SHORT ARTICLE

A study on knowledge and practice regarding biomedical waste management among staff nurses and nursing students of Rajendra Institute of Medical Sciences, Ranchi

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Abstract

Background: Hospitals are the centre of cure and also the important centres of infectious waste generation. Effective management of Biomedical Waste (BMW) is not only a legal necessity but also a social responsibility. **Aims and Objectives:** To assess the knowledge and practice in managing the biomedical wastes among nursing staff and student nurses in RIMS, Ranchi. **Materials and methods**: The study was conducted at RIMS, Ranchi from Oct 2013 to March 2014 (6 months). It was a descriptive, hospital based, cross-sectional study. A total of 240 nurses participated in the present study, randomly chosen from various departments A pre-designed, pre-tested, structured proforma was used for data collection after getting their informed consent. Self-made scoring system was used to categorize the participants as having good, average and poor scores. Data was tabulated and analyzed using percentages and chi-square test. **Results:** The knowledge regarding general information about BMW management was assessed(with scores 0-8),it was found that level of knowledge was better in student nurses than staff nurses as student nurses scored good(6-8correct answers) in more than half of the questions (65%).Whereas staff nurses scored good in only 33.33% questions. When the practical information regarding the BMW management is assessed (with scores 0-8), it was found that staff nurses had relatively better practice regarding BMW management than students as they scored good(6-8correct answers) in 40% and 30% respectively. **Conclusion**: Though overall knowledge of study participants was good but still they need good quality training to improve their current knowledge about BMW.

Key Words

Biomedical waste management; nursing staff; student nurses; scoring system

Introduction

Over the years, there have been tremendous advances in the health care system so it is ironic that a health care setting, which restore and maintain community health, also threatens patient's well-being. One major threat arises from poor waste management practices, which pose a huge risk to the health of the public, patients and professionals and contribute to environment degradation.(1)

Biomedical waste is a global issue today. BMW is waste generated during diagnosis, treatment or immunization of human beings or animals, or in research activities pertaining thereto, or in the production and testing of biological and is contaminated with human fluids.(2) It is important to note that not all hospital waste has the potential to transmit infection. It is estimated that 80-85% is non-infectious general waste, 10% is infectious and 5% is other hazardous waste. (3) However, if the infectious

components get mixed with the general waste, the entire bulk of hospital waste potentially becomes infectious. (4)

Approximately 1.45 kg waste is generated per patient per day in Indian hospitals, it is as high as 4.5 kg in developed countries.(5) In Jharkhand, 5000 kg of biomedical waste are generated per day from more than 700 medical facilities, including hospitals and nursing homes with a combined capacity of 16,866 beds.(6) Thus all the hospital care personnel are at risk to get many fatal infections like HIV, HBV, HCV and injuries by these infectious materials.(7) According to WHO, the inappropriate healthcare waste management globally caused 21 million hepatitis B virus (HBV) infections (32% of all new infections); 2 million hepatitis C virus (HCV) infections (40% of all new cases); 260,000 HIV infections (5% of all new cases) in 2000. Epidemiological studies indicate that a person who experiences one needle stick injury from a needle used on an infected source patient has risks of 30%, 1.8%, and 0.3% respectively of becoming infected with HBV, HCV and HIV.(8)

Safe and effective management of waste is not only a legal necessity but also a social responsibility.(9) Inadequate and inappropriate knowledge of handling health care waste may have serious health consequences. An effective communication strategy is imperative, keeping in view the low awareness level among different category of staff in the health care establishments regarding biomedical waste management. (10)

Among the health care providing team, nurses play a crucial role in proper disposal of hospital wastes. They come in very early step in the chain of hospital waste management process. Also, adequate knowledge of nurse about various steps of waste management is very important for the success of any health care waste management program.

Aims & Objectives

Therefore, the present study was conducted to assess the level of knowledge and practice among staff nurses and nursing students with the following aims and objectives-

1. To assess the knowledge regarding hospital waste management among nurses in RIMS.
2. To know their actual mode of practice in managing the disposal of hospital waste in RIMS

Material and Methods

The study was conducted at RIMS, Ranchi. The institute is a tertiary care centre catering almost entire state and bordering districts of neighboring states. The study was conducted from Oct.2013 to March 2014(6 months).It was a descriptive, hospital based, cross-sectional study. A total of 240 nurses participated in the present study of which 120 were staff nurses and 120 were B.Sc nursing students, randomly chosen from various departments of the hospital. The participants were explained about the objective of the study.

A pre-designed, pre-tested, structured proforma was used for data collection from all the study participants after getting their informed consent and confidentiality was assured. Study proforma contains 2 set of questions concerning the knowledge and practice on the subject. Each correct question scores one mark. Self-made scoring system was used to categorize the participants as having good, average and poor scores

Knowledge and practice scoring of nurses			
Sl. no.	Scoring	Correct answers	Total 8 correct Answers
1	Poor	<3	
2	Average	3-5	
3	Good	6-8	

After collection of data, information gathered was entered into Microsoft excel 2007 version. Data was tabulated and analyzed using percentages and chi-square test.

