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BIO MEDICAL WASTE MANAGEMENT

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ABSTRACT
The main purpose of this research is to identify the quantum of the medical waste generated and various methods involved in their disposal. The Indian Government has introduced Bio medical rules and its amendments in 2016 which dictate effective management of waste to prevent the diseases. These wastes have to be collected, segregated and then transported to the common bio medical waste treatment centre or if possible can be reduced at the source itself minimizing the quantity. It should not be dumped, landfilled, mixed with other municipal solid waste thereby creating a menace to the general public. If possible, it is to be considered for recycling or reuse in case of plastic medical waste.
The study discusses about the quantity of waste collected in the 4 colour code categories namely yellow, red, blue and white. It also checks whether proper collection and disposal methods are followed thus creating awareness in the management of waste.

Keywords: Medical waste, Knowledge, Awareness, Disposal, Health care, management

INTRODUCTION
Management of Biomedical waste is one of the biggest tasks of recent days due to the direct impact on the health of human beings. Waste produced throughout the diagnosis, treatment or immunization of human being or animals and the radioactive waste or waste produced from the laboratories is termed as Bio medical waste. The major source of waste is from the Government and private hospitals. Some amounts of waste are also generated from clinical laboratories, small clinics, dispensaries, nursing homes, mortuary, autopsy centres. Much importance should be given to the safe disposal of waste. Handling of Medical waste is a risky action which requires a high standard of preparation [1]. It is a highly sophisticated process which needs immediate attention otherwise a high chance of spreading harmful diseases cannot be avoided.
Management, treatment and disposal of Medical waste and creating awareness among the medical care workers and the general public has become a growing concern. To achieve this creation of knowledge, awareness and practice among the medical care workers is the need of the hour. Efforts have been made by environmental regulatory authorities for better management of medical waste to prevent the outbreak of diseases. This can be achieved only if the healthcare workers cooperate in the waste management process. Proper implementation of medical waste management can lead to better effects for both public & environment. [2]
Almost all the countries in the world are working hard towards safe management and disposal of these healthcare wastes. However, in many developing countries, management of these healthcare wastes has become one of the major problems due to the increase in the use of disposable items. Moreover, these countries have to tackle problems of improper segregation and disposal of hazardous healthcare waste. In most of the countries, especially in India, unsegregated and untreated hazardous waste are openly dumped into municipal dumping sites and roads or are being incompletely burnt in the open or landfilled. The main treatment techniques involved in the waste management includes Incineration, autoclaving, Hydroclaving,

microwaving, shredding, mutilation, plasma pyrolysis. These techniques should be followed according to the different types of waste generated as per the components and four color coded categories.

The bio-medical waste management is still in its initial stages all over the world. There is a lot of bewilderment with the difficulties among the generators, operators, decision-makers and the general public about the safe management of bio-medical waste. The reason may be a lack of awareness. Therefore, resource material on the surroundings for hospital administrators, surgeons, doctors, nurses, Paramedical staff and waste retrievers, is the need of the hour. [3], [4]

It has been accentuated [5] that for the proper disposal of bio-medical waste, introduction of laws is not sufficient enough. The consciousness of these laws among the general public as well as development of these policies and strict implementation that respect those laws is vital.

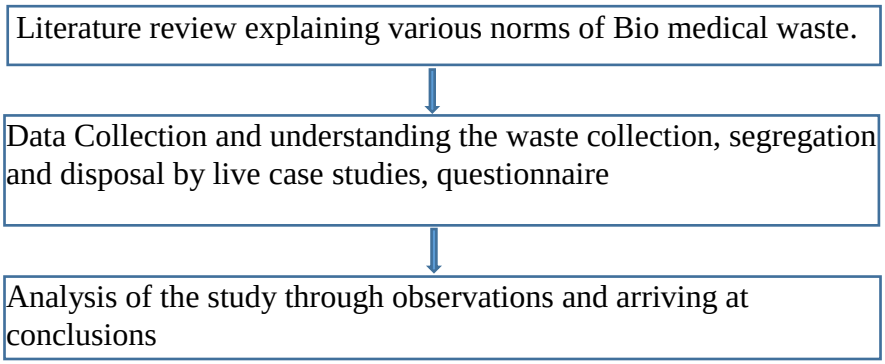
Other reasons for the increase in the medical waste are the growth of the population with various diseases as well as increase in the number of hospitals. Therefore, tackling the situation with a well-developed strategy centring on management of bio-medical wastes is also the need of the hour.

LITERATURE REVIEW

In India, proper medical waste management has to be ensured by following the Bio medical waste management rules 2016. These rules have been listed in the Journal of Laboratory Physicians, BMW rules 2016 & WHO Lab Physicians.2018 Jan-Mar; 10(1): 6–14. [6] which implements on how to segregate, handle, dispose and manage medical waste as per 4 color coded system. It also enables that the health care workers should be well trained to manage the medical waste efficiently. In addition, it also follows the treatment techniques to be adopted for the safe disposal of waste which ensures that the standard emissions should be within the prescribed limits to create a safe environment.

Further it also mentions the need of disposal register of Bio medical waste to be maintained daily and monthly updation of the same on the website is to be followed.

METHODOLOGY



DATA COLLECTION

The First live case study emphases on the “BIO MEDICAL WASTE MANAGEMENT” of a 650 bedded Medical College and Hospital located at Poonamalee, Chennai.

