

Original Research Article

Awareness, Knowledge and Practices on Bio-Medical Waste Management Among Health Care Professionals in Mangalore - A Cross Sectional Study

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Abstract

Introduction: Bio-medical wastes are of great importance due to its potential environmental hazards and health problems. The waste produced in the course of health care activities carries a higher potential for infection and injury than any other type of waste. It is estimated that annually 0.33 million tons of hospital waste is generated in India. The objective of this study is to analyze the medical waste management practices in different health care settings, analyze the risk perceptions of health care personnel and assess the attitude towards the waste management policies.

Materials and methods: A cross-sectional study is conducted using a pre-tested questionnaire to assess the awareness, knowledge and practices on medical waste management among health care personnel in different health care settings in Mangalore city.

Results: Doctors, nurses, and laboratory technicians have better knowledge than sanitary staff regarding biomedical waste management. Knowledge regarding the color coding and waste segregation was found to be better among nurses and laboratory staff as compared to doctors.

Conclusion: The management of hospital waste requires its segregation and removal from the health care establishments in such a way that it will not be a source of health hazards to those who are directly or indirectly related to the hospital environment. The segregation of waste in almost all hospitals is not satisfactory. Proper and judicious handling of Bio-medical waste continues to be a matter of serious concern for health authorities in India.

Key words

Bio-medical waste, Health care, Infections.

Introduction

Biomedical waste is defined as waste generated during the diagnosis, testing, treatment research or production of biological products for humans or animals. It includes syringes, live vaccines, laboratory samples, body parts, bodily fluids and waste, sharp needles, cultures and lancets. Biomedical waste can be categorized into non-hazardous and bio-hazardous. Approximately 75-90% of the biomedical wastes are non hazardous and as harmless as any other municipal waste. The remaining 10-25% is hazardous and can be injurious to humans or animals and deleterious to environment.

Bio-medical wastes are of great importance due to its potential environmental hazards and health problems. The waste produced in the course of health care activities carries a higher potential for infection and injury than any other type of waste. The management of hospital waste requires its segregation and removal from the health care establishments in such a way that it will not be a source of health hazards to those who are directly or indirectly related to the hospital environment. It is estimated that annually 3 million tons of hospital waste is generated in India and the waste generation rate ranges from 0.5 to 2.0 kg per bed per day. With a view to control the indiscriminate disposal of hospital waste/bio medical waste, the Ministry of Environment and Forest, Govt. of India has issued a notification on Bio Medical Waste Management under the Environment (Protection) Act [1]. Govt. of India has also constituted advisory committee,

appellate authority in exercise of powers conferred under Bio Medical rules.

The public concern about the medical wastes management has increased largely in the past few years on a global basis and a significant effort has been directed toward proper and safe management of hazardous medical waste [2]. However, as there is not yet clear understanding of the risks, and as consequence, inadequate management practices are often implemented. Some of the studies have been conducted around the world to assess the medical wastes management practices and all of them referred that planning and implementation of waste management reduce health and environmental risks [3, 4, 5, 6, 7, 8]. In addition, good medical waste management in a hospital depends on a dedicated waste management team, good administration, careful planning, sound organization, underpinning legislation, adequate financing, and full participation by trained staff [9]. The present study was carried out to determine the awareness, knowledge and practices regarding biomedical waste management among health care providers working in different health care settings in Mangalore, Karnataka, India.

Material and methods

A cross sectional study was conducted in the year 2014 among 157 health care personnel including doctors, nurses, laboratory technicians, house surgeons, auxiliary staff, housekeepers, students etc. in different health care settings in

and around Mangalore, Karnataka. Permission to conduct the study was obtained from the concerned authorities of each health care settings and consent was taken from each participant. The study was carried out using a pre-tested questionnaire and field visiting to different health care settings were done to do a spot study regarding the biomedical waste management practices prevailing in these settings. The questionnaires were made to evaluate the knowledge and wastes management practices among health care personnel and their risk perception associated with medical wastes. The questionnaire was validated and a Kappa value of 0.87 was obtained. Questionnaires were distributed to various departments in each health care setting. Confidentiality was ensured and all forms were anonymous. A minimum sample size of 125 was calculated by a technique of random sampling. Statistical analysis was done and results were tabulated accordingly.

