Research Paper
Impact Factor: 3.029
Peer Reviewed & Indexed Journal

IJMSRR
E- ISSN - 2349-6746
ISSN -2349-6738

MANAGEMENT OF MEDICAL WASTE: AWARENESS AND PRACTICES IN PATHANAMTHITTA DISTRICT

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Abstract
Health care service is now became a basic need forpeople irrespective of their age, gender and culture due toincreasing pollution levels and changing lifestyles associatedwith rapid civilization. Hospitals generate huge amount of waste, while rendering health care service tomankind. The management of health care waste is of greatimportance due to its infectious and hazardous nature that cancause undesirable effects on human health and the environment.Government regulations and growing public awarenessregarding health care waste issues have forced health care unitsto adopt suitable strategies for managing this waste. This study aims at examining the medical waste management practises, the type of waste generatedby them and method of disposal adoptedby the Hospitals in Kerala.

Introduction

Hospitals and other healthcare facilities are responsible for the delivery of patient care services. In the process of delivering this healthcare waste is generated. Medical waste management has recently emerged as an issue of major concern not only to hospitals, nursing home authorities but also to the environment. The bio-medical wastes generated from health care units depend upon a number of factors such as waste management methods, type of health care units, occupancy of healthcare units, specialization of healthcare units, ratio of reusable items in use, availability of infrastructure and resources etc. The proper management of biomedical waste has become a worldwide humanitarian topic today. Although hazards of poor management of biomedical waste have aroused the concern world over, especially in the light of its far-reaching effects on human health and the environment.

According to WHO (2000a) the incorrect management of healthcare waste can have direct impacts on the community, individuals working in health care facilities and natural environment. About 75% to 90% of the waste produced by health-care providers is non risk or General health-care waste, which is comparable to the 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. Biomedical waste forms 1 to 2% of the total municipal waste. Less than 10% of this waste is infectious while another 5% is noninfectious but hazardous.

Kerala is one of the biggest consumer states in India. The consumption of more resources results in generation of more wastes. Medical wastes form a considerable share in the total waste. In Kerala there are more than 29000 hospitals, labs and other medical institutions with more than 110000 beds and the biomedical waste generation is about 300gm/bed per day. Once the facilities in the health care establishments are improved it is estimated that the biomedical waste generation will be more that 500gm per bed per day. Thus the quantity of biomedical waste generation is increasing rapidly and so more money to be found for waste management facilities, apart from planning for meeting the future scenario. The necessity of managing health care waste in a scientific manner has been receiving increasing attention in India over the past few years due to the serious threat to public health, pollution of air, water and land resources arising out of its improper management.

Scope & Significance of the Study

The management of healthcare waste is of great importance due to its potential environmental hazards and public health risks.The safe management of healthcare waste may achieved by ensuring care in dealing with the healthcare waste. Hence it is the ethical responsibility of management of hospitals and health care establishments to have concern for public health. The management of biomedical waste is still in its infancy all over the world. There is a lot of confusion among the generators, operators, decision makers and the general community about the safe management of biomedical waste. Biomedical waste management is a special case wherein the hazards and risks exist not just for the generators and operators but also for the general community. Biomedical waste management is a complex problem with detrimental effect and one has to implore the intricacies of management and practices by health care personnel.

Hospital wastes pose a significant impact on health and environment. One estimate shows that some 5.2 million people (including 4 million children) die each year from waste-related diseases. Globally, the amount of municipal waste generated will double by the year 2000 and quadruple by year 2025". The greatest risk is from the infectious and sharp component of the waste because people associated with handling of the waste are at risk of getting injuries from infected sharps or needle prick injury and can contract HIV, Hepatitis B and C. Risk in hospitals and health care settings is highest. Medical related

waste is disposed off illegally with municipal waste. Scavengers pick up used syringes and needles, soiled cotton, IV bottles, tubes, urine bags etc. and sell them for recycling. In the process they may contract infections or sharp injuries. Also, contaminated and improperly sterilized disposables may come for resale in the market. So this study aims at examining how the medical waste management practises followed by the Health Care institutions in Kerala and the type of waste they generated and how they dispose it. These are highly infectious and hazardous for both animals and humans. Proper waste management strategy is needed to ensure health and environmental safety.

