Journal of Advanced Medical and Dental Sciences Research

@Society of Scientific Research and Studies ***NLM ID:*** *101716117*

Journal home page: www.jamdsr.com doi: 10.21276/jamdsr Index Copernicus value = 85.10

(e) ISSN Online: 2321-9599; (p) ISSN Print: 2348-6805

Original Research

Knowledge, Attitude and Practices among Medical Students on Biomedical Waste Management at Tertiary Care Hospital in Jammu

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ABSTRACT:

Background: The term 'Bio-medical waste' (BMW) means any waste, which is generated during the diagnosis, treatment or immunization of human beings or animals or research activities pertaining thereto or in the production or testing of biological or in health camps. 10–25% of health-care waste is regarded as "hazardous" and may pose a variety of environmental and health risks. So its proper management is social and legal responsibility. **Methods:** The present study was cross-sectional study which was conducted in the department of pharmacology and included 138 undergraduate students of second professional. The tool used for the study was self-developed questionnaire consisting of 18 questions to assess knowledge, attitude and practice among medical students on biomedical waste management. **Results:** Students showed satisfactory knowledge regarding health hazards associated with improper handling of BMW, colour coding of containers, biohazard symbol identification, types and sources of BMW. Gaps in knowledge were regarding disinfection of waste before disposal. Majority of the students had positive attitude and considered it as an important issue; but few considered it as extra work and financial burden. There were poor practices regarding segregation of general waste from clinical waste and proper disposal of waste. **Conclusions:** Present study revealed that although second professional undergraduate medical students had overall good knowledge and optimistic attitude ; but continuous educational and training programmes are needed to convert this knowledge into routine practices.

Keywords: Attitude, Biomedical waste, Knowledge, Medical students, Practice.

Received: 02/06/2020 **Modified:** 20/07/2020 **Accepted:** 24/07/2020

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This article may be cited as: Mehra A. Knowledge, Attitude and Practices among Medical Students on Biomedical Waste Management at Tertiary Care Hospital in Jammu. J Adv Med Dent Scie Res 2020;8(8):106-109.

INTRODUCTION

Biomedical waste management has recently emerged as an issue of major concern not only to hospitals, nursing home authorities but also to the environment. The term 'Bio-medical waste' (BMW) means any waste, which is generated during the diagnosis, treatment or immunization of human beings or animals or research activities pertaining thereto or in the production or testing of biological or in health camps.[1] This waste consists of the materials which have been in contact with the patient's blood, secretions, infected parts, biological liquids such as chemicals, medical supplies, medicines, lab discharge, sharps metallic and glassware, plastics etc. Between 75% and 90% of the waste produced by health-care providers is usually "non-hazardous" and the remaining 10–25% of health-care waste is regarded as "hazardous" and may pose a variety of environmental and health risks.[2] It is important to realize that if both these types are mixed together then the whole waste becomes harmful.

In India, Ministry of Environment and Forest, Government of India (1998) has notified Bio-medical Waste (Management & Handling) Rules -1998, which describes ten categories as Human anatomical waste, Animal waste, Microbiology waste and laboratory waste, Waste sharps, Discarded medicines, Solid waste, Infectious solid waste, Chemical waste, Liquid waste and Incineration ash. The rules makes it mandatory for

the health care establishments to segregate, disinfect and dispose their waste in an eco-friendly manner.[3] Three infections most commonly transmitted with BMW are Hepatitis B virus, Hepatitis C virus and Human immunodeficiency virus.[4,5] Tuberculosis, pneumonia, diarrhea diseases, tetanus, whooping cough etc., are other common diseases spread due to improper waste management.[6]

The safe and sustainable management of biomedical waste (BMW) is social and legal responsibility of all people supporting and financing health-care activities. The basic principle of BMW management is segregation at source and waste reduction.[7] BMW management is as important as treatment plan for medical professionals.[8] Biomedical waste treatment reduces hazards & renders it for subsequent handling & disposal. Incineration, autoclaving, bleach, sodium hydroxide, hypochlorite, alkaline digesters, heat & microwave are used to sterilize waste.[9]

Medical students will become future doctors and backbone of healthcare system. Any gap in knowledge, attitude and any inconsistency in practice regarding biomedical waste management should be identified and corrected accordingly. So the present study was planned with the aim to assess the Knowledge, attitude, practices (KAP) of biomedical waste management among medical students.

