ORIGINAL ARTICLE
pISSN 0976 3325 | eISSN 2229 6816
Open Access Article
www.njcmindia.org

KNOWLEDGE, ATTITUDE & PRACTICES RELATED TO BIOMEDICAL WASTE MANAGEMENT AMONG THE NURSING STAFF OF A TERTIARY CARE RURAL HOSPITAL OF GUJARAT, INDIA

Dinesh Kumar[1], Dipkala Jayswal[2], Suman Singh[3]

Financial Support: Partial supported by ICMR STS 2014
Conflict of interest: None declared

How to cite this article:
Kumar D, Jayswal D, Singh S. Knowledge, Attitude & Practices Related to Biomedical Waste Management among The Nursing Staff of A Tertiary Care Rural Hospital of Gujarat, India. Ntl J Community Med 2016; 7(5):372-376.

Author's Affiliation:
[1]Associate Professor, Dept of Community Medicine; [2]MBBS-Students;
[3]Professor, Dept of Microbiology, Pramukhswami, Medical College, Karamsad

Correspondence:
Dr. Dinesh Kumar
drdineshkl@charutarhealth.org

Date of Submission: 27-01-16
Date of Acceptance: 02-05-16
Date of Publication: 31-05-16

ABSTRACT

Background: Nurses constitute one of the largest and most important healthcare personnel category for biomedical waste generation (BMW) and handling.

Methods: Cross-section study using an anonymous, semi-structured, self-administered, pre-tested questionnaire on BMW knowledge, attitude and practices.

Results: Of the 300 respondents 262 (87.3%) were female, 247 (82.3%) had General Nursing and Midwifery qualification, 131 (43.6 %) worked in critical areas. The mean age was 29.8 (SD = 8.37) years, mean work experience was 7.38 (SD = 7.63) years. The scores in domain of policy knowledge was highest and institute specific knowledge was least. Overall knowledge about BMW was found to be better among female nurses (p=0.044). Positive attitude towards BMW management was significantly better among nurses working in critical care areas (p <0.001). Majority i.e. 288 (96.0%) nurses used personal protection equipment. The needle stick injury rate and needle recapping practices were 5% each. Needle stick injuries were more common among those working in critical area. 96% of the nurses had attended sessions on BMW management.

Conclusions: BMW knowledge, attitude and practices among nurses were better than those reported in literature. However scope for further improvement in attitude and good practices does exist.

Key words: Biomedical waste management, Hospital infection prevention, Nurses, Nursing practices

INTRODUCTION

Medical advances have brought several benefits to the humanity. It is also associated with several hazards, including the biomedical waste. Bio-Medical Waste (BMW) is defined as any waste, which is generated during the diagnosis, treatment, or immunization of human being or animal or in research activities pertaining thereto or in the production or testing of biological.[1] Annually about 0.33 million tons of BMW is generated in India.[2] BMW is special in terms of its composition, quantity, & their potential hazardous effect and require special mechanisms for effective management. Reports of BMW being recirculated and causing serious public health problems have been reported especially in developing countries like India.[3] The objective of BMW management is to reduce waste generation, to ensure its efficient collection, handling as well as safe disposal, to control infection & improves safety for employees working in the system.[4] For this to happen, conscious, coor-

dinated & co-operative efforts have to be made by all healthcare staff.

Being at the high risk for hazard from biomedical waste the health personnel needs to be very vigilant. However several studies have shown that the knowledge, attitude and practices of the health personnel across all categories is unsatisfactory.[5-7] Studies have reported that the majority of doctors, nurses & housekeepers have inadequate knowledge & unsatisfactory practices related to biomedical waste management. Some studies reveal that the knowledge regarding biomedical waste is less among nurses as compared to doctors.[5-6] However the nurses have better knowledge, attitude, & practice of biomedical waste management when compared to housekeeping & technical staff. [6, 7] Some studies report better attitude and waste segregation practices among nurses & laboratory staff as compared to doctors .[7-9] Overall knowledge among nurses has been found to be satisfactory in some studies [10,11] and lacking in some.[12]

Nurses usually constitute one of the largest proportion of the health professional in the hospitals. They share major responsibility in waste generation & management since they are with the patient 24 hours a day & 7 days a week. They are most likely to face the adverse effects of poor biomedical practices. They serve as a vital link for translating the institutional bio-medical waste handling policies into action by the less qualified sanitary staff. Nurses are therefore most important among both waste producers and handlers. It is important to assess their knowledge, attitude & practice related to BMW and hence we focused on this group in our study.

