



## Original Research Article

# Knowledge attitude and practices of biomedical waste management among medical and nursing students in a teaching hospital of J & K, India

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## ABSTRACT

**Introduction:** Biomedical waste (BMW) management means to reduce waste generated from healthcare facilities and effectively segregate, collect, transport and dispose it in such a way that it is no more hazardous to HCW (healthcare workers), community or the environment. Lack of awareness and inadequate knowledge about BMW management can have serious consequences.

**Aims & Objectives:** To assess and compare the Knowledge, attitude, practices (KAP) of BMW management among medical and nursing students.

**Materials and Methods:** A cross sectional study was done at a tertiary care teaching hospital among medical and nursing students. A self administered, predesigned, pretested questionnaire was given to 140 participants and data analyzed by using Statistical Package for the Social Sciences version 21.

**Results:** Majority (80%) of the medical students were aware of the BMW rules whereas only 40% of the nursing students were aware of these rules. There was a statistically significant difference in the knowledge about various aspects of BMW management between the two groups of students. The students had an overall positive attitude towards BMW management but the difference was not significant between the groups. Practices of students regarding BMW management were relatively poor.

**Conclusion:** BMW management rules should be strictly implemented at all levels to convert knowledge into good practises. Appropriate training programs should be designed for the undergraduate medical and nursing students focussing on BMW management practises.

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## 1. Introduction

Bio Medical Waste as per Biomedical Waste (Management and Handling) rules 1998 means any waste, which is generated during the diagnosis, treatment or immunization of human beings or animals, or in research activities pertaining there to or in the production or testing of biological.<sup>1</sup> Bio Medical Waste Management includes segregation, storage, transportation, treatment, disposal and retrieving reusable materials from the BMW so that it is no more hazardous to HCW (healthcare workers), community or the environment.<sup>2-4</sup> According to the reports, it is alarming that almost 80% of medical waste are mixed with general waste, in developing countries.<sup>5</sup> Globally

there is an increased awareness about proper BMW handling and disposal but workers across India have reported unsatisfactory awareness level regarding proper BMW handling and disposal.<sup>6</sup> Lack of awareness and inadequate knowledge about biomedical waste handling and management leads to serious health consequences for humans, animals and has an enormous negative impact on the environment.<sup>5,7-9</sup> It is not only an occupational hazard to those who deal with BMW but also practices that HCW's learn in the beginning of their careers become habits which are difficult to change later on.<sup>10,11</sup>

Medical and nursing students are going to be the backbone of healthcare system in the future. Considering this BMW management is being taught in the undergraduate nursing and medical curriculum. Gaps in the knowledge, attitude and practice of effective BMW management

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by the students in every teaching hospital should be identified. Accordingly the future teaching and training strategies for the students can be planned to improve compliance and effective biomedical waste management in our country. Although there are many KAP studies on BMW management but to the best of our knowledge there is no study which has assessed and compared all the parameters like knowledge, attitude and practises regarding BMW management among medical & nursing students. With this background, present study was conducted with the aim to assess and compare the Knowledge, attitude, practices of BMW management among medical and nursing students of our institution.

## 2. Materials and Methods

A descriptive cross sectional study was done in a teaching hospital, by the Department of Microbiology among medical and nursing students. Prior approval was taken from the Institutional ethical committee. A self administered, predesigned, pretested questionnaire assessing knowledge, attitude and practices of BMW management was given to 140 participants after taking their written informed consent which included 70 final year MBBS students and 70 third year nursing students. The questionnaire was pretested on 10% of the study population to ascertain that it is easily understandable and answerable. The students involved in the pretesting were not included in the final study. The participants were asked to return the questionnaire within 10 minutes. The data was collected in a span of two months i.e in the month of February and March 2019 and was kept confidential. It was analyzed by using Statistical Package for the Social Sciences version 21. Chi-square test was used for the association between proportions and P-value of <0.05 was considered as statistically significant.

## 3. Results

A total of 140 students, including 70 final year MBBS students and 70 third year nursing students participated in the study. The results of the study clearly depict that the knowledge of medical students regarding most aspects of BMW management was significantly higher than nursing students with P value <0.05. Awareness of BMW management rules was 80% amongst the medical students whereas only 40% nursing students were aware of the same. Medical students had excellent knowledge of health hazard associated with BMW (100%) where as only 64.3% of nursing students knew about it. More than 95% of the medical students were aware of the types and sources of BMW, biohazard symbol identification and universal precautions while only 40% of the nursing students knew the biohazard symbol and only 60-80% of them were aware of types and sources of BMW & universal precautions respectively. On comparison of knowledge of students about

colour coding of containers and segregation, the difference was found insignificant (Table 1).

