

Waste Management Practices in Health Care Facilities of Chittoor District of Andhra Pradesh, India: A comprehensive study

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Abstract: *Hospital Waste means any waste, which is generated during the diagnosis, treatment or immunization of human beings or animals or research activities pertaining thereto or in the production or testing of biological or in health camps etc. There are different types of Hospital waste that is being generated from the Health Care Facilities which is an important area of human care. The generated waste should be properly segregated at the disposal site itself by using colour coding bags suggested by the Ministry of Forest and Environment. Treatment of hospital waste is extremely important because of infectious and dangerous characteristics. The very process of modern healthcare is also ridden with risk and unhealthy practices. This Bio Medical Waste generation warrants proper Waste management. The present study was undertaken to thoroughly examine the waste segregation practices in the district of Chittoor in A.P. and to suggest measures for better Bio Medical Waste Management for the welfare of the society. The findings of the study revealed that there is significant association between the characteristics of HCFs and waste management segregation methods employed at hospitals. Based on the findings, suggestions were made.*

Keywords: Hospital Waste, Health Care Waste, Bio-medical waste, waste management

Introduction

The Govt. of India promulgated the Bio-medical Waste (Management & Handling) Rules, 1998 and it became mandatory for Hospitals to comply with the rules and the standards laid down under statutory regulations. The Government of India circulated the Bio-medical Waste (Management & Handling) Rules, 1998; Proper disposal of hospital waste is of dominant importance because of its infectious and hazardous characteristics. Therefore the Government of India imposed the Bio Medical Waste Rules to all healthcare units of India therefore it became mandatory for all the hospitals to follow the Biomedical waste rules and the standards laid down under the statutory regulations. The rules framed by the Ministry of Environment and Forests (MOEF), Government of India, known as Bio-medical waste (Management and Handling) Rules, 1998, notified on 20th July 1998, provide uniform guidelines and code of practice for the whole nation.

Health Care Facilities (HCFs) are the hazardous waste generating points. Health care activities can generate different kinds of hazardous wastes. Mismanagement of these wastes can result in environmental and occupational health risks. Developing countries are resource-constrained when it comes to safe management of hospital wastes. Due to this diverse nature of

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hospital wastes there is an immediate need to evolve a comprehensive health care waste characterization programme in India.

The characteristics of the wastes generated by the hospitals providing basic services are not diverse unlike the wastes generated by super or multispecialty health units. Hospital wastes are hazardous due to their inherent potential to spread infections among the public which in turn affects the physical psychological and economic well being of an individual health profile of the society. This would badly hit the communities as well as ecosystem due to the increased accumulation of toxins, microbes and some non biodegradable waste. If these hazardous wastes are not properly treated Indian hospitals continue to be the breeding places for various disease causing organisms and the threat would reach gigantic proportions due to population explosion.

The improper dumping of biomedical wastes without characterizing them should be thoroughly checked because many hospital wastes may contain harmful bacteria and viruses which could enter human body through air and other routes. This study summarizes the main issues faced in hospital waste management. A review of the existing literature suggests that regulations and legislations focusing on hospital waste management are recent accomplishments in many countries. Implementation of these rules varies from one hospital to another. Moreover, wide variations exist as far as wastesegregation and treatment methods are concerned in India. Based on the present study it is clear that the surveyed hospitals suffer from poor waste segregation, collection, storage, transportation and disposal practices, which can lead to occupational and environmental risks. Knowledge and awareness regarding proper waste management remain low in the absence of training for hospital staff. Overall, hospital waste management scenario faces several challenges. Sustainable waste management practices can go a long way in reducing the harmful effects of hospital wastes.

Review of Literature

An attempt was made to review the literature on Bio-Medical Waste Segregation in Hospitals. This is followed by a description of the research objectives and methodology adopted in the present study.

Hospital waste Segregation practices

In a study made by Chitnis et al., (2005) on 'Biomedical Waste in Laboratory Medicine: Audit and Management', have expressed that needle sharps are to be collected in puncture proof containers and the needles are to be autoclaved before sending to needle pit. The discarded/infected blood units in blood bank need to be autoclaved before disposal since chemical treatments are difficult or inefficient. They found that segregation of waste at source is the key step and reduction, reuse and recycling should be considered in proper perspectives.

Lalji et al., (2008) quotes in a study on biomedical waste management in nursing homes and smaller hospitals in Delhi. A systematic analysis of current biomedical waste management practices in smaller nursing homes and hospitals in Delhi was carried out. They identified that there is a marked improvement in the segregation practices of biomedical waste in small private hospitals and nursing homes but awareness and training programs should be given not only to target doctors, nurses, and paramedics but also to waste handlers.