Results and Discussion

The study was conducted using a pretested questionnaire and a cross-sectional study design was selected. The present study was carried out among health care personnel in different hospital settings in Mangalore which included private hospitals, medical colleges, dental colleges, community health centers, primary health centers, dental clinics, nursing homes, laboratories, veterinary clinics etc. Around 52 % of the participants agreed that they have awareness regarding Bio-medical Waste (Management and Handling) Rules, 1998. Among these 65.9% of nurses and 82.05 % of doctors agreed that they have awareness regarding the same (**Figure - 1**). No sanitary staff had any knowledge regarding the Bio-medical Waste (Management and Handling) Rules, 1998. These findings were similar to other studies by Pandit, et al. and Rao in which technically qualified personnel like the doctors, nurses, and laboratory staff have high knowledge regarding these rules but it was low among the sanitary staff [10, 11]. Knowledge about color coding of containers and waste segregation were high

among Nurses (72.72%) than other participants (**Figure - 2**). Only 34 out of 157 participants were able to match the color coding given in the questionnaire. Though the controlling body insists on segregation of hospital waste at source, disposal of the same is not done satisfactorily at present in many hospitals. The segregation and identification of the waste is the primary and most important step to be taken in the process of Bio-medical waste management. The appropriate method of identifying the categories of Bio-medical waste is by sorting the waste into color coded plastic bags or containers at the point of generation of the waste. These findings supported the study done by Deo, et al. [12]. In this present study only five hospitals in the urban area adequately segregated the hospital waste, while pre-treatment of the waste was done in only 46% of the hospital. Low level of knowledge is mainly due to poor training facilities and also because of low educational level among the sanitary staff. Segregation at source of different types of bio-medical wastes and their appropriate storage and/or disinfection sterilization, etc. would ensure that infectious wastes do not get mixed with non-infectious wastes as this would infect the entire waste.

According to Tsakona, et al., it is important to know the quantity of waste generated, and such waste should be classified by type, segregated, in order to allow consideration of the various treatment options [7]. The quantity of waste generated per health care setting showed a mean of 16.36 Kg (SD \pm 24.5) where minimum waste generated was 0.1 Kg and maximum was found to be 194 Kg. 54.78 % (n=86) of participants reported that they do not have any knowledge regarding the quantity of waste generated in their respective health care settings (**Figure - 3**). 110 participants (70.06%) out of 157 agreed that they do not label the infectious waste with the Bio-hazard symbol (**Figure - 4**). This might be probably due to lack of awareness among hospital staff including the sanitary staff regarding the infectious waste. The infectious waste must be labeled with bio-hazard symbol and separately segregated from non-infectious

waste. Saini, et al. found that person with higher education level were more aware regarding this issue [13].

Figure - 1: Awareness regarding bio-medical waste management rule 1998.

