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Awareness on Biomedical Waste Management among Dentists

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ABSTRACT
Bio medical waste (BMW) collection and proper disposal has become a significant concern for both the medical and general community. Effective management of biomedical waste is not only a legal necessity but also a social responsibility.Proper handling, treatment and disposal of biomedical wastes are important elements of health care office infection control programme. Correct procedure will help protect health care workers, patients and the local community. If properly designed and applied, waste management can be a relatively effective and an efficient compliance-related practice. The aim of the study was to assess the current knowledge, attitude and practices of the dentists with regard to the management of BMW.

KEY WORDS: Biomedical waste management, Dental waste management, Medical waste management

I. INTRODUCTION

Until fairly recently, medical waste management was not generally considered an issue. In the 1980s and 1990s, concerns about exposure to human immunodeficiency virus (HIV) andhepatitis B virus (HBV) led to questions about potential risks inherent in medical waste.Thushospital waste generation has become a prime concern due to its multidimensional ramifications as a risk factor to the health of patients, hospital staff and extending beyond the boundaries of the medical establishment to the general population.

Biomedical waste (BMW) is waste generated during diagnosis, treatment or immunization of human beings or animals, or in research activities pertaining thereto, or in the production and testing of biological. In addition, this BMW is contaminated with human fluids (Das et al., 2001). It has been documented that the waste produced in the course of health-care activities carries a higher potential for infection and injury than any other type of waste (Park, 2011).

In India, the Ministry of Environment andForests has promulgated the Biomedical Waste(Management and Handling) Rules 1998 for propermanagement of BM waste. These rules are meant toimprove the overall waste management of health carefacilities in India. However, the introduction oflaws is not sufficient for proper disposal of BMwaste. The awareness of these laws among the general public as well as development of policies andenforcement that respect those laws are essential.

Although there is increased global awarenessamong health care professionals about hazards andalso appropriate management techniques, the levelof awareness in India has been found to be unsatisfactory. Therefore, the present study wasconducted to assess the level of awareness and attitude among dentists on biomedical waste management.

II. METHODS

A cross-sectional study was conducted to assess the awareness on biomedical waste management among dentists. A total of 199 professionals wereconsidered in the study. The Google form questionnairewas sent to the officiating mail ids and the data wascollected.The questionnaire was designed in English.The questionnaire was adapted, validated and modifiedfrom questionnaires of similar studies found in the literature. Data were analysed by using the PSPPversion 1.2.0, Descriptive data included mean (m),standard deviation (SD), frequency, and proportions.The research questions were tested with multipleregression and t test, and statistical significance was setat a P-value of 0.05.Tables were used to present theresults.

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III. RESULTS

Table 1: Descriptive statistics

Question	Response	n	Percentage
What do you mean by Biomedical waste (BMW)?	Waste from household	1	0.5%
	Waste usually generated during various activities like diagnosis, treatment, immunization or research activities in medical, dental or laboratory set up	188	94.5%
	Waste from factory	1	0.5%
	No idea	1	0.5%
How BMW should be disposed of?	Dump directly into garbage bins	2	1.0%
	Buried directly into soil	4	2.0%
	Handing it over to biomedical waste management agency	184	92.5%
	No idea	2	1.0%
According to government guidelines, untreated biomedical waste should not be stored beyond	24 hrs	68	34.2%
	48 hrs	62	31.2%
	72 hrs	21	10.6%
	No idea	40	20.1%
Correct sequence of BMW management	Segregation-Collection&storage-Transportation-Treatment&disposal	72	36.2%
	Transportation-Segregation-Collection&storage-Treatment&disposal	8	4.0%
	Collection&storage-Segregation-Transportation-Treatment&disposal	104	52.3%
	No idea	6	3.0%
BMW handlers should	be made aware of risk involved in handling BMW	1	0.5%
	use personal protection equipment like gloves, mask, protective glasses, gum boots etc.	34	17.1%
	both of the above	154	77.4%
	No idea	2	1.0%
Which of the following is biodegradable waste	Gloves, extracted teeth, IV set	15	7.5%
	IV set, nylon suture, human tissues	53	26.6%
	cotton dressing, black braided silk, Extracted teeth	112	56.3%
	No idea	9	4.5%
Human tooth(extracted tooth) can be disposed in which bag	no idea	43	21.6%
	Red	52	26.1%
	White	18	9.0%
	Yellow	77	38.7%
Glassware &metallic body implants are disposed in	Blue	82	41.2%
	no idea	47	23.6%
	Red	27	13.6%
	White	30	15.1%
Infectious sharps & needles are disposed in	Blue	19	9.5%
	no idea	26	13.1%
	Red	26	13.1%
	White puncture proof container	116	58.3%
In which colour bag will you dispose the blood bag	Blue	26	13.1%
	no idea	53	26.6%

