Chapter - 6

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Biomedical waste management has recently emerged as an issue of major concern not only to hospitals and nursing home authorities but also to the environment. The biomedical wastes generated from health care units depend upon a number of factors such as waste management methods, type of health care units, occupancy of healthcare units, specialization of healthcare units, ratio of reusable items in use, availability of infrastructure and resources, etc. The proper management of biomedical waste has become a worldwide humanitarian topic today. The hazards of poor management of biomedical waste have aroused concern the world over, especially in the light of its far-reaching effects on human, health and the environment. From the present investigation, the following conclusions are drawn.

Maximum number of yellow cover waste was generated in Hospital-A and B in the month of May. In Hospital-B, eventhough there were less number of patients in the month of July, the quantity of yellow cover waste generated was observed to be more due to improper segregation of waste generated in the hospital.

Minimum number of blue cover waste was generated in hospital-A and B in the month of August and February respectively, but it was equally distributed in all the months of the year in Hospital-C and D. Eventhough in Hospital-A, the input of patient and OT activity was not less, in the months of August, September and October the blue cover waste generated was comparatively less due to illegal selling of all the reusable
items by unauthorized people in the hospital premises for reuse. In Hospital-B, even though the OT and treatment activities were maximum, the generation of blue cover waste was very less due to the selling of the reusable disposables. But in Hospital-C and D there was no selling of disposable items and the segregation level was good.

In Hospital-A and B, along with laboratory cultures, other disposable items were also observed in the red covers. Here, the segregation level was not good. But this was not observed in hospital-C and D. The generation of needles and sharps was very less in Hospital-A and B in the months of September, October and November though there was more number of OT and treatment activities. This was due to the selling of sharps and needles illegally. In Hospital-C and D, the input of patients was comparable with the generation of needles and sharps.

The methodology adopted for collection and disposal of various categories of BMW was not as per the norms of CPCB in Hospital-A and B. But in Hospital-C and D it was good to some extent.

The disposal of liquid waste to the sewage was done without pre treatment in the hospitals studied. Except Hospital-C the suspended solids content in waste water was within the CPCB norms in other hospitals. The conductivity and pH of hospital wastewater showed values within the CPCB norms in all the 4 hospitals. In hospital waste water, the oil and grease content was observed more than the CPCB standards and this is true for the Hospitals A, B and C. In Hospital-A and C, the BOD of waste water was more than the permissible limits. In Hospital-B and D out of 4 samples examined. Three samples showed BOD value more than the CPCB norms. Boron, SAR and sulphate contents were within the permissible limits of CPCB norms in all the hospitals.
Hospital-C, the chloride content of waste water was observed more than the CPCB norms. The COD value of waste water of Hospital-A and C was observed more but in Hospital-B and D it was within the CPCB norms.

Flue gas analysis of incinerator stack was carried out and the concentration of the particulate matter, $\text{SO}_2$ and $\text{NO}_2$ in the incinerator flue gases were within the stack emission standards. Ambient air quality monitoring showed that $\text{NO}_2$ and $\text{SO}_2$ concentration in Hospital-A, B, C and D were within NAAQS norms. Whereas, suspended particulate matter concentration in the ambient air samples of Hospital-A, B, C and D exceeded the NAAQS norms, which might be due to the presence of high wind movement and vehicular exhaust. Analysis of incinerator ash was done and the concentration of zinc, iron and chromium was more but lead and cadmium content was below detectable level.

Syringes were properly segregated and disinfected in Hospitals B, C and D, but in Hospital-A, it was not up to the mark. Hospital-A was selling this hazardous item due to its reuse potential. Required treatment technologies as mandated by biomedical waste rules are cost intensive. The segregation and containment of recyclables was practiced in Hospitals B, C and D. Disinfection and disfigurement was not properly attended to in all the hospitals. Segregation and disinfection of waste sharps (needles) was done in hospitals B, C and D but it was not properly done in Hospital-A. Transportation of waste was done manually in Hospital-A whereas Hospitals B, C and D used trolley for transportation. Nevertheless, the packing of waste was not done properly before transportation in all the four selected hospitals.
Hospitals A, B, C and D used plastic containers to keep the biomedical waste covers. Hospitals B, C and D had lids for the containers and disposed the waste twice daily. The containers were not closed with lids in Hospital-A and the waste was disposed once daily. The overall protective clothing was not satisfactory in Hospitals A, B and C. Immunization of the cleaning staff against tetanus was done in Hospitals B, C and D and the immunization of hepatitis B was seen only in Hospital-D.

The responsibility of collection and disposal of waste from the hospital was entrusted to a private organization on rental basis in the hospitals studied. The attitude of staff involved in the biomedical waste management system especially class-IV workers and nursing personnel was not very encouraging in Hospital-A and B. Health awareness was lacking among class-IV employees in Hospital-A, B and C. The new recruits were not being exposed to any orientation programme on BMW management. Health awareness among class IV employees was satisfactory in Hospital-D.

The study indicated that there was lack of awareness, concern and knowledge of appropriate handling and disposal of medical waste in government Hospital-A, but was little better in private Hospitals B, C and D. Hospital-A was not aware of the harmful impact of recycling and reselling of the biomedical waste.

It was observed that none of the hospitals maintained needle stick injury register. The authorization to implement BMW Rules, 1998 was received by all the four selected hospitals. But only in hospital-D the system of recording of illness developing among the waste handling staff which is mandatory as per rules was observed. None of the hospitals had infection control and waste management committee.
Since the biomedical waste was incinerated and burnt into ashes the question of studying the impact of waste disposal on soil quality and water does not arise at the incineration point.

In the present study, it was observed that none of the hospitals have put oil and grease traps which is very essential in the kitchen and canteen sewer lines.

In conclusion, the biomedical waste management in Mysore city hospitals was not in accordance with the guidelines stipulated by the Central Pollution Control Board (CPCB) except to some extent in hospital D. Therefore, it is time that, the authorities concerned should take mitigative measures to ensure that the waste disposal is done according to the norms, thereby keeping the city clean and healthy.