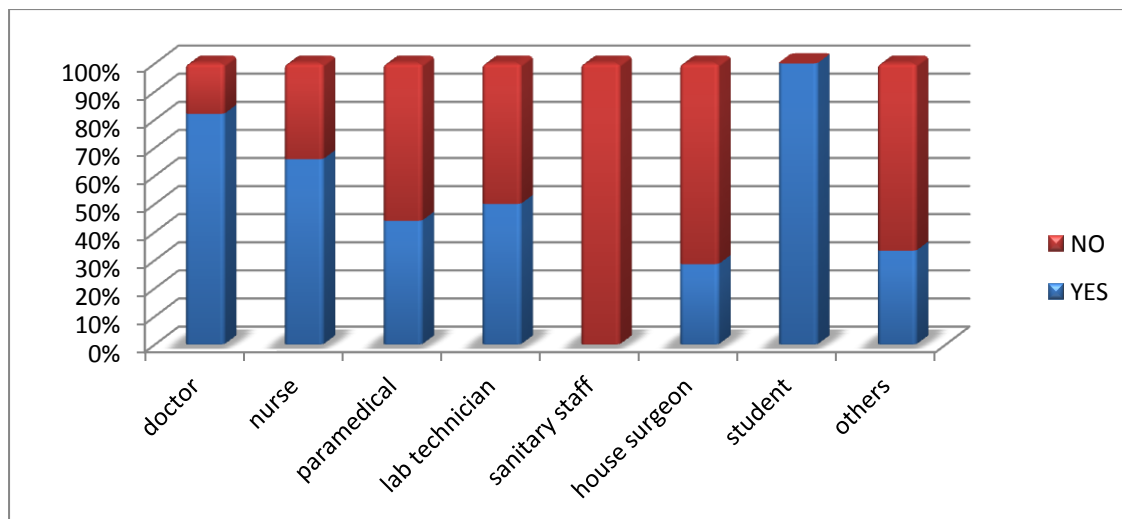
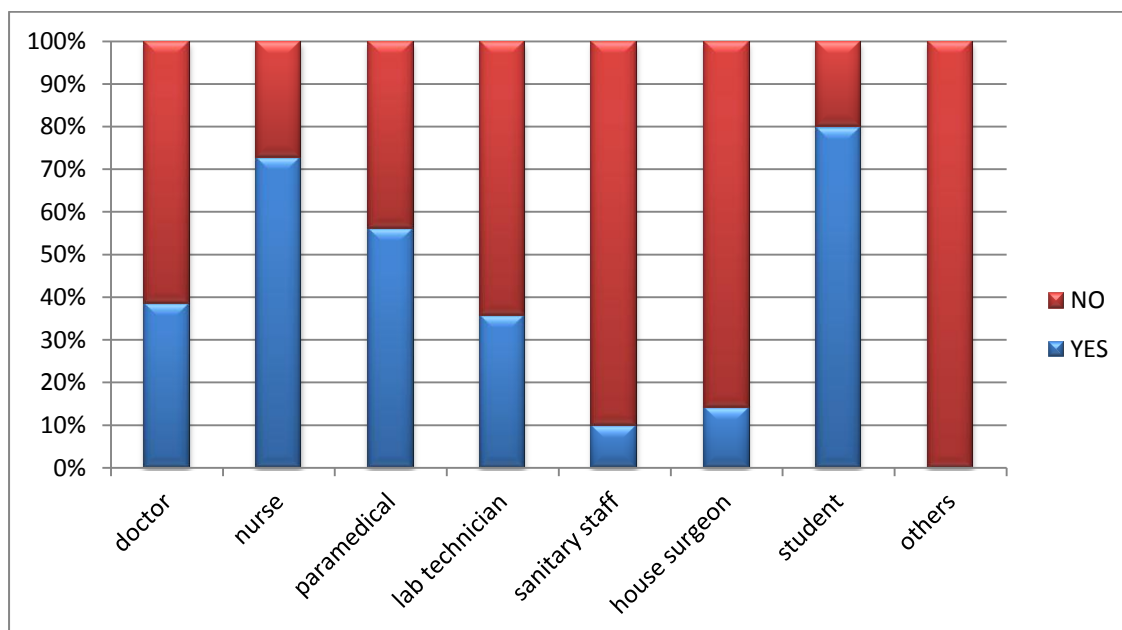


Figure - 2: Knowledge regarding color coding of bio-medical wastes.



Analyzing the facilities available for waste management practices in these health care settings, it was found that autoclaving (67%) was the most widely used facility followed by burning (51%), incineration (46%), segregation (37%), containment (32%), burial (26%) and deep burial (21%). It was found that there was no effective method of segregation, collection, transportation, and disposal system in most of the

health care settings. Barring a few large private hospitals in cities, none of the other smaller hospitals and nursing homes has any effective system to safely dispose of their wastes. Most of the incinerators are not properly operated and maintained, resulting in poor performance. 32% of the participants agreed that they still dump the medical waste in the corporation bin, where as nearly 44% of them reported that they have a

authorized hospital waste collection unit for their health care settings (**Figure - 5**). These findings were similar to study done by Pandit NB, et al. [10], Rijal, et al. [14] and Mathur, et al. [15]. The improper management of Bio-medical waste causes serious environmental problems in terms of air, water and land pollution. Improper waste management has a greater chance of causing infectious diseases. Biomedical waste usually contains blood, body fluids and body secretions

etc. Bio-medical waste could harbor most of the viruses, bacteria and parasites that cause infection. Improper practices such as dumping of Bio- medical waste in municipal or corporation dustbins, open spaces, water bodies etc. leads to the spread of diseases. Such irresponsible dumping has been promoting unauthorized reuse of medical waste by the rag pickers for some years now. Bio-medical waste can also cause health hazards to animals, birds and plants

Figure - 3: Awareness regarding quantity of bio-medical waste generated in respective health care settings.

