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ORIGINAL RESEARCH

A Study of Knowledge, Attitude and Practices on Bio Medical Waste Management among the Nursing Staffs at a tertiary care hospital of Eastern India

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Abstract

Background: Bio medical waste management(BMWM) is a notable issue both for medical community and general public. In a developing country like India, its proper managementis not only a legal but also social responsibility.

Objective: Assessment of the knowledge, attitude and practices among the nursing staffs and nursing students at a tertiary care hospital of Eastern India.

Methods: A descriptive observational study was conducted in Sriram Chandra Bhanja Medical College and Hospital, Cuttack, Odisha from January 2020 to March 2020. Nursing Staffs working in OPD (outpatient department), Indoors, operation theatres, labour room, casualty, blood bank and one batch of third year nursing students of this institute were included as study participants as they are directly responsible for proper disposal of the bio medical waste. A predesigned structured questionnaire was used in the study. The collected data was tabulated, coded and statistically analyzed.

Results: Out of the 138 participants who took part in the study, majority were in the age group of 21-30 years (61%). (92.8%) of study population comprised of females.(38.4%)participants were immunized with HBV vaccine. More than two third of study participants working in this hospital had an experience (in their respective fields) of 1 to 5 years. Only (9.4%)of the study participants received prior training for bio medical waste management. Majority of the participants had adequate knowledge, attitude and practice towards bio medical waste management but still there is a vent existing between knowledge and practice, which was reflected in relatively poor bio medical waste management practice.

Conclusion: Strict execution of the current biomedical rules in the hospitals settings is the need of the hour. Regular training programs for orientation of the nursing staffs is essential to fill the gap between knowledge and practice.

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Keywords: bio medical waste management, knowledge, attitude, practice, nursing staffs.

Introduction

As per Bio-Medical Waste (Management and Handling) rules, 1998 of India, Bio-Medical Waste (BMW) is defined as any waste which is generated during the diagnosis, treatment or immunization of human beings or animals or in research activities pertaining thereto or in the production or testing of biologicals which included ten categories for the same.[1] Under the Environment Protection Act 1986, Biomedical Waste Management Rules 2016, came into force from 28th March 2016 in supersession of the Bio-Medical Waste (Management and Handling) rules 1998. Under this new rules, the coverage has increased and the categorization has been made simpler but still there is a lack of full-fledged implementation of these rules.[2]Although now-a-days, the public is much aware regarding biomedical waste disposal, studies in India have shown poor level of awareness.[3,4]

The main objectives of bio medical waste management are to reduce the volume of waste generated, segregation at the point of generation, proper collection, transport and economical disposal of the waste to prevent harm resulting from it and to retrieve reusable materials.[5] From legal and social point of view, proper handling of biomedical waste is essential, especially for a developing country like India.

Because of their knowledge ,attitude and practice regarding health hazards of bio medical waste, health care workers play a vital role in handling the biomedical waste. Nursing staffs being the core of health care facility should be well equipped with these criterias with respect to biomedical waste management.

Though more than 20 years have passed since the inception of bio-medical waste management rules, but till now we face poor hospital waste management situation everywhere in our country. Thus, there is anurgent need to assess KAP (Knowledge, Attitude and Practice) of nursing staffs, so that some necessary essential measures can be taken to improve the patient care. So, in this study we have tried to assess the KAP of bio-medical waste management among the nursing staff because they are considered as the mainstay of bio-medical waste management.

Materials and methods

A prospective descriptive observational study was undertaken at the Department of Transfusion Medicine, Sriram Chandra Bhanja Medical College and Hospital, Cuttack, Odisha for a period of three months, from January 2020 to March 2020. As the nursing staffs are more involved in direct patient care and are responsible for proper disposal and segregation of various categories of biomedical waste into different colour coded bins at the point of generation, so in order to assess the KAP of BMWM, nursing staffs and students were selected. The BMWM training was conducted in batches of 45 participants in each batch involving nursing staffs working in OPD (outpatient department), Indoors, operation theatres, labour room, casualty, blood bank and one batch of third year nursing students.

A total of 138 nursing staffs and students were included in the study. At the end of each training session, questionnaire was distributed among the participants. A valid structured questionnaire was designed and prepared with the help of thorough literature review. Participants were explained the purpose of the study and KAP questionnaire, and were requested to give genuine response.

