

Knowledge and practice of waste disposal management in dental clinics in Chennai

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ABSTRACT

Aim: This study aims to assess the knowledge, attitude, and practice of private dental practitioners on health-care waste. **Materials and Methods:** A self-administered questionnaire was designed and distributed to 120 practicing dentists, who are private practitioners in Chennai. The survey form was composed of 11 questions framed based on knowledge, attitude, and those regarding the practice of dentists in relation to dental health-care waste management. Chi-square test was used for analyzing the factors influencing waste management protocols. **Results:** A total of 120 questionnaires were distributed among private practitioners of Chennai, of which 33% were male and 87% were female. Most of the respondents were BDS graduates working both in private and corporate sectors. Among the respondents, 54% were practicing for the past 5 years, 28% were practicing for the past 6–10 years, 14% were practicing for the past 11–15 years, and only 4% were practicing for 16–20 years. **Conclusion:** Although most dentists were aware of the hazardous effect of improper disposal of dental waste, majority of them practiced improper waste disposal. There is a need to restrain the practitioners on the importance and newer technologies of proper waste disposal.

KEY WORDS: Dental clinics, Dental office waste, Dental solid waste, Health-care waste, Private dental practices, Solid waste management

INTRODUCTION

Hospitals are health institutions providing necessary patient care services. It is the duty of hospitals and health-care establishments to look after the general public health.^[1] This may be directly through patient care or indirectly by ensuring a clean, healthy environment for their health-care providers. Health-care waste generated which usually includes sharps, human tissues or body parts, and other infectious materials, also referred to as hospital solid waste and biomedical solid waste.^[2] The Government of India (Notification, 1998) specifies that hospital waste management is part of both hospital hygiene and maintenance activities. This involves the management of range of activities, which are mainly collection, transportation,^[3] operation/treatment of processing systems, and disposal of waste. However, initial segregation and storage activities are the direct

responsibility for nursing personnel who are engaged in the hospital. The term clinical waste is associated with waste coming from medical, dental, and veterinary sources and has been defined as waste that is contaminated with blood, saliva, or any other bodily hazardous fluids and which may prove hazardous to any person encountering with it.^[4] The World Health Organization has defined health-care waste as waste produced by health-care establishments, research facilities, and laboratories including the waste originating from minor or scattered sources such as that produced in the course of health care undertaken at home such as dialysis and insulin injection.^[5] The term biomedical waste has been defined as a waste that is generated during the diagnosis, treatment, or immunization of human beings or animals. Health-care establishments (including dental clinics) are mainly concerned with providing high standard services to the community as this cannot be fully accomplished unless a proper waste handling policy that is consistent with the international regulations is strictly implemented.^[6-8] Even though, dental clinics generate relatively small quantities of healthcare waste compared to other medical

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facilities, poor bio-medical management practice constitutes a huge risk to patients and health care workers and contributes to environmental degradation. Dentistry is a profession dedicated to promote and enhance oral health care and well-being.^[9] To accomplish these goals, dentists use a variety of materials and equipment from day to day practice. Unfortunately, some of the materials that are currently in use include heavy metals and biomedical waste presenting potential challenges to the environment. Waste at dental clinics includes X-ray fixers and film, chemical disinfectants, dental amalgam, sharps, and blood-soaked dressings. The key to complete minimization and effective management of health-care waste is segregation and identification of the waste.^[10] Appropriate handling, treatment, and disposal of waste by type reduce costs and do much to protect public health.