Objectives

The objective of the study will be

1. To understand the knowledge and awareness of individuals involved in medical waste generation, handling and disposal.
2. To evaluate the type of waste generated by the hospitals.
3. To study the effectiveness of medical waste management practices of different medical institutions.

Hypothesis of the Study

- Ho1: There is no relation between awareness and different categories of medical staff involved in medical waste generation, handling and disposal.
- Ho2: There is no significant difference in the opinion of staff regarding the effectiveness of medical waste management practices of different medical institutions.

Methodology and Collecting Data

The data for the study will be collected from both primary and secondary sources. The study will be a descriptive and analytical one. Statistical Random Sampling will be applied for the selection of sample Health Care institution.

The health institutions located in Pathanamthitta will be identified and grouped according to their nature into different strata such as government hospitals (including community health centers and primary health centers.) and private hospitals (including multi specialty hospitals and doctor's clinics etc.) . And from each strata certain number of institutions will be selected randomly for our study. The primary data will be collected by using a well structured interview schedule.The secondary data was collected from various government publications, bulletins, magazines, journals etc.

Analysis of Data

For analyzing the primary data, statistical tools like Chi-square, Likert scaling technique and compositeranking are used.

Limitation of the Study.

1. The respondents may not be available in all time to conduct the interview.
2. The problem studied is of a qualitative nature and there were problems in quantifying the same.
3. Since it is a sample study it possesses all the limitations of sampling study.

Introduction

The problem of medical waste disposal in the hospitals and other healthcare establishments has become an issue of increasing concern, prompting hospital administration to seek new ways of scientific, safe and cost effective management of the waste, and keeping their personnel informed about the advances in this area. The need of proper hospital waste management system is of prime importance and is an essential component of quality assurance. This topic has assumed great importance in our country, especially in the light of Honourable Supreme Court Judgement and the notification of the Bio-medical waste (Management &handling) Rules, 1998. Proper hospital waste management ensures control of hospital infections as well as ensures that the hospital is not a source of infection or other type of hazards to the community.

Medical Waste

Medical waste means any waste, which is generated during the diagnosis, treatment or immunization of human beings or animals or in research activities pertaining thereto or in the production or testing of biological. It may include wastes like sharps, solid waste, disposables, anatomical waste, lab cultures, discarded medicine, chemical waste etc.

Classification of Biomedical Waste :These wastes includes all types of waste generated by health centers including hospitals, clinics, doctor's office, dental office, veterinary facilities and other medical facilities. The World Health Organization (WHO) has classified the biomedical waste into 8 categories they are General waste, Pathological waste, Radioactive waste, Chemical waste, Infectious waste, Sharps, Pharmaceutical waste & Pressurized waste.

In developing countries for practical purpose, WHO has reduced this list to 5 Categories, which is given below:

1. General non-hazardous waste
2. Sharps
3. Chemical &Pharmaceutical waste
4. Infectious waste and
5. Other hazardous waste

Medical Waste Management

In order to fulfil the medical ethic to *"first do no harm,"* health care providers have a responsibility to manage waste in ways that protect the public and the environment. MedicalWaste Management helps healthcare organizations to adopt sustainable strategies that optimize profitability without compromising quality of care. The proper management of medical waste depends on good organization, sufficient funding and active participation of informed and trained personnel. The safe management of healthcare waste may be achieved by ensuring care in dealing with the healthcare waste. Hence it is the ethical responsibility of management of hospitals and health care establishments to have concern for public health.

The Government of India (notification, 1998) specifies that Hospital Waste Management is a part of hospital hygiene and maintenance activities. This involves management of range of activities, which are mainly engineering functions, such as collection, transportation, operation or treatment of processing systems, and disposal of wastes. A "waste management" working group must thus be set up by the hospital manager. That team must include the following members: the hospital project manager, the water and habitat engineer, the local waste manager, and members of the hospital staff, such as the hospital administrator, the head nurse, the head of radiology, the chief pharmacist and the head of laboratory.

Review of Literature

The health system is under pressure to dispose of HCW in such a way as to avoid unnecessarily high levels of environmental damage. Health care facilities worldwide are beginning to subscribe to the social goals of a cleaner and safer environment. Here an attempt has been made to examine the studies available addressing the medical waste management issues.

Nasima Akter (2000):Medical wastes pose a significant impact on health and the environment. There is not enoughinformation on medical waste management technologies and impacts in developing countries.Practice of proper medical waste disposal and management is also inadequate.