The students had an overall favourable and positive attitude towards BMW management but the difference was not significant between the groups. All students thought that BMW management is an important issue & must be followed strictly. Majority of the students (85-89%) believed that BMW management is a team work. Around 60-65% of the students considered BMW management as financial burden on the hospital and around 30-35% students also considered it as extra burden on work. Hundred percent of the medical students and majority of the nursing students were willing to attend educational program on BMW management. (Table 2)

Practices of students regarding BMW segregation and disposal were relatively poor and in most of the aspects the difference between the groups was statistically insignificant. Only 38-55% of the students did proper segregation and disposal in properly colour coded bin. Eighty four to ninety percent medical students discarded the needles correctly and wore PPE where as only 85-87% nursing students followed the same. Very few students had undergone any kind of training for BMW management (10-15.7%). Majority of the medical students (95.7%) reported on needle stick injury and were vaccinated against hepatitis B. This was significant in comparison to nursing students amongst whom only 75.7% reported, on needle stick injury and only 60% were vaccinated. (Table 3)

## 4. Discussion

The current study was conducted to assess the knowledge, attitude and practices regarding biomedical waste management of 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 good and it was much better compared to nursing students. Many studies across the country have shown good knowledge regarding BMW management among the medical students.<sup>11-13</sup> All the medical students in our study were fully aware of the health hazards associated with BMW which was higher in comparison to other studies.<sup>12-14</sup> The nursing students were less aware of health hazard of BMW In comparison to other reports.<sup>11,13</sup> The knowledge of relevant legislations amongst our students was much better than reported by other workers.<sup>11-14</sup> Knowledge regarding colour coding of containers and segregation was also higher among both medical & nursing students in our study than many other studies.<sup>11-14</sup> The knowledge about BMW storage and its time limit amongst medical students was higher and amongst the nursing students was lower compared to other studies.<sup>12,13</sup> More percentage of students could identify the biohazard sign in our study.<sup>13,14</sup> Lower percentage of students in our study knew about BMW disposal/ treatment

**Table 1:** Knowledge of participants regarding BMW management

BMW Management Elements	Medical students (70) n*(%)	Nursing students (70) n*(%)	P value
Awareness of BMW management rules	56 (80%)	35 (40%)	0.001
Types and sources of BMW	67 (95.7%)	42 (60%)	0.001
Health hazard associated with BMWs if not handled properly	70 (100%)	45 (64.3%)	0.001
Colour coding of containers and segregation at source	59 (84.2%)	48 (68.6%)	0.28
Biohazard symbol identification	68 (97.1%)	28 (40%)	0.001
Disinfection of waste before disposal	49 (70%)	27 (38.6%)	0.001
Methods of BMW disposal	59 (84.3%)	30 (42.9%)	0.001
BMW Storage /Maximum storage time limit for untreated waste	42 (60%)	27 (38.6%)	0.011
Universal precautions	69 (98.6%)	56(80%)	0.001

\*No. of correct responses

**Table 2:** Attitude of participants regarding BMW management

Questions asked	Medical students (70) n*(%)	Nursing students (70) n*(%)	P value
BMW management is an important issue & must be followed Strictly	70 (100%)	70 (100%)	0.99
All healthcare staff are responsible for BMW management & segregation	60 (85.7%)	62(88.6%)	0.66
Colour coding system is a simple method of segregation of BMW	49 (70%)	45 (64.3%)	0.57
It increases financial burden on hospital	44 (62.9)%	46 (65.7)%	0.55
It is an extra burden on work	21 (30%)	25 (35.7%)	0.31
Willing to attend educational program on BMW management	70 (100%)	65(92.9%)	0.2

\*No. of positive responses

**Table 3:** Practices of students regarding BMW management

Questions asked	Medical students (70) n*(%)	Nursing students (70) n*(%)	P value
Do you segregate general waste from clinical waste?	39 (55.7%)	37 (52.9%)	0.70
Do you dispose of BMW waste in specified colour coded containers	28 (40%)	27 (38.5%)	0.58
Discard used needles in needle destroyer	59 (84.2%)	60 (85.7%)	0.71
Do you wear PPE while handling BMW?	63 (90%)	62 (88.6%)	0.63
Have you ever undergone training for bio-medical waste management?	7 (10%)	11 (15.7%)	0.23
Do you record and report needle stick and sharps injuries?	67 (95.7%)	53 (75.7%)	0.0019
Have you taken vaccination against hepatitis B?	67 (95.7%)	42 (60%)	0.001

\*No. of positive responses

methods than other studies.<sup>11,13</sup>

The students had a very favourable attitude regarding BMW management in our study and most of them were willing to attend educational program on BMW management and it was better than reported by other workers.<sup>11,12</sup> More students in our study felt responsible for BMW management & segregation and considered colour coding system as a simple method compared to other studies.<sup>11</sup> More percentage of students in our study considered BMW management as financial burden and an extra burden on work in comparison to other reports.<sup>11</sup>

