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KNOWLEDGE REGARDING BIOMEDICAL WASTE MANAGEMENT AMONG HEALTH FUNCTIONARIES OF A RURAL BLOCK OF HARYANA

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ABSTRACT

Biomedical waste, also known as infectious waste or medical waste is defined as waste generated during the diagnosis, testing, treatment, research or production of biological products for humans or animals. Biomedical waste includes syringes, live vaccines, laboratory samples, body parts, bodily fluids and waste, sharp needles, cultures and lancets. The aim was to assess knowledge about Biomedical waste management among healthcare functionaries in a rural block Beri of district Jhajjar, Haryana. The study was of cross-sectional design was carried out during July 2011 to June 2012. All the staff involved in Bio-medical waste handling and management in these health care centres/units of the block will be included in the study. All the doctors (15), dental surgeons (4) and MPHSs (6) had knowledge regarding segregation of Biomedical waste at source. None of AYUSH medical officers had knowledge regarding segregation of Biomedical waste at source. The difference between various health functionaries of government health centres regarding segregation was statistically significant ($p=0.002$). Only 13 (18.6%) of the Multipurpose worker male & female and about two third (66.7%) doctors were having the knowledge regarding color coding of waste containers while knowledge of 21 (80.8%) staff nurses and 6 (75.0%) lab and X-ray technician was more in this context. The study concludes that healthcare waste management should go beyond data compilation, enforcement of regulations and acquisition of better equipment.

Keywords: *Biomedical Waste, Segregation, Handling, Infections*

INTRODUCTION

Biomedical waste, also known as infectious waste or medical waste is defined as waste generated during the diagnosis, testing, treatment, research or production of biological products for humans or animals. Biomedical waste includes syringes, live vaccines, laboratory samples, body parts, bodily fluids and waste, sharp needles, cultures and lancets. The main sources of biomedical waste are hospitals, medical clinics and laboratories. Because biomedical waste can be detrimental to human health, the law requires such facilities to follow procedures that protect the public from coming into contact with it. It is estimated that annually about 0.33 million tonnes of hospital waste is generated in India and, the waste generation rate ranges from 0.5 to 2.0 kg per bed per day (Gordon and Rein, 2004). Pandit *et al.*, (2005) found that not a single doctor knew about the various categories of bio-medical waste in a district of Gujrat but all the doctors were aware about risk associated with hospital waste. 74% of all visited doctors said that HIV and Hepatitis-B are the two diseases, from which one should be careful. But awareness of the auxiliary health personnel about this fact was poor (Pandit *et al.*, 2005).

Saini et al conducted a study regarding knowledge of Biomedical waste management amongst staff of a tertiary level hospital in Delhi, India revealed that the knowledge component among consultants, residents, nurses and lab staff was 85%, 81%, 60% and 12% respectively. This shows that the people with higher education have more awareness about the issues and activities on Biomedical Waste Management. Inadequate and inappropriate knowledge of handling of healthcare waste may have serious health consequences and a significant impact on the environment as well (Saini *et al.*, 2005). Various studies on Biomedical Waste Management in urban areas of India have been conducted whereas in rural areas very

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few studies have been undertaken. Hence an attempt is being made to assess knowledge about Biomedical waste management among healthcare functionaries in a rural block Beri of district Jhajjar, Haryana.

MATERIALS AND METHODS

The study was conducted in the rural block, Beri of district Jhajjar (Haryana). The block beri has 1,57,604 rural population and has 133 health care centres/units. All the staff involved in Bio-medical waste handling and management in these health care centres/units of the block will be included in the study. The study was of cross-sectional design was carried out during July 2011 to June 2012. A list of all health care centres/units was obtained from CHC Dubaldhan and CHC Dighal. The investigator himself met the heads of all health care centres/units to explain the purpose of the study and sought their co-operation. All the study subjects were fully informed and consent was obtained before initiating the interview. The confidentiality of the information was assured. Interview with each health functionary was started with general discussion to build up a rapport and to gain their confidence. A pre-tested semi-structured interview schedule was administered to the study subjects and the responses were recorded by the investigator himself. Collected data were entered in the MS Excel spread sheet, coded appropriately and later cleaned for any possible errors in a SPSS (Statistical Package for Social Studies). Analysis was carried out using SPSS for Windows version.18.0 and online.

