



A Study of current Knowledge and Awareness of Biomedical Waste Management among the Nursing Students of Tertiary Care Teaching Hospital, Karnataka, India.

Medical Science

Dr. Jagiri Narotham Rao	Professor and Head, Department of Hospital Administration, JSS Medical College and Hospital, Mysuru, Karnataka.
Dr. Libert Anil Gomes	Associate Professor, Department of Hospital Administration, JSS Medical College and Hospital, Mysuru, Karnataka.
Dr. Makhdoom Killedar	P.G Resident, Department of Hospital Administration, JSS Medical College and Hospital, Mysuru, Karnataka.
Dr. Jayati Bahuguna	P.G Resident, Department of Hospital Administration, JSS Medical College and Hospital, Mysuru, Karnataka.

ABSTRACT

Introduction: Biomedical waste (BWM) management is currently a burning issue more so with the increasing healthcare facilities and increasing waste generation. Therefore knowledge regarding the segregation and disposal of BMW is essential for the healthcare workers.

Aim and Objective: To determine the current knowledge and awareness of nursing students regarding the biomedical waste management.

Material and Methods: This cross sectional observational study was conducted on nursing students (GNM final year) of Nursing College in a Tertiary Care Teaching Hospital, Mysuru. They were asked to fill a predesigned questionnaire. The variables assessed were their knowledge and awareness of practices toward biomedical waste management.

Results & Conclusion: A total of 45 students participated. The male 9(20%) and female 36(80%) ratio was 1:5, mean age of respondents was 21.75+1.47, on an average 80% are correct and 20% are incorrect for knowledge about biomedical waste management. 73% are correct and 27% are incorrect for their awareness about the same.

Results indicate that students had good knowledge and perception level about awareness practices of biomedical waste management.

KEYWORDS:

Knowledge, Biomedical, Awareness, Waste, Practises, Management

Introduction:

It is rightly said "Take care of the earth she will take care of you". Biomedical waste management is currently a burning issue. Day by day there are increasing healthcare facilities worldwide due to which there is tremendous increase in the waste generation by Hospitals. The Global statistics on generation of hospital waste per bed per day: UK – 2.5 kg, USA – 4.5kg, France – 2.3 kg, Spain – 3 kg, India – 1.5 kg. Composition: Hazardous – 15 %, Non – Hazardous – 85 %. It is estimated that annually about 0.33 million tonnes of hospital waste is generated in India and, the waste generation rate ranges from 0.5 to 2.0 kg per bed per day. Wherever, generated, a safe and reliable method for handling of biomedical waste is essential. Effective management of biomedical waste is not only a legal necessity but also a social responsibility.^{1,2} Nurses spend maximum time with patients, hence are at increased risk of exposure to biomedical waste. Health and safety of the nursing staff is cardinal feature of biomedical waste management. There is a significant role of nursing personnel in this whole process of Bio Medical Waste Management. They need to be well informed and educated with skills and practices in managing biomedical waste. They need to be updated with recent amendments in Biomedical waste management eg. Biomedical Waste Management Rules, recent amendments released on 28th March, 2016. They need to be informed about current available technology to deal biomedical waste. The sound knowledge and safe practices among all healthcare staff need to be strengthened.

On the basis of World health organization report in 2003 biomedical waste is generated during diagnosis in that 17% from treatment or immunization of human beings or animal or maternity, 8% in research activity pertaining there to or in the production of testing biological, 50% biomedical waste generated from different departments of the hospitals that are surgical wards, offices. About 85% of the waste generated is known hazardous, other 10% is infectious, other 5% is non-infectious but hazardous waste.

Biomedical waste should be managed through a pathway that includes generation, storage, and segregation, collection, processing transport, treatment and disposal.

All category of waste has to be kept segregated in proper container or bags as the case may. Untreated biomedical waste shall not be kept or stored beyond a period of 48 hours. The container must be sturdy enough to contain design maximum volume and weight of waste without damage. It should be without any puncture or leakage.

Objective:

To assess current knowledge and awareness of biomedical waste management among nursing students of tertiary care teaching hospital, Karnataka, India.

Methodology:

Study setting:

A cross-sectional observational study was conducted in the year 2016 among (GNM final year and) of Nursing College of a Tertiary Care Teaching Hospital, Mysuru. A Pre designed close ended questionnaire was administered to the nursing students The variables assessed were their **Knowledge, Attitude and Practices** towards BMW management. Responses of the students were filled in Excel sheet, and data were analysed and reported in the form of descriptive statistics (i.e. frequency and percentages) by using Statistical package for social sciences (SPSS) software.

Results:

A total of 45 students participated. The male 9(20%) and female 36(80%) ratio was 1:5 (Figure No 1).