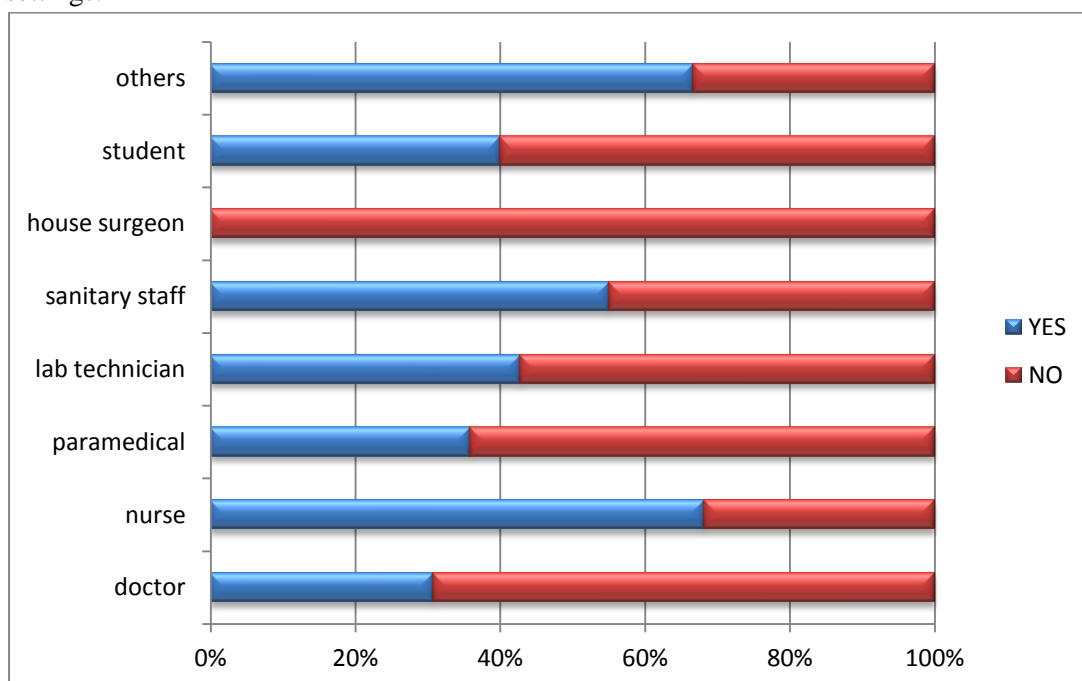


Figure - 4: Distribution according to labeling of infectious waste with Bio-hazard symbol by the participants.

