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

**Medical Science**

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**ABSTRACT**

**Introduction:** Biomedical waste (BMW) 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. 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)
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.8 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. Another study done by Haider S et al. showed that 65% of the nursing students had knowledge various aspects of BMW management. 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.

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

<table>
<thead>
<tr>
<th>Code</th>
<th>Type of Waste</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Human Anatomical Waste</td>
</tr>
<tr>
<td>2</td>
<td>Animal Anatomical Waste</td>
</tr>
<tr>
<td>3</td>
<td>Expiry or Discontinued Medicines</td>
</tr>
<tr>
<td>4</td>
<td>Chemical Waste</td>
</tr>
<tr>
<td>5</td>
<td>Infectious or Liquid Waste</td>
</tr>
</tbody>
</table>

Conclusion:
Importance of BMW should be stressed in the study curriculum to improve their knowledge and attitude towards BMW. 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.

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

**References:**