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Triveni S Inganakal
Assistant Professor, Department
of Civil Engineering, PDA
College of Engineering,
Kalaburagi, India

Shivaraj Inganakal
Assistant Professor, Department
of Bio-chemistry, Gulbarga
University, Kalaburagi, India

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A study on bio-medical waste management approach in Kalaburagi District: An comparative analysis for better practices

Triveni S Inganakal and Shivaraj Inganakal

Abstract

The study aims to analyse the Bio-Medical Waste Management practices adopted in Kalaburagi District. The study has selected two hospitals consists of both private and government hospitals during the year 2016. The data collected from two hospitals comprises of both primary and secondary information for the study purpose. The findings reveals that only primary level segregation was found to be major practice at both the hospitals during the study period, however public sector hospitals where found to be on par with the government hospitals. Conversely, the private sector is rated below the satisfactory level on the basis of certain indicators decided in our research methodology. The used syringes, drug ampoules and sharps are being disposed of properly in both hospitals. Further, the study also conveys that medical staff does not follow proper protection during collection, segregation and transportation in both hospitals. The findings reveals that there are lack of pure dumping sites for these bio-medical waste were every hospital backyard is used as dumping site which is an inappropriate practice of waste management disposal in few cases hospital bio-waste is dumped in city out skirts using transportation. Hence the study suggests that, Proper management of BMW plays a vital role in preventing any outbreak of infectious diseases in society. It causes reduction in the cost of medical expenses by preventing spread of diseases. It helps in maintaining hygienic and healthy environment in medical centres.

Keywords: Bio Medical Waste, Hospital, Waste Segregation, Waste Disposal

Introduction

The present scenario has been challenging especially for using excess resources for growing population which is largely characterised by disposal of waste substance at both national and international levels all over the country. In particular, the Biomedical waste is menacing to the ecosystem and public health at large mass of population. Bio-medical wastes require appropriate handling and treatment prior to its final disposal. Now-a-days, the hospitals are increasing and their Bio Medical Waste (BMW), are largely dumped as untreated waste. On the average, a patient generates 1.5-2 kg of waste per day irrespective of the wards^[1] governed by the "bed occupancy". On a normal day almost 75% of hospital beds are occupied by patients^[1, 2]. The waste includes both the non-risk (domestic) and risk waste (Infectious, Pathological, sharps. etc.).

To cope up with this issue amicably, proper segregation and disposable of (BMW) is vital and needs to be done at the grass-root level. The health concerns pertinent to manhandling of this waste have been brought to notice repeatedly by the electronic media. However, the authorities still haven't been able to chalk out ways to comply with, owing to new challenges in the studied cities. The rigidity which lies in implementation of the modern practices is integral to the non-availability of funds and lack of awareness related to health hazards associated with it. However, research on this critical issue in this region has been very limited, and there is a serious dearth of knowledge, planning and execution of standard procedures in biomedical waste management. Legally, the hospitals are obliged to handle and dispose all kinds of hospital waste generated according to national and international standards without deterioration of environment. At present the importance of waste management has to be taught for all organisations especially hospital where the proportions are greater than comparative

Correspondence
Shivaraj Inganakal
Assistant Professor, Department
of Bio-chemistry, Gulbarga
University, Kalaburagi, India

institutes in general which has to come up in the form of legal implementation at both regional and local governments for better and efficient waste resource management. In countries like India, waste management is defined as collection and segregation coupled with storage and transportation which is great lack of practices of dumping disposals [3&4].

This study contains a survey of two hospitals public and private sector in kalaburagi district. The analysis highlights the current practices for biomedical waste handling, with adherence to the local and international standards. For this purpose, the hospital waste management systems of two regional care hospitals are analyzed and the indistinctness in the whole process is discussed in detail.

Methodology

This study was conducted at two tertiary care teaching hospitals of good credibility in both Government and private hospital sectors from 15th April 2016 to 25th June 2016. Prior permission for the visit was taken and the hospitals under consideration through official communication channel.

The objective of study was explained to hospital authorities and verbal consent was obtained. One tertiary care hospital from the government sector and one from private sector was selected. The study consists of both primary and secondary data for the study during the year 2016. Further, the data is collected through presentations given by hospital

administration, direct interviews from hospital staff, questioners and direct observation methods. The hospital administration was interviewed to get in-depth knowledge regarding hospital waste management policy and training of staff in relation to managing bio-medical waste management resources.

