

Awareness about Bio-Medical Waste Management among Health Care Personnel of Some Important Medical Centers in Agra

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health care organization.

Abstract — The proper handling and disposal of Bio-medical waste (BMW) is very imperative. There are well defined set of rules for handling BMW worldwide. Unfortunately, laxity and lack of adequate training and awareness, in execution of these rules leads to staid health and environment apprehension. In this research paper, awareness about bio-medical waste (BMW) management rules among health care personnel of some important health care facilities in Agra is evaluated. In the present study, health care facilities are categorized into four strata i.e. apex Government hospitals, Government and non Government first level referral units (FRU), private health care facilities and corporate health care facilities. Random sampling technique is adopted at all the four different strata mentioned above to have a representative sample. After random sampling technique, total fourteen health care facilities from all strata are taken up. Periodical visits were made to analyze awareness about bio-medical waste management among health care personnel of all the fourteen health care facilities. To make it all embracing and systematic, a written appraisal tool in the form of different questionnaires was prepared for various categories of working personnel in the hospital/nursing home. To increase the sample size best efforts were made to collect data from maximum number of working personnel and their views and sincere suggestions regarding waste management were noted down. The results obtained pointed towards lack of knowledge and awareness towards legislations on bio-medical waste management even among qualified hospital personnel. As a consequence there is inappropriate practice of BMW handling and management, thus exposing themselves and general public to health and environment hazards.

Index Terms— Biomedical waste, Random sampling.

I. INTRODUCTION

The health care sector includes a diverse range of health care facilities which have a size assortment from large general and specialist hospitals to small municipal dispensaries and D-type centers. All these facilities are an integral part of our society with an endeavor to reduce health problems and to eliminate imminent jeopardy to people's health.

In the course of curing health problems the health care sector produce huge amount of bio-medical waste which may be hazardous to all those who come in contact with this waste. Hazardous waste management is a concern for every

Within waste management (WM), the health care waste management (HCWM) is a process that helps to ensure proper hospital hygiene and safety of health care workers and communities [3].

Health care workers have an important opportunity to manage the environmental effects of their practice. Their efforts may seem small, but each step builds a base of sound behavior and thinking that are necessary for the success of the whole [13].

For proper management of bio-medical waste the Ministry of Environment and Forests has promulgated the Bio-Medical Waste (Management and Handling) Rules, 1998. These rules are meant to improve the overall waste management of health care facilities in India.

It has been emphasized [21] that for the proper disposal of bio-medical waste, introduction of laws is not sufficient enough. The awareness of these laws among the general public as well as development of these policies and enforcement that respect those laws is essential.

The present study tries to find out the real state of affairs of the awareness, knowledge, attitude and practices of the health care personnel of fourteen medical centers of Agra regarding BMW management

II. MATERIALS AND METHODS

In the present investigation first of all an extensive pilot study was carried out at fourteen health care facilities of the above mentioned strata which were selected by random sampling technique [1][17].

The pilot study provided the basic data on which the bio-medical waste management system was premeditated, designed and operated in each facility [18].

Every waste generating unit was identified and categorized as per the standard classification i.e. Bio-medical waste (Management and Handling) Rules, 1998.

A questionnaire was prepared to evaluate the know-how, outlook and practices of employees towards waste management [2][4][6][8][10][11][19].

The information gathered by questionnaires was verified by means of personal observations [3][9][12].

An assessment was made regarding planning of health care facilities' health education and publicity on waste management.

Measures were taken to check staff's participation in the planning and a review on training aspects of working personnel by hospital authorities was done.

Actual work practices, equipment operations and integrity

were also monitored.

III. RESULTS AND DISCUSSION

The present study was divided into four strata i.e. apex Government hospitals, Government and non Government FRU (first level referral units), private health care facilities and corporate health care facilities.

In each strata selection of health care facilities was done by random sampling technique by which a representative sample from all the study strata was taken up with an effort to cover a minimum of 25% of health care facilities in all the strata. Similar technique is adopted in [17] for selection of health care facilities in their study. They selected forty six percent (441/955) US hospitals to identify their waste disposal practices by random sampling technique.

In [1] the epidemiology of percutaneous injuries of health care workers (HCWs) in Ile-Ife, Nigeria has been characterized with the help of a cross-sectional survey. To collect the data regarding needle-stick and sharp instrument injuries among the health care workers within the previous year they adopted random sampling technique for selection of health care workers.

Three health care facilities viz. Sarojini Naidu Medical College, Lady Lyall Maternity Hospital and District Hospital were randomly selected in the first stratum (apex Government hospitals).

Four health care facilities viz. Pushpanjali Hospital and Research Centre, G.G. Medical Institute & Research Centre, Asopa Hospital and Research Centre and Kamayani Hospital were randomly selected in the second stratum (Government and non Government FRU).

