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KNOWLEDGE, ATTITUDE AND PRACTICE OF MEDICAL INTERNS REGARDING BIOMEDICAL WASTE MANAGEMENT

Internal Medicine

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ABSTRACT

Objective: The present study was undertaken to assess the knowledge, attitude and practices of medical interns regarding biomedical waste management. Methods: A total of 100 Interns of ESIC Medical College, Hyderabad, were randomly selected by simple random sampling using random numbers generated by computer. A survey was conducted with the help of questionnaire to assess the knowledge and attitude of medical interns regarding the biomedical waste management. **Results:** The Interns of ESIC Medical College and Hospital (Under the Ministry of Labor and Employment , Government of India),Hyderabad., have very good knowledge about the variables associated with waste management. Medical Interns have high positive attitude regarding all variables of biomedical waste management. **Conclusion:** From this study, we are able to identify the knowledge and attitude of medical interns towards the biomedical waste management.

KEYWORDS

Biomedical waste management, Knowledge, Attitude, Medical interns.

INTRODUCTION

Biomedical waste is any waste containing infectious or potentially infectious materials. These wastes are generated during the diagnosis, treatment, and immunization of humans.. Biomedical wastes can be in both solid and liquid forms.. [Published in the Gazette of India, Extraordinary, Part II, Section 3, Sub-section (i)] Government Of India Ministry Of Environment, Forest And Climate Change Notification New Delhi, the 28th March, 2016.[1][2]

Examples Of Biomedical Wastes Include:

- Waste sharps such as needles, lancets, syringes, scalpels, and broken glass
- Human tissues or identifiable body parts (as a result of amputation)
- Used bandage, dressings, gloves, and other medical supplies
- Liquid waste from infected areas
- Laboratory wastes

Biomedical wastes are distinct from regular garbage and require particular disposal and treatment.

Types of Biomedical Waste

The World Health Organization (WHO)[3][4] has categorized biomedical waste into eight categories. They are:

1. Infectious Waste – Any biomedical waste that is infectious or contaminated.
2. Sharps – Sharps objects like needles, scalpels, broken glass, and razors.
3. Pathological Waste – Body parts of humans or animals, including tissues, fluids, or blood.
4. Pharmaceutical Waste – Unused drugs, medicine, or creams that are expiring.
5. Genotoxic Waste – Toxic drugs and hazardous toxic waste
6. Radioactive Waste – Any waste containing potentially radioactive materials
7. Chemical Waste – Liquid waste from machines, batteries, and disinfectants is chemical.
8. General/Other Waste – All other non-hazardous waste.

Further, the Central Pollution Control Board (CPBC) has designated separate color-coded bins to dispose of biomedical wastes as per their nature.

1. **Yellow Bin:** For anatomical waste, chemical waste, soiled waste, chemotherapy waste, discarded linen and medicines, and laboratory waste.
2. **Red Bin:** For contaminated plastic wastes
3. **Blue Bin:** For glass waste and metallic implants
4. **Black Bin:** For hazardous and other waste

The wastes in each of the bins have different treatment and disposal methods.

Effects of Biomedical Waste

Exposure to hazardous biomedical waste can cause disease or injury to human health and also to the the environment. HIV, hepatitis B, and C are the three most commonly spread viruses worldwide due to improper treatment of medical wastes. They are transmitted through injuries from contaminated syringes and needles.

Doctors, nurses, and sanitation workers are amongst the most vulnerable to the harmful effects of biomedical waste.

At a time of rapid emergence of new strains of the novel corona virus, the importance of appropriate treatment of medical wastes are more emphasized. The various technologies that can be used for treatment include:

- Incineration
- Chemical Disinfection

- Wet Thermal Treatment
- Microwave Irradiation
- Land Disposal
- Inertization

These rules are applicable to every institution generating biomedical waste includes hospitals, nursing homes, clinic, dispensary, veterinary institutions, animal houses, pathology labs, blood banks. Bio-medical waste means any solid, fluid or liquid waste including its container and any intermediate products which is biological products for humans or animals. Knowledge means awareness or understanding of a circumstance or fact, gained through association or experience. Attitude means a settled way of thinking or feeling about something. Practice means the actual application or use of an idea, belief or method as opposed to theories related to it. The present study was undertaken to assess the knowledge, attitude and practices of medical interns regarding the biomedical waste management.

MATERIALS AND METHODS

The present descriptive study was conducted at ESIC Medical College and Hospital (Under the Ministry of Labor and Employment, Government of India.) Hyderabad. Informed consent was obtained from all the participants. A total of 100 final year Medical interns were randomly selected by simple random sampling using random numbers generated by computer

Survey

A survey was conducted with the help of questionnaire to assess the knowledge and attitude of medical interns regarding biomedical waste management. Three questionnaires were used to assess the knowledge and attitude of medical interns towards biomedical waste management. The questionnaire had 9 questions under knowledge on biomedical waste management. Attitude questionnaire consisted of 4 questions, and 16 questions on practice on biomedical waste management.

Statistical Analysis

Data was analyzed by SPSS 20.0. Descriptive statistics used for interpretation of data.

