RESEARCH ARTICLE OPEN ACCESS

Health-Care Waste Management System

T. Subramani[1] P. Anitha[2] S. Sekar[3]
[1]Professor & Dean, Department of Civil Engineering, VMKV Engineering College, Vinayaka Missions University, Salem, India.
[2]PG Student of Environmental Engineering, Department of Civil Engineering, VMKV Engineering College, Vinayaka Missions University, Salem
[3]Assistant Professor, Department of Civil Engineering, VMKV Engineering College,Vinayaka Missions University, Salem

ABSTRACT
The main purpose of this paper is to give A view of the hospital waste management and environmental problem in india. The objective of this study is to analyze the health care waste management system, including practices and compliances. Most countries of the world, especially the developing countries, are facing the grim situation arising out of environmental pollution due to pathological waste arising from increasing populations and the consequent rapid growth in the number of hospital units. In india, there are about 6 lakhs hospital beds, over 23,000 primary health centers, more than 15,000 small and private hospitals. In india, the biomedical waste (management and handling) rules 1998 make it mandatory for hospitals, clinics, and other medical and veterinary institutes to dispose of bio medical wastes strictly according to the rules.
KEYWORDS: Health, Care, Waste Management, Medical.

I. INTRODUCTION

Health-care waste includes all the waste generated by health-care establishments, research facilities, and laboratories. In addition, it includes the waste originating from minor or scattered sources such as that produced in the course of health care undertaken in the home (dialysis, insulin injections, etc.). Between 75% and 90% of the waste produced by health-care providers is non-risk or general health-care waste, comparable to domestic waste. It comes mostly from the administrative and housekeeping functions of health-care establishments and may also include waste generated during maintenance of health-care premises. The remaining 10 to 25% of healthcare waste is regarded as hazardous and may create a variety of health risks. This study is concerned almost exclusively with hazardous health-care waste (also known as health-care risk waste); general wastes should be dealt with by the municipal waste disposal mechanisms. Classification of hazardous health-care waste is summarized.

II. THE NEED FOR PLANNING

- Prevent and minimize waste production.
- Reuse or recycle the waste to the extent possible.
- Treat waste by safe and environmentally sound methods.
- Dispose of the final residues by landfill in confined and carefully designed sites.

III. NATIONAL PLANS FOR HEALTH-CARE WASTE MANAGEMENT

3.1.Purpose of a national management plan

A national management plan will permit health-care waste management options to be optimized on a national scale. A national survey of healthcare waste will provide the relevant agency with a basis for identifying conditions, needs, and possibilities at each level. An appropriate, safe, and cost-effective strategy will be concerned principally with treatment, recycling, transport, and disposal options.

3.2.Health Care in India

Health care is a big concern in India, the land of nearly 1.12 billion people and the second most populous country in the world. As the country is divided into several
states, the state government has the onus to take care of the health of people in the state. Since India is a developing country where a large section of population is below poverty line, health and hygiene are not up to the mark. It is reported that in India, annually 22 lakh infants and children die from preventable illnesses, 1 lakh mothers die during the child birth and 5 lakh people die of tuberculosis. Also around 5 million people suffer from HIV /Aids and numerous others die of diarrhea and malaria2. The plight of the least advantaged has been increasing because of the poor public health systems the Government Hospitals.

3.3.Methodology and tools

This study is an empirical research based on survey method. Data required for this study are both primary and secondary. Primary data relating to patients of the hospital are collected through personal interview with the patients and secondary data relating to the hospitals are collected from the records of the select hospitals. The researcher had personal discussions with the patients of the hospitals, and they were personally contacted and interviewed to elicit relevant information. The interview schedule used by parasuraman, et. Al., (1988) is adopted for the study. Moreover, the data also are collected from doctors of the hospitals using a questionnaire to know about the management perceptions of patients expectations. The important attributes are classified into five dimensions based on the servqual model developed by Parasuraman for measuring the service quality. The interview schedule using servqual model consists of 44 items: each having two sections: one, the expectations of the patients from the hospitals and the other, the perceptions of the patients. The questionnaire for doctors also consists of 22 items on management perceptions of patients expectations.

IV. WASTE MANAGEMENT PLAN FOR A HEALTH-CARE ESTABLISHMENT

4.1.Assignment of responsibilities

The proper management of health-care waste depends largely on good administration and organization but also requires adequate legislation and financing, as well as active participation by trained and informed staff. The head of the hospital should form a waste management team to develop a waste management plan. The team should have the following members:

- Head of Hospital (as chairperson)
- Heads of Hospital Departments
- Infection Control Officer
- Chief Pharmacist
- Radiation Officer
- Matron (or Senior Nursing Officer)
- Hospital Manager
- Hospital Engineer
- Financial Controller
- Waste Management Officer (if already designated).

