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A STUDY TO ASSESS THE KNOWLEDGE ABOUT THE BIO MEDICAL WASTE (MANAGEMENT & HANDLING) RULES 2011 AMONG THE PARAMEDICS AND LABORATORY TECHNICIANS OF A TERTIARY CARE HOSPITAL IN NORTH WEST INDIA

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HOW TO CITE THIS ARTICLE

Mitasha Singh, Abhilash Sood, Ashok Kumar Bhardwaj. "A Study to assess the Knowledge about the Bio Medical Waste (Management & Handling) Rules 2011 among the Paramedics and Laboratory Technicians of a Tertiary Care Hospital in North West India". Journal of Evolution of Medical and Dental Sciences 2015; Vol. 4, Issue 50, June 22; Page: 8661-8667, DOI: 10.14260/jemds/2015/1253

ABSTRACT: **BACKGROUND:** Bio Medical Waste (BMW) refers to the waste generated in a health care facility. It carries a high potential for infection and injury, both to the health care workers and the public. The Government of India framed the Bio Medical Waste (Management and Handling) Rules in the year 1998 and subsequently amended, the last amendments being in 2011. **OBJECTIVE:** To Assess the Knowledge with respect to the Biomedical Waste (Management &Handling) rules, 2011 among paramedical staff and interns of a tertiary care centre in North West India. **MATERIALS& METHODS:** It was a cross sectional study conducted at a tertiary care centre of North West India in the month of September and October 2014 through a self-administered questionnaire using convenience sampling on Paramedical staff and interns. **RESULTS:** Two hundred twenty questionnaires were distributed. Two hundred workers responded with a response rate of 91%. Out of the total 200 participants, 47% were laboratory technicians and 53% nursing staff and interns. Out of 72% who were trained in BMW management, 17% were laboratory technicians against 83% of nursing staff and interns. Knowledge about the new guidelines was seen among 72% but only 13 % knew it correctly. Majority of the participants (77%) were aware of hand washing as basic and important universal work precaution. **CONCLUSION:** The different categories of paramedical staff were aware about the importance of BMW but they were not fully aware with the latest guidelines of BMW rules. Lack of training was found to be one of the most important and common constraint for the paramedical staff.

KEYWORDS: Biomedical waste, Knowledge, Paramedical health care workers.

INTRODUCTION: Ministry of Environment and Forest (MoEF), Government of India has notified new Biomedical Rules, 2011 under Environment (Protection) Act, 1986 to replace the earlier Biomedical Waste Rules, 1998.¹ In developing countries like India an estimated 0.1 to 4.5kgs of waste is generated per bed each day.^{2,3} Since the implementation of the Biomedical Waste Management and Handling Rules (1998),⁴ every concerned health personnel is expected to have proper knowledge, practice, and capacity to guide others for waste collection and management, and proper handling techniques. But the change of the rules in the year 2011 needs to be inculcated in the health care delivery workers as soon as possible. Despite the formal notification, BMW management has been consistently overlooked by healthcare facilities across India, possibly due to ignorance, poor infrastructure or because of the absence of a model facility that can be emulated.⁵ Bio-medical waste management rules comprise of Schedule I: includes the eight categories of BMW. Schedule II: Color coding & type of container for disposal of BMW. Schedule III: Different labels for BMW containers &

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bags required for identification & safe handling of waste.⁴ The Bio Medical Waste (Management and Handling). Rules 1998 contained ten categories of wastes which have been reduced in the present rules to eight. The current rules have also cleared the confusion over the colour coding of the containers used for disposal of BMW and have clarified the ambiguity and allotted one colour code to each category of waste.¹

The BMW handler should wear all the protective gears i.e., mask, glove, boot, apron, etc. while handling of waste. Health care workers are at a risk of acquiring infection through occupational exposure and can transmit infections to patients and other employees.⁶ Hand washing has been observed as the most effective Universal health precaution.

In 2002, the results of a WHO assessment conducted in 22 developing countries showed that the proportion of healthcare facilities that do not use proper waste disposal methods range from 18% to 64%.⁷ This can possibly be attributed to lack of knowledge, lack of motivation amongst the staff and employees, ignorance about existing rules and simple dishonesty.⁵ The present study was conducted to assess the baseline knowledge of the Paramedical staff and interns of a tertiary care center in North west India regarding the BMW handling and management Rules, 2011.

