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Original Research Article

Healthcare Waste Management Practices: A Case of Chennai, India

Dr. P. Praveen Kumar[1], Ms. Farhanaaz. C[2]

[1]Asst. Professor, Saveetha School of Management, Saveetha Institute of Medical and Technical Sciences, Chennai - 77.
[2]Student, Saveetha Institute of Medical and Technical Sciences, Chennai - 77.

Corresponding Author: Dr. P. Praveen Kumar

ABSTRACT

Healthcare industry is one of the budding sectors in developing countries like India. Waste disposal is the leading impediment which is encountered in hospitals. Wastes in the hospitals can be pigeonholed into two cluster; general and hazardous wastes. General wastes are those which are of minor risk and are non-contaminated, it includes wastes like office waste and kitchen waste. Wastes that seize greater risk and are easily contaminated are considered as hazardous wastes, it includes wastes like needles, scalpels, radioactive wastes, human fluids, excreta, expired drugs or vaccines, lab cultures, disinfectants and mercury wastes. Blood-borne pathogens like HIV, Hepatitis B and C may perhaps effortlessly get transmitted through skin; henceforth it is obligatory to train and make available proper equipment's to the workers. This literature tries to investigate the perception of health care professionals on waste management practices. Study reveals that hospitals provide proper training on collection of waste, specific route and spot is available for transportation and disposal of waste.

Key words: Healthcare waste management, hazardous wastes, waste disposal.

INTRODUCTION

In India, there are legislations such as Bio Medical Waste Rules (BMWR) for administration and handling hospital wastes which came into power in the year 1998. It falls under the Environment Protection Act. BMWR groups the wastes into an assortment of categories and provides solutions for treatment and disposal of wastes depending on the categories. Based on the rules, the wastes are color coded, so that it could be segregated into yellow, red, blue and white. The color yellow comprises of anatomical wastes which includes human tissues, organs, etc. The color red encompasses disposable wastes such as tubes, syringes without needles, urine bags, etc. The color blue symbolizes glass wares. The color white represents sharp objects such as needles. Depending on the color codes, various types of containers are used and finally the wastes are treated and disposed. Hospitals includes committees those who handle and manage medical wastes. According to the Bio Medical Waste Rules, 1998 it is mandatory to submit report every year regarding the quantities and types of waste handled and managed during the previous year.

REVIEW OF LITERATURE

Oli et al. (2016) examined the involvement of the healthcare workers in the process of management of healthcare waste. The study collected data from private hospitals located in south east Nigeria. The

findings of the study are the accessibility of substance for the purpose of waste segregation at the point of creation and need for infection control committee in the hospitals.

Sharma and Gupta (2017) investigated about the healthcare management practices in the hospitals situated in Himachal Pradesh. The data is collected through questionnaire method. The study shows that the private hospitals engender more healthcare waste regarding yellow and red category, when compared with the public hospitals that generate greater blue category wastes.

Camilleri-Fenech et al. (2018) scrutinized the process involved in administration of the municipal waste considering an island named Malta. The study also makes clear about the waste management aspects followed in those hospitals. The emissions of carbon have been reduced to a greater extent after implementation of waste management practices.

Nola et al. (2018) proposed an exigent systematic model for dealing with the challenges of waste management. The study gives a resolution designed for exportation of waste and self-sufficiency seen in management of waste. The study examines four circumstances. The study provides a better explanation to announce policy makers and enhance decision processes.

El-Salam (2010) inspected the customs followed for waste management in eight hospitals positioned in Damanhour city. The survey method is opted for collecting data. The study pointed that about 1.249 tons medical wastes are spawned everyday from every hospitals. The outcomes of this study are the hospitals should prefer apposite waste management techniques for the advantage of the society.

Omar et al. (2012) have done a comparative study in order to decide upon the resemblance and diversions in the waste management traditions. The data is analysed through SPSS. The findings exhibit similarities in numerous areas which make evident that the standard practices are followed in those areas and they fall short in the segregation process.

Blenkharn (2007) observed about the handling of clinical wastes in 16 UK hospitals. The study portrays that the members of the hospital can access the waste storage carts. The waste segregation was comparatively poor and pathetic in those hospitals. The upshots of the study are that the hospitals in UK stays behind in the waste management and possess pitiable hygienic conditions.

