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Research Article

BIOMEDICAL WASTE MANAGEMENT IN DENTISTRY -A SURVEY IN CENTRAL INDIA

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ABSTRACT

Background: The actual biomedical waste management situation in the democratic developing country like India is grim. Even though there are Rules stipulating the method of safe disposal of biomedical waste, hospital waste generated by hospitals is still largely being dumped in the open, waiting to be collected along with general waste. Safe and effective management of biomedical waste is not a legal necessity but also a social responsibility. Lack of concern in person working in that area, less motivation and awareness are some of the problems faced in the proper hospital waste management.

Aim and objectives: To obtain information about the knowledge, attitude and practice of interns, PG students, faculties from dental colleges and private practitioners in disposal of biomedical waste.

Material and methods: A self-administered questionnaire composed of 30 questions was designed and distributed among 300 participants chosen randomly including interns, PG students, faculties from dental colleges and private practitioners from central India.

Results: Many dentists have knowledge about the waste management but they lack in the attitude and practice.

INTRODUCTION

Health care waste is the waste generated from any health care activities in health care organizations, research institutes or laboratories. Almost, three-fourth of the health care wastes is nonhazardous, while the remaining fraction is hazardous, and is referred as biomedical waste (BMW).The term biomedical waste has been defined as "any waste that is generated during the diagnosis, treatment, or immunization of human beings or animals, or in the research activities pertaining to or in the production or testing of biological and includes categories mentioned in schedule I of the Biomedical Waste (Management and Handling) rules 1998 and rules 2011.[1,2] The actual biomedical waste management situation in the democratic developing country like India is grim. Until fairly recently, medical waste management was not generally considered an issue. Concerns about exposure to human immunodeficiency virus (HIV) and hepatitis B virus (HBV) led to questions about potential risks inherent in medical waste. Thus hospital waste generation has become a prime concern due to its multidimensional ramifications as a risk factors to the health of patients, hospitals staff and extending beyond the boundaries of the medical establishment to the general population[3]. Even though there are Rules stipulating the method of safe disposal of biomedical waste, hospital waste generated by hospitals is still largely being dumped in the open, waiting to be collected along with general waste. Safe and effective management of biomedical waste is not a legal necessity but also a social responsibility. Lack of concern in person working in that area , less motivation and awareness are some of the problems faced in the proper hospital waste management. It is dangerous due to its high harmful potential, not only for people, but also for the environment, if it is not properly managed. For this reason, medical waste sterilization is an important process to eliminate risks associated with handling and transport. This important advancement moreover provides a guarantee to hospital administrations that are responsible for such waste for as long as it presents a danger. Biomedical waste can be classified into four big categories: clinical waste, laboratory waste, nonclinical waste and kitchen waste[4].Good knowledge and attitude toward dental waste will minimize the risk of transmission of the disease from the hospital and dental clinic to the community. Poor bio-medical management practice constitutes a huge risk to the general public health, patients, and health care workers and contributes to environmental degradation.[5]

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Aim and objectives

To obtain information about the knowledge, attitude and practice of interns, PG students, faculties from dental colleges and private practitioners in disposal of biomedical waste and Discuss the best management practices in relation to the findings of survey

MATERIALS AND METHODS

A self-administered questionnaire composed of 30 questions (standard) were designed and distributed among 300 participants chosen randomly including interns, PG students, faculties from dental colleges and private practitioners from Bhilai and Durg cities of central India. Confidentiality of the participants was maintained. The percentage response for each question from all the participants was obtained and the data was calculated.

RESULTS

A total of 30 questionnaires were distributed among interns, PG students, college faculties and private practitioners. Among the participants, 40% were interns, 15% were PG students, 10% college faculties and 30% were private practitioner. Forty percent of respondents had a training in biomedical waste management. In our study, only 48% of participants were aware of biomedical waste management regulation applicable to dentists. 49% of participant have knowledge regarding use of color coded container for segregation of biomedical waste. In this survey 46% of participant don't know the symbol of biohazard. And 49% think that biomedical wastes can be infectious. All the respondents agree that biomedical waste management should compulsorily be made part of dental undergraduate curriculum. Only 40% of participant think that Occupational safety of waste handler and documentation regarding waste disposal is required. Only 30% of respondents are using color coded bags for biomedical waste management.