Table 1: Assessment Of Knowledge On Biomedical Waste Management

S. No.	Question	Response
1.	Are all healthcare wastes hazardous?	Yes 84 No 16
2.	Are you aware that biomedical waste management rules modified in 2016	Yes 65 No 35
3.	Can any plastic bag be used for waste disposal?	Yes 90 No 10
4.	Have you had any training in biomedical waste management?	Yes 87 No 13
5.	Are you aware of IMAGE?	Yes 43 No 57
6.	If yes, what does IMAGE stand for? a. Indian Medical Association for Greener Environment. b. Indian Medical Association for Go Green Eco friendly c. Indian Medical Association Goes Eco friendly d. Don't know	 10 46 21 23
7.	According to the national guidelines, what is the maximum time limit for which biomedical waste can be stored? a. 24 hours b. 72 hours c. 48 hours d. Don't know	 55 10 26 9
8.	Which of the following is the universally accepted symbol for biohazard?	 12  88
9.	Do you feel that biomedical waste management should compulsory be made part of undergraduate curriculum?	Yes 94 No 6

Table 2: Response To Attitude Based Question On Biomedical Waste Management

10.	Do you agree that biomedical wastes should be segregated into different categories?	Yes 91 No 9
11.	Do you think your knowledge regarding biomedical waste management is adequate?	Yes 76 No 24
12.	Do you think you require any further training on biomedical waste management?	Yes 80 No 20
13.	Does your institute have tie up with waste management companies?	Yes 67 No 10 Don't know 23

Table 3: Response To Practice Based On Question On Biomedical Waste Management

14.	Does your institute have incinerator for treatment of biomedical waste management?	Yes 44 No 66
15.	Do you dispose all kind of waste into general garbage	Yes 7 No 93
16.	Do you segregate the biomedical waste according to different categories?	Yes 95 No 5
17.	Where do you dispose cotton, guaze and other items contaminated by blood? a. Red Plastic Bag b. Yellow Plastic Bag c. General waste d. White container	 5 90 2 3
18.	Where do you dispose pharmaceutical waste? a. Black Plastic Bag b. Red Plastic Bag c. Yellow plastic Bag d. White container	 13 5 74 8
19.	Where do you dispose waste sharps? a. Black Plastic Bag b. Red Plastic Bag c. White container d. Yellow Plastic Bag	 4 5 87 4
20.	Where do you dispose excess mercury and mercury contaminated cotton? a. Drain b. General garbage c. Plastic Bag d. Yellow plastic Bag	 30 10 10 50
21.	How do you dispose the hazardous liquid waste? a. Drain b. General garbage c. Chemical treatment and drain discharge	 45 10 55
22.	According to modified biomedical waste management 2016, Can biomedical waste cross border for its treatment?	Yes 7 No 93
23.	Incineration is safe method for treatment of a. Anatomical waste, animal carcasses & amputated limbs b. Microbiological waste c. Infected metallic implants	 85 11 4
24.	Where do you dispose contaminated glassware & medicine vials a. Yellow Bag b. Red Bag c. White container with biohazard label d. Blue card board box	 7 5 11 77
25.	Which bag to be used for disposal of gloves? a. Red Bag b. Yellow Bag c. Either of two d. None	 79 10 7 4
26.	Proper method for needle disposal a. Recapping b. Burning and cutting c. Disinfection in sodium hypochlorite d. All	 20 60 15 5
27.	Various steps in waste management, reduction Segregation storage transportations and treatment	Correct Answer 82%

28.	Inertisation is a process of mixing waste with Cement before disposal of toxic substances	Correct Answer 30%
29.	Biomedical waste is treated at 850-2000°C in incinerator	Correct Answer 71%
30.	In Indian condition about 1.5-2 kg of waste per bed per day is generated.	Correct Answer 60%

About (84%) of the respondents (n=84) considered all health care wastes hazardous. 35% of the respondents (n=35) were not aware of the fact that biomedical waste management rules modified in 2023.

Table 2 contains the responses to attitude based questions on biomedical waste management. The response showed a favorable positive attitude towards the topic of discussion.

DISCUSSION

Aradhya Abrol, Savita Mahajan, Madhu Chauhan, Narender Kumar et.al [5] revealed that although the attitude about biomedical waste management was high among the healthcare personnel but the practice was comparatively low. The study indicated that there is a need for creating more awareness among health care personnel regarding biomedical waste management. The topic should compulsory be made a part of undergraduate Medical curriculum or repeated training of biomedical waste management may help to enrich the knowledge of Interns to overcome this critical problem

Kiran Yadav, Kanika Pallavi Bhatt et.al. [6] The study was conducted to assess the knowledge, attitude and practice regarding the biomedical waste segregation among the medical interns. Hence the study conclude that there is a good knowledge, positive attitude and good practice regarding the biomedical waste segregation among the housekeeping staff but there is a need for continuing education regarding the waste management and segregation for further prevention of the infection.

Suchitra et al. (2007) testified that education has positive correlation on retention of knowledge, attitudes and practices in all categories of staff. However, it is required to develop a system of continuous education for all categories of staff.[7]

Mahesh Chandra and Priya Bhat's study concluded that Biomedical waste management should be a joint team effort of the hospital with government support.It is our basic right to live in a clean and safe environment. [8]

In the present study we have observed highly good knowledge and positive attitude of medical Interns towards the biomedical waste management. The management of biomedical wastages poses a great challenge to the policy planners, city administrators, medical personals and workers in the recycling industry. There is a need for adopting cost effective system for providing better medical waste treatment facilities and reduce the amount of waste generation by awareness and education of all concerned.

CONCLUSION

From this study, we are able to identify the knowledge and attitude of Interns towards biomedical waste management. We conclude that interns from ESIC Medical College have good knowledge, and positive attitude towards the biomedical wastage to protect the environment and health of the hospital. We recommend all institutes to conduct similar studies and educate the staff and students for pollution free world for betterment of all in general.

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