According to Hem Chandra (1999), in an article on 'Hospital Waste: An Environmental Hazard and its Environment' examined about the hospital waste, classification of waste and stated that 1.5 kg/bed/day waste is being generated, among that only 10% is hazardous waste.

Importance of safety measures and imparting training to the personnel involved in waste handling is also mentioned in the study.

Need of the study

In order to estimate and to evaluate the present waste segregation scenario in Chittoor district of Andhra Pradesh, the present study was undertaken. Bio-Medical waste is hazardous to the living organisms, hence, proper waste management methods are of dire necessity. In this context, a comprehensive study was carried out on waste handling practices in Chittoor District of Andhra Pradesh.

Objectives of the study

1. To thoroughly examine the wastesegregation practices in the district of Chittoor in A.P.
2. To suggest measures for better Bio Medical Waste Management for the welfare of the society.

Research Hypothesis

H1: There is no significant association between type of hospital and waste segregation practices

H2: There is no significant association between category of hospital and waste segregation practices

Data Collection Sources

The present study was carried out by collecting both primary data and secondary data. Primary data was collected from field survey on waste segregation and treatment practices in Health Care Facilities (HCFs) in Chittoor District.

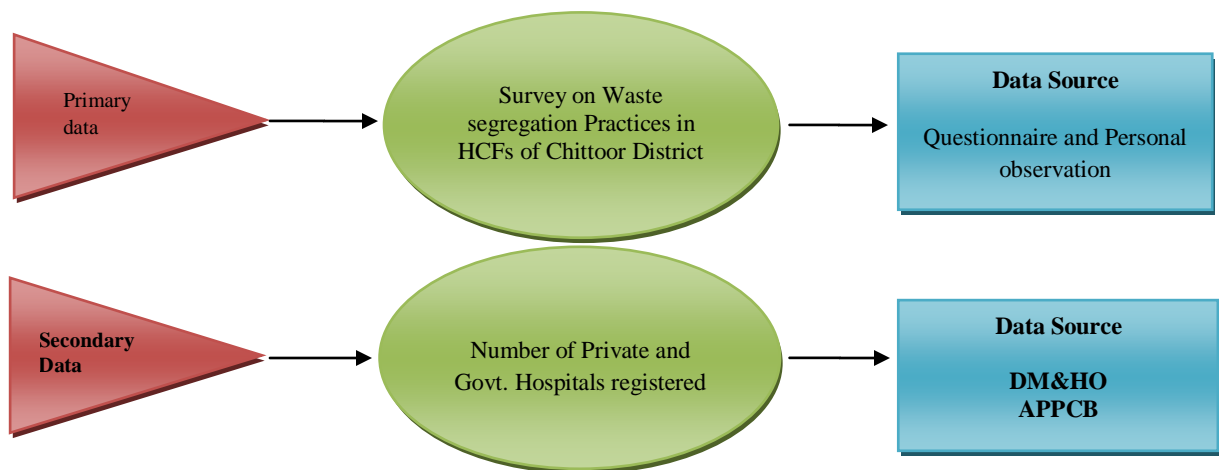


Figure 1: Data Sources

To evaluate the proper biomedical waste segregation methods among hospitals in Chittoor District of Andhra Pradesh was surveyed by using descriptive research method. For which a questionnaire was designed based on the standards given by World Health Organization (WHO). The questionnaire consists of two parts:

1. The first part consists profile (Type, Category) of the HCFs in Chittoor District

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2. The second part covers questions related to waste Segregation methods

Population

The Study was conducted in Chittoor District of Andhra Pradesh. The population chosen for the study is 271 HCFs, among them 20 are Government and 251 are private Health Care Facilities.

Sampling Technique

The technique adopted is one of convenience sampling but based on some rationale. There was a purposive bias of including most of the Government HCFs into the survey. The Government hospitals only constitute 6.5% of the total HCFs.

Sample Size

The structured questionnaire was distributed and data was collected from 118 private HCFs and 16 Govt. HCFs.

Statistical Tools used

The data was processed by using M.S Excel and SPSS version 19.0. Descriptive statistical tools like percentages were carried out to test the hypothesis by using X^2 technique.

Scope and Limitations of the study

In addressing the problem of BMW management, the scope would vary at different levels.