Aims and Objectives: To assess the Knowledge, attitude, practices (KAP) of Biomedical waste management among medical students.

MATERIALS AND METHODS: This was an observational, descriptive, cross sectional study which was conducted in department of Pharmacology. Ethical clearance was taken from Institutional Ethics Committee.

The study group comprised of medical students in our institution after taking their written informed consent.

Inclusion criteria

The second professional undergraduate medical students of either gender were included.

Exclusion criteria

Students not willing to give consent and those who were not present at the time of conduct of study were excluded from study.

The tool used for the study was a self-developed questionnaire that included both open and close ended questions regarding knowledge, attitude and practice of biomedical waste management. This final validated questionnaire written in English comprised of 18 questions. The students were instructed to record their responses without consulting fellow students or using resources like books, mobile etc.

The questions on knowledge evaluated the participant's knowledge on attributes related to the colour coding; identification of biomedical hazard symbol; types and sources of biomedical waste; health hazard associated with BMW; universal precautions; methods of disposal and disinfection of waste before disposal.

The questions on attitude appraised if biomedical waste management an important issue; does BMW management increase financial burden on hospital or was it extra burden on work. It also assesses willingness of students to attend educational programmes on BMW management.

The questions on practice evaluated if the students were immunized against hepatitis B and if they discard used needles in needle destroyer. Questions related to reporting of needle stick injuries and disposal of BMW waste in colour coded containers were also asked.

The identity of the study participants were maintained anonymous during the study.

Data entry was done in Microsoft Excel. Data was analysed and the results were expressed by descriptive statistics such as counts and percentages.

RESULTS

A total of 138 Second professional undergraduate medical student included in the study were analyzed for practice, attitude and knowledge about biomedical waste management. The results were evaluated across 3 domains for all the students. 83 (60.14%) were males and 55 (39.85%) were females. The mean age of students was 18.99±0.48 years.

All the students (100%) had knowledge regarding health hazard associated with biomedical waste if it is not handled properly. Knowledge with respect to Universal precautions was found in 88.4% of the students. About 86.95 % of the students were aware of colour coding of containers and segregation at source. Majority of the study participants had good knowledge of types and sources of BMW; biohazard symbol identification; methods of disposal of waste. Overall, the study respondents showed satisfactory knowledge regarding biomedical waste management. The gaps in knowledge were in the areas regarding disinfection of waste before disposal. (Table 1)

All students (100 %) concerned management of biomedical waste as an important issue. Almost all the participants stated the management and segregation of biomedical waste as collective responsibility of all health care staff. A very optimistic attitude was found with respect to willingness to attend education program on biomedical waste management among all students. 84 % of students were of opinion that colour coding is simple method of segregation of BMW. It was concerning that the lacuna in attitude domain was that biomedical waste management was considered as extra

burden on work and financial burden on Hospital by some students. (Table 2)

Almost all the students had taken vaccination against Hepatitis B. More than 82 % of students reported that they discard used needles in needle destroyer. Only 49 % of the students had practice of segregation of general waste from clinical waste. The practice of disposing biomedical waste in specified colour coded containers was reported quite less among students. (Table 3)

Table 1: Knowledge of participants regarding BMW management

BMW MANAGEMENT ELEMENTS	Medical students (138) n*(%)
Types and sources of BMW	110 (79.71)
Health hazard associated with BMWs if not handled properly	138 (100)
Colour coding of containers and segregation at source	120 (86.95)
Biohazard symbol identification	105 (76.08)
Disinfection of waste before disposal	101 (73.18)
Methods of BMW disposal	107 (77.53)
Universal precautions	122 (88.4)