MATERIAL AND METHODS: This was a cross sectional study conducted among the paramedical staff and interns working in Dr. Rajendra Prasad Government Medical College, Kangra at Tanda, Himachal Pradesh over a period of four weeks in the month of September and October 2014. The hospital in the Sub Himalayan region has bed strength of around 800.

A questionnaire was constructed to assess knowledge about the Bio Medical Waste (Management & Handling) Rules 2011 among the Paramedical and laboratory staff and interns based on a review of literature and similar studies conducted elsewhere. Thus a predesigned, pre-tested and self-administered multiple response questionnaire was provided 220 nursing staff, interns and paramedical interns using convenience sampling. All subjects were informed about the objectives of the study and assured that the information collected would be treated as confidential and used only for research purposes. Only those students who gave their verbal informed consent were administered the questionnaire. With a response rate of 91%, 200 paramedical staff and interns and lab technicians participated in the study. Due clarification was provided to subjects who asked for it regarding any of the item in the questionnaire. No names or other identifying information were included except the gender and age on the self-administered questionnaire to ensure anonymity. A descriptive statistical analysis was done by calculating means, percentages.

RESULTS: The study population comprised of 58% (116/200) females. The laboratory technicians contributed to 47% (94/200) and nursing staff and interns to 53% (106/200) of the total. The mean age of the participants was 23.8 ± 4.6 years.

The awareness about the term hospital waste management was present in 98.5% of the study population, with 75% acquiring the knowledge from their teachers and 15% from their colleagues. It was known to 91.5% of participants that the BMW management should be done at any health care institution. Non Infectious waste amounts to maximum waste was known to 51.5% of participants and 48.5% knew it to be infectious waste. Presence of Color coding for hospital waste was known to 97% and 93.5% were aware that there were 4 color coded bins in their working area, while 5.5% said that there are only 3 bins in their working area. (Table 1)

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Training has been imparted to 71.5% of the participants and among them 31.5% (45/143) has received it within 6 months to 1 year duration, 14% and 16% have received it beyond 1 year and 2 year respectively. Awareness about the presence of a committee on hospital waste management was seen among 67% of participants. The latest guidelines on BMW were known to 72.5% of participants, however 76% responded to number of categories in for BMW management as 10 and 13% as 8. Thirteen percent of all participants felt that BMW management helps in segregation, safe transportation of waste and reduction of injury to health care workers, 10% felt that it was of no use. 48.5% found this method of waste disposal cumbersome. (Table 2)

Table 3 represents the knowledge about universal health care precautions among the health care workers. Universal precaution as the best way for prevention of transmission of diseases was known to 77% of participants and hand washing as its basic component was answered by 82.5%. All the Personal protective equipment was known to 87% of participants.

DISCUSSION: India is struggling with double burden of infectious and non-infectious diseases. The 20% of all infectious diseases in developing world is attributed to hospital acquired infections (HAI). One of the major sources of these HAI is the improper handling and management of hospital waste and neglect towards Universal health precautions, which is the most cost effective preventive measure. In previous studies, it has been well documented that the level of knowledge of nursing staff in a hospital settings is the direct indicator of the patient care and patient safety component of quality services.⁸ In our study the knowledge about BMW was seen in > 90% participants. The results also revealed that the major source of information on BMW to these health personnel is their teachers (75.5%). Kanwar et al have also stressed on this aspect that the senior health personnel (Nurses and technicians) have a huge impact because they are the one who are guiding, teaching and supervising. So this is another category in which stress regarding education and improvement has to be laid upon.⁹

Periodic training at short intervals is important. Our study showed that around 72% have received training in BMW and 32% within a year. Aljabre et al gave a higher proportion of nurses (85%) and allied medical staff (83%) receiving past orientation or education exposure in waste management, also recent reorientation was imparted to 73% of nurses and 71% of allied medical staff.¹⁰

In our study majority of participants were aware of ten categories of BMW handling and management and 13% knew it to be eight. Due to the changes in the categories and deficiency of reorientation training, still the old rules are being followed although the new rules are less ambiguous and clearer. Only 13% knew the mechanisms how color coding helps in BMW management and half of the participants found the overall method cumbersome. The new rules will be of much help as it will be less cumbersome.