Results

This study was conducted among nurses of RIMS, Ranchi regarding the knowledge and practices on hospital waste management. Nurses are the backbone of hospital management.

This study (Table 1) shows that regarding existence of BMW management/handling rule 1998, only 56.67% staff nurses were aware but it was significantly better in student nurses as 70.83% knew about this. In the same way, biohazard symbol was rightly identified by 76.67% of students while only 51.67% of staff nurses recognized correctly. It is alarming to note that 73.33% of students and only 46.67% of staff nurses knew that 10-25% of hospital waste is infectious. Regarding components of colour coded containers; students had a better knowledge than staff nurses that is 75% and 53.33% respectively. Diseases transmitted by BMW, if not properly managed were known by 60% of staff nurses while a higher proportion i.e. 78.33% students were aware of the same. Only about 20% students and 35% staff nurses said that they were sensitized /trained about hospital waste management during their work period.

Regarding practice assessment (table 2) it was found that 61.67% staff nurses maintained BMW records at

their work place while only 43.33% students used to do this. Majority of staff nurses (73.33%) and 60% students and were using personal protective measures while handling BMW. Among all nurses, 51.67% staff nurses and 41.67% students said that there is no proper storage facility for collecting BMW at work site. It was very surprising that only 23.33% staff nurses and 18.33% students were having some records for injuries related to BMW. More than half of the staff nurses i.e. 51.67% while a very few students i.e.20% knew the place where BMW treated.

The knowledge regarding general information about BMW management was assessed (with scores 0-8),it was found that level of knowledge was better in student nurses than staff nurses as student nurses scored good(6-8correct answers) in more than half of the questions (65%).Whereas staff nurses scored good in only 33.33% questions. This was also statistically significant (table 3).

When the practical information regarding the BMW management is assessed(with scores 0-8) , it was found that staff nurses had relatively better practice regarding BMW management than students as they scored good(6-8correct answers) in 40% and 30% respectively. Only 8.33% staff nurses scored poor (<3correct answers) but higher number of student nurses i.e. 26.67% scored poor. It was also statistically significant (table 4).

Discussion

This cross-sectional study targeted at assessing the knowledge, attitude and practice about the hospital waste management. The lower level of knowledge about hospital waste handling may have direct impact on the overall process of safe disposal of hospital waste which may lead to spread of disease to the community.

Though overall knowledge of study participants was good but still they need good quality training to improve their current knowledge about BMW. It revealed that knowledge score of students was better than staff nurses. When inquired about the same, it was found that as BMW management was included in their curriculum so they remembered the whole concept. Whereas staff nurses should get periodic training on the issue which would help them in refreshing their knowledge and keeping updated for maintaining high standards. The present study findings are in contrast to a similar study done by Girish *et al* in central Karnataka, (11) where staff nurses had better level of knowledge then student nurses. About practice assessment, it was found that staff nurses had relatively better practice score than student nurses. This was due to more years of exposure in staff nurses making them to practice BMW in a better way than students. As students had less years of exposure, though their knowledge was good but they lack practical aspect of BMW management. Overall, practice assessment was found to be average in both groups. In a similar study done in Lucknow (12) amongst staff of institutional trauma centre II concluded that 65% of the nurses were practicing more than 70% of the correct practices as per the norms of the university. A similar study done by Pallavi V Tenglikar *et al* (13)amongst staffs of nursing homes of Gulbarga city revealed that practical information regarding BMW management was assessed(with scores 0-35), the average score was maximum in housing staff (17.32/35) followed by nursing staff (15.75/35) and least in doctors (7.36/35).In this study also, nurses scored average.

Conclusion

This study revealed that though overall knowledge of study participants was good but still they need good quality training to improve their current knowledge about BMW. The lower level of awareness about hospital waste handling may have direct impact on the overall process of safe disposal of hospital waste. For this, there is a need for intensive training programs at regular time interval to repeatedly train and retrain all the staff, which may include question raising and problem solving approach. Score cards may be introduced in the work certificate which will record the proper BMW practice monitored by departmental authority. Prizes and consolations can be strongly effective in motivating and educating the nurses for proper BMW handling. There should be an inspecting body in hospital itself to check the violation of BMW rules. There should be time to time informative session about newer way of scientific, safe and cost effective management of the waste and to sensitize them to the needs of BMW management in the hospital.