MATERIAL & METHODS

A descriptive cross-sectional study was conducted in a rural tertiary care teaching hospital of Gujarat, India, after approval from the Institutional Ethics Committee. The study was carried out from January 2014 to September 2014 among the nursing staff. Data was collected using a semi-structured, self-administered questionnaire in Gujarati language. The questions were categorized in three sets with questions each on knowledge, attitude & practice. The questionnaire was developed by the investigators using the information available in literature and also in the Biomedical waste rules. There were some questions related to bio-medical waste management practices in the institute based on the institutional policy documents. The questionnaire was validated by reviewing it with the Hospital Infection Control Committee and public health expert. The questionnaire was pretested on a subset of nurses for validation. A list of nursing staff was obtained from the nursing office. Only the staff who was working in the institute for more than one month were included in the study. Informed consent was taken from the study participants. The study participants were approached at their workplace, provided questionnaire and responses were collected next day. In all 350 questionnaires were distributed. There were 27 questions covering four domains namely policy knowledge, knowledge about guidelines, attitude and practices of the nurses regarding the BMW management All the questions were provided equal weightage while calculating the scores. Though the attitude questions had three options namely agree, disagree and no opinion, only one attitude was correct and questions were scored accordingly. Scores were calculated separately for each domain. Separate scores were also calculated for institute specific knowledge about the bio medical waste management policy and implementation strategy. Total BMW management knowledge score was obtained by adding above two scores. The data was entered in Microsoft Excel spread sheet and analyzed using Epi-Info version 6. (open access software from Centre for Disease Control, Atlanta, USA)

RESULTS

Of the 350 questionnaires distributed 300 (85.7%) were returned. There were 262 (87.3%) female and 38 (12.7%) male participants. Most of the nurses i.e. 247 (82.3%) had General Nursing and Midwifery (GNM) qualification. The mean age was 29.8 (± 0.96) years. The mean work experience was 7.38 (± 0.88) years.

Table1. Distribution of age and work experience among the study participants (n=300)

Variables	Frequency (%)
Age (n=300)	
19 years	4 (1.3)
20-29 years	189 (63.0)
30-39 years	62 (20.7)
40-49 years	31(10.3)
>50 years	14 (4.7)
Work experience (n=296)	
1 year or less	47 (15.9)
1-5 years	137 (46.3)
5.1-10 years	32 (10.8)
10.1-20 years	54 (18.2)
20 years or more	26 (8.8)

Table 1 depicts the distribution of the participants according to age and work experience. One hundred and thirty one (43.6 %) participants worked in

critical areas (Cardiac center, Operation room, Oncology, Intensive Care Unit (ICU), Trauma department) and 169 (56.4%) worked in the non-critical areas (Wards, Outpatient departments, Nursing office). The overall distribution of scores in the various domains of biomedical waste management knowledge and attitude are provided in the table 2.The attitude of the nurses towards biomedical waste handling are presented in table 3.

Table 2: Distribution of scores in various domains related to biomedical waste management knowledge and attitude. (n=300)

Domain	Maximum possible score	Score obtained				
		Minimum	Maximum	Mean	Mean as % of maximum	SD
Policy Knowledge score	5	1	5	4.73	94.6%	.605
General BMW Score*	11	6	10	9.17	83.4%	1.038
Institutional BMW Score*	13	1	12	6.62	50.6%	2.073
Total BMW Knowledge Score*	24	8	22	15.79	65.8%	2.415
Attitude score	6	2	6	5.51	91.8%	.808

*BMW-Biomedical waste management; SD-Standard Deviation

Table 3: Distribution of the attitude of the nurses towards bio-medical waste handling among the study group

Item	Agree	Disagree	No opinion
Not an important issue	44 (14.7%)	238 (79.3%)	18 (6.0%)
Responsibility of the only government	12 (4.0%)	279 (93.0%)	9 (36.0%)
Team work	275 (91.7%)	19 (6.3%)	6 (2.0%)
Unnecessary financial burden on management	8 (2.7%)	284 (94.7%)	8 (2.7%)
Extra work burden	12 (4.0%)	282 (94.0%)	6 (6.0%)
Nurse is equally responsible *	294 (98.7%)	0	4 (1.3%)

*- 2 missing values

Table 4: Sex wise distribution of scores in various domains of biomedical waste management among the nurses (n=300)