In certain establishments, the structure may include a Hospital Hygienist, in addition to or instead of the Infection Control Officer, to address specific problems relating to hospital hygiene. In such cases, some or all of the duties of the Infection Control Officer specified below will be carried out by the Hospital Hygienist.

4.2.Typesof Hospitalcare Wastes:

These are of two types, infectious wastes and non-infectious wastes

4.2.1Infectious hospital wastes:

- Human anatomical or surgical waste,
- Animal waste
- Pathological waste including tissues, organs, blood and body
- Fluids, microbiological cultures, cotton, swabs etc.
- Used syringes, i.e. Tubes, blood bags and other items contaminated with Blood and body fluids.
- Items such as plaster, casts and bandages, when contaminated by blood and pus.
- Waste from isolation wards.
- The amount of infectiouswasteisnearabout15to
- 20 percent of the total wastes generated from the healthcare establishment.

V. STATEMENT OF THE PROBLEM

Healthcare services have a distinct position among other services due to the highly involving and risky nature of service. Though a large number of public and private hospitals are existing all over the country, it is found that many government hospitals are not able to provide quality services to patients. Further more the private hospitals also are not able to fulfill the requirements of the patients to a certain extent. The main problem of hospitals is that they are not able to provide quality service based on the needs and expectations of the patients.

5.1.Construction Waste Disposal

Under the state health system development project a lot of construction work and civil work is being advised. Therefore there will be a good amount of construction waste. The contractor will be made responsible for picking up and disposing of the civil works waste. The contractor will also be responsible for the proper disposal of the liquid waste generated during the construction activity. The contractor will remove this waste and sell the re-saleable waste to the vendor. It will be the duty of the contractor to ensure that the liquid waste generated during the construction work has proper drainage system, so that no stagnation of water takes place.

5.2.Challenges Of Hospital Wastes In India

To treat 420561 kg per day of biomedical waste in accordance with BMW rules. Number of common biomedical wastes treatment facility (cbmwtf)to be increased manifold. Presently there are 157 facilities which are not adequate to handle all the bio medical wastes generated. CBMWTF is to be set up under

public private partnership mode. New technologies to be promoted for destruction of toxic biomedical waste out of 84,809 healthcare establishments ,43,075 authorizations have been generated by SPCBs for management of biomedical waste. Out of 420461 kg/day of waste generation, only 240682kg/day of waste is treated. Out of 84,809 hospitals, 48,183 Hospital are either using common bio medical waste treatment facilities (which are170 in numbers) or have engaged private agencies. There are;391incinerators (with APCB),2562 autoclaves, 458 microwaves,145 hydro claves and 6047 shredders in operation. Further,14,959 hospitals have been served as show cause notices as defaulters. Surveys carried out by various agencies show that the health care establishments in India are not giving due attention other waste management. After the notification of the bio medical waste(handling and management)
rules,1998,hospitalsareslowlystreamliningthe process of waste segregation, collection, treatment, and disposal.

VI. HOSPITAL WASTE TREATMENT AND DISPOSAL

Different methods have been developed for rendering biomedical waste environmentally innocuous and aesthetically acceptable. The biomedical waste legislation has elaborately mentioned the recommended treatment and disposal options according to the different categories of waste generated in hospitals. Different methods and treatment technologies have been developed(a)incineration, (b)autoclave treatment,(c) hydro clave treatment, (d) microwave treatment,(e) mechanical/chemical disinfecting, (f) sanitary and secured land filling and (g) general waste.

6.1.Sampling Scheme

Two hospitals in Salem are purposively selected for the study, i.e., one private hospital and another public hospital. The private hospital is Sri Gokulam hospital (p) ltd., and the public hospital is Mohan Kumaramangalam Government Medical College hospital. In these two hospitals, a sample of 400 in-patients (each having 200 samples) are selected to measure the patients perception of service quality. As the population frame cannot be properly defined during the period of collection of data with regard to the patients admitted in the hospital, the researcher has to approach the patients who are available in the hospital at the time of interview.

6.2.Maintenance Of Records

According to the bio-medical waste (management and handling) (second amendments) rules, 2000, every authorised person, i.e., hospital superintendent/chief medical officer will maintain records related to the generation, collection, reception, storage, transportation, treatment, disposal and/or any form of handling of bio-medical waste in accordance with this rules and any guidelines issued. All records will be subject to inspection and verification by the prescribed authority at any time. Accident reporting according to the bio-medical waste (management and handling) (second amendments) rules, 2000, when any accident occurs at any institution or facility or any other site where bio-medical waste is handled or during transportation of such waste, the authorized person, i.e., hospital superintendent/ chief medical officer will report the accident in form iii as prescribed in the gazette of Indianotification to the prescribed authority forthwith. Action will immediately be taken to treat the emergencies, if any, quarantine of the person who have come in contact with the infectious waste, and if there is any spillage then action will be taken to contain it as required.