Four health care facilities viz. Shree Ram Hospital, Malhotra Nursing home, Jaidevi Hospital and Ram Raghu Hospital were randomly selected in the third stratum (private health care facilities).

Three Nagar Nigam Mahila Aspatal situated at Gadha Pada, Vijay Nagar and Naglapati were randomly selected in the fourth stratum (corporate health care facilities).

In the first stratum (apex Government hospitals) total 1227 staff was in position, out of which 569 (46.37%) responded to questionnaires, which constituted the sample for the study.

In the second stratum (Government and non Government FRU) total 572 employees were in position, out of which 230 (40.21%) responded to questionnaires, which constituted the sample for the study. In the third stratum (private health care facilities) total 173 people were in position, out of which 82 (47.39%) responded to questionnaires, which constituted the sample for the study. In the fourth stratum total 27 personnel were in position, out of which 16 (59.25%) responded to questionnaires, which constituted the sample for the study (Table I).

The methodology of data collection with the help of questionnaires is in accordance with the study performed in North Carolina (NC) hospitals [16], in an academic medical center in a large eastern US metropolitan city [20], in New Brunswick health establishments [15], at a New York teaching hospital [22], in the nuclear cardiology laboratory, USA [14], in health care establishments of Saudi Arabia [2], in regional hospitals of Senegal [4] and in 25 U.S. Army

medical treatment facilities [6].

In the first stratum (apex Government hospitals), out of total 569 persons who responded to the questionnaire, only 189 (33.21%) employees were aware of Bio-medical Waste (Management & Handling) Rules, 1998.

In the second stratum (Government and non Government FRU), out of 240 recruits who responded to the questionnaire, only 64 (29.09%) were aware of Bio-medical Waste (Management & Handling) Rules, 1998. I

In the third stratum (private health care facilities), out of 82 personnel who responded to the questionnaire, 14 (17.07%) were aware of Bio-medical Waste (Management & Handling) Rules, 1998. In the fourth stratum (corporate health care facilities), out of 16 staff members who responded to the questionnaire, no one was aware of Bio-medical Waste (Management & Handling) Rules, 1998 (Table II).

In a similar study, it has been tried to assess the knowledge and practices of bio-medical waste management and infection control among dentists of a teaching hospital and reported lack of awareness on Bio-medical Waste (Management & Handling) Rules, 1998 [10].

In the first stratum (apex Government hospital), out of total 70 waste handlers/sweepers, only 29 (41.43%) waste handlers were aware of the risk involved in bio-medical waste handling, none received any special training on this topic. 07(10.00%) waste handlers suffered with injury/puncture/ infection in the past six months but no one reported to higher authorities.

In the second stratum (Government and non Government FRU), out of total 54 waste handlers/sweepers, only 23 (42.59%) waste handlers were aware of the risk involved in bio-medical waste handling. 12(22.22%) reported to receive special training on biomedical waste handling. 10(18.52%) waste handlers suffered with injury/puncture/ infection in the past six months but no one reported to higher authorities.

In the third stratum (private health care facilities), out of total 18 waste handlers/sweepers, 5 (27.78%) waste handlers were aware of the risk involved in bio-medical waste handling but no one received any special training to handle and manage biomedical waste. 6(33.33%) waste handlers suffered with injury/puncture/ infection in the past six months but no one reported to higher authorities.

In the fourth stratum (corporate health care facilities), out of total 4 waste handlers/sweepers/aayas, none of them was aware of the risk involved in bio-medical waste handling at the same time did not receive any training. 4(100.00%) waste handlers suffered with injury/puncture/ infection in the past six months but no one reported to higher authorities (Table III).

The information gathered by means of questionnaire was also verified by personal observation of the waste management practices of the staff members and it was concluded that neither the Government funded nor the privately managed health care facilities in Agra were working in accordance with the Bio-medical Waste (Management & Handling) Rules, 1998.

Due to lack of proper monitoring agencies on them, they were evading the rules.

This heartless act of the responsible section of the society

On the basis of the present study it is recommended that a massive drive should be launched by the Government to generate awareness regarding serious environmental and health hazards of bio-medical waste.

All measures should be adopted to inform the public about legislation regarding bio-medical waste management. Workshops, seminars, exhibition etc. must be organized from time to time with representatives from various units related to bio-medical waste management, including the risks involved in scavenging discarded needles and other sharp items.

Information about the risks linked to health care waste can be displayed by poster exhibitions in hospitals, at strategic points such as waste bin locations, giving instructions on waste segregation.

These posters should be explicit, using diagrams and illustrations to convey the message that could be understood by all people who make regular visits to health care establishment's even illiterate people.

Collected information on various methods of disposal and updated technology should be made available to all categories of health care personnel.