1. The sample has purposive bias as more of Government supported HCFs are taken in to the sample survey.
2. The accuracy of the responses in the survey is questionable with a margin of doubt typical to a social survey

Data Analysis

Data was collected on type (Private and Government) of Hospital and Category (General, Surgery, Specialized and others) of Health Care Facility.

Table 1: Demographic factors of Health Care Facilities

Type of Hospital	Frequency	Percentage
Private	118	88.06
Government	16	11.94
Total	134	100.0
Category of HCFs		
General	87	64.93
Surgery	15	11.19
Specialized HCFs	16	11.94
Others	16	11.94
Total	134	100.00

The survey consists of 88.06 percent Private HCFs and 11.94 percent Government HCFs. Among 4 categories of HCFs mentioned in Table 1, 64.9 percent were under General Category, 11.2 percent belongs to Surgery Category, and 11.9 percent are in Specialized HCFs and 11.9 percent are under Others Category. HCFs which are registered under Others Category may

consist of either General Category or any specialty or multispecialty categories as per the norms laid down by the A.P. State Government.

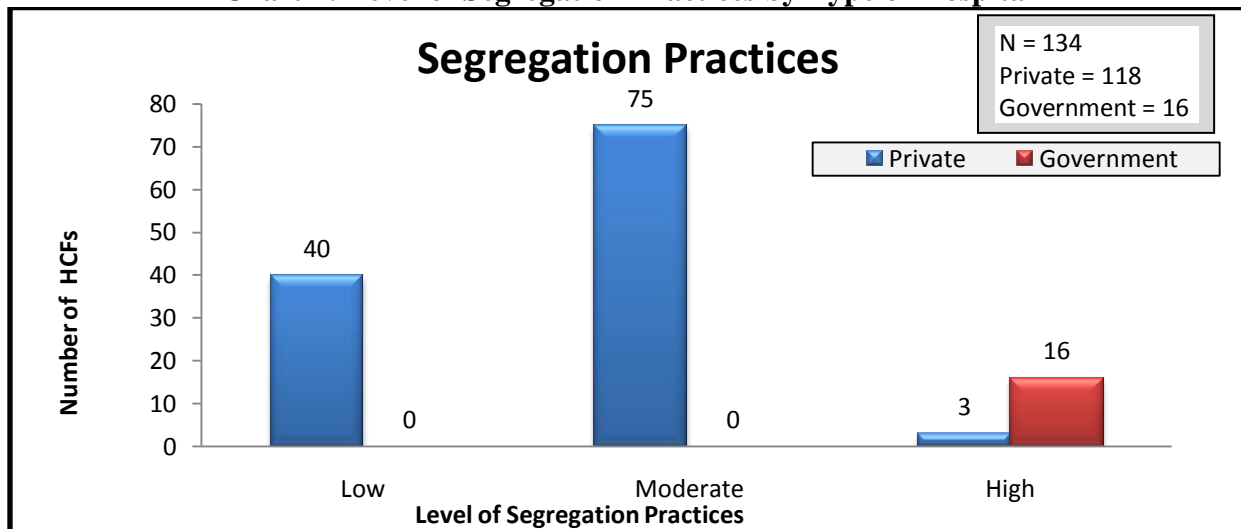
Type of Hospital

The present study covers two types of hospitals. They are Private and Government Hospitals. Based on this data, an attempt was made to test the association between type of hospital and waste management practices in HCFs.

Table 2: Level of Segregation Practices by Type of Hospital

Chi-square value	p-value	Segregation Practices			Total
		Low	Moderate	High	
109.973**	0.000				
Type of Hospital	Private	40 33.9%	75 63.6%	3 2.5%	118 100.0%
	Government	0 0.0%	0 0.0%	16 100.0%	16 100.0%
Total		40 29.9%	75 56.0%	19 14.2%	134 100.0%

Chart 1: Level of Segregation Practices by Type of Hospital



From the results presented in table No.2 and Chart 1, it can be interpreted that the segregation practices like segregation at source, using color coded and puncture proof bins and separation of sharp and non sharp waste at source in Government HCFs are good when compared to Private HCFs. In private HCFs (63.6 percent) segregation practices are moderate. But in all Government HCFs, the segregation practices are high. It was also observed from the Chi-square test that there is significant association between type of hospital and segregation practices. It clearly indicates that the level of waste segregation practices in Government HCFs is high and effective when compared to private HCFs because waste handling workers are more in number and all are trained in segregation practices.