It also discusses about the extent of waste collected in “4 different color coded categories as per Bio medical waste management rules 2016”. The waste segregation, collection, transportation and disposal are done on a daily basis thus creating awareness among the health care workers. The medical waste collected from Sep21, 2020 to Sep 27, 2020 is listed in the table below.

Table 1: Collection of waste for one week

Waste collection as per different color coded categories	Quantity of waste generated per day in KG						
	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Yellow	3.87	9.86	9.70	4.53	3.82	2.83	9.70
Red	4.63	25.92	23.26	21.46	20.90	21.66	23.26
Blue	1.85	1.69	1.18	1.81	1.80	1.86	1.18
White	-	-	-	-	-	-	-
Total	10.35	37.47	34.14	27.80	26.52	26.35	34.14

The Second live case study is about the management of bio medical waste in S.P. HOSPITAL located at Adambakkam, Chennai. It is a 40 bedded hospital and G+1 storey building established in the year 2001.The waste segregation, collection, transportation and disposal are done on a daily basis thus creating awareness among the health care workers. The following table shows the medical waste collected for one week from Oct 6, 2020 to Oct 12, 2020

Table 2: Collection of waste for one week

Waste collection as per different color coded categories	Quantity of waste generated per day in KG						
	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	Sunday
Yellow	4	3	1.5	2	2	1.5	2
Red	2	2	2	2	1	2	1
Blue	1	1	0.5	1	1	1	1
White	-	-	-	-	-	-	-
Total	7	6	4	5	4	4.5	4

From the above two tables, though the process of collection of medical waste is done on a daily basis there are some mismatches according to the waste generated. In India it is estimated that around 1.5kg/bed of medical waste is generated in one day. This may slightly differ according to the number of beds in Hospitals. But from the above tables, one can't substantiate about the waste collected from the hospitals according to the number of beds. So there may be some discrepancies about that.

Table 3: Direct Interview and responses

S.No	Questions	Medical College & Hospital at Poonamalee, Chennai	SP Hospital
1.	Name of the Person responsible for waste management.	Dr.E.Subbulakshmi	Mr.S.Sivaselvam
2.	Whether the person received any training on waste management?	**Yes**/No	**Yes**/No
3.	Does your hospital have a waste management team?	**Yes**/No	**Yes**/No
4.	Does the waste management staff have job descriptions detailing their tasks?	**Yes**/No	**Yes**/No
5.	Are they aware of the legislation application to hospital waste management?	**Yes**/No	**Yes**/No
6.	Are they aware of a document/record outlining the hospital waste management policy?	**Yes**/No	**Yes**/No
7.	Is there a manual or guideline document available on the hospital waste management?	**Yes**/No	**Yes**/No
8.	Are there clearly defined procedures for collection and handling of wastes from specified units in the hospital?	**Yes**/No	**Yes**/No
9.	Does the Hospital follows the basic 4 color coded categories in collecting and storage of waste?	**Yes**/No	Yes/**No**

The above table describes about the questionnaire collected by direct interview with the respondents such as medical supervisors, waste in charge officers and ward boys related within the medical waste management process.

OBSERVATIONS

Though the management of bio medical waste is carried on as per rules as observed in the questionnaire, certain discrepancies were noted in both the hospitals such as using white cans instead of white containers in one hospital and mixing of sharp items (needles, blades, scalpels etc) in the blue containers which has to be collected in the white containers, in the other hospital. Such practices should be avoided for the safety of medical personnel and workers involved in handling the waste. Below figure shows the medical waste collected and stored as per 4 color coded categories in the medical college and Hospital located at Poonamalee, Chennai.

a) Yellow waste b) Red waste c) Blue waste d) White waste

Figure 1: Different types of waste collected in 4 color code categories at Medical College and Hospital, Poonamalee, Chennai

Figure 2: Waste Storage Container in SP Hospital

CONCLUSIONS

Health care facilities both private and government should follow the norms of bio medical waste rules, 2016 strictly to avoid mismanagement of bio medical waste disposal. Health care workers should be trained properly in the medical waste management system. In the absence of regular workers, other workers should also have adequate knowledge regarding the management of medical waste. In such a way only, we can efficiently manage the medical waste disposal.

Even though several norms have been enacted by the Government of India in effective and efficient management of bio medical waste, sheer negligence occurs both in small and big hospitals. To avoid this Government should take punitive action against the defaulters. Concerned medical authorities should make a surprise inspection of the hospitals to check whether the bio medical waste management system is followed properly or not. They should assist in case any improvement is required in the management of medical waste disposal.

Public should oppose the practice of mixing medical waste with the municipal waste which will create nuisance not only to them but also to the surrounding environment. They should insist on providing a sensor system that will identify the dumping of the medical waste with the general municipal waste. In such a way the violators will be caught and punished. They should also claim that the hospitals should not dump the

medical waste in open/vacant land near the river or wherever space available by spreading many dreadful diseases. Awareness regarding the medical waste disposal should be borne in the mind of the locals also, thereby preventing any unpleasant circumstances.

"Since safe and efficient Bio medical waste is not only a legal and also a social responsibility", [7] Government should insist on all the Health care facilities to have their own necessary treatment facilities to ensure proper treatment of wastes and its disposal, so that it will minimize the risk of exposure to staff, patients, doctors and the community from biomedical hazards.

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