

Awareness of Biomedical Waste Management in Small sized healthcare centres of Jabalpur city, Madhya Pradesh

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Abstract – The biomedical waste increases day by day due to growth in population results in increased number and sizes of hospitals and pathology labs as well as increased use of disposable medical products etc. The hospital wastes are infectious wastes which if not properly managed and disposed of pose a great health risk. Besides it may lead to environmental pollution and resulting the scarcity of natural resources. According to a report of WHO(2011) at the global level, 18–64% of HCFs are reported to have unsatisfactory BMW management; predictors include lack of awareness, insufficient resources, and poor disposal. An appropriate strategy for safe management of BMW needs integrating technical, financial, institutional, managerial, social and environmental issues.

Jabalpur is a growing city of Madhya Pradesh. In Jabalpur Elite Engineers (CBMWTF) covered 198 health care facilities from Jabalpur and Katni city, Still, the BMW generators are yet to get enrolled to utilize this offsite facility. The present study aims to identify the present scenario about the awareness and knowledge of disposing the biomedical waste management in Jabalpur city by conducting a survey research and further data were analysed to find the problems and their measures accordingly.

Index Terms – Biomedical Waste Management; Generation; Segregation; Storage.

1. INTRODUCTION

The biomedical waste increases day by day due to increased number and sizes of hospitals and pathology labs as well as increased use of disposable medical products. The World Health Organization (WHO, 2011) reported that at the global level, 18–64% of HCFs have unsatisfactory BMW management; predictors include lack of awareness, insufficient resources, and poor disposal. It was recognizes that in many countries, improper management and disposal of medical waste continue to pose a great health risk. Besides, it may lead to environmental pollution and resulting the scarcity of natural resources.

Bio-medical waste is the waste that 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.

The scientific "Hospital Waste Management" is of vital importance as its improper management poses risks to health care workers, waste handlers, patients, community in general and largely the environment.(Pandit et al., 2007).

In India, the Ministry of Environment and Forests (MoEF) has notified the Biomedical Waste (Management and Handling) Rules 1998 for proper management of BM waste. These rules are meant for safe handling, segregation, storage, transportation, treatment, and disposal of biomedical waste (BMW) generated from the healthcare establishments (HCEs)/healthcare facilities (HCFs). These rules were amended in 2000 and 2003 so as to fill the gaps as felt necessary at that time (Manar et al, 2014). Dasimah et all (2012) have conducted a survey study in the District Hospitals of Tumpat, Batu Pahat and Taiping in Malaysia and found that there were a number of respondents stated that they were injured with needle stick or sharp injury during waste handling.

They found that improper management of clinical waste management can create many problems especially threats to the health, safety and environment. However, to improve the overall waste management of health care facilities in India the introduction of laws is not sufficient for proper disposal of BM waste. The awareness of these laws among the general public as well as development of policies and enforcement that respect those laws are essential. It is the institutions responsibility to manage and dispose the biomedical waste in proper way.(Col A.K. Jindal et.al. (2013))

The management of BMW has been a neglected issue till date. In Jabalpur Elite Engineers (CBMWTF) covered 198 health

care facilities from Jabalpur and Katni city. But it was found that the BMW generators are yet to get enrolled to utilize this offsite facility. This may be due to lack of knowledge and rules about the biomedical waste management.

The objective of the study was to assess the awareness towards hospital waste management in some small sized hospitals of Jabalpur city. This assessment will help to develop a strategy to improve BMW management in these hospitals and all levels of healthcare facilities.

Biomedical waste management in the study area

Jabalpur District is a district of Madhya Pradesh state in central India. The Latitude and longitude of the city are 23° 10' 0" N and 79° 59' 0" E. The city of Jabalpur is the administrative headquarters of the district. The area of the district is 10,160 km² with of population 2,167,469 (2001 census). Jabalpur District is located in the Mahakoshal region of Madhya Pradesh, on the divide between the watersheds of Narmada and the Son, but mostly within the valley of the Narmada, which here runs through the famous gorge known as the Marble rocks, and falls 30 ft. over a rocky ledge (the Dhuandhar, or misty shoot).

As in most Indian cities, health and medical facilities are generally provided by the private sector and State Government hospitals. At Jabalpur city a CBMWTF was established which is 1 km away from the residential and sensitive area. In order to provide all the requisite systems, CBMWTF has a built up area of around 3200 sq.ft with a land area of 1 acre. The initial cost of construction was around 3 lakhs. CBMWTF charges Rs.95/bed/month to hospitals. The unit started operation in 2003 even though it was established in 2001. According to (Pulavarthi and Pothireddy, 2012) For common disposable / incineration sites, the municipal corporation, municipal boards or urban local bodies, shall be responsible and should take the valid legal action for violating the rules. It is an ethical and social responsibility of healthcare professionals to control the process of disposal of dangerous waste of healthcare sector. There is a need of developing a system and culture through education, training, motivation to healthcare staff.

