-session test and 95% in post-session test in overall participants

**Table 1:** Effect of training on change in knowledge regarding BMW management

| Effect of training regarding the following | Nursing staff* | | Laboratory technicians** | | Housekeeping staff*** | | Total # | |
|---|---|---|---|---|---|---|---|---|
| | Pre-session test (%) | Post-session test (%) | Pre-session test (%) | Post-session test (%) | Pre-session test (%) | Post-session test (%) | Pre-session test (%) | Post-session test (%) |
| Risk from BMW if not managed properly | 56 | 93 | 53.3 | 100 | 40 | 100 | 54 | 95 |
| If BMW not managed properly, it also causes | 50.66 | 96 | 53.3 | 100 | 20 | 50 | 50 | 97 |
| New categories for BMW management for disposal | 8 | 45.3 | 6.6 | 46.6 | 40 | 100 | 9 | 46 |
| BIOHAZARD logo and CYTOTOXIC logo | 2.66 | 72 | 33.3 | 86.6 | 00 | 60 | 3 | 73 |
| New color coding of bags/containers for BMW management (rule) 2016 | 42.6 | 82.6 | 6.6 | 86.6 | 50 | 80 | 42 | 83 |
| Diseases can be transmitted from BMW | 64 | 96 | 80 | 100 | 30 | 100 | 63 | 97 |
| Recommendations after needlestick injury | 50.6 | 88 | 40 | 80 | 80 | 100 | 52 | 88 |
| Personal protective devices | 82.6 | 93.3 | 86.6 | 93.3 | 90 | 90 | 84 | 93 |
| Correct orders of steps of BMW management | 10.66 | 56 | 13.3 | 80 | 00 | 30 | 10 | 57 |
| Storage of BMW and other facts | 82.66 | 96 | 80 | 100 | 60 | 90 | 80 | 96 |

*Two-tailed *P* valve for nursing staff<0.0001. **Two-tailed *P* valve for laboratory technicians<0.0001. ***Two-tailed *P* valve for housekeeping staff<0.0089. #Two-tailed *P* valve for total<0.001. BMW: Biomedical waste

and correct color coding for waste disposal in pre-session test was 42%, and in post-session test, it increased to 83%. Although almost all the respondents were aware that BMW is hazardous, awareness about risk of transmission of diseases through BMW if not managed properly was known to 63% in pre-session test which increased to 97% of the participants in post-session test. The knowledge about needlestick injury prophylaxis protocol was 52% before session and increased to 88% after training session. Knowledge about the new categories of BMW disposal was found to be 9% in pre-session test and increased to 46% after training sessions. Although majority of the respondents were aware of the existence of some law and new amendments related to BMW management, the exact rule was not known to the majority. Awareness regarding the maximum period of waste storage in pre-session test 80% of the respondents which increased to 96% in post-session test. Only 10% of respondents were aware about correct orders of steps of BMW management in pre-session test which improved to 57% in post-session test. Awareness regarding BIOHAZARD logo and CYTOTOXIC logo was very poor (3%) before the session and improved to 73% after training among all the respondents. The change in the knowledge about different aspects of BMW handling and management after training was statistically significant.

## DISCUSSION

Knowledge regarding the theoretical aspect of BMW, for example, correct definition of BMW and about the diseases spread by it and new amendments in the law was poor among all the other categories of HCWs before training session. The poor knowledge of the housekeeping staffs could be due to their poor literacy status. Awareness of new and correct color coding was known to a majority (42%) of respondents in total but was least among the laboratory staff (6.6%). Similar observations were made by Mathur *et al*.[6] in their study. Use of personal protective devices was found to be 93% among all the categories of HCWs in post-session test which was also significant (84%) in pre-session test. Similar findings were observed in Sehgal *et al*.[7] Majority of the participants knew about the existence of education program on new rule of BMW management and were willing to attend such a program in the hospital. Basic and new knowledge is utmost essential for all the health care workers which should be provided through continuous training sessions regarding BMW management and handling.

The limitation of the study is that first as it is difficult to tell how honest the response was as many people understand what to say in response to a question and sometimes use of unfair means in test sessions. Second is sufficient literature is not available for comparison of the results before and after training sessions.

## CONCLUSION

The study outlines a significant gap in awareness of new rules of BMW management and handling among the health care workers, which could be because of lack of training and improper and uniform implementation of new rule in hospitals. Training is essential of all the staffs should be specially emphasized on all aspects of BMW management before implementation of amended rule 2016 so that correct practice can be promoted.

## ACKNOWLEDGMENT

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