S.Chandralekha (2004):Studies have reported that medical waste does not have a separate line of disposal in most of the places. As a result hospital waste is thrown outside the hospitals and finally this waste finds its way into municipal waste and gets disposed off with other waste.

K. Muduli and A. Barve (2012): Many efforts have been made by environmental regulatory agencies and waste generators to better manage the waste from healthcare facilities in recent years but still these are not sufficient enough to prevent environmental hazards and associated health hazards caused by health care waste.

Praveen Mathur, Sangeeta Patan and Anand S. Shobhawat (2012): They deals with the basic issues as definition, categories, problems relating to medical waste and procedure of handling and disposal method of Medical Waste Management. It also intends to create awareness amongst the personnel involved in health care unit.

Dohare S, Garg V K And Sarkar B K (2013):Purpose of study was to highlight certain aspects of hospital waste management status in health facilities providing health care in an urban area. This study is focused on awareness of health facilities about CPCB(Central Pollution Control Board) rules, hospital waste management training status, maintenance of records and accident reporting system and proper disposal of hospital waste.

Analysis of Data

Table 1, Gender Proportion

Serial No.	Particulars	No	Percentage
1	Male	47	47
2	Female	53	53
		100	**100**

Source: Primary data

Table 1 shows the gender proportion of medical staff selected for the study. Of the total respondents, 47% are male and 53% are female. The sample includes 47 male and 53 female medical staff.

Table 2, Educational qualification

Serial No.	Particulars	No	Percentage
1	MBBS	8	8
2	M.SC and B.SC Nursing.	18	18
3	General Nursing	37	37
4	M.Phm & Technician course	12	12
5	Plus two & S.S.L.C	25	25
		100	**100**

Source: Primary data

Table 2 shows the educational qualification of medical staff selected for the study. A close observation of the table shows that 75% of the medical staff are professionally qualified. 25% of the respondents have SSLC and plus two qualification.

Table 3, Awareness of Medical Waste Management Practices

Serial No.	Particulars	Aware		Not Aware	
		No	Percentage	No	Percentage
1	Clinical Staff	70	93.33	5	6.67
2	Non Clinical Staff	8	32	17	68

Source: Primary data

Table 3 showsawareness of medical waste management practices among clinical and non clinical staffs in different hospitals. 93.33% of clinical staffsare aware about medical waste management practices but only 8% of non clinical staffs have awareness about medical waste management practices in different hospitals.

