An analytical study on medical waste management in selected hospitals located in Chennai city.

Sutha Irin A*

Assistant Professor, Department of Commerce, Faculty of Science and Humanities, SRM University, India

Abstract

The present paper aims to study the Medical Waste Management assessment, the process of managing the medical waste: management of medical waste, segregation, storage, and disposal of medical wastes in public and private hospitals in Chennai City. A structured questionnaire was circulated among 140 health workers at hospitals in Chennai with 70 respondents from governmental hospital and 70 respondents from a private hospital respectively. Simple Random sampling method was used in this study. The results reveals that the, health care facilities in private and governmental hospitals still struggle with unsuitable biomedical wastes management which has not received enough concern. In the surveyed hospitals, there is lack in implementing training courses about healthcare waste management. Hence, the Ministry of Health and health care institution and hospitals should give more consideration towards policies for proper management and hospital wastes disposal in order to develop medical waste management in Chennai City. The study was concluded with recommendations for improvements on biomedical wastes handling and treatment in order to render proper and adequate waste disposal system in health institutions.

Keywords: Assessment, Medical waste management, Segregation, Disposal, Biomedical waste management

Accepted on February 27, 2018

Introduction

The treatment and disposal of medical waste from hospitals has been of growing concern in recent times. This is due to the hazardous nature of these wastes and the potential threat to spread deadly diseases to humans and other living organisms. To characterize and quantify these wastes, a study was carried out to ascertain the generation of biomedical wastes from hospitals. Medical care is very important for our life, health and wellbeing. But the waste extracted from medical practice can be harmful, poisonous and even deadly because of their high potential for diseases transmission. The concern for hospital waste management was increase in infectious diseases and indiscriminate disposal of waste in worldwide. Medical waste has been identified by the US Environmental Agency as the 3rd largest known source of dioxin air emission and contributor of about 10% of mercury emissions to the environment from human activities. In this last few decades the generation of biomedical waste has increased; management of medical waste continues to be a major challenge. Biomedical waste is generally extracted from hospitals, health care teaching institutes, research institutions, blood banks, clinics, laboratories, veterinary institutes and animal houses etc. As per Bio-Medical Waste (Management and Handling) Rules, 2016, Source: http://mpcb.gov.in/biomedical/pdf/BMW_Rules_2016.pdf.

G.S.R.343(E) whereas the Bio-Medical Waste (Management and Handling) Rules, 1998 was published vide notification number S.O. 630 (E) dated the 20th July, 1998, by the Government of India in the Ministry of Environment and Forests, gave a regulatory frame work for management of bio-medical waste generated in the country; And also to implement these system more effectively and to improve the collection, segregation, processing, treatment and disposal of these bio-medical wastes in an environmentally sound management and plummeting the bio- medical waste generation and its impact on the environment, the Central Government reviewed the accessible rules.

Bio Medical Waste handling is a dangerous waste action which requires a high standard of preparation. It calls for specific training that depends on the nature of the work in the hospital, the hazard and worker experience, and also the responsibilities of individual workers states Manyele and Anicetus [1].

Process of Managing the Medical Waste

Segregation

The segregation process reduce the toxicity and the volume of the waste, it makes easier to transport the waste. Segregation process depends on the quantity, composition and the disposal.

Separating

The collected medical waste from medical centers, infectious, pathological waste and sharps will be placed in different containers and labeled biohazard, uniform color for each type of medical waste. The size of the containers depends on the volume of waste generated in the center.

Packaging and labeling

Packaging the medical waste in uniform color code bags and labeling the waste.

Common storage

Segregated medical waste stored in the common storage point.

Transportation

The medical waste will transported from the common storage point to common Bio-Medical waste treatment facility storage point.

Treatment

The process of incineration will destruct the waste by burning it at elevated temperature, which will remove the hazardous, reduce the value of the waste and convert to ash. Incineration process suits for pathological and sharp wastes. Auto claving process will kill bacteria and infectious material in the biomedical waste, it will be considered as noninfectious and go for landfill. The shredding machine is used to destroy waste such as syringes, scalpels, vials, glass, plastics, blades etc, it will shape or cut waste into small pieces, so that waste unrecognizable and safe to disposal recycling and landfill.

