



“Awareness of Biomedical Waste Management among Dental Practitioners in Moradabad district, Uttar Pradesh, India”

Dental Science

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ABSTRACT

Proper handling, treatment and disposal of biomedical wastes are important elements in any health care setting has been the topic of investigations for many years. These waste materials have important health impacts and are hazardous to humans and the environment. The aim of the present study was to assess the Knowledge, Attitude and Practices among 140 dental practitioners regarding waste disposal in Dental Clinics of Moradabad district, India. The result of the study concluded that dentist have better knowledge and practice regarding waste generated regularly in the dental clinics. Furthermore, it could be suggested that Dental practitioner's should upgrade their knowledge about latest development in BMW.

KEYWORDS:

INTRODUCTION

Hospital/clinic is a place of almighty, a place to serve the patient. Since beginning, the hospitals are known for the treatment of sick persons but we are unaware about the adverse effects of the garbage and filth generated by them on human body and environment. Now it is a well-established fact that there are many adverse and harmful effects to the environment including human beings which are caused by the "Hospital/clinic waste" generated during the patient care.

These waste cause a potential health hazard to the health care workers, public and flora and fauna of the area, Hospital/clinic acquired infection, transfusion transmitted diseases, rising incidence of Hepatitis B, and HIV, increasing land and water pollution lead to increasing possibility of catching many diseases¹.

Biomedical waste is a global issue today². 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 biologicals and includes categories mentioned in Schedule I of the Government of India's Biomedical Waste (Management and Handling) rules 1998^{3,4}."

Dental waste is a subset of hazardous biomedical (BM) waste. Dental practices generate large amounts of cotton, plastic, latex, glass, sharps, extracted teeth and other materials, much of which may be contaminated with body fluids⁵. Hazards arising from waste disposal from dental practices can be divided in to two main areas. First, there is the environmental burden of a variety of hazardous products and second, the more immediate risks of potentially infectious material that may be encountered by the individuals handling waste⁶. With the increase in demand for dental care, there has been a rapid growth of dental clinics in the recent years and this lead to increase in the amount of biomedical waste generated by them⁷.

To protect the environment and community from these hazards, the Ministry of Environment and Forest, Government of India, issued a notification on biomedical waste (management and handling) rules 1998 under Environment Protection Act (EPA). So it is the duty of every occupier of a hospital or clinic generating biomedical waste to take necessary steps to ensure that such waste is handled without any adverse effect to the human health or environment³. Hence, the study is planned to assess the knowledge, Attitude and Practices regarding waste disposal in Dental Clinics of Moradabad districts, India.

Materials and Method:

A cross-sectional study was carried out among the private dental practitioners of Moradabad district to assess the awareness and practices of biomedical and dental waste disposal. Ethical clearance

was obtained from institutional ethics and review board KDCRC Moradabad and written consent was taken from all the participating subjects. A total of about 150 dental practitioners were registered with the Dental Councils in Moradabad district out of which 140 were participated. The study was carried out for a period of 1 month in June 2016.

The questionnaire composed of 10 close ended questions divided in to three sections framed based on knowledge, attitude, and those regarding the practice of dentists in relation to dental healthcare waste management.

A pilot study was carried out on a small group of Dentists after which the questionnaire was finalized. The questionnaire was designed in an appropriate way such that the objectives of the study were met. The questionnaire was distributed among 140 private dental practitioners of Moradabad district. Each Dentist was given a copy of the questionnaire personally and was requested to answer it completely before being collected back from them on the same day or next day.

The resulting data was coded and statistical analysis was done using SPSS (statistical package for social sciences) software version 17.0. Mean is calculated for demographic variables and percentages were calculated for the responses given by the dentist. The responses were divided and analyzed using Chi Square test. For all the tests, P value of < 0.05 was considered for statistical significance.

Results:

The results revealed that in respect to BMW management policies out of 140, only 118 dentist (84%) know about the BMW generation and legislation. Regarding BMW management practices 92 dentist in which 36 (69%) of post-graduation as compared to 56 (64%) of undergraduate were following color coding of BMW.