In addition, all wards, departments and general area of both hospitals were visited and examined the management practices which were adopted by the respective hospitals. The study aims to know the various methods of disposing bio-medical waste such as dumping sites, segregation, storage at different levels in the hospitals which consist of both in and around hospital sites. The existing waste segregation practices were analysed in conformance to the international standard color coding and waste disposal protocol which are presented in the Table-I. The information was also obtained from secondary data sources such as literature review and other research organisations. The questionnaire was exclusively prepared for this study in order to fulfill the designed objectives and also to gather the meaningful insight of the study. The study attempted to focus on various disposable patterns followed in Bio Medical Waste (BMW) waste generated using structured format in a similar way from both hospitals was collected to avoid any discrepancy and was analysed.

Table 1: Shows the colour codes and type of containers used for disposal of biomedical waste ¹

Color coding	Type of container	Waste category	Treatment options
Yellow	Plastic bags	Human and animal wastes, Microbial and Biological wastes and soiled wastes (Cat 1,2,3 and 6)	Incineration / Deep Burial
Red	Plastic bags	Microbiological and Biological wastes, Soiled wastes, Solid wastes (Cat 3,6,7)	Autoclave / Microwave / Chemical Treatment)
Blue/white	Transparent Plastic bag	Puncture proof container Waste sharps and solid waste (Cat 4 &7)	Autoclave / Microwave / Chemical Treatment Destruction and Shredding
Black	Plastic bag	Discarded medicines, Cytotoxic drugs, Incineration ash and chemical waste (Cat 5,9 & 10)	Disposed in secured landfills

Results and Observations

Both hospitals have good cleanliness and hygiene maintained inside their premises. The atmosphere in general is healthy and periodic mopping is functional. The operation theatre has high standard of cleanliness and sterilization system in both hospitals.

The private sector hospital has no waste management department/committee contrary to the other third parties for better management of waste neither they have adopted any set of rules or any other standard for the handling bio-medical waste. In many hospitals in spite of rules implemented during 2005 in the form of legal clause for communication related to Waste Management Rules waste not properly segregated not even according to color bags waste is not disposed. Instead the practice is the use of red and blue tapes on the local polythene bags which are liable to tear damage easily. Moreover, the collection, and transportation from wards to dumping site are not being carried out as per international standards in both the hospitals. The hospitals try to segregate the waste from the start where it is generated. However there is no system to check or verify the correct segregation of waste at the later stages. Both hospitals have no system in operation to handle and treat the infected or hazardous waste before disposal.

Regarding training of staff, no system is identified which properly train or aware the staff about biomedical waste hazards and segregation. Further formal interviews from the concerned authority, medical, paramedical and sanitary staff

reveals that there is a lack of gross level awareness among sanitary staff and paramedical staff regarding biomedical waste management and handling in both hospitals. No proper evidence of regular medical check-up of sanitary staff directly involved with waste handling is found in both hospitals. This reveals that in both hospitals actual reporting of waste management is lacking even the technology is also advanced in the hospital but disposal facilities are not up to the mark (Table-II).

Table 2: Check list of BMW protocol

	Government Sector Hospital	Private Sector Hospital
Cleanliness General area	Yes	Yes
Wards	Yes	Yes
Departments	Yes	Yes
Waste management (WM)		
WM committee exist	Yes	No
Segregation at site of production (wards/departments)	Not proper, but better than private	Not Proper
Waste containers are proper	Yes	Yes
Transportation to dumping site in proper way (Trolley/cart)	Yes	No
Initial storage site in wards	Improper	Improper
Proper dumping site	No	No

Segregation of waste at dumping site	Improper	Improper
Transportation to final site	Proper	Improper
Final disposal site	Proper	Proper
Incinerator facilities	No	No
Waste Management Staff		
Had training in handling waste	No	No
Using protective gears	No	No
Had proper knowledge of waste management	Basic	average
Having regular training sessions	No	No
Having medical examination	Yes	No
Infectious waste treatment		
Disinfected before disposal	No	No
Handling by special staff	No	No
Special barrier clothing	No	No
Incident report procedure	No	No

Discussion

Bio Medical Waste (BMW) management is of great importance due to its public health risks and potential environmental hazards. The improper disposal of waste imposes serious complications to environment and the people living near. The exposed waste may lead to an epidemic disease and can also contaminate the water and soil. The contaminated water may be found at a far distance causing infectious diseases^[3,6]. The hospital laboratory waste, if not treated according to the standards can lead to serious cause consequences. It may contaminate the water body nearby and cause hazardous threats causing water borne diseases⁷. In past, the BMW was often mixed with municipal solid waste and mostly disposed of in residential waste landfills especially in developing and underdeveloped countries. Due to increase in awareness, in recent years, efforts have been made by waste generators and environmental regulatory agencies to manage BMW in a proper way^[3,4].

Sanitary staff and janitors when handling waste, wear protective clothing at all times including face masks, industrial aprons, leg protectors, industrial boots and disposable or heavy duty gloves, as required. Sanitary staff and sweepers must ensure that waste is collected at least once daily and all waste bags are labeled before removal, indicating the point of production, ward, hospital and contents. They must also ensure that the removed waste bags and containers are immediately replaced with new ones of the same type and where a waste bag is removed from a container, the container is properly cleaned before a new bag is fitted there in^[1]. None of these practices were being observed in both private and government sector hospitals.