*No. of correct responses

Table 2: Attitude of participants regarding BMW management

Questions asked	Medical students (138) n*(%)
BMW management is an important issue & must be followed Strictly	138 (100)
All healthcare staff are responsible for BMW management & segregation	130 (94.2)
Colour coding system is a simple method of segregation of BMW	117 (84.78)
It increases financial burden on hospital	43 (31.15)
It is an extra burden on work	18 (13.04)
Willing to attend educational program on BMW management	138 (100)

*Number of 'Yes' responses

Table 3: Practices of students regarding BMW management

Questions asked	Medical students (138) n*(%)
Do you dispose of BMW waste in specified colour coded container?	55 (39.85)
Do you discard used needles in needle destroyer?	114 (82.6)
Do you report needle stick and sharps injuries?	99 (71.73)
Have you taken vaccination against hepatitis B?	131 (94.92)
Do you segregate general waste from clinical waste?	68 (49.2%)

*Number of 'Yes' responses

DISCUSSION

The current study was conducted to assess the knowledge, attitude and practices regarding biomedical waste management of undergraduate medical students in our institution as they are going to be the backbone of the future health care system. The data analysis revealed that knowledge regarding BMW among medical students was satisfactory. Many studies across the country have shown good knowledge regarding BMW management among the medical students.

All the medical students in our study were fully aware of the health hazards associated with BMW which was higher in comparison to study by Kanchi P et al.[10] Knowledge regarding colour coding of containers and segregation of waste, which is the golden rule in the management of BMW was also higher among medical students in our study than many other studies.[10,11,12] But our participants were less aware than those in study by Anand P et al.[14] Also less percentage of students could identify the biohazard sign in our study than other studies. [10,13,14,15] When students were asked about the types and sources of biomedical waste, almost 79% answered correctly. This is in accordance to study by Pandey A et al.[14] It was observed, in our study, that there was a lack of knowledge about disinfection of waste before disposal and methods of disposal that needs to be addressed.

Our findings reveal that students had positive attitude towards BMW management and all the students were willing to attend educational program on BMW management. This is similar to that observed in study by Gupta NK et al.[15] All the students considered it an important issue; similar to that found in study by Kaur Najotra D et al.[11] Most of the students were of the opinion that colour coding is a simple method of segregation of biomedical waste. Some participants (31.15%) in our study felt that BMW is financial burden on hospital and some (13.04%) considered it as extra burden on work. This number is less than other studies.[13,15,16] The present study also revealed that not all the students were disposing BMW waste in specified colour coded container and segregating general waste from clinical waste. These findings were similar to other studies.[11] Majority of students (94.92%) had taken vaccination against Hepatitis B; this percentage is more than that in study by Parida A et al (66%).[12] In contrast to study by Kaur Najotra D et al, less percentage of students (71%) reported needle stick injuries in our study.[11] 82.6% of the students had the practice of discarding needles in needle destroyer. This is in accordance to study by Anand P et al.[13]

The findings of our study revealed that although students had satisfactory knowledge and favourable attitude; similar to other studies.[17-20] But the practices were not upto the mark. So regular educational and training programmes are needed.

CONCLUSION

Present study revealed that although second professional undergraduate medical students had overall good knowledge and optimistic attitude ; but there were still some scope of improvement for motivating them to convert this knowledge into routine practices. Correct Knowledge and practice regarding bio-medical waste management is essential to reduce the risk of transmission of disease and exposure to pathogens. The continuous education and training programmes are mandatory for Undergraduate medical students to improve the biomedical management.

ACKNOWLEDGEMENTS: Authors are thankful to Department of Pharmacology, Government Medical College Jammu

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