

AWARENESS OF BIOMEDICAL WASTE MANAGEMENT IN A TERTIARY CARE HOSPITAL

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Abstract

Introduction: Generation of biomedical waste is an unavoidable outcome of modern day hospital care. Rapid mushrooming of hospital both in the public and private sector to meet the societal demand has collaterally increased the biomedical waste generated. It is essential to optimally manage the biomedical waste to avoid any public health hazards. Hence this study was undertaken to assess the knowledge of biomedical waste management through questionnaire among staff of acute surgical ward and ICU of a tertiary care teaching hospital.

Material and Methods: The study was designed to give an input of knowledge of staff which includes doctors, nurses and class IV employee of the acute surgical ward and ICU based on questionnaire.

Results: It was seen nurses had overall excellent knowledge about the biomedical waste management accounting to 57 % among all staff members included in the study; this was followed by doctors accounting to 7 %; whereas none of the class IV employees came in excellent category.

Conclusion: Proper management of Bio medical waste is a concern. Lack of sound knowledge about biomedical waste management affects the practice of proper waste disposal and is harmful for general health and environmental condition. Besides continuing medical education and updates, on ground practical training should be provided at regular intervals. Strict monitoring should be ensured right from the site of generation to the final site of disposal of biomedical waste.

Keywords: Biomedical waste, Hazards, Tertiary care teaching hospital, Knowledge, Disposal

Introduction

Definition of biomedical waste states “any waste that is generated during diagnosis, treatment or immunisation of human beings or animals, or in the research activities pertaining to or in the production or testing of biologicals and includes categories mentioned in schedule I of the Government of India’s Biomedical Waste (Management and Handling) Rules 2016”^(1,2). Of the various wastes generated the maximum waste is non –infectious general waste accounting to 80–85%, 10% is infectious and 5% is other hazardous waste⁽³⁾. Due to lack of awareness if the infectious component gets mixed with the general non-infectious waste, the entire bulk of hospital waste becomes infectious⁽⁴⁾.

Generation of biomedical waste is an unavoidable outcome of modern day hospital care and practices⁽⁵⁾. Rapid mushrooming of hospital both in the public and private sector to meet the societal demand has collaterally increased the biomedical waste generated. The increasing use of disposable materials has significantly enhanced this problem. It is essential to optimally manage the biomedical waste to avoid any public health hazards⁽⁶⁾. Hence this study was undertaken to assess the knowledge of biomedical waste management through questionnaire

among staff of acute surgical ward and ICU of a tertiary care teaching hospital.

Material and Methods

The study setting was done in Command Hospital (Southern Command), Pune. The study was designed to give an input of knowledge of staff which includes doctors, nurses and class IV employee of the acute surgical ward and ICU based on questionnaire. There were two acute surgical wards (3 & 7). Ward 3 was female surgical ward with bed strength of 45 and ward 7 was male surgical ward with bed strength of 20. The total bed strength of ICU was 20. The questionnaire was divided into two parts. The section I of questionnaire consisted of questions on personal and professional data including age, gender, qualification, total years of experience etc. The section II of questionnaire contained 15 questions on assessment of knowledge regarding biomedical waste management. The section II questions were divided into three groups.

- (A) Biomedical Waste Management and Handling Rules
- (B) Segregation of Biomedical Waste Management
- (C) Disposal of Biomedical Waste

The study was approved by the institutional ethical committee and written consent was taken from all the subjects before they were given the questionnaire.

Total 60 sets of questionnaire were distributed among doctors, nurses and class IV employees working in acute surgical wards and ICU during different shifts in the hospital. Questionnaire was provided in English, Hindi and

Marathi depending upon which language the individual understands. The respondents were asked to return the questionnaire immediately. Before this the questionnaire was pilot-tested on a small group of staff.