	White	18	9.0%
	Yellow	92	46.2%
Discarded medicines/cytotoxic drugs can be disposed in	Black	78	39.2%
	no idea	46	23.1%
	Red	27	13.6%
	Yellow	38	19.1%
Catheters,IV sets can be disposed in	Blue	44	22.1%
	no idea	50	25.1%
	Red	59	29.6%
	Yellow	35	17.6%
Used impression materials are disposed of in	Black bag	42	21.1%
	Blue/white bag	53	26.6%
	no idea	58	29.1%
	Red bag	33	16.6%
Human Anatomical waste can be disposed by	Autoclaving	10	5.0%
	Incineration	143	71.9%
	Microwaving	16	8.0%
	no idea	16	8.0%
Incineration should be done at temperature	400-500c	15	7.5%
	600-700c	57	28.6%
	800-900c	86	43.2%
	no idea	32	16.1%
The most effective way to remove accidental spill of mercury in the clinic	mercury slit kit	139	69.8%
	no idea	9	4.5%
	with sponge	15	7.5%
	with vacuum cleaner	25	12.6%
Does your institution is having its own disposal mechanism	No	52	26.1%
	no idea	44	22.1%
	Yes	91	45.7%
Does your institution includes hazardous waste in the form of solid & liquid?	No	38	19.1%
	no idea	39	19.6%
	Yes	112	56.3%
Existence of trained personnel's to handle the waste disposal	No	39	19.6%
	no idea	48	24.1%
	Yes	100	50.3%
Is liquid waste directly discharged in sewer system	No	97	48.7%
	no idea	56	28.1%
	with proper treatment.	1	.5%
	Yes	36	18.1%
Are there any attempts to minimize the quantity of waste generation in your institution	No	42	21.1%
	no idea	45	22.6%
	Yes	103	51.8%
Any mechanism to decrease the toxicity of the waste generated	No	28	14.1%
	no idea	59	29.6%
	Yes	102	51.3%
Do you aware about any training course for BMW management	No	83	41.7%
	no idea	37	18.6%
	Yes	70	35.2%
To whom should we report in case of accidental injury	Emergency unit	101	50.8%
	Head of the department	34	17.1%
	no idea	10	5.0%
	Occupational health department	45	22.6%
Awareness & following of the	No	39	19.6%

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rules & regulations regarding BMW in your institution	no idea	32	16.1%
	Yes	119	59.8%

IV. DISCUSSION

The knowledge and awareness level regarding BMW management among the subjects is inadequate and there is significant variation in practice and management in different studies which can be attributed to difference in sample size and different study settings. A self-reported questionnaire was used for gathering information from the subjects regarding BMW management.

