STUDY TO ASSESS THE KNOWLEDGE AND PRACTICE REGARDING BIOMEDICAL WASTE MANAGEMENT AMONG NURSING PERSONNEL WORKING IN TERTIARY CARE CENTER AT LUCKNOW, U.P.

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Abstracts

Background: Inadequate and inappropriate knowledge of handling of healthcare waste may have serious health consequences. The best BMW management (BMWM) methods aim at avoiding generation of waste or recovering as much as waste as possible, rather than disposing. Adequate knowledge about the health hazard of hospital waste, proper technique and methods of handling the waste, and practice of safety measures is unsatisfactory between health providers. In view of the foregoing, we performed a qualitative study in a tertiary care teaching hospital in India to explore the perceptions of the nursing personnel working in the hospital regarding health care waste management.

Aims and Objective: The present study was performed to assessing knowledge, attitude of nursing personnel regarding biomedical waste management.

Materials and Methods: A cross sectional observational study conducted at the different indoor wards of tertiary care hospital of Lucknow. The sample for this study were sixty nursing personnel dealing with care of admitted patient and engaged to perform routine medical procedure like blood sampling, intravenous fluid administration, bed sore dressing etc. Quantitative data of subjects recorded were age of the subject, year of experience and training of BMW management. Qualitative data recorded were knowledge related to BMW management, colour of bin regarding waste disposal and practice of waste management guideline during routine medical procedure

Results: Majority (75%) of subject were having working experience less than ten year and 21.7% of subject were having working experience between 10 to 20 year. Study results showed that 16.7% of subjects have taken training of BMW management before starting the job and 73.3% of subjects have not taken any training of BMW. Knowledge regarding BMW of study subjects showed that majority (77%) have average knowledge, 21.6% of subjects have good knowledge and rest 6.7% of subjects have poor knowledge of BMW management.

Conclusion: The awareness and practices of the BMW management varied among nursing personnel and were not found to be satisfactory. For effective implementation of biomedical waste management practices in the hospitals continuous training program is mandatory to improve their knowledge and practice.

Keywords: Bio-medical waste, Nursing personnel, knowledge, Practice

Introduction

Health care waste also termed biomedical waste contains infectious, contaminated and hazardous waste like discarded sharps, non-sharps, blood, body parts, toxic chemicals, pharmaceuticals, medical devices and radioactive substances.¹ Health care activities like medical treatments, diagnostic tests, immunization, and laboratory examinations restore health and save lives. At the same time health services may generate large quantity of wastes and byproducts that need to be handled safely and disposed of properly.² Only about 10%–25% of BMW is hazardous, and the remaining 75%–95% is nonhazardous. The hazardous part of the waste presents physical, chemical, and/or microbiological risk to the general population and health-care workers associated with

handling, treatment, and disposal of waste.³ The best BMW management (BMWM) methods aim at avoiding generation of waste or recovering as much as waste as possible, rather than disposing. Therefore, the various methods of BMW disposal, according to their desirability, are prevent, reduce, reuse, recycle, recover, treat, and lastly dispose. Hence, the waste should be tackled at source rather than “end of pipe approach.”⁴ In July 1998, first BMW rules were notified by Government of India, by the erstwhile Ministry of Environment and forest.⁵ In India, BMW problem was further compounded by the presence of scavengers who sort out open, unprotected health-care waste with no gloves, masks, or shoes for recycling, and second, reuse of syringe without appropriate sterilization.⁶ In India, “Bio Medical Waste Management and Handling Rules” were framed in 1998.⁷ Since then the onus lies on

the health care institutions to ensure proper HCWM.⁸ However, much is unknown regarding the compliance of the norms.⁹ In general, and specifically for the Indian context, there is a considerable paucity of management-strategy related research and context specific explorations of hospital staff perception regarding feasibility and acceptability of HCWM interventions and implementation strategies, particularly in rural hospital settings.^{10,11,12}

Adequate knowledge about the health hazard of hospital waste, proper technique and methods of handling the waste, and practice of safety measures can go a long way toward the safe disposal of hazardous hospital waste and protect the community from various adverse effects of the hazardous waste. In view of the foregoing, we performed a qualitative study in a tertiary care teaching hospital at Lucknow, India to explore the perceptions of the nursing personnel working in the hospital regarding health care waste management.