Mean age of respondents was 21.75+1.47 (Standard Deviation). (Figure No.2)

Figure No. 1: Gender

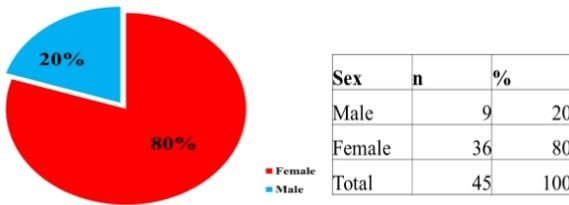
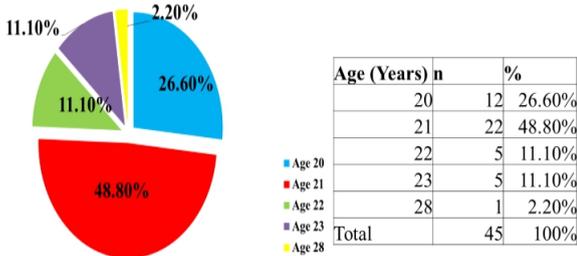


Figure No. 2: Age



Discussion:

Majority of the respondents in this study had the knowledge and Awareness of the most of the aspects of biomedical waste i.e. 80.4% (Figure No. 3), such as Needle Stick Injuries, Incineration and Autoclaving, Adequate Segregation of waste, Contaminated waste containing pathogens, Conducting Surveys across the healthcare institutions, risks associated, Occupational hazards associated with hazardous waste, proper operational strategy, Biohazardous Symbol, Latest BMW rules and laws.

73% of the respondents had positive attitude and practices towards Bio Medical Waste Management (Figure No. 4) such as discontinuing practice of storage of wastes, proper disposal of sharps and discontinuing practice of recapping of needle, usage of chlorinated bags, introducing proper waste disposal practices starting from the point of generation of waste and most importantly use of colour coded bags as per BMW 2016 rules (Table no 1).

A study done by Sachan et al showed that 70% students had **Knowledge** of the most of the aspects of biomedical waste management and 60% had **Positive Attitude and Practices** towards the same.^{38,4} Although the students have good knowledge about BMW management rules, but relatively less number had positive attitude towards it. Study done by Satyanarayan et al. showed that 72% of the nursing students had less knowledge on composition and disposal of BMW.⁵ Another study done by Haider S et al. showed that 65% of the nursing students had knowledge various aspects of BMW management.⁶ However Nursing students are not directly involved in the BMW management. After completion of their training, only when they get hands on experience they deal with Bio Medical Waste and their disposal respectively.

Figure No. 3: Knowledge and Awareness

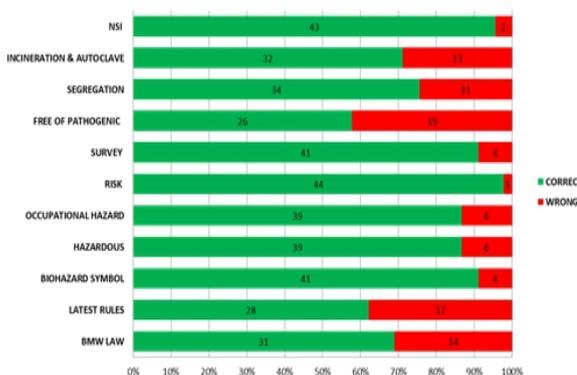


Figure No. 4: Attitude and Practice

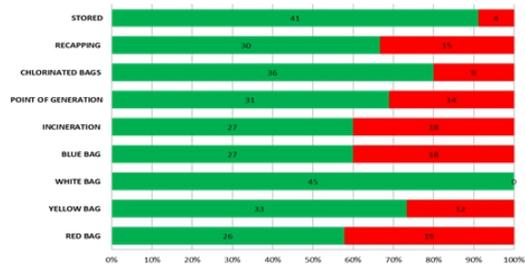


Table No. 1: Use of Color Coded Bags for BMW management

Color	Type of Bag/ Container used	TYPE OF WASTE	Treatment /Disposal options
Yellow	non-chlorinated plastic bags Separate collection system leading to effluent treatment system	a) Human Anatomical Waste b) Animal Anatomical Waste c) Soiled Waste d) Expired or Discarded Medicines e) Chemical Waste f) Micro, Bio-t and other clinical lab waste g) Chemical Liquid Waste	Incineration or Plasma Pyrolysis or deep burial
Red	non-chlorinated plastic bags or containers	Contaminated Waste (Recyclable) tubing, bottles, intravenous tubes and sets, catheters, urine bags, syringes (without needles) and gloves.	Auto/ Micro/Hydro and then sent for recycling, not be sent to landfill
White	(Translucent) Puncture, Leak, tamper proof containers	Waste sharps including Metals	Auto or Dry Heat Sterilization followed by shredding or encapsulation
Blue	Cardboard boxes with blue colored marking	Glassware	Disinfection or auto/ Micro/Hydro and then sent for recycling.