Diagram 3

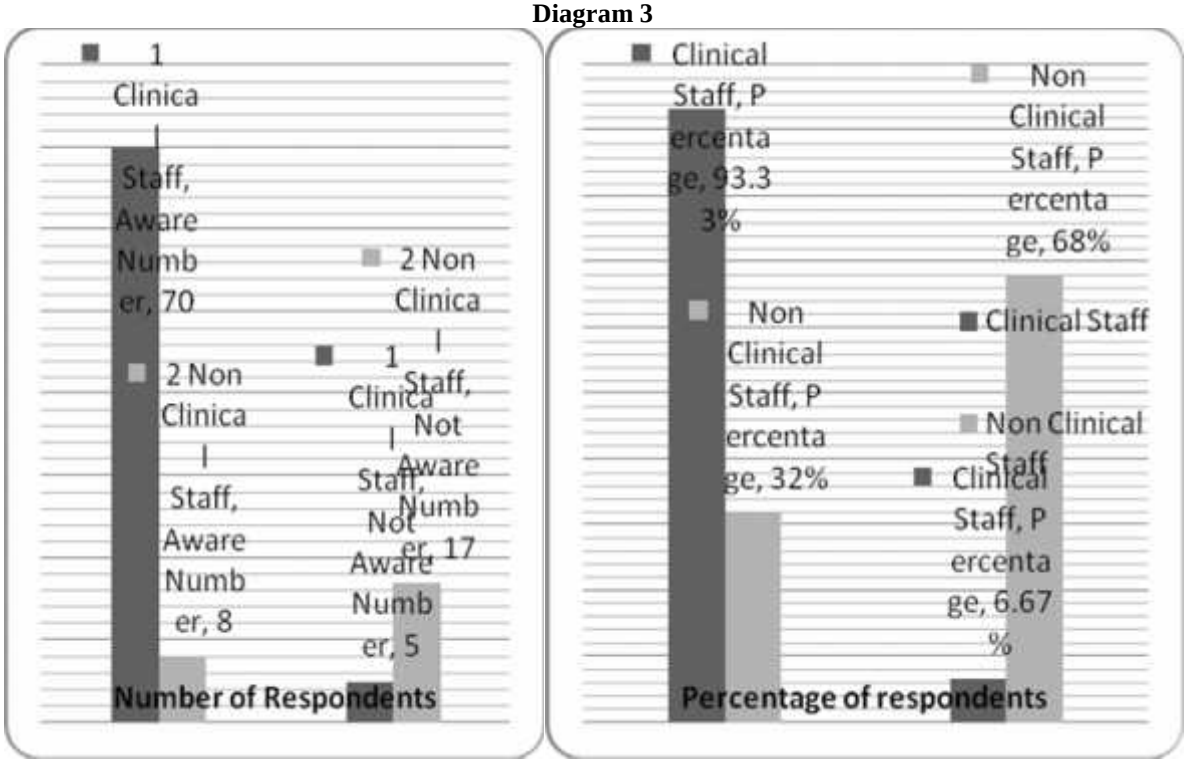


Table 4,Source for Awareness of the Medical Waste management practices

Serial No.	Particulars	No	Percentage
1	News paper	78	78
2	Journals	56	56
3	TV/Radio	62	62
4	Training program and others	63	63

Source: Primary data

Table 4 shows source for awareness of the medical waste management practices in different hospitals. 78% of the respondents feel that News papers are most popular source for awareness of the medical waste management practices. Training programs are also a popular media of information about medical waste. Articles in journals and advertisement in television are identified by the respondent as popular media of information.

Table 5, Types of medical waste generated in different department

SL. No.	Particulars	Ranks					
		1	**2**	**3**	**4**	**5**	
1	General non hazards waste	78	6	8	5	3	**100**
2	Sharps	10	69	11	7	3	**100**
3	Chemical & Pharmaceutical waste	7	13	72	7	1	**100**
4	Infectious waste	3	7	6	69	15	**100**
5	Other hazards waste	2	5	3	12	78	**100**
		100	**100**	**100**	**100**	**100**	

Source: Primary data

Table No. 5(a) Composite indices of Types of medical waste generated in different department

Sl. No	Reasons	Weight						Rank
		5	**4**	**3**	**2**	**1**	**Total**	
1	General non hazards waste	390	24	24	10	3	**451**	**I**
2	Sharps	50	276	33	14	3	**376**	**II**
3	Chemical & Pharmaceutical waste	35	52	216	14	1	**318**	**III**
4	Infectious waste	15	28	18	138	15	**214**	**IV**
5	Other hazards waste	10	20	9	24	78	**141**	**V**

Source: Primary data

Table 5a shows different categories of medical waste generated by different departments in hospitals. Composite indices are calculated for ascertaining the most prominent medical waste. It is very clear that the general non hazards waste is the most prominent waste generated in different department. The composite rank in this respect is 451. The second rank goes to the waste ' Sharps'. However it was to note that the infectious waste generated in various departmentsamounts to 10% to25% of the total medical waste generated.The composite rank in this respect is 214. Other hazards waste is least produced waste in different department. Its composite rank is 141.

Table 6, Method of Disposing Wastes

Serial No.	Particulars	No	Percentage
1	Incineration	85	85
2	Autoclaving & Shredding	78	78
3	IMAGE	55	55
		100	100

Source: Primary data

Table No. 6 shows the different methods adopted by hospitals for the disposal of medical waste. 85% of medical staff reveals that Incineration method is most commonly used disposal method. 78% of respondents agree that they adopt Autoclaving & Shredding for disposing medical waste. 55 respondents out 100 are gave contract to IMAGE for disposing medical waste.

Table 7, Effectiveness of Medical Waste Management

Serial No.	Particulars	No	Percentage	Weight	Product
1	Highly effective	35	35	5	175
2	Effective	45	45	4	180
3	Not effective	7	7	3	21
4	Highly ineffective	5	5	2	10
5	No opinion	8	8	1	8
		100			**394**

Source: Primary data

The above table shows the opinion of medical staff about the effectiveness of medical waste management practices adopted in different hospital. A simple examination of the table also reveals that 44medical staff out of 100 considermedical waste management practices adopted in different hospitals are effective and 23respondents recommends it as highly effective. Likerts scaling technique is used to quantify the degree of effectiveness. The value calculated as per the scaling technique is 394,which is very close to 400 (100 4). Hence we can state that medical staffs feel the waste management practices in their hospital are effective.