When asked about the disposal of developer and fixer solution and exposed X-ray films 51% of the dentist disposed developer and fixer by first diluting it, 28% of them led directly in to sewer, 62% of dental practitioner's stored lead foil and x-ray films separately in red/blue color coding containers. The values are seems to be statistically non-significant.

About 46% of the dentist disposed silver amalgam in common bin, 48% of them stored in a tight container with water. Concerning about the extracted tooth and human tissue disposal half of the dentist (53%) disposed it correctly in yellow bags.

The question on maintenance of BMW records in the hospitals only 74(53%) of dental surgeons responded correctly, 120(86%) dentists responded correctly for the need of regular educational programme,

81% of dental surgeons were agree to report to the pollution control board(PCB) of India about particular institutions if it is not complying with the guidelines for BMW. (Table 1)

As the study depends on the opinion of the respondents assessed through questionnaires this is all possibility of response bias especially because of study accessing the practice as per judiciary of the state.

Discussion:

Improper segregation and disposal of BMW and mixing it with municipal waste can result in possible exposure of the health care workers, waste handlers, waste pickers, and the general public to the microorganisms⁸, which are responsible for highly infectious and fatal diseases⁹. For effective implementation of BMW rules in health care settings, the health care professionals should possess adequate knowledge with respect to the source of BMW and its appropriate disposal¹⁰.

The current study was done to assess the awareness and practices of dental care waste management among dental practitioners in Moradabad, which provide an important knowledge in the proper method of disposal of waste by private practitioners.

In the present study 84% of the dentist were know about the guidelines laid down by Government of India for BMW, whereas in a previous studies, conducted in year 2011-12 by Ramandeep et al¹¹ all the dentist were aware of that, whereas the study done in New Delhi by Kishore J et al¹² some 12 years ago, only 35.9% respondents were aware of this,. Thus there is a need for continuing dental waste management practices to the dental practitioners.

In present study 64% of BDS and 69% of MDS practitioners followed the color coding guidelines laid down by Government of India by which Bio-medical waste shall be segregated and kept in the color coded containers or bags at the point of generation in accordance with schedule II of the Rules prior to its storage, transportation, treatment and disposal. Color coding for containers or bags (yellow, red, blue, black) for collection of various categories of bio-medical wastes, including the treatment options has been specified to avoid overlapping and confusion^{3,4}. Whereas in the present study 24% of the dentists were not following color coding. Similar results was found in study done by Sudhakar and Chandrashekar¹³.

In our study, the questions on different type of infected wastes such as extracted teeth/human tissue/ soiled dressings and used impression material being disposed in a yellow colored bag were answer correctly by 53% and 66% of dentists respectively. In a study conducted in Indian hospitals in 2006, by Y.Saraf et al a higher level of awareness was observed and the questions were answered correctly by all the doctors (100%). It was suggested that this variation in level of awareness due to the training that the staff received in their hospital¹⁴.

A major concern in our field is management and disposal of mercury¹⁵ Amalgam particles are a source of mercury, which is known to be neurotoxic and nephrotoxic¹⁶ It was found in my study around 47% of the dentists used common bin for disposal of excess silver amalgam, which was found to be more in contrast with the study carried out by Sudhakar and Chandrashekar(2008)¹³ in which the 35.2% of the dentists disposed excess silver amalgam in common bin.

In the present study, 11% of the practitioners disposed lead foil of x-ray films directly in to the common bin, which was in contrast to the study conducted by Mohit Bansal et al [2013]¹⁷ in which 34% of them disposed in to the common bin, which is not considered a safe method for disposal as it can affect neurological development and function as discussed by hedge et al. (2007)¹⁸. Unused X-ray film can be sent to a recycler. Lead containing foils sent for recycling, because there is a possibility of leaching of lead¹⁹.

It was noticeable in the present study only half of the dentist wants to maintain a record of biomedical waste disposal is mandatory in the clinics, it may be due to ineffective implementations of rules in various hospitals/clinics by the monitoring authorities. However 86% of the dentist want to attend regular voluntarily and educational programs on BMW as these programs upgrades their knowledge.

