



Original Research Article

## Effect of Training on Knowledge Regarding Bio Medical Waste Management among Sanitation Staff: An Intervention Study from a Tertiary Care Centre of Uttar Pradesh

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### ABSTRACT

**Background:** Health care services are important for our health but the huge amount of bio medical waste generated from it. Unregulated handling of biomedical waste is emerging as a serious threat to human health and safety. Even after a decade biomedical waste management in India is in primitive stage.

**Objectives:** To assess the existing knowledge of biomedical waste management among sanitation staff and to find out the effectiveness of training regarding the knowledge of biomedical waste management among sanitation staff.

**Materials and Methods:** The Present study was conducted among 100 sanitation staff working in UPRIMS & R, Saifai, Etawah (UP) from January to March 2014. Data collection tool consisted of a structured interview questionnaire to assess the knowledge of sanitation staff regarding biomedical waste management. After pre-intervention data collection the study participants were trained on bio medical waste management. Data were analyzed by using SPSS 16.0 and statistics mean, standard deviation, frequency and percentage of distribution were calculated. To study the effectiveness of the training t-test was applied.

**Results:** Maximum of the study subjects were in the age group 31-40 years (46.0%), 71.0% male and maximum having educational qualification junior high school and below. Majority (48%) of the sanitation staff had poor knowledge, and only 6% had good knowledge regarding biomedical waste management. Sanitation staff had highest knowledge in the area of waste generation and prevention against biohazards and least in the area of waste handling and collection. After intervention, improvement was observed in knowledge of sanitation staff regarding all the areas of bio medical waste management.

**Conclusion:** Regular training programs of sanitation staff on bio medical waste are very important and this should be done at regular interval.

**Keywords:** Biomedical waste management, sanitation staff, pre-intervention, post-intervention

### INTRODUCTION

Health care services are important for our health but the huge amount of bio

medical waste generated from it. Unregulated handling of biomedical waste is emerging as a serious threat to human health

and safety, and many researchers have documented this as a priority area. [1,2] Bio medical waste means any solid and/or liquid waste including its containers and any intermediate product, which is generated during the diagnosis, treatment or immunization of the human beings or animals. WHO stated that 85% of hospital wastes are actually non-hazardous, around 10% are infectious and around 5% are non-infectious but hazardous wastes. [3] In 1998, the Government of India implemented the Biomedical Waste Management and Handling Rules, 1998 which specify that the hospital waste management is a part of hospital hygiene and maintenance activities, such as collection, transportation, treatment, operation of processing systems, and appropriate disposal of waste is a liability for the hospital management. [4] In India, the rate of generation of hospital waste is estimated to be 1.59 to 2.2 kg/day/bed and out of which 10-15% is found to be bio-medical waste. [5]

Even after a decade biomedical waste management in India is in primitive stage. There is a lot of confusion and inappropriate knowledge among the generators, operators and general community. Hence the appropriate knowledge regarding collection, segregation and disposal is of great importance as it can decrease directly or indirectly health risk of the people, and damage to flora, fauna and environment.

Occupational health concerns exist for health care workers, laundry workers and sweepers. Injuries from sharps, exposure to harmful chemical waste and radioactive waste poses serious threat to the workers of hospital. It is of paramount importance that there are significant voids that need to be addressed. Handling, segregation, mutilation, storage, transport and final disposal are vital steps for safe and scientific management of bio medical waste. The key

to minimization and effective management of biomedical waste is identification and segregation. The proper knowledge and awareness among waste handlers regarding bio medical waste management would likely to improve the situation in hospitals.

So the present study was conducted among sanitation staff in a tertiary care hospital of Uttar Pradesh with following objectives:

1. To assess the existing knowledge of biomedical waste management among sanitation staff.
2. To find out the effectiveness of training regarding the knowledge of biomedical waste management among sanitation staff.

## MATERIALS AND METHODS

The Present study was conducted among 100 sanitation staff working in UP Rural Institute of Medical Sciences & Research, Saifai, Etawah (UP) from January to March 2014. Data collection tool consisted of a structured interview questionnaire to assess the knowledge of sanitation staff regarding biomedical waste management. There were two sections in the study proforma:

1. **Section A:** Questionnaire related to demographic profile of study subjects
2. **Section B:** Questions to evaluate the existing knowledge of sanitation staff regarding bio medical waste management.