Xin (2015) elaborated about an innovative method for the management of medical waste through comparisons. The comparisons were carried out on the foundation of level and affiliation. The study apparently manifests the relationships among the diseases' coverage, medical waste generation and the complexity of the hospital treatment.

Blenkharn (2006) analysed the management of clinical wastes in 26 UK hospitals. It is found that the storage areas are effortlessly reachable to the public. The study recommends that improvements must be possibly made to reduce the hospital acquired infections, follow the rules and to fulfill the standards.

Jouhara et al. (2017) evaluated the waste management systems in the household. The study proves that the biological methods are cheaper but the results are ineffective. Gasification and pyrolysis assent in abundant consumption of waste at home. The study highlights the safety and efficient methods of waste disposal.

Boonmee et al. (2018) described about the post-disaster techniques for waste management in the supply chain. The study formulates a linear programming model. The particle swarm optimizations in addition to differential evolution are used to solve the above mentioned issues. The methods that are formulated are effective in both on-site and off-site operations.

Sawalem et al. (2009) discussed regarding the managing and disposing of hospital waste. The study was performed in case study format. The data was collected from fourteen hospitals from three cities. The scrutinization of the study shows that the hospitals never had any guidelines or procedures for segregation and disposal of the wastes which strongly urge for the need of a proper hospital waste management system.

Perrego (2017) argues that the negligence of the regulated waste is an expensive issue for health care facilities. This study is conducted in order to perk up the excellence aspects of the health care facilities. This is done through auditing. The findings display that the perioperative staffs are more expected to enhance the compliance regarding disposal of the regulated waste after escalating their knowledge.

MATERIALS AND METHODS

Waste management practices are assessed through primary data collected from 62 professionals in health care sector using drafted questionnaire. Questionnaire consists of variables related to health care professional's information and their perception about waste management practices. Demographic profile is scrutinized by means of frequency analysis. Perception related variables are discussed with analysis of mean, variance and t-test. SPSS 16 is used to analyse the collected data.

WASTE MANAGEMENT PRACTICES

The demographic profile of those professionals is discussed in Table 1.

Table 1: Demographic Profile

Gender	*Frequency*	*Percentage*	*Age*	*Frequency*	*Percentage*
Male	23	37.1	Less than 25 years	15	24.2
Female	39	62.9	25 to 35 years	33	53.2
Total	62	100.0	More than 35 years	14	22.6
Type of Profession	*Frequency*	*Percentage*	*Total*	62	100.0
Doctor	28	45.2	*Service*	*Frequency*	*Percentage*
Nurse	26	41.9	Less than 2 years	9	14.5
Technician	2	3.2	2 to 5 years	27	43.5
Others	6	9.7	More than 5 years	26	42.0
Total	62	100.0	*Total*	62	100.0

Table no. 1 deals with the results of frequency analysis related to the demographic profile of the healthcare professionals. In the selected hospitals, majority of the professionals were female (62.9 %). Most of the data pertaining to waste management have been collected from Doctors (45.9%) and Nurses (41.9). Nearly, 53.2 percent of professionals live in the age group of 25 to 35 years (53.3%) followed by less than 25 years (24.2 %) and more than 35 years (22.6%). It is clear from the table that majority of the respondents have served in hospital industry for 2 to 5 years (43.5%) followed by more than 5 years (41.9%) and less than 2 years (14.5%). Major units (85.4%) of health care professionals hold minimum 2 years of experience in their specific fields.

Table 2: Collection of Waste

S. No.	*Collection of Waste*	*Mean (Rank)*	*Gender T Value*	*Service F Value*	*Profession F Value*
1	Protective equipments have been used when collecting medical waste. (Equipment)	4.08 (6)	2.285**	2.898	3.212**
2	Procedures are laid to collect waste. (Procedures)	4.24 (4)	3.334***	6.317***	1.999
3	Collection of waste has been done as per bio medical waste rules. (Rules)	4.16 (5)	1.440	0.628	1.081
4	Drivers, collectors and other handlers aware of nature and risk of the waste. (Awareness)	4.35 (2)	2.581***	2.898	0.979
5	Workers are protected by vaccination against tetanus and hepatitis B. (Protection)	4.31 (3)	1.892	3.096**	0.654
6	Proper training provided to the waste collectors. (Training)	4.42 (1)	1.516	3.739**	1.788

****Sig. at 1 percent level; **Sig. at 5 percent level.*

Table 2 shows the results of analysis of mean, independent samples t test and variance related to perception about collection of hospital waste. It is apparent that variable "training" has the highest mean score of 4.42, followed by awareness (4.35), protection (4.31), procedures (4.24), rules (4.16) and equipment (4.08). The difference between demographic profile such as gender, service and type of profession of health care professionals and their perception about collection of hospital waste is measured using independent samples t test and analysis of variance (ANOVA). It is obvious from the table that majority of the variables t and F values are not significant. Hence, it is observed that there is no difference between respondents profile and their perception. Hospitals provide training for collection of waste.