RESULTS

Table 1: Number of existing and studied health centres of Beri block

SN	Type of healthcare centres/units of Beri block	No. of centres	No. of centres studied (%)
1	General Hospital	1	1 (100)
2	Community Health Centres	2	2 (100)
3	Primary Health Centres	3	3 (100)
4	Sub Health Centres	25	25 (100)
5	General practitioner's clinic (Allopathic, Naturopathy, Ayurveda, Homeopathy, Unani, quacks etc.)	75	53 (70.7)
6	Veterinary healthcare centres	18	18 (100)
7	Dental Clinics	2	2 (100)
8	Private laboratories	7	6 (85.7)
	Total	133	110 (82.7)

Figures in the parentheses are percentages

Table 1 shows that there are 133 health centres/units in the Beri block, out of which 110 (82.7%) could be studied. Rest 23 (17.3%) health centres could not be studied because heads of these health centres didn't consent to carry out the study. All the government centres consented for the study but least response rate (70.7%) was from general practitioners clinics.

Table 2: Distribution of various health functionaries in government health centres (n=138)

Health Functionaries	Numbers (%)
Allopathic Doctors	15 (9.2)
AYUSH Doctors	2 (1.2)
Dental Surgeons	4 (2.4)
MPHS (Male & Female)	6 (3.6)
Pharmacists	7 (4.3)
MPHW (Male & Female)	70 (42.7)
Staff Nurses	26 (15.9)
Radiographers	2 (1.2)
Lab technicians	6 (3.6)
Quacks	0 (0)
Total	138 (100)

Figures in the parentheses are percentages

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Table 2 shows that about two third (67.8%) health functionaries in government health centres were multipurpose health worker (male & female), staff nurses and allopathic doctors. In private centres more than half (54.3%) of the health functionaries were quacks and about one fifth (20%) were AYUSH doctors.

Table 3: Knowledge among government[#] healthcare functionaries regarding Biomedical waste management (n = 138)

Knowledge regarding Biomedical waste	doctors (n=15)	dentists (n=4)	AYUSH Medical Officers (n=2)	Pharmacists (n=7)	Staff Nurses (n=26)	MPHW (M & F) (n=70)	MPHS (M & F) (n=6)	Lab & X-ray technicians (n=8)
Segregation of waste at source*	15 (100)	4 (100)	0 (0)	5 (71.4)	19 (73.1)	63 (90.0)	6 (100)	6 (75.0)
Benefits of color coding	12 (80.0)	4 (100)	2 (100)	7 (100)	12 (46.2)	44 (62.9)	4 (66.7)	6 (75.0)
Color coding for waste containers*	10 (66.7)	0 (0)	0 (0)	2 (28.6)	21 (80.8)	13 (18.6)	2 (33.3)	6 (75.0)
Disinfection of hospital waste before disposal*	13 (86.7)	1 (25.0)	0 (0)	2 (28.6)	19 (73.1)	31 (44.3)	2 (33.3)	5 (62.5)
Chemical disinfection is easiest at source*	13 (86.7)	3 (75.0)	2 (100)	1 (14.3)	7 (26.9)	40 (57.1)	6 (100)	1 (12.5)
Treatment & Disposal method for each color coded bag*	8 (46.7)	0 (0)	0 (0)	2 (28.6)	8 (30.8)	7 (10.0)	2 (33.3)	2 (25.0)
Transmission of diseases through Biomedical waste*	15 (100)	4 (100)	2 (100)	0 (0)	14 (53.8)	69 (98.6)	6 (100)	2 (25.0)
Predominant source of injury	15 (100)	4 (100)	2 (100)	7 (100)	25 (96.2)	70 (100)	6 (100)	8 (100)
Predominant source of infection*	15 (100)	4 (100)	0 (0)	5 (71.4)	9 (34.6)	65 (92.9)	6 (100)	4 (50.0)
Benefits of safe management of BMW*	15 (100)	4 (100)	2 (100)	7 (100)	20 (76.9)	68 (97.1)	6 (100)	5 (62.5)

[#] Excluding veterinary staff. * Statistically significant. Figures in the parentheses are %

The table 3 shows that all the doctors (15), dental surgeons (4) and MPHSs (6) had knowledge regarding segregation of Biomedical waste at source. None of AYUSH medical officers had knowledge regarding segregation of Biomedical waste at source. The difference between various health functionaries of government health centres regarding segregation was statistically significant ($p=0.002$). Only 13 (18.6%) of the Multipurpose worker male & female and about two third (66.7%) doctors were having the knowledge regarding color coding of waste containers while knowledge of 21 (80.8%) staff nurses and 6 (75.0%) lab and X-ray technician was more in this context. The difference between various health functionaries of government health centres regarding color coding was statistically significant ($p=0.000$). Knowledge regarding disinfection was poor in all the government health functionaries except doctors 13 (86.7%) and staff nurses 19 (73.1%). The difference between various health functionaries of government health centres regarding disinfection was statistically significant ($p=0.007$).