BMWM Structured questionnaire as follows:

I. Demographic profile

- Age
- Sex

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- Education
- Qualification
- Experience in service
- Immunization with HBV Vaccine
- Previous training in BMWM

II. Knowledge Questionnaire

- Do you know about the biomedical waste management rules? Yes/No
- Do you have the knowledge regarding colour coded bins available for BMWM? Yes/No
- Into which colour bin do you dispose broken glass slides/vials?
- Gloves are disposed in which colour bins?
- What do you mean by autoclaving?
- What is the percentage of sodium hypochlorite solution routinely used for disinfection?
- Majority of the waste generated in hospital are infectious or non-infectious?

III. Attitude Questionnaire

- Do you think medical staffs need to be trained for bio medical waste management? Yes/No
- Do you think healthcare workers need to be immunised with hepatitis B vaccination? Yes/No
- Do you think personal protective equipment(PPE) should be worn while handling spills in bio medical waste management? Yes/No
- Do you believe segregation to be done at the source of generation of waste? Yes/No
- Do you practice safety measures while working at work place? Yes/No
- Do you inform your authority when affected by needle stick injury? Yes/No
- Do you need further training on bio medical waste management? Yes/No

IV. Practice Questionnaire

- Are you using gloves while working in the wards/lab.? Yes/No
- Into which bin you are putting non-infectious waste?
- Do you use hypochlorite solution as disinfectant? Yes/No
- Are you cleaning your working surface daily? Yes/No
- Are you using apron and slipper in your labs.? Yes/No
- Into which bin you put the mask after use?
- Are you maintaining biomedical waste management records daily? Yes/No

After distributing the questionnaire among the participants, 20 minutes time was given to them to complete the questionnaire. All the collected data were entered into excel sheet and then coded. The data was then analysed statistically with SPSS-22.0 version.

Statistical analysis

This observational study was done among N=138 number of participants. The study is paired design and having one group and non-normal distribution. Categorical variables were summarized using percentages and the continuous were summarized using descriptive statistics. SPSS Statistical software (version 22.0) was used for all the analysis.

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Results

A total of 138 nursing staffs and students participated in the study. KAP of management of biomedical waste was assessed among all the participants.

Characteristics	Number (N)	Percentage%
Age group (in years)		
15-25	85	61.6
26-35	24	17.4
36-45	23	16.7
46-55	3	2.2
56-65	3	2.2
Sex		
Female	128	92.8
Male	10	7.2
Immunized with HBV Vaccine		
Yes	53	38.4
No	85	61.6
Previous training in BMWM		
Yes	13	9.4
No	125	90.6

Table 1: Demographic profile of study participants

N	**Valid**	138
	Missing	0
Mean		4.94
Std. Deviation		7.157
Minimum		1
Maximum		35

Table 2: Experience in years of study participants

Knowledge questionnaire	Yes	%	No	%
• Do you know about the biomedical waste management rules?	135	97.8	3	2.2
• Do you have the knowledge regarding colour coded bins available for BMW?	138	100	0	0
• Into which colour bin do you dispose broken glass slides/vials?	**Blue**	**%**	**Others**	**%**
	134	97.1	4	2.9
• Gloves are disposed in which colour bins?	**Red**	**%**	**Others**	**%**
	135	97.8	3	2.2
• What do you mean by autoclaving?	**Yes**	**%**	**No**	**%**
	65	47.1	73	52.9
• What is the percentage of sodium hypochlorite solution routinely used for disinfection?	**5%**	**%**	**not 5%**	**%**
	24	17.4	114	82.6
• Majority of the waste generated in hospital are infectious?	**Yes**	**%**	**No**	**%**
	67	48.6	71	51.4

Table 3: Knowledge among participants regarding Biomedical waste management

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Attitude questionnaire	Yes	%	No	%
• Do you think medical staffs need to be trained for bio medical waste management?	136	98.6	2	1.4
• Do you think healthcare workers need to be immunised with hepatitis vaccination?	136	98.6	2	1.4
• Do you think personal protective equipment should be worn while handling spills in bio medical waste management?	136	98.6	2	1.4
• Do you believe segregation to be done at the source of generation of waste?	130	94.2	8	5.8
• Do you practise safety measures while working at work place?	132	95.7	6	4.3
• Do you inform your authority when affected by needle stick injury?	121	87.7	17	12.3
• Do you need further training on bio medical waste management?	106	76.8	32	23.2