MATERIALS AND METHODS

A self-administered questionnaire was designed and distributed to 120 practicing dentists, who are private practitioners in Chennai. The survey form was composed of 11 questions framed based on knowledge, attitude, and those regarding the practice of dentists in relation to dental health-care waste management. Chi-square test was used for analyzing the factors influencing waste management protocols. Response was recorded as correct answer or incorrect answer.^[11]

Questionnaire

Name: **Age/sex:** **Designation:**

- 1. How do we do dispose amalgam?**
 - (a) General waste
 - (b) Improper manner
 - (c) Recommended manner
- 2. How do we dispose dental cements?**
 - (a) General waste
 - (b) Improper manner
 - (c) Recommended manner
- 3. How do we dispose sharps, needles?**
 - (a) General waste
 - (b) Improper manner
 - (c) Recommended manner
- 4. How do we dispose files/reamers/burs?**
 - (a) General waste
 - (b) Improper manner
 - (c) Recommended manner
- 5. How to dispose discarded medicine?**
 - (a) General waste
 - (b) Improper manner
 - (c) Recommended manner
- 6. How to dispose protective wears?**
 - (a) General waste
 - (b) Improper manner
 - (c) Recommended manner

7. How to dispose used X-ray films and solution?

- (a) General waste
- (b) Improper manner
- (c) Recommended manner

8. How to dispose gauze pieces/cotton?

- (a) General waste
- (b) Improper manner
- (c) Recommended manner

9. How to dispose anatomical waste?

- (a) General waste
- (b) Improper manner
- (c) Recommended manner

10. How to dispose suction tips?

- (a) General waste
- (b) Improper manner
- (c) Recommended manner

11. How to dispose alginate impression material?

- (a) General waste
- (b) Improper manner
- (c) Recommended manner

RESULTS

A total of 120 questionnaires were distributed among private practitioners of Chennai, of which 33% were male and 87% were female. Most of the respondents were BDS working both in private and corporate sectors. Among the respondents, 54% were practicing for the past 5 years, 28% were practicing for the past 6–10 years, 14% were practicing for the past 11–15 years, and only 4% were practicing for 16–20 years. Average OPDs of most of the clinics are between 1 and 10 per day (86%) while 11% clinics had 11–20 OPDs per day and only 3% clinics had 21–30 OPDs per day [Table 1]. 47% of the respondents have attended training on management of dental waste programs. 48% of practitioners were aware of waste management guidelines and have been practicing color-coded containers in their clinics [Table 2]. Waste management practice among the respondents is described in detail Table 3. Attending

Table 1: Demographic profile of the participating dentists

Characteristics	n (%)	Total
Gender		
Male	87 (87)	
Female	33 (33)	120
Designation		
BDS	120	120
Practicing since		
0–5 years	54 (54)	
6–10 years	28 (28)	
11–15 years	14 (14)	120
16–20 years	34 (34)	
Average OPD (per day)		
1–10	86 (86)	
11–20	11 (11)	
21–30	3 (3)	120
>30	20 (20)	

Table 2: Dentists reported knowledge about waste management practices

Characteristics	n (%)		Total
	Yes	No	
Attended training or CDE program	87	33	120
Awareness about waste management guidelines	68 (68)	52 (52)	120
Using color-coded containers	68 (68)	52 (52)	120

Table 3: Waste management practice among the respondents

Characteristics	n (%)	Total
Amalgam		
General waste	79 (79)	120
Improper manner	33 (33)	
Recommended manner	8 (8)	
Dental cements		
General waste	71 (71)	120
Improper manner	23 (23)	
Recommended manner	26 (26)	
Sharps/needle		
General waste	16 (16)	120
Improper manner	44 (24)	
Recommended manner	60 (60)	
Files/reamers/burs		
General waste	78 (78)	120
Improper manner	31 (31)	
Recommended manner	11 (11)	
Discarded medicine		
General waste	87 (87)	120
Improper manner	29 (29)	
Recommended manner	4 (4)	
Protective wears		
General waste	22 (22)	120
Improper manner	39 (39)	
Recommended manner	59 (95)	
Used X-ray films and solution		
General waste	26 (26)	120
Improper manner	65 (65)	
Recommended manner	29 (29)	
Contaminated gauze pieces/cotton		
General waste	34 (34)	120
Improper manner	42 (42)	
Recommended manner	44 (44)	
Anatomical waste		
General waste	13 (13)	120
Improper manner	45 (45)	
Recommended manner	62 (62)	
Used suction tips		
General waste	85 (85)	120
Improper manner	23 (23)	
Recommended manner	12 (12)	

training or CDE program about waste management practices has made significant influence on waste management guidelines.