The outcome of result revealed that there is a urgent need to apply more strict laws and measures for Biomedical waste disposal in India, so that

it becomes obligatory for all private practitioners to register their clinics under Biomedical waste management services.

Conclusion:

The present study shows a huge number of practitioners were aware of different categories and color coding of different types of waste yet have failed to practice the same in their clinics. Thus, there is an urgent need for continuing dental education on dental waste management practices to these dental practitioners. Dentists are encouraged to follow best management practices when disposing hazardous wastes. All the dental personnel as required to undergo continuing training programme on biomedical waste management, because "Everyone wins, when the environmental health is respected and safe guarded"

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TABLE 1: Responses of Dentists on Knowledge, Attitude and Practices of Biomedical waste management.

QUESTIONS	OPTIONS	BDS (n=88)(%)	MDS (n=52)(%)	TOTAL (n=140)(%)	p-value
Q1. Do you know about BMW generation and legislation?	Yes	70(80%)	48(92%)	118(84%)	0.45(S)
	No	0(0%)	0(0%)	0(0%)	
	Not sure	18(20%)	4(8%)	22(16%)	
Q2. Do you follow color coding for BM waste?	Yes	56(64%)	36(69%)	92(66%)	0.543(N S)
	No	24(27%)	10(19%)	34(24%)	
	Sometimes	8(9%)	6(12%)	14(10%)	
Q3. Soiled dressings and used impression materials are disposed of in?	Black bags	20(23%)	4(8%)	24(17%)	0.068(N S)
	Yellow bags	56(64%)	36(69%)	92(66%)	
	Red bags	24(27%)	2(4%)	6(4%)	
	Blue/White bags	8(9%)	10(19%)	18(19%)	
Q4. Disposal of developer and fixer solution?	Led in to sewer	20(23%)	19(36%)	39(28%)	0.171(N S)
	Diluted & led in to sewer	45(51%)	26(50%)	71(51%)	
	Return to the supplier	17(19%)	6(12%)	23(16%)	
	Others(RVG/No unit)	6(7%)	1(2%)	7(5%)	
Q5. Disposal of used lead foil oh X-ray films?	Common bin	10(11%)	8(15%)	18(13%)	0.554(N S)
	Stored separately & disposed	53(60%)	34(66%)	87(62%)	
	Buried in soil	5(6%)	1(2%)	6(4%)	
	Disposed in secured landfill	20(23%)	9(17%)	29(21%)	
Q6. Extracted tooth and human tissue should be disposed in?	Black bags	12(14%)	6(11%)	18(13%)	0.879(N S)
	Yellow bags	47(53%)	27(52%)	74(53%)	
	Red bags	24(27%)	17(33%)	41(29%)	
	Don't know	5(6%)	2(4%)	7(5%)	
Q7. How do you store a waste silver amalgam?	Dispose in common bin	41(47%)	24(46%)	65(46%)	0.999(N S)
	Store in air tight container with water	42(48%)	25(48%)	67(48%)	
	Store in a fixer	0(0%)	0(0%)	0(0%)	
	Don't know	5(5%)	3(6%)	8(6%)	

Q8. Is maintaining BMW records mandatory in your clinic?	Yes No Do not know	48(54%) 34(39%) 6(7%)	26(50%) 20(38%) 6(12%)	74(53%) 54(39%) 10(8%)	0.315(NS)
Q9. Would you like to attend voluntarily programs that enhance and upgrade your knowledge about waste management?	Yes No Cannot comment	76(87%) 10(11%) 2(2%)	44(85%) 6(11%) 2(4%)	120(86%) 16(11%) 4(3%)	0.863(NS)
Q10. Do you think it is important to report to the PCB of India about a particular institution if it is not complying with the guidelines for BMW?	Yes No Cannot comment	68(77%) 0(0%) 20(23%)	46(88%) 0(0%) 6(12%)	114(81%) 0(0%) 26(19%)	0.100(NS)

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