For waste handling in wards the protective gear must be used by the personnel who are handling the waste to avoid any direct contact with BMW. For this purpose specialized skin fitted rubber gloves of bright yellow color should be used. The gloves should be washed twice after handling the waste with carbolic soap and a disinfectant^[8,9]. To prevent contamination of clothing and for protection of skin, aprons made of cloth or impermeable material such as plastic should be used^[10].

Boots that are rubber soled and antiskid should be long enough to cover legs, and be able provide greater skin protection especially when splashes or large quantities of infected waste have to be handled for example at Operation Theater. Various types of masks, goggles and face shields should be use alone or in combination depending upon the

situation and waste material^[2, 10]. There is a gross lack of all these facilities in both hospitals especially in private sector hospital. It was found that at hospital level risk waste was separated which was generated at hospital staffs during medical check-ups.

Staff interview and direct observation shows the lack of proper awareness of staff regarding handling and segregation of waste at the place of generation in both institutions. However, the key to effective management to minimize the hazard of biomedical waste is the identification and segregation at the point of generation. It is recommended that it must be kept away from direct contact with humans, animals, insects, and environmental elements, such as rain and wind. It is recommended that the limited access should be granted only to trained and authorized personals that are trained to handle this waste^[11, 7].

Regarding the disposal of hazardous waste, literature recommends that the sharps should be kept in rigid, unbreakable, leak and puncture-resistant containers which are tightly lidded and labelled during handling, storage and transport. For this purpose rigid plastic, single-use or approved multiple-use containers may also be used^[1, 12]. Puncture proof boxes to dispose sharps were being used in both the hospitals.

The BM waste should be transported to dumping site either in trolleys or in covered wheelbarrow. Manual loading should be avoided as far as possible. The Container containing BMWs should be lidded before transportation. During transportation the disposal specification should be mentioned so that they can be easy to segregate at further level before transportation for dumping. Special vehicles must be used so as to prevent direct contact with the waste by the transportation operators, the scavengers and the public. The transport containers should be properly enclosed. In addition to above the to manage the traffic accidents driver should be taught how to manage the waste and avoid environmental spillage at local areas and private hospital discourage the practice of transporting bio-medical waste^{7, 11}. Government hospital has a good system for transporting the BMW to the dumping site that do not involve any manual transportation. Both hospitals however lack the proper labelling procedures that are required before disposing off the waste.

The treatment processes use the chemical which act as disinfectants e.g., chlorine dioxide, Sodium hypochlorite, per acetic acid, H₂O₂, dry inorganic chemical and O₃. Most chemical processes are water-intensive and require neutralizing agents^[9]. We have not observed any treatment process being done or mentioned by both hospital authorities. In addition it has low detrimental impact on ecological system; low incidence of community and occupational health hazards^[8, 13]. BMW management leads to improved public health, better quality of life and cleaner environment.

In developed countries, there is a committee in each hospital that develops a plan for recycling or waste minimization. Health professionals; such as doctors, nurses and waste handlers, are given regular training on waste management practices. Their programs include segregation, collection, handling, transportation, treatment and disposal of waste, as well as occupational health and safety issues. The committee is also responsible for developing a plan for treatment and disposal of chemical and pharmaceutical waste Therefore, a proper BMW management system should be introduced in hospitals of developing countries like India, which offers proper training to the staff. Instead of just one site the authority should introduce multiple sites for segregating the

waste, making it more convenient for the waste treatment authorities to collect waste easily.

Conclusion

The analysis of study reveals that segregation of various bio-medical wastes in the both government as well as private hospitals was found to be improper nature. This reveals the lack of knowledge bio-medical resource waste management and its importance in playing significant role in healthy environment. The study suggests that, more number of staff in each hospital and also other human resource persons should engaged in this bio-medical disposal wastes which is essential for creating awareness and also protect the environment on sustainability lines without affecting the pollution in and around hospital which are surrounded by residential areas where the communicable disease spread at very faster rate especially during winter seasons, if they are not managed properly. Hence the study suggests that, a mandate policy should be adopted by all the hospitals, which are engaged in bio-medical waste management process. Apart from creating awareness, the study also suggest that Capacity Building Programmes on these practices will not only boost the healthy practices but also helps in regulating diseases free environmental especially in governmental hospital's when compared to private hospitals. By adopting these practices management policy and Standard Operating Procedure (SOP) for bio-medical waste will be efficient at both local and regional levels with great zeal among the nursing staff to work better and efficient ways for overall development of hospitals.

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