Table 4: Attitude among participants regarding Biomedical waste management

Practice questionnaire	Yes	%	No	%
• Are you using gloves while working in the wards/lab.?	80	63.7	50	36.23
	Black	**%**	**Others**	**%**
• Into which bin you are putting non-infectious waste?	113	81.9	25	18.1
	Yes	**%**	**No**	**%**
• Do you use hypochlorite solution as disinfectant?	128	92.8	10	7.2
	Yes	**%**	**No**	**%**
• Are you cleaning your working surface daily?	60	43.4	78	56.5
	5%	**%**	**< 5%**	**%**
• Are you using apron and slipper in your labs.?	127	92.03	11	7.97
	Yellow	**%**	**Red**	**%**
• Into which bin you put mask after use?	128	92.8	10	7.25
	Yes	**%**	**No**	**%**
• Are you maintaining biomedical waste management records daily?	80	57.97	58	42.03
	Yes	**%**	**No**	**%**

Table 5: Practice among participants regarding Biomedical waste management

Table-1 shows the demographic profile of Nursing staffs. The study participants included were in the age range of 17-60 years. Majority of study participants belong to 15-25(61.6%)age group and female gender 128(92.8%)Only 53(38.4%)study participants were immunized with HBV vaccine. Only 13(9.4%) study participants have earlier received training for biomedical waste management. **Table-2** reveals, mean work experience of participants which is nearly 5 years with a standard deviation (S.D) of 7.15.

Table-3 shows the response of the participants with regard to knowledge questionnaire on BMWM. 135(97.8%) participants were previously aware of BMWM rules. All 138 participants had knowledge regarding colour coded bins. 134(97.1%) correctly answered regarding disposal of broken glass slides/vials into blue colour bin. 135(97.8 %)responded correctly regarding that gloves to be discarded in red colour bins. Only 65(47.1 %) persons knew the meaning of autoclaving. Only 71(51.4%) answered that majority of the waste generated in hospital are non-infectious.

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Table-4 describes the feedback of the participants with respect to attitude questionnaire on BMWM. 136(98.6%) thought that medical staffs need to be trained for BMWM. Immunization with hepatitis B vaccination among health care workers was essential in consideration in 136(98.6%) participants. 136(98.6%)felt the need of wearing PPE while handling spills in BMWM. 130(94.2%) believed segregation to be done at the source of generation of waste. 130(95.7%) practised safety measures while working at work place. On being injured by a needle stick injury, 121(87.7%) gave their view that authority should be informed. Further training on BMWM was insisted by 106(76.8%).

Table-5 reveals the retroaction of the participants on practice questionnaire of BMWM. Gloves are being used by 88(63.7%)while working in the wards/lab. Non-infectious waste are discarded into black bins by 113(81.9%).128(92.8%) used hypochlorite solution for disinfection. Work surface are cleaned by 60(43.4 %) daily. 127(92.03 %)are using apron and slipper in their work stations. Masks are being disposed into yellow bins by 128(92.8 %) participants after use. Only 80(57.97%) are maintaining BMWM records daily and 58(42.03 %) are still not maintaining it.

Discussion

Biomedical waste is dangerous with a potential to spread infection and spawning and continuous liberation of high levels of accidently produced organic pollutants. So, in order to protect public health and guard our environment, BMW requires safe management through its complete life cycle. In India, until 1990s, health care waste management was an abandoned issue. However, with the execution of BMW(Management and Handling) Rules of 1998, significant progress has been made in this zone and the improvement should be an uninterrupted process. The essence of BMWM is segregation at source of generation.

Now a days, the amount of biomedical waste generated are expanding rapidly. Inspite of having rules for proper handling and disposal of BMW with amendments at regular intervals, till now we are facing practical problems in effective implementation of guidelines. Till now we face a bigger challenge of illegal reuse and inappropriate recycling of disposables. Such scenario worsens the existing bad situations. Knowledge, attitude and practice or "KAP" study is conducted to collect information on the knowledge(what is known),attitude(what is thought)and practices (what is done) on a particular topic. It serves as a kind of educational diagnosis of the community.[6]

A KAP survey essentially is an "opinion" of the participants and is based on the statements of the individuals.[7]Always there exists a gap between what is known and what is done. It is very important to find this gap in order to reduce the gap. We conducted this study to find this gap. Similar study protocol was taken up in various other studies.[2,3,8,9]

The participants of the study mostly were of younger age group and there was a female preponderance in our study. Knowledge regarding colour coding is essence of BMWM. Majority of the study participants have heard about BMWM rules but less no of participants have undergone training on the same. Although they have good knowledge regarding segregation of BMW, still they lack knowledge on issues like autoclaving and disinfection. Though overall knowledge of participants was good but still they need good quality training to improve their present knowledge about BMWM. This finding was similar to yadavnnavar MC et al [10],but in contrast to pandit NB et al[11]. So importance has to be given on quality training of Nursing staffs at regular intervals.