Aims and objectives

1. To assess the knowledge and practice regarding biomedical waste management among nursing personnel.
2. To assess the correlation of knowledge and practice of biomedical waste management among nursing personnel.

Operational definition

Assessment- It refers to the variety of methods or tools or methods the educator used to evaluate.

Knowledge and practice- It refers to the understanding, awareness and response of nursing personnel regarding biomedical waste management and practice refers to the form, manner and order of conducting and carrying on suit and prosecution through their vitreous stages.

Biomedical waste management (BMW)- Any waste which generated during the diagnosis, treatment or immunization or in research activities pertaining there to or in the production of testing of biological.

Nursing personnel- Nursing personnel are an integral component of the healthcare delivery which usually assigned to nursery areas under supervision of the qualified professionals.

Methodology

A cross-sectional observational study conducted at the different indoor wards of KGMU, U.P., Lucknow. The sample for this study were nursing personnel dealing with care of admitted patient and engaged to perform routine medical procedure like blood sampling, intravenous fluid administration, bed sore dressing etc. A total of 60 nursing personnel randomly selected for the study after taking their verbal consent. After explaining the nature of study to subject, pre formed questionnaire related to knowledge

and practice of bio medical waste management given to subjects and instruct them to answer honestly, by assuring them to maintain confidentiality of their result. Quantitative data of subjects recorded were age of the subject, year of experience and training of BMW management. Qualitative data recorded were knowledge related to BMW management, color of bin regarding waste disposal and practice of waste management guideline during routine medical procedure. Analysis of available data done by spss software and results expressed in mean and percentage.

Result

Socioeconomic variable of study finding showed that 66.7% were female and 33.3% were male. Age variation of nursing personal showed that 50% of subjects were between 21 to 30 year age group and 30% and 16.7% were between 31 to 40 year and 41 to 50 year age group respectively. Only 2% were in 51 to 60 year age group. If we see year of experience it showed that majority (75%) of subject were having working experience less than ten year and 21.7% of subject were having working experience between 10 to 20 year. In our study 16.7% of subjects have taken training of BMW before starting the job and 73.3% of subjects have not taken any training of BMW. Knowledge regarding BMW of study subjects showed that majority (77%) have average knowledge, 21.6% of subjects have good knowledge and rest 6.7% of subjects have poor knowledge of BMW management.

In our study we assess the knowledge level of nursing personnel working in different wards of tertiary care hospital regarding BMW management of routine simple procedure performed in wards. Knowledge level related to blood sampling technique result showed that 85% of subjects segregate waste at site of generation and 86.7% of subjects use color coded bin for waste disposal. 93.3% of subjects not using proper knowledge of disinfection before waste disposal (**Table 4**). Results of intravenous cannula procedure showed that 88.8% of subjects having no knowledge of using coded bins for disinfection and disposal of pre-procedure waste in yellow bin. 72.2% of subjects practice to discard post procedure waste in coded bins (**Table 5**). Results related to technique of blood products administration technique showed that 95.5% of subject's not using proper color bin to discard pre procedure waste. 95.5% of study subject not aware about use of red bin after procedure (**Table 6**). Results of bed sore dressing procedure showed that 100% of subject not using yellow bin to discard gauze pieces before procedure and majority of subjects not practice to use of red bin to discard plastic bottles and rubber tube to discards (**Table 7**). 80% of subjects not practice to use red or yellow bin to discard gloves, cotton swab and other waste to discard (**Table 8**).