Domain	Males	Females	Mean difference	p value #
Policy Knowledge score	4.58	4.75	0.17	0.108
General BMW Score*	8.87	9.21	0.36	0.055
Institutional BMW Score*	6.18	6.68	0.50	0.166
Total BMW Knowledge Score*	15.05	15.90	0.85	0.044
Attitude score	5.42	5.52	0.10	0.584

*BMW-Biomedical waste management. , # p value based on Student's T test

Table 5: Area of work wise distribution of scores in various domains of biomedical waste management among the nurses.(n=300)

Domain	Non critical area	Critical area	Mean difference	p value #
Policy Knowledge score	4.69	4.76	0.07	0.350
General BMW Score*	9.19	9.15	0.04	0.757
Institutional BMW Score*	6.50	6.72	0.22	0.373
Total BMW Knowledge Score*	15.69	15.87	0.22	0.516
Attitude score	5.24	5.71	0.47	<0.001

*BMW-Biomedical waste management. , # p value based on Student's T test

Table 6: Distribution of various aspects of biomedical waste management practices among the nurses (n=300)

Area related to biomedical waste practice	Yes (%)	No (%)	Total
Personal protective equipment use	288 (96.0%)	12 (4.0%)	300
Needle recap	15 (5.0%)	284 (95.0%)	299 *
Needle stick injury in last 1 year	15 (5.1%)	282 (94.9%)	297*
Complete Hepatitis B vaccination	287 (97.3%)	8 (2.7 0%)	295*

* Total is less than 300 as there were some missing responses.

Female nurses had better score in all the domains, however statistical significance was seen only in domain of total BMW management score as depicted in table 4. Nurses working in critical areas had better score in all the domains except general BMW management knowledge, however statistical significance was seen only in domain of attitude towards BMW management as shown in table 5.There was no statistical association between age, work experience and various domains related to BMW management.

Various issues related to BMW handling practices are listed in Table 6. Needle stick injuries were more common among nurses working in critical care area [Odds ratio = 5.3 (Confidence Interval =1.2-23.9)]. All the 15 nurses who had needle stick injury had reported to the concerned authority.

298 (99.3%) had attended some kind of BMW management training during their work tenure, 293 (97.7%) felt need for such training to be held annually and 289 (96.3%) were willing to attend such training if conducted in near future.

DISCUSSION

Medical advances have brought several benefits to the humanity. It is also associated with several hazards, including the BMW. Nurses constitute one of the largest and most important healthcare personnel for BMW generation and handling.

In our study most of the nursing staff were relatively young (20-29 years), had GNM qualification and experience of one to five years. The scores in domain related to policy knowledge about BMW were highest (94.6%). Knowledge related to BMW management especially institute specific knowledge was low (50.6%). The questions in this domain mainly consisted of various facilities available for waste disposal in the institute and as the nurses mainly deal with waste segregation and not final handling, their knowledge in this domain could be low. Similar results are also reported in other studies.[11,13] Overall knowledge about BMW was found to be better among female nurses. Most of the nurses had positive attitude towards BMW management. However the attitude of nurses working in critical care areas was found to be better. This may be explained by the repeated reinforcement by continuous educational interventions and strict adherence to infection control practices to prevent infections in susceptible population.

Work experience and age were not associated with any significant difference in any domain related to BMW management. Studies have reported both positive and no association between work experience and the BMW management related knowledge and practices.[11] Overall knowledge, attitude and practices of nurses regarding BMW handling were satisfactory. The use of personal protection equipment like gloves, mask etc. was very high (96%) compared to that of 40-85% reported in literature .[11,14] The needle stick injury rate of 5% in our study compared to 3-80% reported in other studies .[15-18] Needle recapping practices of about 5% was less than 30-40% reported in other studies .[15-18] Needle stick injuries being more common among those working in critical area may be explained by the fact that invasive procedures are more in these areas. The reporting of needle stick injury to authorities and knowledge about availability of post exposure prophylaxis was almost universal as compared to 20-80% reported in other studies .[15,17,18] Almost all (98%) the nurses were immunized against Hepatitis B virus. Most of the nurses had attended regular sessions on biomedical waste management and were willing to attend refresher trainings regularly.

Since the study is based on questionnaire and not on audit data validity of the study may suffer. A study based on actual workplace observation in combination with audit of record for immunization and workplace related injuries will overcome these fallacies.

CONCLUSIONS

Most of the nurses have adequate knowledge about BMW management. BMW management practices among nurses in our hospital are better than those reported in literature. Knowledge about institute specific BMW issues needs to be improved. There is still a scope for further improvement especially in terms of change in favorable attitude and good practices. The fact that there is no difference in knowledge, attitude and practices with work experience duration needs to be looked into. Male nurses and those working in non-critical area need to be focused upon for re-training.