Questionnaire

Assessment of Biomedical Waste Management

Section I

Please fill the following particulars

Your position - Doctor Nurse Class IV employee

Age _____

Gender _____

Highest Educational qualification _____

Current job Position _____

Total years of Experience _____

Section II

Instructions: Among given four options only one option is correct. Please tick the correct answer.

(A) Biomedical Waste Management and Handling Rules

1. Guidelines for handling of Biomedical Waste Management and Handling Rules, 2016 are laid down by

- (a) Ministry of Social-Welfare (b) Directorate of Medical Education and Research
(c) Ministry of Health and Family Welfare (d) Ministry of Environment and Forests

2. How many types of categories are proposed in Biomedical Waste Management & Handling Rules?

- (a) 7 categories (b) 8 categories (c) 9 categories (d) 10 categories

3. Which statement describes infectious biomedical waste?

- (a) Materials that may be poisonous, toxic, or flammable and do not pose disease-related risk
(b) Waste that is saturated to the point of dripping with blood or body fluids contaminated with blood.
(c) Waste that does not pose a disease-related risk
(d) None of the above

4. Who regulates the safe transport of medical waste?

- (a) Pollution Control Board of India (b) Transport Corporation of India.
(c) College Administration (d) All of the above

5. Biohazardous waste can be one of the following

- (a) Controlled substances
(b) Cultures, stock or specimens of microorganisms, live or attenuated vaccines and human / animal cell culture

(c) Hazardous chemicals (d) None of the above

6. According to the Biomedical Waste Management & Handling Rules, no untreated bio-medical waste shall be kept stored beyond

(a) 12 hours (b) 48 hours (c) 72 hours (d) 96 hours

(B) Segregation of biomedical waste management

7. Objects like scalpels, needles, glass ampoules, test tubes and slides, are disposed in which colour bag?

(a) Black bags (b) Yellow bags (c) Clear bag (d) White transparent container

8. Cotton, gauze and other items contaminated by blood in wards are disposed in which colour bag?

(a) Yellow bag (b) Red bag (c) Blue bag (d) Black bag

9. The colour code of the container for disposal of normal waste from the ward is

(a) Red bag (b) Black bag (c) Yellow bag (d) Blue bag

10. Anatomical waste consists of human and animal tissue, organs and body parts. Which container should this waste is disposed of into?

(a) Red bag (b) Blue bag (c) White container (d) Yellow bag

11. Pharmaceutical waste of the ward is disposed into which colour coded container?

(a) Red bag (b) Blue bag (c) Black bag (d) Yellow bag

12. All of the following statements about hazardous waste containers are true, except for

(a) Containers must be closed except when removing or adding waste

(b) Containers must be clean on the outside

(c) Contents must be compatible with the type of waste containers

(d) Any type of container, including food containers, can be used to contain hazardous waste

(C) Disposal of biomedical waste

13. Human anatomical waste is finally disposed by which method?

(a) Incineration (b) Deep burial (c) Autoclaving (d) Shredding

14. Contents of red bag are finally disposed as

(a) Incineration (b) Deep burial (c) Autoclaving (d) Shredding

15. Sharp wastes before final disposal should be treated with

(a) Formalin (b) Autoclaving

(c) 1 % sodium hypo chlorite solution (d) Normal saline

Statistical Analysis

Both Section I and section II of the questionnaire were evaluated. Each correct answer was given one mark and incorrect answer was given zero mark. As per the marks grades were given as per the criteria given below.

Criteria for judgment is

Excellent – 8 correct answers out of 10

Good – 6 correct answers out of 10

Average – 4 correct answers out of 10

Poor – less than 4 correct answers out of 10

Calculations were further done in terms of percentages.

A Pearson formula was used to find the correlation between years of experience and marks obtained.

Results

Out of total 60 sets of questionnaires only 55 responded. It was seen that overall nurses had excellent knowledge about biomedical waste management accounting to 57 % among all staff members included in the study; this was followed by doctors accounting to 7 %; whereas none of the class IV employees came in excellent category as shown in **Table1**.