The practises of students regarding BMW management were not up to the mark in our study. Although medical students had better practises than nursing students. Majority of the students in our study reported needle stick injuries which is much better than other studies.<sup>12,15</sup> Compliance of segregation of general waste from clinical waste and disposal of BMW waste in specified colour coded containers was low in our study in comparison to some studies.<sup>12,15</sup> Ninety percent of the medical students wore PPE while handling BMW whereas a study has reported 100% compliance in wearing PPE.<sup>12</sup> The compliance of nursing students in wearing PPE was better than that reported from Ranchi.<sup>15</sup>

So, there is lot to be desired as far as practises regarding BMW management is concerned, in spite of having good level of knowledge and a positive attitude. Most likely reason for this is that in our institution BMW management is stressed upon theoretically in the undergraduate curriculum but only 10-15% of students had undergone any formal training for BMW management. So this gap between knowledge and practise can be bridged by giving them hands on training by organizing workshops. Also, undergraduate nursing curriculum needs further strengthening as there is a significant difference between the knowledge level of medical & nursing students.

## 5. Conclusion

BMW management rules should be strictly implemented at all levels to convert knowledge into good practises. Appropriate training programs should be designed for the undergraduate medical and nursing students focussing on BMW management practises to keep the students updated and reinforce the good BMW management practises.

## 6. Source of Funding

None.

## 7. Conflict of Interest

None.

## References

1. Biomedical Waste (Management and Handling) Rules 1998, 2000, Ministry of Environment and Forests Notification, New Delhi.

2. Asadullah MD, Karthik GK, Dharmappa B. A study on knowledge, attitude and practices regarding biomedical waste management among nursing staff in private hospitals in Udupi city, Karnataka, India. *Int J Geol, Earth Environ Sci.* 2013;3(1):118-23.
3. Singh A, Kumari R, Wakhlu A, Srivastava K, Wakhlu A, Kumar S. Assessment of biomedical waste management in a government healthcare setting of North India. *Int J Health Sci Res.* 2014;4(11):203-8.
4. Guidelines for protecting the safety and health of health workers. NIOSH /Health Care Workers guidelines / Chap 6.
5. Singh VP, Biswas G, Sharma JJ. Biomedical waste management - An emerging concern in Indian hospitals. *Indian J Forensic Med Toxicol.* 2007;1:39-44.
6. Mathur V, Hassan MA, Dwivedi S, Misra RP. Knowledge, attitude, and practices about biomedical waste management among healthcare personnel: A cross-sectional study. *Indian J Community Med.* 2011;36(2):143-5.
7. Oyefabi AOM, Yahuza BS. Ethical issues in knowledge, perceptions, and exposure to hospital hazards by patient relatives in a tertiary institution in North Western Nigeria. *Niger J Clin Pract.* 2016;19(5):622-31.
8. Tabasi R, Marthandan G. Clinical waste management: A review on important factors in clinical waste generation rate. *Int J Sc Technol.* 2013;3:194-200.
9. Modak P, Wilson DC, Velis C. Waste Management: Global Status in Global Waste Management Outlook. Geneva: United Nations Environmental Programme; 2015.
10. Glenn M, Garwal R. Clinical waste in Developing Countries. An analysis with a Case Study of India, and a Critique of the Basle TWG Guidelines; 1999.
11. Pinto VN, Joshi SM, Velankar DH, Mankar MJ, Bakshi H, Nalgundwar A. A comparative study of knowledge and attitudes regarding biomedical waste (BMW) management with a preliminary intervention in an academic hospital. *Int J Med Public Health.* 2014;4(1):91-5.
12. Kumar M, Kushwaha R, Kumari M, Singh G, Kumari R. Knowledge, awareness, attitude regarding biomedical waste management among medical students in a tertiary care centre: A cross sectional Study. *PARIPEX Indian J Res.* 2017;6(4):611-4.
13. Ukey UU, Kambatla R, Dash S, Naidu NA, Kulkarni VP. Awareness about Biomedical Waste Management in Undergraduate Medical and Nursing Students at a Teaching Institute in Vizianagaram, Andhra Pradesh. *Natl J Community Med.* 2012;3(3):428-32.
14. Singh LD. Knowledge on Biomedical Waste Management among Medical Students in RIMS. *IOSR J Dent Med Sci.* 2018;17(1):40-3.
15. Haider S, Kumari S, Kashyap V, Sunderam S, Singh SB. A study on knowledge and practice regarding biomedical waste management among staff nurses and nursing students of Rajendra Institute of Medical Sciences, Ranchi. *Indian J Comm Health.* 2015;27:135-8.

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