Literature Review

Hospital medical waste was collected by cleaning personnel who picked up the medical waste from completely different departments and transported it manually to a temporary storage area where the hospital waste was kept before being taken to the final disposal place as most of time general waste will be mixed with medical waste, and this area was poorly sanitized and not secure AL-khatib and Sato [2]. Acharya and Singh Meeta [3]. Stated steps for safe management of bio medical waste are handling, segregation, mutilation, disinfection, storage, transportation and final disposal. Rao [4], says that incineration, autoclave hydroclave are the technologies to reduce the harm of bio medical waste.Gupta and Boojh [5,6] said that segregation process helps to separate the infectious waste and non infectious waste, lack of separating technique increase the chance of mixing the infectious and non infectious waste, additionally Athavale and Dhumale [7] found lack of training among waste handlers and auxiliary staffs lead to mixing the collected infectious and non infectious waste together and the result of segregation is ultimately failed (Tables 1-7).

Methodology

Table 1. *Methodology.*

Research Work	Empirical
Primary Data Collection Method	Structured Questionnaires
Secondary Data Collection Method	E-Journal, E-Thesis and Websites
Sampling Method	Simple Random Method
Sample Area	Chennai City
Valid Sample Size	140
Statistical Tools Used	Frequency Distribution
Software	SPSS Statistics 20

Table 2. *Indicating Cronbach's Alpha as reliability tool to validate the data.*

Reliability Statistics	
Cronbach's Alpha	N of Items
0.947	25

Inference: The reliability for 25 items is 0.947. Even if one of the 25 items is deleted the Cronbach's Alpha value will be reduced. This indicates that the reliability for all items is higher.

Table 3. *KMO and Bartlett's Test.*

KMO and Bartlett's Test		
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.867
Bartlett's Test of Sphericity	Approx. Chi-Square	3300.151
	df	300
	Sig.	0

Inference: Kaiser-Meyer-Olkin measure of sampling adequacy is 0.867 and Bartlett's Test of Sphericity and approximate Chi-square value is 3300.151 which are statistically significant at 5% level. Therefore, it can be concluded that the sample size is adequate.

Objectives of the Study

1. To know the socio demographic factors of respondents.

2. To find out whether the training program / course is conducted for all the staffs.

3. To know the medical waste segregation practices prevail in hospital.

4. To give suggestion to minimize the issues prevail in medical waste management.

Limitations of the Study

1. The sample for the study is restricted to Chennai City, Hence, findings cannot be generalized.

2. The size of the valid sample is restricted to 140.

Analysis and Inference

Background information about the study respondents

Table 4. *Distribution of respondents based on socio demographic factors.*

Demographic	Variables	Government	Private	Total
Gender	Male	35	35	70
	Female	35	35	70
	Total	70	70	140
Field of Work	Doctor	20	24	44
	Nurse	30	20	50
	Laboratory Technician	5	5	10
	Quality Management	2	1	3
	X Ray Technician	1	2	3
	Pharmacist	4	7	11
	Cleaner	3	5	8
	X-Ray Doctor	1	2	3
	Anesthesia Technician	1	1	2
	Administrative	3	3	6
	Total	70	70	140
Working Experience	1-3 Years	17	30	47
	4-7 Years	33	24	57
	8 Years & Above	20	16	36
	Total	70	70	140

Inference: The study involved different categories of health workers at hospitals who supposed to deal with medical waste directly, as 31% of respondents are doctors, 36% nurses, 8% Pharmacist, 7% Laboratory Technician while the other 18% of respondents were distributed among Quality Management, X-Ray technician, Cleaner, X Ray Doctor, Anesthesia

Technician and Administrative.

Is Medical Waste Segregated?

Table 5.*Table Shows Respondents responses on Medical Waste are segregated*

Based on Scale	Frequency	Percent
Strongly Disagree	10	7%
Disagree	50	36%
Neutral	25	18%
Agree	25	18%
Strongly Agree	30	21%
Total	140	100%

Inference: The Above table shows 36% Disagree, 21% strongly agree, 18% of them are Agree and Neutral towards Medical waste are segregated.

Training about Health Care Waste Management

Table 6. *General Investigation in training Program.*

Training Program	Variables	Government	Private	Total
Have you been Trained	Yes	25	40	65
	No	45	30	75
	Total	70	70	140
Place of Training	Received training in different places	30	25	55
	Current working place	25	15	40
	Didn't receive any training	15	30	45
	Total	70	70	140
Training Period	Nil	15	30	45
	1-15 Days	10	24	34
	More than 15 days	7	8	15
	1 Month	25	5	30
	More than 1 Month	8	2	10
	6 Months	5	1	6
	Total	70	70	140
New Workers Trained	Yes	25	20	45
	No	35	35	70
	Don't Know	10	15	25
	Total	70	70	140

Inference: The Above table shows General investigation on training program conducted in hospitals, 65 respondents from Government and Private hospital said they are trained to manage Bio medical waste and 75 of them responded they are not, 55 respondents from Government and Private hospital said they trained from different places and 45 of them responded they didn't receive any training, Majority of Government and private hospital respondents received training for the period of 1-15 days. 45 respondents from Government and private hospitals responded new workers are trained to manage Bio medical waste and 70 them responded No training program is conducted.