The knowledge regarding biomedical waste management and handling rules was maximum among doctors at 57 %, whereas the knowledge regarding segregation of biomedical waste and disposal of biomedical waste was maximum among nurses both accounting to 90 % as shown in **Table2**.

As per data it was found that there was correlation between marks obtained and years of experience. The persons who were working more than 5 years were having good knowledge of biomedical waste management as shown in scattered **graph 1**. Correlation coefficient calculated by Pearson formulae=0.3

Discussion

In recent years, increasing public concern is raised about the management of healthcare waste throughout the globe and especially in developing nations ⁽⁷⁾. Lack of awareness has led to the hospitals becoming epicenters of spreading disease rather than working toward eradicating them ⁽⁸⁾.

Though India has the state of art medical facilities on par with global standards for a comparatively cheaper cost with best knowledge, the bio-waste management protocols of many hospitals are far below the international standards.

Biomedical waste management in any hospital usually suffers from following reasons: Lack of commitment by the top management, lack of teamwork and coordination among the various departments, lack of adequate and appropriate equipment, lack of training and continuity of training and lack of accountability and responsibility of the

persons involved at various stages of handling biomedical waste.

This study was undertaken to assess the knowledge of our health care professionals about the biomedical waste management with the help of questionnaire which was of closed type ⁽⁹⁾. As the strength of the questionnaire based study depends upon the quality and not the quantity of questions, highly selective good quality 15 questions were made. The questionnaire which overall judged the knowledge of the biomedical waste management of the health care personnel was grouped as such.

(A) Biomedical Waste Management and Handling Rules

(B) Segregation of Biomedical Waste Management

(C) Disposal of Biomedical Waste

In our study it was found that 7 % of the doctors had excellent knowledge about the biomedical waste management as compared to 57 % nursing staff. None of the class IV employees scored excellent and good grade. It was found that 92 % of class IV employees had average knowledge. The doctors had maximum knowledge regarding biomedical waste management and handling rules i.e. 57 %, whereas the knowledge regarding segregation of biomedical waste management and knowledge regarding disposal of biomedical waste management was maximum among nurses reaching up to 90 % in both. The doctors were observed to be sounder in theoretical knowledge than in the more practical aspects of biomedical waste management. In the case of nurses and class IV employees opposite was true, i.e., though their theoretical knowledge lagged behind that of doctors, their practical knowledge regarding biomedical waste management was better. This is important as nurses and class IV employees play an important role as far as ground work related to biomedical waste is concerned. These findings in our study were in agreement with the study conducted by Mathew et al ⁽¹⁰⁾ and Saini et al ⁽¹¹⁾.

In our study it was seen that persons having 10th class education qualification and 10+2 class education qualification were having average grades in the scoring system as compared to graduates and post graduates who had scores between good and excellent. Our results in this regard were in agreement with Saini et al ⁽¹¹⁾ who also found that persons with higher education level were more aware about the biomedical waste management.

It was also found in our study that the health care persons who had more than 05 years of experience were having better knowledge about biomedical waste management. It can be attributed as a result of practical work which a health care worker learns with increasing number of years.

Conclusion

Proper management of Bio medical waste is a concern. Lack of Sound knowledge about biomedical waste management affects the practice of proper waste disposal

and is harmful for general health and environmental condition. Besides continuing medical education and updates, on ground practical training should be provided at regular intervals. For the successful initiatives in health care waste management a legal framework has to be used. Strict monitoring should be ensured right from the site of generation to the final site of disposal of biomedical waste. As our hospital is horizontally spread into wider area, it is difficult for one person to monitor the waste management activity; therefore the responsibility should be assigned to ward medical officers and nursing officers in charge working at the waste generation site. At the end of every month a ward should be selected for its best performance in biomedical waste management system and employee should be duly rewarded creating sense of competition among different wards and increasing self-motivation.

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