Materials and methods

In the present work an attempt has been made through a survey research in the small sized healthcares of Jabalpur city to examine and evaluate biomedical waste management and to identify the level of knowledge and awareness among the hospitals in personnel.

A total 145 healthcares are registered and disposed their waste to common bio medical waste treatment facility (CBMWTF) Jabalpur. The survey units of the study were healthcares, having strength of (0-200) beds facilities in which 76 major hospitals, 35 clinics/dispensary, 22 pathology and 14 nursing home is running at Jabalpur. For study healthcares categories

according to their bed strength as given table 1 in which 15(10.34%) healthcares of Category-A with (50-200beds), 59(40.69%) healthcares of Category-B of (0-49beds) and 71(48.97%) healthcares included Clinics, blood bank, nursing home and research lab of Category-C. The survey research is used to evaluate biomedical waste management techniques and to examine the level of knowledge and awareness among the staff members and doctors. The study used questionnaire as a tool to collect data and information from the hospitals personnel.

Table 1 Category of Healthcare According to Their Bed Strength and Type of Health cares

Sr. No	Healthcare Size	Category	No of healthcare	Percentage	No of Responds
1	50-200 beds	A	15	10.34%	45
2	1-49 beds	B	59	40.69%	45
3	Other healthcares	C	71	48.97%	47
Total			145	100.00%	137

Other healthcares: - Blood banks, Clinics/dispensary, Nursing home, Pathology centres, Research lab.

Inclusion & Exclusion Criteria

For survey purpose included healthcare which allowed for the assessment their employee who is present at the time of survey and who co-operated and responded and Excluded Healthcare which didn't allowed for the assessment and Employees of the healthcare who didn't responded and cooperated were not included in the study. Full cooperation by some of the hospital personnel in answering questionnaires booklet cannot be achieved through the study. Longer time was required by the respondents for many reasons such as lack of time to answer etc.

Tools for data collection

A pre structured and pre tested interview questionnaire was used from a study done at Jaipur city by Sharma et al. (2013) to collect necessary information regarding hospitals and biomedical waste management of the healthcares.

Field visit and survey The purpose of the interview with the respondents at health care establishments was to collect the primary data and background information about the waste management practices at the health care establishments.

Initially the education level of the respondents were and found that the majority of the nurses and laboratory technicians were graduates, whereas most of the sweepers (55.6%) had studied only up to primary level only. Of the respondents, 74 % were men. Here, 65% of nurses and 60% of laboratory technicians were in the age group of 25–40 years whereas 55 % of sweepers were in the age group of more than 40 years.

The purpose of the interview with the respondents at health care establishments was to collect the primary data and background information about the waste management practices at the health care establishments. The data and information collected formed the basis for this research. An interview protocol was initially developed to cover qualitative data collection that included interview technique, sampling, ethical issues and data analysis. Semi-structured interview: This approach is meant to assure that some general areas of information are collected from each interviewee; this provides more focus than the conversational approach, but still allows a degree of freedom and adaptability in getting the information from the interviewee.

2. RESULT & DATA ANALYSIS

The aim of present study to assess the knowledge and practice of bio-medical waste management among the health care providers working in primary health centres (PHCs) and hospitals of Jabalpur District. To fulfil the aim survey research was done through an initial set of questions to put the respondent at ease. A set of 40 questions were asked during the survey.

Table 2 summarize the distribution of respondents where total 137 respondents answered to the questionnaire out of which 14 (10 %) were Doctor, 46 (34%) Nurses, 32 (23%) Lab Technician and 45 (33%) Sweepers responded to the biomedical waste questionnaire. Total 45 respondents were answer in Category-A out of which 5(11.11%) doctors, 15(33.33%) Nurses, 10(22.23%) lab technicians and 15(33.33%) sweepers, similarly total 56 respondents were answer in Category-B out of which only 4(7.14%) doctors , 20(35.71%) nurses, 12(21.42%) lab technicians and 20(35.71%) sweepers were responded and total 36 respondents were answer in Category-C out of which 5(13.89%) doctors, 11(30.56%) nurses, 10(27.78%) lab technicians, and 10(27.78%) sweepers were answer the questionnaire.

Table-2 Respondents of available Category Doctors, Nurses, Lab technician and Sweepers.