Section B of the study proforma consisted of 20 questions related to knowledge of bio medical waste management and 1 score was given to each correct answer. This section had 3 items regarding waste generation, 6 regarding waste segregation & categorization, 2 regarding waste handling & collection, 5 regarding transportation, treatment & disposal and 4 regarding prevention against

hazards of bio medical waste. Prior to the study informed consent was obtained from the participants regarding their willingness to participate in the study and ethical clearance was obtained from the Institutional Ethical Committee of UP Rural Institute of Medical Sciences & Research, Saifai, Etawah (UP). Data collection was done by the interns posted in the department of Community Medicine of the institute, who were trained before hand for data collection. After pre-intervention data collection the study participants were trained by faculty members of the Department of Community Medicine through a series of lectures & demonstrations in four batches each consisting of 25 participants over a period of one week. The study participants were also provided with booklets and pictorial flip charts regarding bio-medical waste management. Post intervention data was collected using section B of the study proforma.

Data were analyzed by using SPSS 16.0 and statistics mean, standard deviation, frequency and percentage of distribution were calculated. To study the effectiveness of the training t-test was applied.

## RESULTS

**Table 1: Demographic profile of study subjects (N = 100)**

| No | Demographic variables            | Frequency | Percentage (%) |
|----|----------------------------------|-----------|----------------|
| 1  | <b>Age</b>                       |           |                |
|    | 20-30                            | 32        | 32             |
|    | 31-40                            | 46        | 46             |
|    | >40                              | 22        | 22             |
| 2  | <b>Gender</b>                    |           |                |
|    | Male                             | 71        | 71             |
|    | Female                           | 29        | 29             |
| 3  | <b>Educational qualification</b> |           |                |
|    | Junior High School & below       | 54        | 54             |
|    | High School                      | 27        | 27             |
|    | Intermediate & Above             | 19        | 19             |

Table 1 shows that maximum of the study subjects were in the age group 31-40 years (46.0%), 71.0% male and maximum having educational qualification junior high school and below.

**Table 2: Level of knowledge of sanitation staff regarding biomedical waste management (Pre-Intervention)**

| Range of score | Level of knowledge | Number of respondents | Percentage (%) |
|----------------|--------------------|-----------------------|----------------|
| 0-7            | Poor               | 48                    | 48             |
| 8-14           | Average            | 46                    | 46             |
| 15-20          | Good               | 06                    | 06             |
| Total          |                    | 100                   | 100            |

**Table 3: Pre-Intervention mean scores of sanitation staff in various areas of biomedical waste management**

| Areas  | Maximum score | Mean  | SD   | Mean% |
|--|---------------|-------|------|-------|
| Waste generation                             | 3             | 1.21  | 0.47 | 40.33 |
| Waste segregation and categorization         | 6             | 2.27  | 1.21 | 37.83 |
| Waste handling and collection                | 2             | 0.70  | 0.78 | 35.00 |
| Waste transportation, treatment and disposal | 5             | 1.83  | 1.19 | 36.6  |
| Prevention against Biohazards                | 4             | 1.61  | 1.36 | 40.25 |
| <b>Overall knowledge</b>                     | 20            | 07.62 | 2.89 | 38.10 |

**Table 4: Post -Intervention mean scores of sanitation staff in various areas of biomedical waste management**

| Areas  | Maximum score | Mean  | SD   | Mean% |
|--|---------------|-------|------|-------|
| Waste generation                             | 3             | 1.82  | 0.61 | 60.66 |
| Waste segregation and categorization         | 6             | 4.31  | 1.82 | 71.83 |
| Waste handling and collection                | 2             | 1.18  | 0.63 | 59.00 |
| Waste transportation, treatment and disposal | 5             | 3.91  | 1.42 | 78.20 |
| Prevention against Biohazards                | 4             | 2.89  | 1.70 | 72.25 |
| <b>Overall knowledge</b>                     | 20            | 14.11 | 4.13 | 70.55 |

Table 2 shows that majority (48%) of the sanitation staff had poor knowledge, and only 6% had good knowledge regarding biomedical waste management.