All the Government agencies and private health care facilities in collaboration with Agra authorities, local help groups and general public should work together to find a proper bio-medical waste management and handling procedures, which should be in accordance with the spirit of Bio-medical waste (Management & Handling) Rules, 1998.

The [23] also supports the findings of the study. According to it bio-medical waste management programme cannot successfully be implemented without the willingness, devotion, self-motivation, cooperation and participation of all sections of employee of any health care establishment.

If we want to protect our environment and health of community, we must sense ourselves to this important issue not only in the interest of health managers but also in the interest of community.

IV. CONCLUSION

The present study outlines the gap between BMW Rules and inadequate state of execution and awareness in practice.

The need of standard operative procedures (SOP) and defined management techniques like TQM and timely training programs explicitly for BMW handling and disposal is highlighted.

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TABLE I: TOTAL NUMBER OF STAFF AND NUMBER OF PERSONS RESPONDED TO QUESTIONNAIRES ON BMW

Sr. No.	Designation	I st Stratum			II nd Stratum			III rd Stratum			IV th Stratum		
		In Pos.	Resp. No.	%	In Pos.	Resp. No.	%	In Pos.	Resp. No.	%	In Pos.	Resp. No.	%
1	Doctor (Specialist)	164	88	53.66	123	45	36.59	28	11	39.29	4	0	0.00
2	Doctor (Resident)	292	100	34.25	26	9	34.62	6	2	33.33	0	0	0.00
3	GDMO	37	18	48.65	8	2	25.00	1	0	0	0	0	0.00
4	Nurse	213	93	43.66	127	42	33.07	32	16	50	13	8	61.54
5	Technician	59	33	55.93	70	27	38.57	25	12	48	1	1	100.00
6	Pharmacist	40	22	55.00	5	2	40.00	0	0	0	0	0	0.00
7	Ward boy	102	44	43.14	36	22	61.11	18	12	66.67	0	0	0.00
8	Peon	46	27	58.70	0	0	0.00	2	1	50	3	2	66.67
9	Aaya	52	28	53.85	32	18	56.25	11	6	54.55	3	3	100.00
10	Sweeper	145	70	48.28	117	54	46.15	37	18	48.65	2	1	50.00
11	Clerk & Other Staff	77	46	59.74	28	9	32.14	13	4	30.77	3	1	33.33
Total		1227	569	46.37	572	230	40.21	173	82	47.4	29	16	55.17

TABLE II: AWARENESS REGARDING BIO-MEDICAL WASTE (MANAGEMENT AND HANDLING) RULES, 1998

Sr. No.	Designation	I st Stratum			II nd Stratum			III rd Stratum			IV th Stratum		
		Resp. No.	Aware No.	%	Resp. No.	Aware No.	%	Resp. No.	Aware No.	%	Res p. No.	Aware No.	%
1	Doctor (Specialist)	88	66	75.00	45	32	71.11	11	7	63.64	0	0	0.00
2	Doctor (Resident)	100	55	55.00	9	6	66.67	2	1	50.00	0	0	0.00
3	GDMO	18	9	50.00	2	0	0.00	0	0	0.00	0	0	0.00
4	Nurse	93	37	39.78	42	15	35.71	16	4	25.00	8	0	0.00
5	Technician	33	7	21.21	27	7	25.93	12	2	16.67	1	0	0.00
6	Pharmacist	22	4	18.18	2	1	50.00	0	0	0.00	0	0	0.00
7	Ward boy	44	2	4.55	22	2	9.09	12	0	0.00	0	0	0.00

8	Peon	27	0	0.00	0	0	0.00	1	0	0.00	2	0	0.00
9	Aaya	28	0	0.00	28	0	0.00	6	0	0.00	3	0	0.00
10	Sweeper	70	4	5.71	54	0	0.00	18	0	0.00	1	0	0.00
11	Clerk & Other Staff	46	5	10.87	9	1	11.11	4	0	0.00	1	0	0.00
Total		569	189	33.22	240	64	26.67	82	14	17.07	16	0	0.00

TABLE III: TRAINING OF WASTE HANDLERS AND PARTICULARS REGARDING RISK INVOLVED IN BMW WASTE HANDLING

Sr. No.	Training and other particulars	Ist Stratum		IInd Stratum		IIIrd Stratum		IVth Stratum	
		No.	% (n=70)	No.	% (n=54)	No.	% (n=18)	No.	% (n=4)
1	Received special training in bio-medical waste handling	0	0.00	12	22.22	0	0.00	0	0.00
2	Aware of risk involved in BMW handling	29	41.43	23	42.59	5	27.78	0	0.00
3	Any injury/puncture/infection in the past 6 months	7	10.00	10	18.52	6	33.33	4	100.00
4	Accident reported to higher authority	0	0.00	0	0.00	0	0.00	0	0.00