It is highly recommended in previous studies that mere hand washing can avert approximately 40-45% of infections,¹¹ in hospitals, which is reasonably a high success rate. In our hospital also more than three fourth were aware of universal work precautions and hand washing as its most important component. The findings were similar to Kanwar et al who included only nurses in their study.⁹

CONCLUSION: Knowledge is a set of understanding, one's capacity of imagining and way of perceiving health behavior.¹² However; this does not mean that this behavior will be followed. For this knowledge to be put into practice attitude and behavior change is needed. Continued education/

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training/skill development of the health care workers is an important step in improving the quality of services which will in turn lead to decrease in HAI. The participants of our study belong to a younger age group and are interns, hence the knowledge related to BMW is satisfactory but this knowledge needs to be continuously furnished. As these interns will be future health care workers, continuous orientation programmes and workshops are the best way to keep their knowledge updated.

Sl. No.	Questions	Response	Number (percentage)
1.	Heard about Hospital waste management	Yes	197(98.5)
		No	3(1.5)
2.	Source of knowledge about HWM	Television/internet	3(1.5)
		Teachers	151(75.5)
		Colleagues	30(15)
		Other source	12(6)
3.	Institutions which need BMW handling	Blood bank	4(2)
		Pathological laboratory	4(2)
		Veterinary institution	3(1.5)
		Dispensary	0
		Any health care institution	183(91.5)
4.	Source of Maximum waste	Infectious	97(48.5)
		Non infectious	103(51.5)
5.	Any color coding for hospital waste in your hospital?	Yes	194(97)
		No	2(1)
		Don't know	4(2)
6.	Number of bins in your ward/laboratory	3	11(5.5)
		4	187(93.5)
		5	0
		6	2(1)

Table 1: Knowledge of Paramedical staff (200) regarding Biomedical Waste management Rules

Sl. No.	Questions	Response	Number (percentage)
1.	Have you been imparted training in BMW?	Yes	143(71.5)
		No	57(28.5)
2.	Duration since your last training?	<6 months	38(19)
		6 month-1 year	45(22.5)
		>1 year	28(14)
		>2 year	32(16)
3.	Are you aware of latest guidelines of BMW management	Yes	145(72.5)
		No	55(27.5)

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4.	What is the number of categories in BMW management?	5	6(3)
		6	5(2.5)
		8	26(13)
		10	152(76)
		Don't know	11(5.5)
5.	Are there guidelines/ charts for management of BMW in your lab/ward as per CPCB?	Yes	167(83.5)
		No	26(13)
		Don't know	5(2.5)
	How is the color coding in waste management helpful?	Segregation of waste	76(38)
		Safe transportation of waste	31(15.5)
		Reduce risk of injury	51(25.5)
		All above	26(13)
6.	Is present method of disposing waste cumbersome	Not helpful	5(10)
		Yes	97(48.5)
7.	Is there a committee in your hospital on BMW management?	No	103(51.5)
		Yes	134(67)
		No	61(30.5)
		Don't know	5(2.5)

Table 2: Questions related to training and knowledge regarding implementation of rules in their hospital

Sl. No.	Questions	Response	Number (Percentage)
1.	Best way of personnel protection in prevention of transmission of diseases from health care waste	Immunization	23(11.5)
		Isolation of patients	20(10)
		Medical treatment	3(1.5)
		Follow universal precautions	154(77)
2.	What is the basic component of universal precautions?	Hand washing	165(82.5)
		Isolation of patient	2(1)
		Sterilization	19(9.5)
		Disinfection	14(7)
3.	Which are self-protection devices for waste handling staff?	Mask	10(5)
		Mask & glove	5(2.5)
		Mask, glove and boots	11(5.5)
		Mask, glove, boots and aprons	174(87)

Table 3: Knowledge of Universal work precautions

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FINANCIAL OR OTHER

COMPETING INTERESTS: None

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Date of Submission: 27/04/2015.

Date of Peer Review: 28/04/2015.

Date of Acceptance: 13/06/2015.

Date of Publishing: 19/06/2015.