Chemical disinfection is easiest at source was known only to 86.7% doctors, 75% of dentists, all AYUSH doctors & MPHS while only 14.3% pharmacists and 12.5% of lab & X-ray technicians knew this. The difference between various health functionaries of government health centres was statistically significant ($p=0.000$). Knowledge about treatment & disposal method for each color coded bag was very low among all the government health functionaries. Only 8 (46.7%) doctors and less than one third of other health functionaries were aware about treatment & disposal methods. The difference between various health functionaries of government health centres was statistically significant ($p=0.032$).

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DISCUSSION

The awareness among healthcare functionaries is essential for the adequate management of BMW. The overall awareness about BMW management was found maximum among medical professionals followed by paramedical staff. The present study showed that majority of the paramedical workers were quite aware about transmission of disease and predominant source of infection. Majority of the health functionaries were aware regarding benefits of safe management of BMW except lab & X-ray technicians (56.2%), Quacks (52.6%) and none of the private staff nurses knew this. Similar observations were noted by Pandit *et al.*, (2005) and Deo *et al.*, (2006) in their study regarding awareness and practices of Biomedical waste in Gujarat and Maharashtra respectively. Saini *et al.*, (2005) in their study reported that the people with higher education have more awareness about the issues and activities on Biomedical waste management further supporting the findings of present study. The knowledge regarding segregation is important in Biomedical waste management to prevent the mixing of hazardous and non-hazardous or domestic waste because according to WHO about 80-85% of the total hospital waste is not hazardous/infected (provided strict segregation is practiced). The remaining 15-20% is hazardous and can be injurious to humans or animals and deleterious to environment. However, if the infectious component is mixed with the general non-infectious waste, the entire bulk of hospital waste potentially becomes infectious.

The present study revealed that in government health centres all the doctors, all dental surgeons and all MPHSs (Male & female) had knowledge regarding segregation of BMW at source. None of AYUSH medical officers, only 13 (18.6%) of the MPHs (Male & female) and about two third (66.7%) doctors were having the knowledge regarding color coding of waste containers while knowledge of 21 (80.8%) staff nurses and 6 (75.0%) lab and X-ray technician was more in this context. The difference between various health functionaries of government health centres regarding color coding was statistically significant ($p=0.000$).

Although segregation at source is the golden rule of bio medical waste management and it should be known to each and every health care functionary. The low knowledge regarding segregation at source is surprising and worrying. Low level of knowledge is mainly attributed to poor training facilities in the study area. Hence training of both the technical staff and the nontechnical staff is critical for the proper and appropriate management of Biomedical waste.

Knowledge regarding disinfection was poor among all the government health functionaries except doctors 13 (86.7%) and staff nurses 19 (73.1%). The difference among various health functionaries was found statistically significant ($p=0.007$). None of the veterinary officers, private dentist, lab & X-ray technicians, staff nurse was having knowledge regarding disinfection. Similar findings were noted by Pandit NB et al. in their study regarding awareness and practices of Biomedical waste in Gujarat, they found that while government health functionaries knew about the disinfection of waste but because of lack of supply, they could not effectively implement the system and Private/Trust/NGO run hospitals were not aware of disinfecting method for waste (Pandit *et al.*, 2005).

Knowledge about treatment & disposal method for each color coded bag was very low among all the government health functionaries. Only 8 (46.7%) doctors and less than one third of other health functionaries were aware about treatment & disposal methods. The difference between various health functionaries was statistically significant ($p=0.032$). None of the AYUSH doctors was having knowledge about treatment & final disposal methods of Biomedical waste management. None of the private AYUSH doctors, dentists, staff nurses, lab & X-ray technicians had knowledge regarding treatment & final disposal methods of Biomedical waste management while only 1 (25%) private doctor and 1 (2.6%) quack knew about this. Poor knowledge regarding treatment & disposal methods was also observed by Shafee *et al.*, (2010) in a study conducted in Andhra Pradesh and found that only 14.4% subjects had knowledge about various methods of disposal of BMW.

Conclusion

The study of Biomedical waste management in the rural area has shed some light on the prevalent practices in dealing with the important issue of disposal of medical waste in healthcare establishments.

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These healthcare establishments were severely lacking in actions to dispose of the waste and uphold their statutory responsibilities. This is due to lack of education, awareness and trained personnel to manage the waste in the hospital, as well as the paucity of funds available to create a proper waste management system. The study concludes that healthcare waste management should go beyond data compilation, enforcement of regulations and acquisition of better equipment.

The study recommends that all the heads of the institutions, health care personnel of health care centres/units must undergo awareness programme to keep abreast with the current knowledge of scientific waste management system and its importance and benefits to the patients, staff and the community as a whole. There should be an induction training programme for both medical and non-medical staffs. The training should include the universal precautions, initial biohazard handling, safety policies, safety activities, safety equipment and materials, ongoing monitoring and potential exposure of staff. The healthcare functionaries must also be made aware regarding environmental issues relating to health care waste.

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