It showed thatthere was a poor level of knowledge and awarenessabout BM waste generation hazards, legislation andmanagement among dentists.The results of the study are in accordance withprevious studies. A study conducted in NewDelhi, India, among the 64 dentists who wereteachers in Government institutions reported thatthe majority of the respondents were not aware ofthe proper clinical waste management regulations.Another recent Indian study compared the BMwaste knowledge, attitude and practices amonghealth care personnel and showed that doctors,nurses and laboratory technicians had a betterknowledge than the cleaning (sanitary) staff regarding biomedical waste management. A study of medical waste management inthe south of Brazil revealed that all the health carefacilities promoted segregation of Group A wastes,especially sharps waste. However, not much attentionwas given to other types of waste, which were usually managed without a perspective for recycling andcollected through the municipal collection system.Thus, it can be demonstrated that for properdisposal of BM waste, the introduction of laws isinsufficient. The awareness of these laws amongthe public, as well as development of policies andenforcement that respect those laws, is essential.

POTENTIAL IMPLICATIONS OF BIOMEDICAL WASTE

Risk to healthcare workers and waste handlers

Improperly contained contaminated sharps pose greatest infectious risk associated with hospital waste. There is also theoretical health risk to medical waste handlers from pathogens that may be aerosolized during the compacting, grinding or shredding process that is associated with certain medical waste management or treatment practices. Physical (injury) and health hazards are also associated with the high operating temperatures of incinerators and steam sterilizers and with toxic gases vented into the atmosphere after waste treatment.

Risk to the public

Public impacts are confined to esthetic degradation of theenvironment from careless disposal and the environmental impact of improperly operated incinerators or other medical waste treatment equipment.

There may be increased risk of nosocomial infections in patients due to poor waste management. Improper waste management can lead to change in microbial ecology and spread of antibiotic resistance.Safe and effective management of waste is not only a legal necessity but also a social responsibility. Lack of concern, motivation, awareness and cost factor are some of the problems faced in the proper hospital waste management. Proper surveys of waste management procedures in dental practices are needed. Clearly there is a need for education as to the hazards associated with improper waste disposal. Lack of apathy to theconcept of waste management is a major stymie to the practice of waste disposal. An effective communication strategy is imperative keeping in view the low awareness level among different category of staff in the health care establishments regarding biomedical waste management.

Proper collection and segregation of biomedical waste are important. At the same time, the quantity of waste generated is equally important. A lesser amount of biomedical wastemeans a lesser burden on waste disposal work, cost-saving and a more efficient waste disposal system. Hence, health care providers should always try to reduce the waste generation in day-to-day work in the clinic or at the hospital.

BIO MEDICAL WASTE MANAGEMENT RULES, 1998 (Amended in 2000 and 2003)

Under the Environmental Protection Act, the biomedical waste management rules were introduced. These rules are directly relevant to the health sector. The salient features of these rules are as follows:

- Bio medical wastes means waste that is generated during the diagnosis, treatment or immunizations of human beings or animals or in research activities pertaining thereto or in the production or testing of biological.
- It is the duty of every occupier of aninstitution generating bio medical waste which includes a hospital, nursing home, clinic, dispensary, veterinary institution,animal house, pathological laboratory and blood bank by whatever name called

totake all steps to ensure that such waste is handled without any adverse effect to human health and the environment, policies, legislation and regulations policy framework, March 2007.

An important challenge tobe overcome is the need to progress from the concept of "waste management" to one of sustainabledecisionmaking regarding resource use, includingmethods of waste minimisation at source and recycling. It is therefore strongly recommendedthat waste management programmes should be apart of academic curricula for all health care workers and in continuing dental education.

V. CONCLUSION

It can be concluded from the present study that thereis poor level of knowledge and awareness about BMwaste generation hazards, legislation and management among dentists. The proper hospital waste management system can help the control diseases can reduce community exposure to resistant bacteria, and could reduce HIV/AIDS and Hepatitis transmission from dirty needles and other improperly cleaned or disposed medical items.Based on the observation, the importance of training regarding bio medical waste management cannot be overemphasized, lack of proper and complete knowledge about bio medical waste management impacts practices of appropriate waste disposal.

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