Category	Doctor		Nurses		Lab Technician		Sweepers	
	No	Percent	No	Percent	No	Percent	No	Percent
	Resp.	Resp.	Resp.	Resp.	Resp.	Resp.	Resp.	Resp.
A	5	33%	15	33%	10	31%	15	33%
B	4	27%	20	43%	12	38%	20	44%
C	5	33%	11	24%	10	31%	10	22%
Total	14	100	46	100%	32	100%	45	100%

Table 3 shows the good to poor percentage of knowledge, awareness, attitude and needle-stick injuries knowledge of Doctors, Nurses, Lab Technician, and Sweepers, in which Category-A total average 85% Doctors, 35% Nurses, 23% Lab

Technicians and 10% sweepers scoring good knowledge, 15% Doctors, 40% Nurses, 63% Lab Technician, 42% sweepers having average knowledge and 0% Doctors, 25% Nurses, 15% Lab Technician, 49% Sweepers having poor knowledge of BMW. Category-B total average 50% Doctors, 16% Nurses, 17% Lab Technicians and 8% sweepers scoring good knowledge, 50% Doctors, 66% Nurses, 67% Lab Technician, 46% sweepers having average knowledge and 0% Doctors, 18% Nurses, 17% Lab Technician, 46% Sweepers having poor knowledge of BMW. Category-C total average 70% Doctors, 7% Nurses, 15% Lab Technicians and 3% sweepers scoring good knowledge, 30% Doctors, 62% Nurses, 15% Lab Technician, 38% sweepers having average knowledge and 0% Doctors, 32% Nurses, 30% Lab Technician, 60% Sweepers having poor knowledge of BMW.

It was found that knowledge, awareness, attitude and needle stick injuries knowledge is varying according to the level and education of the respondents because doctors having higher educational qualification and experiences about biomedical waste but they don't have any involvement in the biomedical waste management so they have good knowledge where as nurses and lab technicians have lower qualification as compare to doctor but higher qualification than sweepers and they trained to manage the biomedical waste so they have average level of knowledge, awareness , attitude and needle-stick injuries knowledge.

Sweepers have a very low level of education and some time found illiterate don't have very broad knowledge about biomedical waste and its management they just instructed from administration that how they have to manage waste without knowing the impact associated with the biomedical waste so they poor scores.

Table 3 Level of Knowledge, Awareness, Attitude and Needle-stick injuries knowledge of healthcare persons in Jabalpur city.

Category	Section	Doctors			Nurses			Lab Technician			Sweepers		
		Good	Average	Poor	Good	Average	Poor	Good	Average	Poor	Good	Average	Poor
A	I	60%	40%	0%	33%	27%	40%	0%	80%	20%	7%	47%	47%
	II	80%	20%	0%	40%	60%	0%	20%	80%	0%	20%	33%	47%
	III	100%	0%	0%	33%	27%	40%	20%	60%	20%	13%	40%	47%
	IV	100%	0%	0%	33%	47%	20%	50%	30%	20%	0%	47%	53%
	Average	85%	15%	0%	35%	40%	25%	23%	63%	15%	10%	42%	49%
B	I	25%	75%	0%	15%	55%	30%	0%	67%	33%	0%	45%	55%
	II	75%	25%	0%	20%	80%	0%	33%	67%	0%	20%	25%	55%
	III	50%	50%	0%	15%	45%	40%	17%	50%	33%	5%	60%	35%
	IV	50%	50%	0%	15%	85%	0%	17%	83%	0%	5%	55%	40%
	Average	50%	50%	0%	16%	66%	18%	17%	67%	17%	8%	46%	46%
C	I	60%	40%	0%	0%	55%	45%	0%	50%	50%	0%	20%	80%
	II	60%	40%	0%	27%	73%	0%	10%	80%	10%	10%	30%	60%
	III	80%	20%	0%	0%	55%	45%	30%	40%	30%	0%	20%	80%
	IV	80%	20%	0%	0%	64%	36%	20%	50%	30%	0%	80%	20%
	Average	70%	30%	0%	7%	62%	32%	15%	55%	30%	3%	38%	60%