Category of Hospital

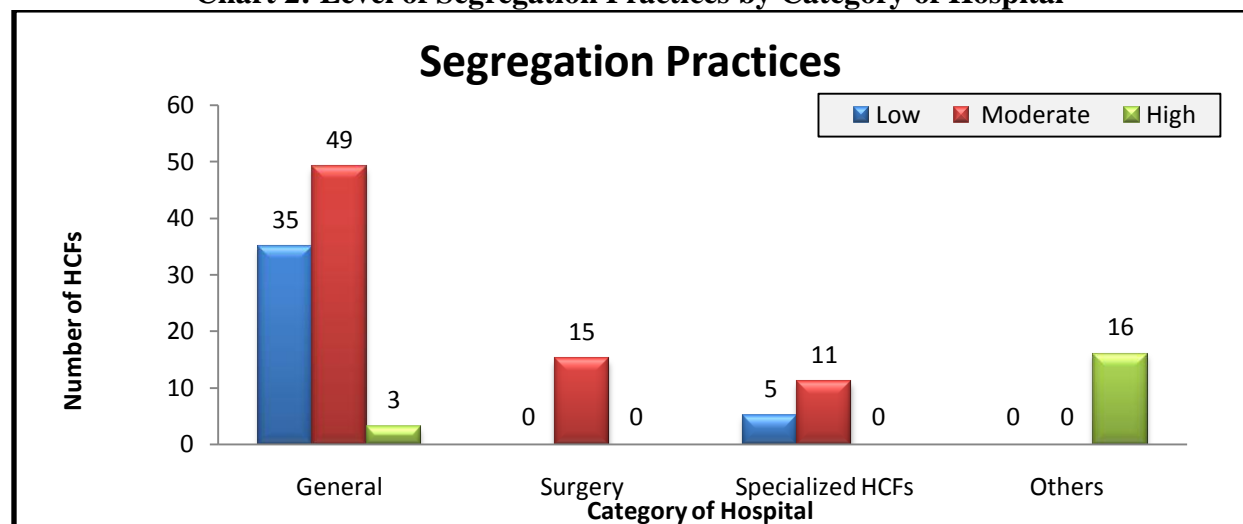
The present study covers four categories of hospitals which were spread all over the Chittoor District. Chi-square analysis was made to test the association between category of hospital and

Waste Management Practices in Health Care Facilities of Chittoor District of Andhra Pradesh, waste management practices. This indicates whether the waste management practices are similar or different based on category of hospital.

Table 3: Level of Segregation Practices by Category of Hospital

Chi-square value	p-value	Segregation Practices			Total
		Low	Moderate	High	
161.93**	0.000				
Category of Hospital	General	35	49	3	87
		40.2%	56.3%	3.4%	100.0%
	Surgery	0	15	0	15
		0.0%	100.0%	0.0%	100.0%
	Specialized HCFs	5	11	0	16
		31.25%	68.75%	0.0%	100.0%
	Others	0	0	16	16
		0.0%	0.0%	100.0%	100.0%
Total		40	75	19	134
		29.9%	56.0%	14.2%	100.0%

Chart 2: Level of Segregation Practices by Category of Hospital



Segregation practices among different categories of HCFs have been analyzed. From table No.3 and chart No.2, it is analyzed that segregation practices differ among categories of hospitals. Segregation practices followed among 29.9percent HCFs are at low level, 56.0 percent HCFs are at moderate level and 14.2 percent HCFs are at high level. It has also been evidenced with the help of Chi-square test, that *there is significant association between category of hospital and segregation practices*. Segregation practices are good in Others Category when compared to General, Surgery and Specialized categories. Segregation practices are moderate in General HCFs when compared to specialized HCFs like Surgery, Pediatrics, Cardiology, Gynecology, Ortho, Neurology and Urology etc.,

Conclusions

When the amount of waste generation is more in quantity, it seeks more attention towards waste management practices employed in health care facilities. Hence, this study was undertaken with an objective of Hospital Waste segregation methods. Based on the findings and analysis, the

following conclusions were drawn related to the following aspects through the various tools of research methodology.

Segregation of BMW includes 'segregating at source, using of colour coded bins for collection of BMW, puncture proof containers for temporary storage and separating of sharp waste from non sharp waste' are assessed to observe the segregation practices that are followed in HCFs. Segregating waste at the point of generation only through which one can avoid mixing of infectious waste with non-infectious waste. The segregation at source would help for proper waste treatment and management and minimizes health risk among health care employees as well as to the environment. The Government should plan for surveillance and monitoring of biomedical waste management, subsequently the waste segregation and handling practices can be improved in Private Healthcare facilities at par with Government Healthcare units. This would help to reduce the biohazards to the environment as well as to the living organisms.

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