

ASSESSMENT OF KNOWLEDGE AND IMPACT OF TRAINING REGARDING BIOMEDICAL WASTE MANAGEMENT AMONG BIOMEDICAL WASTE HANDLERS, PARAMEDICAL STAFF AND HOSPITAL ADMINISTRATORS OF PRIVATE HOSPITALS OF MAJOR CITIES OF GUJARAT

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Abstract

Background: Biomedical waste also known as infectious waste or medical waste, is defined as any waste which is generated during the diagnosis, treatment or immunization of human beings or animals or in research activities pertaining there to or in the production or testing of biological and including categories mentioned in schedule I. The large volumes of health care waste if not managed properly can lead to a global hazard. This could not only lead to the spread of highly contagious diseases but the hazardous chemical waste produced by the use of items can cause considerable damage to the ecosystem and the environment. The objective of this study was to assess knowledge of Biomedical Waste Handlers, Paramedical Staff and Hospital Administrators about Bio-Medical Waste Management. **Materials and Methods:** It was a cross sectional study carried out from September 2021 to March 2022. Participants in the study were BMW handlers, Paramedical staff and Hospital administrators working at various private hospitals in 8 major cities of Gujarat. e.g. Ahmedabad, Surat, Vadodara, Rajkot, Jamnagar, Bhavnagar, Junagadh and Gandhinagar. After taking consent of participants, data collection was done two times during study period. Pre-Knowledge assessment was done at the start of the study. **Result:** There were 365 participants who had filled pre-test questionnaires and 258 had filled post-test questionnaires. Participants were from diverse categories. Majority of participants 243(66.58%) were paramedical staff followed by cleaning staff (13.42%), hospital manager/administrator (13.42%) and others (6.58%). There was statistically significant increase in knowledge score in post-test after training ($p < 0.0001$). There was statistically significant improvement of knowledge in all questions except correct method of using mop & discarding human anatomical waste. **Conclusion:** Concluding from the results, the importance of training regarding biomedical waste management cannot be ignored; lack of proper and complete knowledge about biomedical waste management impacts practices of appropriate waste disposal.

INTRODUCTION

Biomedical waste also known as infectious waste or medical waste, is defined as any waste which is generated during the diagnosis, treatment or immunization of human beings or animals or in research activities pertaining there to or in the production or testing of biological and including categories mentioned in schedule I. The large

volumes of health care waste if not managed properly can lead to a global hazard. This could not only lead to the spread of highly contagious diseases but the hazardous chemical waste produced by the use of items can cause considerable damage to the ecosystem and the environment.^[1] Thus health care waste, if not managed properly will be a cause in ushering of “disasters in making” by causing air, water, soil pollutions and helping in emergence of

antibiotic resistant strains of microbial ingress of pollutants in the food chain and thus becoming a part of human consumption. There is also growing concern about the spread of HIV, Hepatitis and other infectious disease that can be caused by needle-stick injuries and other forms of contagion that can result from the improper management of biomedical wastes by hospitals and other health care institutions. Practices or techniques that control or prevent transmission of infection help to protect clients and health care workers from acquiring various diseases. The lack of awareness and technical guidance in the management of the bio medical waste has led to the hospital becoming a hub in spreading diseases rather than working towards eradicating them.^[2,3] India already has biomedical waste management regulations including a ban on the incineration of biomedical waste with the exception of human and animal waste at the Union level, but their implementation and enforcement throughout the country has been inconsistent. This study was carried out with the objective of knowledge Assessment of Biomedical Waste Handlers, Paramedical Staff and Hospital Administrators before imparting training on biomedical waste management.

MATERIALS AND METHODS

It was a cross sectional study carried out from September 2021 to March 2022. Participants in the study were BMW handlers, Paramedical staff and Hospital administrators working at various private hospitals in 8 major cities of Gujarat. e.g. Ahmedabad, Surat, Vadodara, Rajkot, Jamnagar, Bhavnagar, Junagadh and Gandhinagar. After taking consent of participants, data collection was done

two times during study period. Pre-Knowledge assessment was done at the start of the study. Then one day training on Bio-Medical Waste (BMW) management, Infection Prevention and Control (IPC) and Water, Sanitation and Hygiene (WASH) was given to the participants. Post knowledge assessment was done at the end of training. Data collection for pre knowledge assessment was done by using structured questionnaires on BMW management, Infection Prevention and Control and Water Sanitation and hygiene containing 20 questions. Each question was given score of 1 Marks for correct answer and 0 marks for wrong answer. Post Knowledge assessment was done by using same questionnaire after training. Data was entered in MS Excel 2016 and analysis was done by MedCalc software v 12.5.0. Analysis was done in form of frequency, percentages and chi square and paired “t” test was applied for statistical significance.