Sixteen percent of the respondents were manipulating amalgam with ungloved hands. Only 8% of dentists follows the recommended manner of amalgam disposal. 80% of participant dispose fixer solution directly into the wash basin. With the advent of needle destroyer 60% of dentists dispose the used needle by using needle destroyer. Only 10% of clinic and institution have tie up with waste management companies.87% of participant dispose there expiry date medicine into the general waste. Only 40% of the participants follows the proper waste protocol of anatomical waste.91% of respondent dispose the x ray films and lead foil directly into the general wastes. Only 40% of participant follows the recommended protocol for disposal of blood soaked gauzes and cotton.

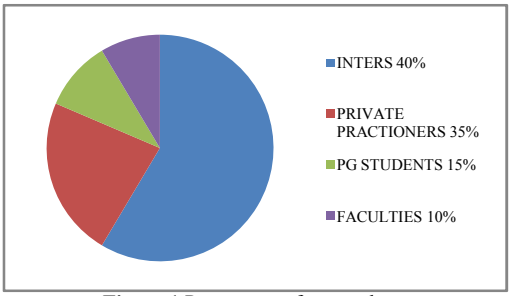


Figure 1 Percentage of respondents

Table 1 Dentists reported knowledge about waste management practices

	Yes	No
Training in Biomedical waste management	40%	60%
Awareness about waste management guidelines	48%	52%
Using color coded containers	49%	51%
Knowledge regarding biohazard symbols	54%	46%
Knowledge regarding which are infectious wastes	49%	51%

Table 2 Response to attitude based questions on biomedical waste management

Yes		No
Biomedical waste management should compulsorily be made part of dental undergraduate curriculum	100%	0%
Occupational safety of waste handler and documentation regarding waste disposal is required	40%	60%
Whether color coded bag /dust bean using or not	30%	70%

Table 3 Waste management practice among the respondents

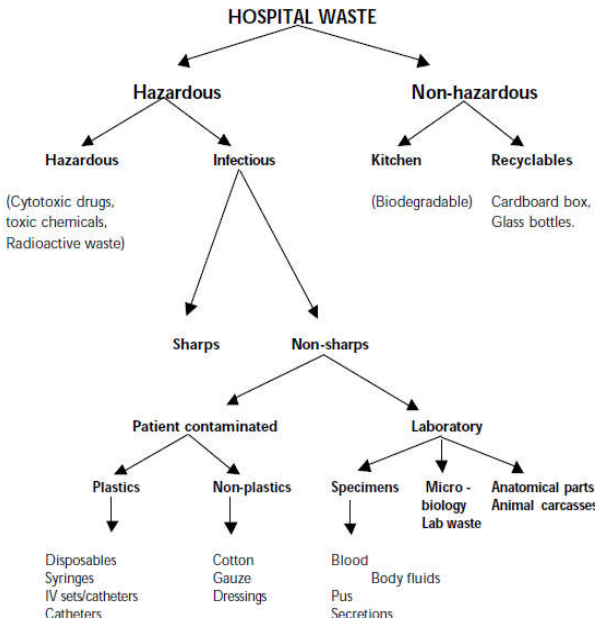
Amalgam	**General Waste**	**92%**
	Recommended manner (in fixer solution)	**8%**
Disposal of fixer solution	Improper manner (drain in basin)	80%
	Recommended manner (consulting recycling department)	20%
Needle	General Waste	40%
	Recommended manner (use of needle destroyer)	60%
institute/clinic tie up with waste management companies	Yes	10%
	No	90%
Discarded Medicine	General Waste	87%
	Improper manner (blue bag)	9%
	Recommended manner (black bag)	4%
Anatomical Waste	General Waste	13%
	Improper manner (red bag)	45%
	Recommended manner (yellow bag)	42%
Used X-Ray film lead foils	General Waste	91%
	Recommended manner (recycling department)	9%
Contaminated Gauze pieces/Cotton	General Waste	14%
	Improper manner (yellow bag)	42%
	Recommended manner (red bag)	44%

DISCUSSION

The questionnaire study was chosen as it allows us to collect lot of information and data from large number of respondents relatively quickly. According to WHO, hospital waste produces 80–85% of non-hazardous waste and 15–20% of hazardous waste. The hazardous waste can be infectious (10%) like sharps or noninfectious (5%) such as chemical and pharmaceutical waste. All these aspects require and necessitate more awareness and training in infection control and BMW management for both dental and non dental personnel. It is recommended that this important fact should be included in curriculum of undergraduate and postgraduate dental academics and also should be mandatory for dental hygienist, dental technicians,

and dental operating room assistant. The rule applies to all those persons who generate, collect, receive, store, transport, treat, dispose, and handle the biomedical waste. It is ideal and desirable that occupational safety be a prime consideration for any system of waste management.