Table 1: Socio demographic variables of subjects

Characteristics	Frequency %
Gender	
Male	20 (33.3%)
Female	40 (66.7%)
Age of Subjects	
21 – 30	30 (50.0%)
31 – 40	18 (30.0%)
41 – 50	10 (16.7%)
51 – 60	2 (3.3%)
Year of experience	
<10 year	45 (75%)
10 –20 year	13 (21.7%)
21-30 year	2 (3.3%)
>30yr	0 (0.0%)

Graph 1: Distribution of subject according to year of experience**Table 2:** Distribution of subject according to knowledge related to bio medical waste management

Education related to BMW management	Frequency	Percentage
Training of BMW management before starting the job	10	16.7%
Training of BMW management after starting the job	5	8.3%
Any workshop or conference attended held on BMW management	1	1.7%
Untrained for BMW management	44	73.3

Table 3: Distribution of subject according to level of knowledge

Knowledge Level	Percentage	Score Range
Good	21.6	23 & Above
Average	77	11-22
Poor	6.7	Below 11

Table 4: Awareness regarding bio medical waste management of blood sampling technique

S.N.	Procedure- Blood sampling technique	Yes	No
1.	Is the waste segregated at the site of generation?	9(15%)	51(85%)
2.	Is non-infectious general waste e.g. packing materials, fruit and vegetables, pills syringes and needle rappers, medicine covers to be disposed in green/black plastic bins.	52(86.7%)	8 (13.3%)
3.	Is the infectious waste and non- infectious waste mixed at source of generation?	45 (75%)	15 (25%)
4.	Is the practice of recapping or bending of needle done?	12(20%)	48 (80%)
5.	Is the plastic waste like IV bottles, syringe, latex gloves, catheters etc cut by scissors before disinfection in 1% sodium hypochlorite solution for 1 hour.	4 (6.7%)	56 (93.3%)

Table 5: Awareness regarding bio medical waste management of intravenous canula procedure

S.N.	Procedure- Intravenous canula Procedure	Yes	No
Pre Procedure			
1.	Disposal of antiseptic swab in proper container (yellow bin)	2 (11.1%)	16 (88.8%)
2.	Disposal of rapper / protective coverings of equipment in proper container (black bin).	17 (94.4%)	1 (5.6%)
After Procedure			
1.	Disposal of Syringe used for saline flushing after procedure in proper container (red bin).	13 97.2%)	5 (27.8%)
2.	Disposal of stylet (needle) of cannula in proper container (sharp container).	6 (33.3%)	12 66.7%)
4.	Disposal of gloves in proper container (red bin).	14 (77.8%)	4 (22.2%)

Table 6: Awareness regarding bio medical waste management of blood product administration

Blood product administration	Yes	Yes
Pre Procedure		
1. Disposal of antiseptic swab in proper container(yellow bin)	2 (5.6%)	34 (95.4%)
2. Disposal of ampoule/vials used for medication in proper container (blue bin).	28 (77.8%)	8 (23.2)
3. Disposal of Syringe (used for saline flush) in proper container (red bin).	23 (83.9%)	13 (36.1%)
4. Disposal of rapper/ protective coverings of equipment in proper container (black bin).	27 (75%)	9 (25.5)

Post Procedure			
1.	Disposal of iv/drip set/ infusion tubing (after cutting in two halves) in proper container (red bin)	2 (5.6%)	34 (95.4%)
2.	Disposal of fluid bag / bottles in proper container (red bin)	16 (44.4%)	20 (55.6%)
3.	Disposal of needle used in fluid bottles/bag in proper container(sharp container)	19 (52.8%)	17 (47.2%)
4.	Disposal of gloves in proper container (red bin).	33 (91.7%)	3 (8.3%)

Table 7: Awareness regarding bio medical waste of Bed sore dressing

S.N.	Procedure- Bed sore dressing	Yes	No
1.	Disposal of gauze pieces in proper container (yellow bin)	0 (0%)	28 (100%)
2.	Discarding gloves in proper container (red bin)	11 (39.3%)	17 (60.7%)
3.	Disposal of wrapper/ protective coverings of equipment (black bin)	22 (78.6%)	6 (21.4%)
4.	Cut and dispose the suction catheter in proper container(red bin)	7 (25%)	21 (75%)
5.	Disposal of old normal saline bottles after cutting it into halves(red bin)	6 (21.4%)	22 (78.6%)
6.	Disposal of gloves in proper container (red bin)	11 (39.3%)	17 (60.7%)
7.	Disposal of mask in proper container(red bin)	9 (32.9%)	17 (60.7%)