Hypothesis I

Ho 1: There is no relation between awareness and different categories of medical staff involved in medical waste generation, handling and disposal.

Ha: There is relation between awareness and different categories of medical staff involved in medical waste generation, handling and disposal.

Test statistics: Chi square

Level of significance: 0.05

Degree of freedom =(r – 1) (c – 1)

=(2 – 1) (2 – 1) = 1

Table value of ¡ ^{2} = 3.841

Computed value of ¡ ^{2} **= 41.10**

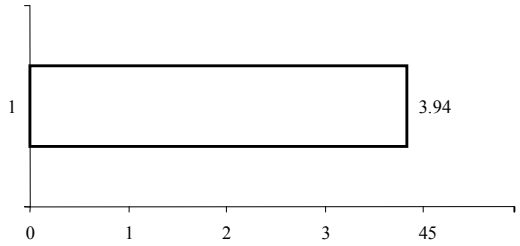
Conclusion: Since the computed value of $\chi^2$is more than that of table value, reject Ho. i.e., there is relation between awareness and different categories of medical staff involved in medical waste generation, handling and disposal.

Hypothesis II

Ho: There is no significant difference in the opinion of staff regarding the effectiveness of medical waste management practices of different medical institutions.

Ha: There is significant difference in the opinion of staff regarding the effectiveness of medical waste management practices of different medical institutions.

Test statistics: Likert's scaling technique .



Computed value:is 3.94

Conclusion

Since the staff of feels that there are significant difference medical waste management practicesofdifferent medical institutions (quantified value being 3.94) Ho is rejected.

Findings of the Study

- 93.33% of clinical staffs have awareness about medical waste management practices but only 8% of non clinical staffs have awareness about medical waste management practices in different hospitals.
- 78% of the respondents feel that News papers are most popular source for awareness of the medical waste management practices. Training programs are also a popular media of information about medical waste. Articles in journals and advertisement in television are identified by the respondent as popular media of information.
- The general non hazards waste is the most prominent waste generated in different department. The composite rank in this respect is 451. The second rank goes to the waste 'Sharps'. However it was to note that the infectious waste generated in various departments amounts to 10% to25% of the total medical waste generated.Initial segregation and storage activities are the direct responsibility of nursing personnel who are engaged in the hospital. If the infectious components get mixed with the general infectious wastes, the entire mass becomes potentially infectious.The composite rank in this respect is 214. Other hazards waste is least produced waste in different department. Its composite rank is 141.
- 85% of medical staff reveals that Incineration method is most commonly used disposal method. 78% of respondents agree that they adopt Autoclaving & Shredding for disposing medical waste. 55 respondents out 100 are gave contract to IMAGE for disposing medical waste.
- There is relation between awareness about medical waste management and different categories of medical staff involved in medical waste generation, handling and disposal. Clinical staffs get more information and training from different sources. But unfortunately non clinical staffs have little bit knowledge about medical waste management practices.

Suggestions

All institutions generating biomedical wastemust be registered with central/state pollution control board. All health care personnelinvolved in the generation, segregation orhandling of medical waste must be trained inbiomedical waste management including healthand safety measures. Continuous monitoring on the part of government agencies will go a long way in seeing that the waste generated in the hospital premises is treated and disposed off regularly. It is high time that the authorities take necessary actions to see that these stipulations are being followed by the hospitals and if not take stringent action against them.

Conclusion

Medical wastes should be classified according to their source, typology and risk factors associated with their handling, storage and ultimate disposal. The segregation of waste at source is the key step and reduction, reuse and recycling should be considered in proper perspectives. We need to consider innovative and radical measures to cleanup the distressing picture of lack of civic concernon the part of hospitals and slackness in government implementation of bare minimum ofrules, as waste generation particularly biomedical waste imposes increasing direct and indirect costs on society. The challenge before us, therefore, is to scientifically manage growing quantities of biomedical waste that go beyond past practices. If we want to protect our environment and health of community we must sensitize ourselves to thisimportant issue not only in the interest of health managers but also in the interest of community

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