According to WHO, hospital waste produces 80–85% of non-hazardous waste and 15–20% of hazardous waste. The hazardous waste can be infectious (10%) like sharps or noninfectious (5%) such as chemical and pharmaceutical waste.[6] Collection of biomedical waste should be done as per BMW (management and handling rules, 1998) rule 6, Schedule II and the containers/bags should be labeled as per guidelines of schedule III, i.e, biohazard and cytotoxic symbol.[7]



Practical Classification of Hospital Waste (World Health Organization)[8]
According to BMW (management and handling rules, 1998, Schedule I) [7]

Be placed in yellow colour bags, e.g., human anatomical waste, microbiological waste, and soiled plastic waste

- All the biomedical waste to be sent for microwave/autoclave/chemical treatment should be placed in red coloured bags, e.g., infected plastic syringes, tubings, gloves, rubber dam sheets;
- Any waste which is sent to shredder after autoclaving/microwaving/chemical treatment is to be placed in blue/white translucent bags/containers, e.g., sharp containers for needles and used file

Pharmaceutical waste that includes expired drugs should also be disposed off properly. Such waste is considered to be hazardous non-infectious waste. Either it should be returned to manufacturer or collected in a separate black bag and given to waste collection company, where they are either buried in deep landfills or incinerated. The mutilated sharps should be placed in puncture proof sharp container containing 1% NaOCl for disinfection. Once the container is three-fourth filled, it should be given to waste handlers and sent for shredding, encapsulation, and disposal in landfills by common treatment facility. Placement and removal of dental amalgam restorations generate amalgam waste particles that are suctioned into vacuum line and discharge into sewer system. Lead cannot be placed in the regular solid waste containers nor can it be disposed of down the drain; it must be managed as either recyclable metal or hazardous waste. The used fixer should be collected separately in a labeled plastic container. Silver from used fixer is a valuable source and should be recycled. Another important issue is the types of plastic bags used for collection of waste. The plastic bags used for waste disposal are special non-chlorinated, which can be incinerated.[9,10,11]

Steps in Waste Management[4]

1. Washing of hands with soap and warm water after handling BMW. Also, washing of all areas of body with soap and water that you may have come into contact with biomedical waste, even if we are not sure that body actually touched the biomedical waste.
2. Keeping all sores and cuts covered. Immediately replace wet bandages with clean, dry bandages.
3. Wear disposable latex gloves when handling BMW. Discard the gloves immediately after use.
4. Wear an apron or another type of cover to protect clothes from contact with the waste. If clothes become soiled, put on fresh clothes, and take a shower, if possible. Launder or throw away clothes soiled with biomedical waste.
5. Promptly clean and disinfect soiled, hard surfaced floors by using a germicidal or bleach solution and mopping up with paper towels.
6. Clean soiled carpets. First blot up as much of the spill as possible with paper towels and put the soiled paper towels in a plastic lined, leak-proof container. Then try one of the following: Steams clean the carpet with an extraction method. Scrub the carpet with germicidal rug shampoo and a brush. Let the carpet dry, and then vacuum it.
7. Never handle syringes, needles, or lancets with hands. Use a towel, shovel, and/or broom and a dustpan to pick up these sharp objects. Dispose of them in a plastic soda pop bottle with a cap. Tape down the bottle cap. Then throw the bottle in the trash.

CONCLUSION

Concluding from the results, the importance of training regarding biomedical waste management cannot be overemphasized; lack of proper and complete knowledge about biomedical waste management impacts practices of appropriate waste disposal. It was disappointing to find that the majority of the dentists did not have any knowledge of any documents outlining waste management, which does not only jeopardize the safety of the workers, but also causes avoidable mishaps in handling of dental waste. It is important to segregate and dispose waste in safe manner to protect environment and human health., but 70% of dentists are not using different color coded bags/ dust beans for biomedical waste. The rule applies to all persons who generate, collect, receive, store, transport, treat, dispose and handle the biomedical wastes. Regular monitoring and training is required at all levels. It is highly recommended that waste management programme should be a part of academic curriculum and dental education curriculum not only in theory but also should be part of practical.

Acknowledgment

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