JSS MEDICAL COLLEGE AND HOSPITAL
DEPARTMENT OF HOSPITAL ADMINISTRATION
MG ROAD, MYSURU - 570004

Knowledge and Awareness of Biomedical Waste Management among the Students of Nursing School, Mysuru, India

Name:	Age:	Gender:	Course:
1. Biomedical Waste Management and Handling law was established by Govt. of India in the year 1998			Yes/ No
2. Latest Biomedical Waste Management Rules were laid down by Govt. of India in the year 2016			Yes/ No
3. Which of the following is a Bio-Hazard symbol			
4. 20% of waste generated by health-care activities is hazardous			Yes/ No
5. Biomedical waste is an occupational hazard			Yes/ No
6. Risk associated with hospital waste includes HIV, hepatitis B, injuries, etc.			Yes/ No
7. Waste survey is the first step in waste management			Yes/ No
8. Medical waste should be completely free of pathogenic bacteria before disposal			Yes/ No
9. Segregation is the key step in waste management			Yes/ No
10. Incinerator and autoclaving is the key process for deactivating biological waste			Yes/ No
11. One needle-stick injury from a needle used on an infected source patient has risks of 30% become infected with HBV			Yes/ No
12. Red bag is used to discard Contaminated waste (Recyclable)			Yes/ No
13. Yellow bag is used to discard the microbiological and biotechnological waste			Yes/ No
14. White (Translucent) bag is used to discard waste sharps including metals			Yes/ No
15. Blue bag is used to discard used Glassware and Metallic body implants			Yes/ No
16. Incineration and other high temperature waste treatment systems are sometimes described as thermal treatment			Yes/ No
17. Segregation of waste must be done at the point of generation			Yes/ No
18. Chlorinated bags should be used to discard the Biomedical Waste			Yes/ No
19. Recapping of the needles should be done after use			Yes/ No
20. As per BMW rules, waste should not be stored beyond 48 hours			Yes/ No

Conclusion:

Importance of BMWM should be stressed in the study curriculum to improve their knowledge and attitude towards BMWM. Practical implications should also be covered so that students can avoid any hazards of BMW. An optimistic attitude and collective accountability is required for proper segregation and safe disposal of biomedical waste so as to protect the environment as well as health care workers. Periodic and orientation based training programmes should be provided to all health care workers, so that both the knowledge as well as practice of bio-medical waste management can be upgraded. Apart from that, quality assessment for management of biomedical waste at centres should be routinely done from time to time. Further intensive training programs, Seminars and workshops are essential. For effective implementation of Biomedical Waste Management

practices in the hospitals periodical sensitization and continuous training program is mandatory to improve the biomedical waste knowledge and practices among HCW's especially focusing at the Nursing and technical staffs.

Recommendations:

- The entire waste management practices should be a part of total hygiene practice of the society rather than confining to the hospital and health facility.
- Bio Medical Waste Management should be included in the Nursing curriculum for adequate sensitization of the staff.
- Students should have adequate knowledge regarding
 - Collection
 - Segregation
 - Transport
 - Storage & Disposal of BMW
- Basic Principles to handling BMW:
 - Segregate waste
 - Disinfect and mutilate sharps
 - Adopt safer technologies such as Autoclave and Microwave
 - Don't burn chlorinated plastics
 - Prevent re-use of disposables
 - Motivate and train all hospital personnel
 - Practice universal precautions
 - Follow the Bio-medical waste rules.

ACKNOWLEDGEMENTS:-

I would like to thank all the nursing students who participated in this study and the Principal of school of nursing for participating in the study.

I would also like to thank my students for their dedicated participation along with me in the study.

Funding:- No Funding sources

Conflict of interest:- None declared

Ethical approval:- The study was approved by the institutional ethical committee.

References:

1. Patil AD, Shekdar AV. Health-care waste management in India. *J Environ Manage.* 2001;63:211–20. [PubMed]
2. 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.* 2000;11:157–61. [PubMed]
3. Sachan, R, Patel M L, Nischal A. Assessment of the knowledge, attitude and Practices regarding Biomedical Waste Management amongst the Medical and Paramedical Staff in Tertiary Health Care Centre. *International Journal of Scientific and Research Publications*, Volume 2, Issue 7, July 2012; ISSN 2250-3153: 1 – 6
4. Saini R et al. Knowledge of Biomedical Waste Management among the Students of Rural Dental College, Maharashtra, India. *International Journal of Experimental Dental Science*, January - June 2013; 2(1): 24 - 26
5. Ajmera V, Jayalaxmi L.S. A Study to Assess the Knowledge Regarding BioMedical Waste Management among B.Se Nursing Students of Selected Nursing Colleges of Udaipur. *International Journal of Science and Research (IJSR)*. Volume 5 (4), April 2016; ISSN (Online): 2319-7064: 1734 – 1738
6. Haider S et al. A study on knowledge and practice regarding biomedical waste management among staff nurses and nursing student of Rajendra Institute of Medical Sciences, Ranchi. *Indian Journal of Community Health*. Volume 27, Issue 01, January – March 2015; 135- 138