6.3.Results And Discussions

Average scores of management's perceptions, patients expectations and their differences for the public and private hospitals the mean scores of management perceptions about patients expectations and patients expectations of the public and private hospitals are given in the table 6.1.

Table 6.1

Service Quality Dimensions	M		E		M-E	
	Mean	%	Mean	%	Mean	%
Tangibles						
Excellent hospitals will have modern looking equipment	6.26	89.43	5.38	76.70	0.89	12.64
The physical facilities of excellent hospitals are visually appealing	6.80	97.14	5.35	76.39	1.45	20.75
Personnel at excellent hospitals will be neat in appearance	6.28	89.71	5.16	73.64	1.13	16.07
Materials associated with the services will be visually appealing in an excellent hospitals	6.22	88.86	5.22	74.50	1.01	14.36
Reliability						
When excellent hospitals promise to do something by a certain date, they do so	6.02	86.00	5.30	75.64	0.73	10.36
When a patient has a problem, excellent hospitals will show a sincere interest in solving it	6.28	89.71	5.16	73.75	1.12	15.96
Excellent hospitals will be dependable	6.30	90.00	5.21	74.46	1.09	15.54
Excellent hospitals will provide their services at the time they promise to do so	6.24	89.14	5.09	72.71	1.15	16.43
Excellent hospitals will get the things right the first time	6.52	93.14	5.18	73.97	1.34	19.17
Responsiveness						
Personnel in excellent hospitals will tell patients exactly when services are provided	6.30	90.00	5.17	73.86	1.13	16.14
Personnel in excellent hospitals will give prompt services to patients	6.38	91.14	5.20	74.25	1.15	16.89
Personnel in excellent hospitals will always be willing to help patients	6.52	93.14	5.13	73.25	1.39	19.89

6.4.Findings

The safe management of hospital waste has received much attention over recently ears in India. Emphasis is placed mainly on the proper handling, segregation and disposal of the hospital wastes. Waste minimization and recycling are still not well promoted. The main issues considered were the adverse environmental and health impacts that arise from poor handling and disposal practices, the responsible institutions and initiatives taken and the policy framework. The measure of gap between the management's perceptions of patient expectations and the patients expectations of service quality are studied in this study. The perceptions of the doctors representing the management about the patients expectations of service are very high when compared to the patients expectations in both hospitals. Aggregate mean values of the two hospitals are calculated and it is found that for all the dimensions, there is significant difference between the mean scores of management's perceptions of patient expectations and patients expectations. However, as between the hospitals, there is no significant difference between the hospitals in the doctors perceptions about patients expectations.

VII. CONCLUSION

The main focus of the study is to understand what patients expectations are for service quality which can help shape a hospital's health care service delivery to better meet patients needs and desires. The management's perceptions of expectations of the patients have been measured. All these enable the health care system to understand their strength and weaknesses in the delivery of health care to the patients.

The proper hospital waste management system can help the control diseases can reduce community exposure to resistant bacteria, and could reduce HIV/Aids and hepatitis transmission from dirty needles and other improperly cleaned or disposed medical items. Regarding the environmental issues, a correct and sustainable management system of hospital waste will avoid the negative long term health effects, from the environmental release of toxic substances such as dioxin, mercury and others. From both volume and toxicity perspectives, the use of plastics in society is a focus of waste management concern. In the past, medical waste was often mixed with house hold waste and disposed of in municipal solid waste land fills. In recent years, increased public concerns over the improper disposal of hospital waste have led to a movement to regulate the waste more systematically and stringently by the India n government.

REFERENCES

[1]. Ahmed,s.A.,&ali,m, (2004), "*partnerships for waste management in developing countries: linking theories to realities*," habitat international, 28(3).

[2]. Anon,(2006),"*note on biomedical waste managemen*t", Tamil Nadu pollution control board, chennai, India .

[3]. Blenkharn,j.i,(2007),"*standards of clinical waste management in hospitals*, "a second look journal of royal institute of public health., articlein press, .uk

[4]. Dept. Of health services, (2004), "*biomedical waste management status in NCT of Delhi*," govt. of NCT of delhi.

[5]. Gordon,jg,rein,pa.(2004),"*medical waste management*," hospital epidemiology and infection control.

[6]. Government of Tamil Nadu, (2005), "*department of health and family welfare," Tamil Nadu health systems project*, health carewaste management plan for hospitals in Tamil Nadu, Chennai