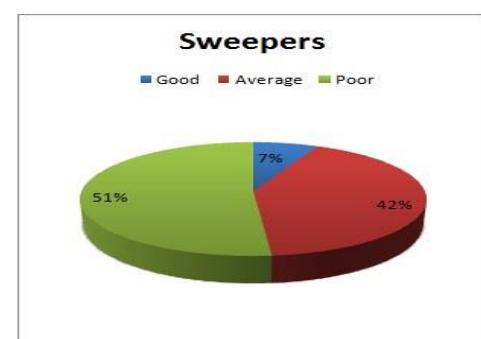
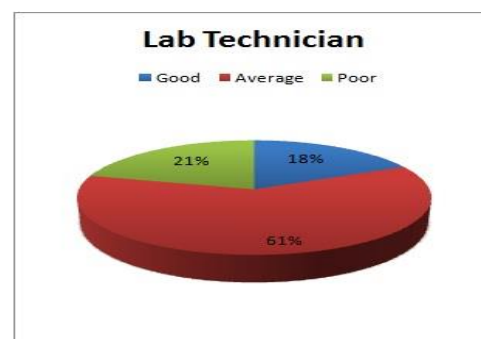
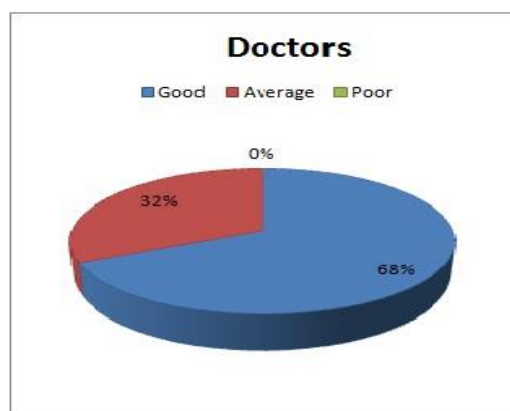
Table 4 Distribution of Mean, Median, Standard Deviation and Mode

		Right	Wrong	Not Sure	Total
Nurses	Mean	52%	23%	25%	100%
	Median	53%	22%	22%	100%
	Mode	61%	0%	0%	100%
	SD	0.194554	0.202745	0.216507	-
Lab Technicians	Mean	52%	23%	25%	100%
	Median	53%	19%	30%	100%
	Mode	63%	0%	0%	100%
	SD	0.22	0.22	0.23	-
Sweepers	Mean	41%	36%	23%	100%
	Median	42%	34%	20%	100%
	Mode	44%	20%	0%	100%
	SD	0.202482	0.208041	0.244746	-
Doctors	Mean	84%	10%	7%	100%
	Median	86%	7%	0%	100%
	Mode	79%	0%	0%	100%
	SD	0.121373	0.0965	0.123598	-

Table 5 Combined Knowledge level for BMW Management

Knowledge	Doctor	Nurses	Lab Technician	Sweepers
Good	68%	19%	18%	7%
Average	32%	56%	61%	42%
Poor	0%	25%	21%	52%

Table 5 shows the combine distribution of knowledge of BMW management scores where 68%, 19%, 18% and 7% of majority only have good knowledge for doctors, nurses, Lab Technicians and Sweepers respectively. About 32% doctors, 56% nurses, 61% lab technicians and 42% sweepers have average knowledge. The study shows that almost 0% doctors, 25% nurses, 21% lab technicians and 52 % sweepers are having very poor knowledge, they are not aware for the hazards.



All the Health Care Establishments are good in condition in view of inflow, admission and the staffs and treatment but few PHCs and General Hospitals were not felt hygienic. The majority of the doctors, nurses and Lab technicians do not generally use gloves and wear mask while treating, administering and blood drawing respectively. The one aspect was observed in the HCEs as to Colour coded bins and it was also found but the knowledge regarding the kind of waste to be disposed of was in great confusion and few did not know about it at all. This showed lack of training. Nurses, lab technicians and Sweepers are not having even average knowledge for hazards and legislations. Most of them giving wrong answers. It can be stated that awareness is in good level. But it should be noted that nurses and lab technicians are more aware than the sweepers. There is a need for awareness program for sweepers.

3. CONCLUSION

It is concluded that more a thorough training programme are needed to all healthcare personnel's responsible for waste handling in health care establishments, and for municipal workers collecting waste from health care establishments, to ensure that they adopt professional attitudes to waste management and apply approved practices. It can be stated that awareness is in good level among the doctors and nurses and lab technicians are more aware than the sweepers. . More emphasis should be needed for awareness program for sweepers as they have to handle the waste mostly.

Besides, There should be a Common Bio Medical Waste Treatment Facility (CBWTF) for all the small sized healthcares. The proper monitoring is required that all the

hospitals/nursing homes must send the Bio Medical Waste to CBWTF as per the Bio Medical Waste Rules. A legal action must be taken to those violating the rules.

Therefore there is a need of training or awareness programme among all the medical practitioner, implementation of the rules as per the guidelines and frequently monitoring is required.

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