Table 8: Awareness regarding bio medical waste of Urinary Catheterization procedure

S.N.	Procedure- Urinary Catheterization	Yes	No
1.	Discarding gloves used for perineal examination (red bin)	1 (20%)	4 (80%)
2.	Discarding used cotton swabs in proper container (yellow bin)	1 (20%)	4 (80%)
3.	Disposal of wrappers/protective coverings of equipment (black bin)	4 (80%)	1 (20%)
4.	Disposal of old catheter(if any) by cutting it into two halves in proper container (red bin)	1 (20%)	4 (80%)
5.	Disposal of used syringe in proper container (red bin)	2 (40%)	30 (60%)
6.	Disposal of urine from urine bag properly (flushing in toilet)	1 (20%)	40 (80%)
7.	disposal of cap of lignocaine	2 (40%)	3 (60%)

Discussion

The participants involved in this study to assess their knowledge, attitude, and practice of BMW management while performing simple routine procedure in indoor wards of tertiary care center. This study revealed that the awareness and proper practice of BMW was not satisfactory. Majority (77%) of subjects having average knowledge, 21.6% of subject having good knowledge and rest 6.7% of subject having poor knowledge about BMW management. Most of the subjects were not following color coding to discard waste. Mukesh K et al. (2015) stated in his study that awareness regarding disposal of items in red and yellow bag was found to be maximum in nurses which was 46.6% and 70.9% respectively. In their study 75% of nurses were practicing segregation of waste at place of generation which was higher than other categories of HCW.¹³

Aastha et al. (2017) also observed that there was a lack of knowledge about colour coding in biomedical waste management that needs to be addressed. Regarding colour coding, 99% of the participants answered that it is essential but, when asked about exact categories, 30% did not answer at all and the rest could not tell which category of waste belonged to which colour container.¹⁴ Deo et al, (2006), also reported poor knowledge among the medical staff (20%).¹⁵ However our results were contrast with study of Kanchi P et al. (2017), in which 86% of the participants had knowledge of the colour coding.¹⁶ Similarly, knowledge about color coding of containers, and waste segregation which itself is probably the most

important pivotal point and crucial for further waste management, was also found to be better among the technically qualified staff as compared to that of the sanitary staff. Training of both the technical staff and the nontechnical staff is critical for the proper and appropriate management of biomedical waste.^{17,18} In our study majority (44%) of subjects were untrained for BMW management and only 10% of subjects having training before starting the jobs, this is very low compared to study conducted by Chudasama et al.¹⁹ (2013). where 44% health care worker received training. 73.3% of subjects have not taken any training of BMW management and 16.7% of subjects have taken training before starting job and 8.3% of subjects have taken training during job. Deo D et al. (2006) in his study reported 54.88% paramedical staff were aware about BMW rule. 15 44.6% Nursing staff and 61.5% laboratory technicians were aware about the same. Only 44.29% study participants had actually received training about BMW management, which indicates significant requirement of good quality training related to BMW management at regular interval ($p < 0.05$).^{18,20} Training of both the technical staff and the nontechnical staff is critical for the proper and appropriate management of biomedical waste.^{17,18} Pandit N et al. and Saini S et al. conducted a study to assess knowledge regarding bio medical waste management in all health related professional and found that knowledge about biomedical waste management rules among the technically qualified personnel like the doctors, nurses, and laboratory staff was high but was low among the sanitary staff; this was similar to the findings from other studies.^{17,21}

Conclusion

The awareness and practices of the BMW management varied among nursing personnel and were not found to be satisfactory. For effective implementation of biomedical waste management practices in the hospitals continuous training program is mandatory to improve their knowledge and practice.

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