Table 3 reveals that sanitation staff had highest knowledge in the area of waste generation and prevention against biohazards with a mean percentage of 40.33 and 40.25 respectively followed by waste segregation & categorization with mean percentage 37.83 and least in the area of waste handling and collection with mean percentage of 35.00. The mean knowledge score was  $7.62 \pm 2.89$ , with a mean percentage of 38.10 revealing that the overall knowledge of the sanitation staff regarding biomedical waste management was poor.

Table 4 shows that after intervention, improvement was observed in knowledge of sanitation staff regarding all the areas of bio medical waste management. Comparison of area wise knowledge scores showed that, the effectiveness of training programme in the area of 'waste generation' had 20.33% increase in the mean percentage. In the area of 'Waste segregation and categorization' 34.00% increase was observed in the mean percentage knowledge scores. In the area of 'Waste handling and collection' there was 24.00% increase in the mean percentage. In the area of 'Waste transportation treatment and disposal' 41.6% improvement was observed in the mean percentage knowledge score. In the area of 'prevention against bio hazards' there was 32.45% increment was observed in the mean percent knowledge score.

**Table 5: Comparison of overall knowledge of study subjects (pre-intervention v/s post-intervention)**

| Pre-Intervention score<br>Mean $\pm$ SD | Post-Intervention score<br>Mean $\pm$ SD | t-test                             |
|---|--|------------------------------------|
| 7.62 $\pm$ 2.89                         | 14.11 $\pm$ 4.13                         | t = 12.81<br>df = 198<br>p < 0.001 |

Table 5 depicts the comparison of pre intervention and post intervention knowledge scores of sanitation staff. Post intervention mean score of the knowledge of the sanitation staff increased from 7.62 to 14.11 and this difference in pre and post interventions means was found to be statistically significant (t = 12.81, p < 0.001).

## DISCUSSION

Now days, various types of drugs are used by the hospitals and it includes antibiotics, corrosive chemicals, cytotoxics, radioactive substances, which finally becomes part of hospital waste. Knowledge and practice of bio medical waste is important as it contains pathogenic organisms and various types of substances which may be harmful to the health of human being. This biomedical waste may contain virulent strains of viruses and pathogenic bacteria. [6] Among the various para medical staff in the hospital sanitation staff plays a very important role in management of hospital waste. They collect and transport the hospital waste. To complete their task efficiently they must have correct knowledge and practice of bio medical waste management. [7]

So the aim of the study was to introduce an intervention programme for sanitation staff regarding bio medical waste management.

In the present study the overall knowledge regarding health care waste management among sanitation staff was found poor or average and these findings of our study are similar to the other studies [8-11] conducted by different researchers in the country. However Ajay Singh et al [12] in their study found higher level of knowledge (71.3%) regarding bio medical waste among sanitary staff as compared to our study. The lower level of knowledge in our study may be because of lack of regular training of the sanitary staff and high turnover of the staff

as well. The mean score of the knowledge in the present study was lower as compared to the study conducted by Pallavi V Tenglikar et al (2012) [10] in Tamil Nadu, again the difference in the findings of the two studies may be attributed to lack of regular training. As far as the different areas of bio medical waste management are concerned lowest mean score of knowledge was found in the area of waste handling and collection while it was highest in the area of waste segregation and categorization in our study. These findings of our study are in conformity with the findings of the studies conducted by Mathur V et al [8] and Bathma V et al. [9] Post intervention assessment of knowledge of sanitation staff regarding bio medical waste management showed increase in the mean knowledge scores of the study participants in each area of the bio medical waste handling and management. On comparison of pre and post intervention mean knowledge scores of the study participants, a significant statistical difference was observed.

## CONCLUSION

Incomplete knowledge regarding bio medical waste affects proper and correct practices of bio medical waste; this may endanger the life of human beings. So regular training programs of sanitation staff on bio medical waste are very important and this should be done at regular interval.

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