Table 3: Storage of Waste

S. No.	*Storage of Waste*	*Mean (Rank)*	*Gender*	*Service*	*Profession*
			T Value	*F Value*	*F Value*
1	Temporary storage is created within the hospital. (Temp Storage)	4.21 (4)	0.656	1.399	0.863
2	Temporary storage areas are sanitized. (Hygiene)	4.31 (1)	0.872	0.079	1.742
3	Special place is available for hazardous waste. (Special Place)	4.16 (5)	0.111	0.581	1.287
4	Biomedical wastes are segregated as per categories mentioned in the rules. (Segregation)	4.29 (2)	1.103	0.490	0.721
5	Wastes are not stored for more than 24 hours. (Time)	4.27 (3)	0.257	1.005	0.835

****Sig. at 1 percent level; **Sig. at 5 percent level.*

Table 3 shows that variable "hygiene" has the utmost mean value of 4.31 followed by segregation (4.29), time (4.27), temp storage (4.21) and special place (4.16). No significant signs are seen in the table. It concludes that all the professionals express similar views on storage of waste. They also feel that temporary storage places are more hygienic in nature.

Table 4: Transportation of Waste

S. No.	*Transportation of Waste*	*Mean (Rank)*	*Gender*	*Service*	*Profession*
			T Value	*F Value*	*F Value*
1	Wastes are transported in desiccated bags or containers. (Packaging)	4.23 (4)	-0.102	0.544	1.435
2	Specific routes are arranged to transport waste within hospital. (Route)	4.37 (1)	1.070	1.455	1.422
3	Avoid passage of waste through patient care areas. (Hygiene)	4.24 (3)	-1.270	0.312	0.446
4	Separate time is allotted to transport bio medical waste. (Time)	4.32 (2)	-1.702	0.017	1.153

****Sig. at 1 percent level; **Sig. at 5 percent level.*

Table 4 shows values of mean, t and F. T test is performed to measure difference between gender of respondents and their perception about transportation of waste. F test includes service, type of profession and perception about transportation of waste. Table shows that variable "route" has the highest mean value of 4.37. It indicates that route is specified for transportation of waste. Moreover, all the professionals are expressing similar perception about transportation of waste.

Table 5: Disposal of Waste

S. No.	*Disposal of Waste*	*Mean (Rank)*	*Gender*	*Service*	*Profession*
			T Value	*F Value*	*F Value*
1	Separate location is available for disposal of medical waste. (Location)	4.24 (1)	-1.453	0.406	0.985
2	Final disposal taken care by separate company. (Outsourcing)	4.21 (2)	-0.990	0.410	3.939***
3	Practicing the safe disposal of general waste. (Practice)	4.11 (4)	0.218	0.176	1.144
4	Biomedical wastes are buried/autoclaved/incinerated. (Handling)	4.21 (2)	0.752	0.299	1.260

****Sig. at 1 percent level; **Sig. at 5 percent level.*

Table 5 reveals that there is a separate spot in hand for disposal of medical waste. Both t and F test reveal insignificant values. It signals that there is zero variation between demographic profile of health care professionals and their perception about disposal of waste.

CONCLUSION

Hospitals are one of the resources which engender hazardous wastes, risk the

life of workers and pollute the environment. Proper management is required while handling these wastes. By means of appropriate plans and strategies generated, wastes have to be collected, stored, transported and disposed. Employees of hospitals are accountable for managing hospital wastes. They must be aware of the risks regarding the contamination due to hospital wastes. Hospitals are liable for minimizing the quantity of wastes and must persuade in reusing and recycling of the wastes. BMWR has been modified recently in the year 2016 by Ministry of Environment, Forest and Climate change. The newer rules are put into operation with clarity and simplified version of the previous rules. It is implemented to dwindle the risks of undesirable effects to the personnel as well as the environment.

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