Medical Waste Segregation Practice in Hospital

Table 7.*General Investigations on Medical Waste Segregation Practice in Hospital.*

Segregation Practice	Variables	Government	Private	Total
Who Segregate Medical Waste	Medical Staff	15	10	25
	Cleaning Worker	25	23	48
	Cleaning Worker and Medical Staff	10	27	37
	Don't Know	15	7	22
	Not Applicable	5	3	8
	Total	70	70	140
Place of Segregation	At the beginning near the source	13	22	35
	After waste is collected	35	7	44
	Waste storage place in hospital	18	35	53
	Don't Know	4	6	10
	Total	70	70	140
Are Container identified and distinguished	Yes	25	33	58
	No	35	25	60
	Don't Know	10	12	22
	Total	70	70	140
Are waste sacks subjected to tear	Yes Always	17	25	42
	Sometimes	26	13	39
	Rarely	8	9	17
	No	9	8	17
Are waste Sacks Fastened Properly	Don't Know	10	15	25
	Total	70	70	140
	Yes Always	23	13	36
	Sometimes	17	8	25
	Rarely	18	6	24
	No	10	27	37
	Don't Know	2	16	18
	Total	70	70	140
Are their provisional measures to prohibit liquids running out from waste	Yes Always	8	18	36
	Sometimes	6	13	19
	Rarely	13	23	36
	No	28	13	41
	Don't Know	15	3	18
	Total	70	70	140

Inference: The Above table shows General investigation on Medical waste segregation in hospitals, 48 respondents from Government and Private hospital responded Cleaning workers will segregate the waste, 53 respondents from Government and Private hospital responded waste will be stored in the storage place in hospital, 60 respondents from Government and Private hospital responded containers are not identified, 42 respondents from Government and Private hospital responded waste sacks subjected to tear, 37 respondents from Government and Private hospital responded No to waste sacks fastened properly and 41 respondents from Government and Private hospital responded No to Provisional measures to prohibit liquids running out from waste.

Suggestion and Conclusion

This study exposed that medical waste management has not received sufficient consideration in both private and governmental hospitals; hence there is inadequate and inefficient isolation, collection, transportation and storage of biomedical waste. The Ministry of Health should pay more attention towards policies for the disposal of wastes and proper management to ensure improvement and adequacy in the medical waste management practices. Moreover there is need to be incorporated into regular worker training, continuing education, and management evaluation processes for systems and personnel. Every health care facility should have a waste management unit to seriously handle the waste management practice. Cleaners, Nurses and sanitary workers handless should be properly trained. Sorting of wastes at source using the colour-coded system should seriously practice. Government should ensure that hospital facilities have good and functioning incinerators or provide a central incinerating facility where these waste could be taking to and treated before final disposal. Further study will be conducted based on storage issues and transport of Bio medical waste.

References

1. Manyele SV, Anicetus H. Management of medical waste in Tanzanian hospitals. Tanzania Health Research Bulletin.2006;8(3):177-82.
2. AL-khatib I, Sato C. Solid health care waste management status at health care centers in the West Bank-Palestinian Territory. Wastes Management. 2009; 29(8);2398-2403.
3. Acharya DB, Singh Meeta. The book of Hospital Waste Management1st edition New Delhi Minerva, 2000.
4. Rao, HVN. Disposal of hospital wastes in Bangalore and their impact on environment. In the third international conference on appropriate waste management technologies for Developing Countries Nagpur. 1995:839-42.
5. Gupta S, Boojh R. Biomedical waste management practices at Balrampur Hospital Lucknow, India. Waste management and research. 2006;24(6):584-91.
6. Shiferaw Y, Abebe T, Mihret A. Sharps injuries and exposure to blood and bloodstained body fluids involving medical waste handlers. Waste Management. 2012;30(12):1299-1305.
7. Athavale AV, Dhumale GB. A Study of Hospital Waste Management at a Rural Hospital in Maharastra. Journal of ISHWM. 2010;9(1):21-31.

***Correspondence to:**

Dr. A.Irin Sutha
Assistant Professor
Department of Commerce
Faculty of Science and Humanities
SRM University
India
Tel: +9195660993500
E-mail: irinsutha.a@ktr.srmuniv.ac.in