References

1. Ramandeep S Narang, Adesh Manchanda, Simarpreet Singh, Nitin Verma, Sarfaraz Padda. Awareness of biomedical waste management among dental professionals and auxiliary staff in Amritsar, India. OHDM; 2012 December;11(4).
2. Das NK, Prasad S, Jayaram K. A TQM approach to implementation of handling and management of hospital

waste in Tata Main Hospital. Issued by Hospital waste management committee, T.M.H.2001;11-12(1-2):75-8.
3. Manual on hospital waste management. Central pollution control board, CPCB, Delhi.2000.
4. Available from:http://pib.nic.in/infonug/infaug.99/i30089991.html.[accessed on May 25th, 2008.Info Nugget. 2003 Hospital waste management and bio-degradable waste].
5. Saini S, Nagarajan S.S. and Sarma R.K. Knowledge, Attitude and Practice of Bio-medical waste management amongst staff of a tertiary level hospital in India. Ind Medica Journal of the Academy of hospital administration 2005;17:2. Available at http://www.indmedica.com/journals.
6. Available from:www.dailypioneer.com/…/ranchi/pollution-board-irked-at-poor-biomedical-waste-treatment.html.15 Sept.2013
7. Saraf Y, Shinde M, Tiwari SC. Study of awareness about hospital waste management among personnel and quantification. Indian Journal of Community Medicine, April-June 2006; 31(2):11.
8. WHO factsheet No253.Nov.2011 Available from:www.who.int/mediacentre/factsheets/fs253/en/.
9. Mathur V, Dwivedi S, Hassan MA, Misra RP. Knowledge, attitude and practices about biomedical waste management among healthcare personnel: A cross-sectional study. Indian J Community Med 2011;36:143-5.
10. Hedge V, Kulkarni RD, Ajantha S. Biomedical waste management. Journal of Oral Maxillofacial pathology 2007; 11(1):5-9.
11. HO Girish, Aswin Kumar, Raghavendraswamy koppad, Sudhir Prabhu, Divya HM. Awareness about hospital waste management among nursing students and staff nurses in Central Karnataka, India: Across-sectional study. International Journal of Medical and Applied Sciences.
12. Singh Ajai, Srivastava Rajeshwar Nath. Knowledge, attitude and practices of bio-medical waste management amongst staff of institutional trauma centre level II, International Journal of Research in Health Sciences(Supplement)July-Sept.2013;1(2).
13. Pallavi V. Tenglikar, G. Ajay Kumar, R. Kapate, Srinivas Reddy, Vijaynath. V. Knowledge, attitude and practices of health care waste management amongst staff of nursing homes of Gulbarga city. Journal of Pharmaceutical and Biomedical Sciences. 2012;19(19).

Tables

TABLE 1 KNOWLEDGE ABOUT BMW AND ITS MANAGEMENT AMONG NURSES

Questions	Student nurses (n=120) Number(%)	Staff nurses(n=120) Number(%)	Total(n=240) Number(%)
1.Existence of BMW management & handling rule,1998	85(70.83%)	68(56.67%)	153(63.75%)
2.Know different categories of waste	78(65.00%)	52(43.33%)	130(54.17%)
3.Recognize biohazard symbol	92(76.67%)	62(51.67%)	154(64.17%)
4.Proportion of hospital waste that are hazardous	88(73.33%)	56(46.67%)	144(60.00%)
5.Know components of colour coded containers	90(75.00%)	64(53.33%)	154(64.17%)
6.Correct segregation of all colour coded containers	86(71.67%)	60(50.00%)	146(60.83%)
7.Diseases transmitted by BMW, if not properly managed	94(78.33%)	72(60.00%)	166(69.17%)
8.Recieved any training on BMW management	24(20.00%)	42(35.00%)	66(27.5%)

TABLE 2 PRACTICE ASSESSMENT REGARDING BIO-MEDICAL WASTE

Questions	Student nurses (n=120) Number (%)	Staff nurses(n=120) Number (%)	Total(n=240) Number (%)
1.Maintaining BMW records at work site	52(43.33%)	74(61.67%)	126(52.5%)
2.Segregation of BMW done at work site	60(50.00%)	72(60.00%)	132(55.0%)
3.Disinfection of BMW done before disposal at work site	58(48.33%)	78(65.00%)	136(56.67%)
4.Using personal protective measures while handling BMW	72(60.00%)	88(73.33%)	160(66.67%)
5.Proper storage facility provided for collecting BMW at work site	50(41.67%)	62(51.67%)	112(46.67%)
6.Provided with hub cutters for needles and syringes	32(26.67%)	42(35.00%)	74(30.83%)
7.Any record available for injuries related to BMW	22(18.33%)	28(23.33%)	50(20.83%)
8.Know the place where BMW treated	24(20.00%)	62(51.67%)	86(35.83%)

TABLE 3 ASSOCIATION BETWEEN GRADE OF NURSES WITH THEIR LEVEL OF KNOWLEDGE (N=240)

Grade of nurses	Good	Average	Poor	Total	Degree of freedom	Chi square value		P value
						Cal.	Tab.	
Student nurses	38(31.67%)	62(51.67%)	20(16.67%)	120	2	24.1	5.99	<0.05
Staff nurses	44(36.67%)	58(48.33%)	18(15.00%)	120				

TABLE 4 ASSOCITION BETWEEN GRADES OF NURSES WITH THEIR MODE OF PRACTICE (N=240)

Grade of nurses	Good	Average	Poor	Total	Degree of freedom	Chi square value		P value
						Cal.	Tab.	
Student nurses	36(30.00%)	52(43.33%)	32(26.67%)	120	2	14.12	5.99	<0.05
Staff nurses	48(40.00%)	62(51.67%)	10(8.33%)	120				