Most of the participants in our study showed a positive attitude towards biomedical waste management . Most of the nursing staff opined that the basic principle of BMWM is segregation at point of generation of waste. Similar results were there in previous studies.[12-14]They showed a very appreciable attitude towards further training on BMWM to update their current knowledge about the same.

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Regarding BMWM practices, many of the participants follow good practice. They are practising the proper disposal of waste into different colour coded bins as per guidelines.[12,13] However, disappointing are the results in some practices like wearing gloves while working in wards, cleaning the work surface daily and maintaining biomedical records. Many of the previous studies have reported that health care personnel have very good knowledge regarding BMWM, but has not been put into practice[15]So this becomes our responsibility to organize trainings at regular intervals so that their skill, knowledge, attitude can be improved and to be encouraged to put them in practice.

Conclusion

This study concludes that although nursing staffs have good knowledge and a positive attitude towards biomedical waste management, but practice among the participants is relatively poor. So there lies the importance of effective compulsory training programmes for health care workers on management of biomedical waste which should be organized at regular intervals. This will help us in reducing the existing gap between knowledge and practice, so that quality of patient care can be improved.

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Conflict of interest

No conflict of interest.

References

1. Sharma AK. Bio Medical Waste (Management and Handling) Rules. Bhopal: Suvidha Law House; 1998.
2. Patil AD, Shekdar AV. Health-care waste management in India. J Environ Manag. 2001;63(2):211-20.
3. Sharma A, Sharma V, Sharma S, Singh P. Awareness of biomedical waste management among health care personnel in Jaipur, India. Oral Health Dent Manag. 2013;12(1):32-40.
4. Basu M, Das P, Pal R. Assessment of future physicians on biomedical waste management in a tertiary care hospital of West Bengal. J Natural SciBiol Med. 2012;3(1):38.
5. Guidelines for protecting the safety and health of health workers. NIOSH /Health Care Workers guidelines / Chap 6
6. Kaliyaperumal KI. Guideline for conducting a knowledge, attitude and practice (KAP) study. AECS Illumination. 2004;4(1):7-9.
7. Launiala A. How much can a KAP survey tell us about people's knowledge, attitudes and practices? Some observations from medical anthropology research on malaria in pregnancy in Malawi. Anthropology Matters. 2009;11(1):1.
8. 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(2):143.
9. Kishore J, Goel P, Sagar B, Joshi TK. Awareness about biomedical waste management and infection control among dentists of a teaching hospital in New Delhi, India. Indian J Dent Res. 1999;11(4):157-61.
10. Yadannavar MC, Berad AS, Jagirdar PB. Biomedical waste management: A study of knowledge, attitude and practices in a tertiary health care institution in Bijapur. Indian Journal of Community Medicine. 2010;35:170-1.
11. Pandit NB, Mehta HK, Kartha GP, Choudhary SK. Management of bio medical waste: awareness and practices in a district of Gujarat. Indian J Public Health 2005; 49: 245-247.

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12. Madhukumar S, Ramesh G. Study about awareness and practices about health care waste management among hospital staff in a medical college hospital, Bangalore. Iranian J Basic Medical Sci. 2012;3(1):7-11.
13. Malini A, Eshwar B. Knowledge, Attitude and Practice of Biomedical waste management among health care personnel in a tertiary care hospital in puducherry. IJBR. 2015;6(3):172-6.
14. Sood AG, Sood A. Dental perspective on biomedical waste and mercury management: a knowledge, attitude, and practice survey. Indian JDent Res. 2011;22(3):371.
15. Sachan R, Patel ML, Nischal A. Assessment of the knowledge, attitude and practices regarding Biomedical Waste Management amongst the Medical and Paramedical staff in Tertiary Health care Center. International Journal of Scientific and Research Publications. 2012;2(7):1-6.