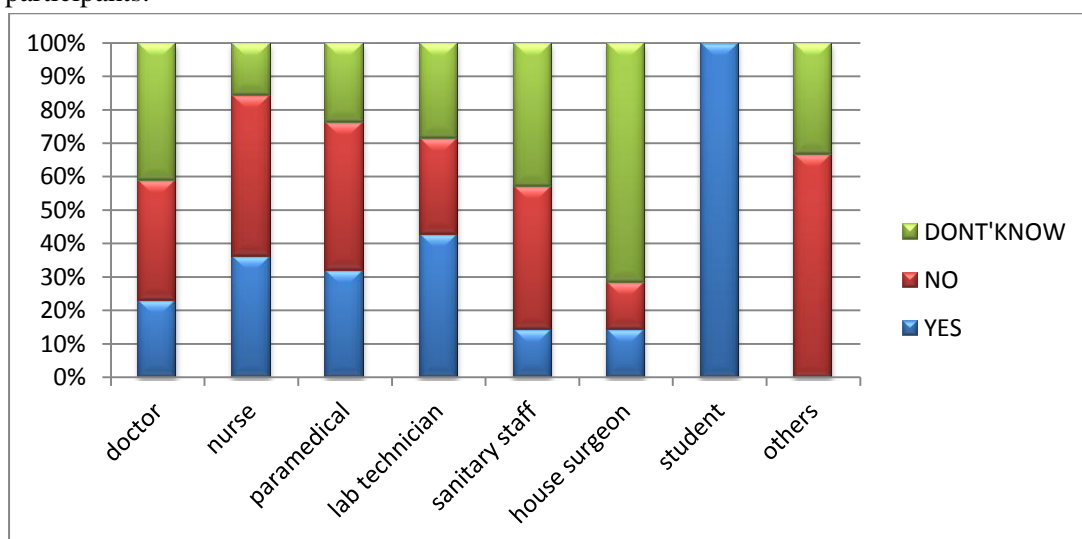
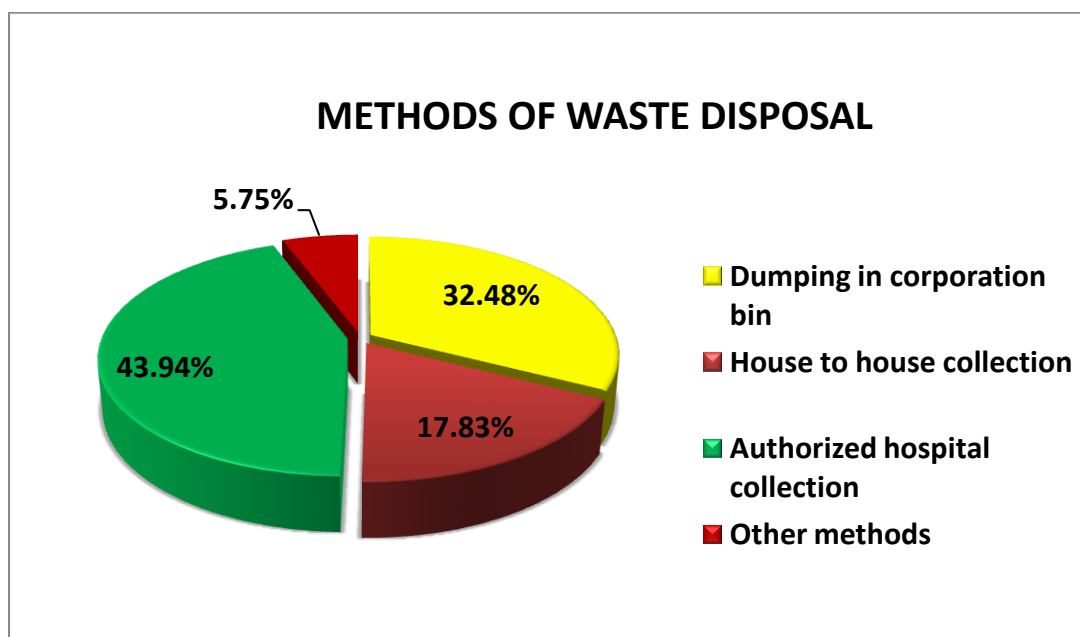


Figure - 5: Methods of waste disposal in different health care settings.



Each health care setting should provide proper education to its employee regarding the bio-medical waste management practices. Lack of knowledge regarding the waste management practices could be the reason for improper methods and practices by the employee. In this study 68 participants (43.31%) agreed that their health care setting provide annual education on bio-medical waste management, whereas 57 participants (36.3%) reported that their health care setting do not provide any education regarding the same. Another finding of this study is that the sanitary staffs who handle the medical wastes are completely unaware of the harmful effects caused by these wastes. So handling of the bio-medical waste should be done by the personnel who have proper knowledge regarding the bio hazards caused by them.

Conclusion

Safe handling of Bio-medical waste continues to be a matter of serious concern for health authorities in India. The segregation of waste in almost all hospitals was found to be not satisfactory. Most of the health care settings do not have proper waste treatment and disposal facilities. In the cities where common treatment facilities have come up, many medical

establishments are yet to join the common facility. It shall be the duty of every occupier of a health care setting generating biomedical waste which includes a hospital, nursing home, clinic, dispensary, veterinary institution, animal house, pathological laboratory, blood bank to take all steps to ensure that such waste is handled without any adverse effect to human health and the environment.

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