RESULTS

There were 365 participants who had filled pre-test questionnaires and 258 had filled post-test questionnaires. As per table 1, participants were from diverse categories. Majority of participants 243(66.58%) were paramedical staff followed by cleaning staff (13.42%), hospital manager/administrator (13.42%) and others (6.58%). As shown in table 2 there was statistically significant increase in knowledge score in post-test after training ($p < 0.0001$). As per table 3 there was statistically significant improvement of knowledge in all questions except correct method of using mop & discarding human anatomical waste.

Table 1: Categories of Participants

Participants Category	Number (N=365)	Percentage
Cleaning Staff	49	13.42
Hospital Manager/Administrator	49	13.42
Paramedical Staff	243	66.58
Others	24	6.58

Table 2: Improvement in knowledge score

Score	Pre test	Post Test	P-Value
Score (Mean± SD)	13.41±3.34	17.88±2.35	<0.0001

Table 3: Question wise improvement in Knowledge after training

Sr. No.	Questions	Pre Test (n=365)	Post Test (n=258)	P-Value
1	Correct identification of Biomedical Waste Category	247(67.67%)	207(80.23%)	0.0007
2	Frequency for Cleaning of Underground and Overhead Tank	245(67.12%)	214(82.95%)	<0.0001
3	Frequency for emptying water cooler and purifier	174(47.67%)	181(70.15%)	<0.0001
4	Correct method of using mop	27(7.39%)	212(82.17%)	0.08
5	Correct method of using number of buckets for mopping	213(58.35%)	223(86.43%)	<0.0001
6	Bin used for human anatomical waste	331(90.69%)	226(87.60%)	0.27
7	Number of steps for hand washing	181(49.59%)	211(81.78%)	<0.0001
8	Use of PPE	165(45.21%)	231(89.53%)	<0.0001
9	Used syringe and urine bag discarded in which bin	289(79.18%)	224(86.82%)	0.02
10	Frequency of cleaning hospital toilet ,bathroom and washbasin	236(64.66%)	239(92.64%)	<0.0001
11	Hand washing by Hospital Staff	246(67.40%)	242(93.80%)	<0.0001
12	Labour room is which type of area	174(47.67%)	239(92.64%)	<0.0001

13	Used mop should be disinfected with	107(29.32%)	199(77.13%)	<0.0001
14	Expired medicine should be discarded in which bin	172(47.12%)	228(88.37%)	<0.0001
15	Temperature & Pressure for autoclaving	168(46.03%)	218(84.50%)	<0.0001
16	Color coded bins implemented in your hospital for BMW	281(76.99%)	249(96.51%)	<0.0001
17	Three bucket system is there in your hospital for mopping	267(73.15%)	246(95.35%)	<0.0001
18	If yes then which type of water in all buckets	80/267(29.96%)	190/246(77.24%)	<0.0001
19	Is there sanitation corner or cleaning corner in your hospital?	276(75.62%)	254(98.45%)	<0.0001
20	Maximum period for holding BMW in hospital	262(71.78%)	230(89.15%)	<0.0001

DISCUSSION

This study was carried out on participants with different categories consist of cleaning staff, hospital manager and paramedical staff. This study revealed that mean knowledge score among participants was 13.41 and there was significant increase to 17.88 after training ($p < 0.001$). Knowledge about colour coding of containers, and waste segregation which itself is probably the most important pivotal point and crucial for further waste management, was found to be lacking among participants. A cross sectional study, involving 383 healthcare personnel, carried out by Madhukumar^[4] found that majority (96.1%) were aware of the colour coding for waste segregation but they did not have any clear idea of what should be disposed in which bin. In our study 45.21% participants were aware of use of PPE. Shrestha et al^[5] reviewing compliance to biomedical waste management rules in a tertiary care hospital in Maharashtra found that compliance with respect to use of PPE's such as gloves, masks and aprons was only 93%, 24% and 6% of the total sites respectively. Low level of knowledge is mainly attributed to poor training facilities and also to relatively low educational level of the cleaning staff. Training of staff is critical for the proper and appropriate management of biomedical waste.^[6,7]

CONCLUSION

Concluding from the results, the importance of training regarding biomedical waste management cannot be ignored; lack of proper and complete

knowledge about biomedical waste management impacts practices of appropriate waste disposal.

Following recommendations are proposed: (i) strict implementation of biomedical waste management rules is necessary (ii) it should be made compulsory for healthcare facilities to get their healthcare personnel trained from accredited training centers. These training sessions should not become merely a one-time activity but should be a continuous process depending upon the patient input in different healthcare facilities, (iii) training of sanitary staff should be specially emphasized.

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