Acknowledgements: We would like to acknowledge the help provided by Indian Council of Medical Research, New Delhi as a part of Short Term Studentship programme grant (2014). Our sincere thanks to the institutional authorities for permitting us to carry out this study and to the nursing staff for the sincere response and enthusiastic participation.

REFERENCES

1. Bio-Medical Waste (Management and Handling) Rules, 1998. Available from: http://envfor.nic.in/legis/hsm/biomed.html. Accessed April 24th 2016.

2. Patil AD, Shekdar AV. Health-care waste management in India. J Environ Manage 2001; 63(2): 211-20.

3. INCLEN Program Evaluation Network (IPEN) study group. Bio-medical waste management: situational analysis & predictors of performances in 25 districts across 20 Indian States. Indian J Med Res 2014; 139:141-153.

4. Kewalramani N. Biomedical waste management in Mumbai; issues & solutions. Journal of Indian Society of Hospital Waste Management 2006; 5(1): 9-16.

5. Sengodan VC, Amruth K H. Knowledge attitude and practice study on biomedical waste management among health care professionals and paramedical students in a Tertiary Care Government Hospital in South India. Int J Env Health Eng 2014 [cited 2015 Dec 22];3:11. Available from: http://www.ijehe.org/text.asp?2014/3/1/11/132683

6. Saini S, Nagarajan SS, Sharma RK. Knowledge, attitude & practices of biomedical waste management amongst staff of a tertiary level hospital in India. Journal of the Academy of Hospital Administration. 2005; 17(2): 1-12.

7. Mathur V, Dwivedi S, Hussan MA, Misra RP. Knowledge, attitude & practices about biomedical waste management among healthcare personnel: A cross-sectional study. India J Community Med. 2011; 36(2): 143-145.

8. Mathew SS, Benjamin AI, Sengupta P. Assessment of biomedical waste management practices in a tertiary care teaching hospital in Ludhiana. Healthline. 2011; 2(2): 28-30.

9. Hakim SA, Mohsen A, Bakr I. Knowledge, attitudes and practices of health-care personnel towards waste disposal management at Ain Shams University Hospitals, Cairo. EMHJ 2014; 20(5):347-54.

10. Shaffee M, Kasturwar NB, Nirupama N. Study of knowledge, attitude & practices regarding biomedical waste among paramedical workers. Indian J community Med 2010; 35(2): 369-370.

11. Kaur S.A comparative study on knowledge and practices of nurses regarding biomedical waste management in select government hospitals. Nursing and Midwifery Research Journal.2011; 7(3):130-40.

12. Qureshi W, Hassan G, Wani NA, Baba A, Kadri SM, Khan N. Awareness of Biomedical Waste Management amongst Staff of the Government SMHS Hospital, Srinagar A Tertiary Level Hospital in Kashmir Valley. JK-Practitioner 2007; 14(1): 60-61.

13. Mir MR, Ahamad J, Ashfaq A, Jan R. Knowledge, attitude and Practices about Biomedical Waste management among Nursing Professionals of SKIMS Medical College Hospital Bemina-A Cross Sectional study. IOSR Journal of Nursing and Health Science.2013: 1(5):47-48.

14. Chudasama RK, Rangoonwala M, Sheth A, Misra SKC, Kadri AM, Patel UV .Biomedical Waste Management: A study of knowledge, attitude and practice among health care personnel at tertiary care hospital in Rajkot. Journal of Research in Medical and Dental Science 2013;1(1):17-22.

15. Sharma R, Rasania SK, Verma A, Singh S.Study of Prevalence and Response to Needle Stick Injuries among Health Care Workers in a Tertiary Care Hospital in Delhi, India. Indian J Community Med. Jan 2010; 35(1): 74–77.

16. Sneha K , Hemagiri K , Basavaraj S , Vasanta SC. Knowledge and practices of biomedical waste management among the staff nurses- a cross sectional study. Rural Medicine 2014; 2(2):106-9.

17. Muralidhar S, Singh PK, Jain RK, Malhotra M, Bala M. Needle stick injuries among health care workers in a tertiary care hospital of India. Indian J Med Res 2010:131:405-10.

18. Laishram J, Keisam A, Phesao E, Tarao M S, Laloo VJ, Devi H S. Prevalence of needle stick injuries among nurses in a tertiary care hospital and their immediate response. Int J Med Public Health 2013;3:257-60