DISCUSSION

The questionnaire study was chosen as it allows us to collect lot of information and data from many respondents relatively quickly.^[12] The participants were chosen randomly from the urban and rural areas of Chennai. Safe handling of hazardous waste is essential. All involved dentists need to be aware of possible health hazards present and must be trained in the appropriate handling, storage, and disposal

methods. It was disappointing to find that most of the dentists did not have any knowledge of any documents outlining waste management, which does not only jeopardize the safety of workers but also avoids mishappenings in handling of dental waste.^[13] Sharps such as needles, syringes, and used ampoules are regarded as highly hazardous health-care waste since they can cause injuries and transmitted diseases, especially to waste collection, treatment, and disposal personnel.^[14] In the present study, it was found that more than half of respondents were not aware of waste management guidelines. Disappointingly, only small percentage of our surveyed dentists (66%) uses safety boxes for sharps and needles. Unfortunately, malpractice of disposing of the hazardous waste such as syringes, blades, and ampoules in dustbins and emptying these into municipal corporation bins was also reported by Singh, 2012, study.^[15] In spite of previous knowledge and recommendation for amalgam waste disposal, simply by putting the scrape into a closed container filled by water, glycerine, or X-ray fixer, only a few of the participants (8%) practice this measure.

This may show the lack of availability of such training and educational programs in our country.^[16] There was no association between knowledge and variables mainly year of experience, place of graduation, and degree of qualification. This can be justified by sample size not large enough, study concise to private clinics, bias of candidates on answering the questionnaire, non-specific questions, and not up to point questions about dental waste management protocols.^[17-19]

Same results were found in a study done in Nairobi, Kenya. This could be due to lack of initiative by dental practitioners on acquiring new knowledge after training or lack of training at institution. Only 8% of dentists reported disposal of amalgam in a closed container; in previous studies, it was stated that contact and non-contact amalgam should be stored separately in different containers, the container should be labeled with biohazard symbol as recommended by the American Dental Association guidelines should be followed for proper disposal of amalgam waste.

About 4% of dentists indicated that bloody/body wastes should be disposed according to set guidelines; while 56% disposed bloody/body waste

as a general waste. In the study done in Nairobi, Kenya, 56.1% of respondents dispose the bloody/body waste according to the set guidelines. Bloody/body waste is suspected of causing infection and set guidelines should be followed strictly for this type of waste.

It was also found that 48% of the respondents indicated that it was important to follow set guidelines on management of dental waste while in the study done in Nairobi, Kenya, 63.5% follow the set guidelines. In the study done in Ajman, United Arab Emirates, it was found that majority of the dentists did not have any knowledge of waste management guidelines.

While 60% of the dentists did apply the recommended manner for disposal of sharps/needle; only 11% of the dentists disposed files/reamers as sharp/needle.^[20] In the study done in Kenya, 61% of respondents applied the recommended manner for sharps/needle. Only 56% of the dentists knew the recommended manner for disposal of sharps/needle in the study done in Ajman, United Arab Emirates.

Needlestick and puncture wound injuries and resulting infections have been recorded in situations where sharps have been improperly handled or disposed. The sharps (needles and scalpel blades) are that category of waste that needs maximum precaution and care.^[21] Safe management of health-care waste has come to be recognized as being more of a problem of attitude rather than just providing technology or facilities, as observed in the present study as all the facilities for waste management existed in the hospital set up, but they were not used properly (ADA, 2003).^[22]

Many questioned dentists are not practicing proper methods of dental waste disposal and many require improvement in their knowledge.

CONCLUSION

The present study was done to determine the current status of knowledge, attitude, and practices regarding biomedical waste management and areas of deficit in a dental teaching hospital in Chennai. This study revealed that though overall knowledge of study participants was moderate, they still require good quality training to improve their current knowledge about dental waste management. The lower level of awareness about hospital waste handling may have direct impact on the overall process of safe disposal of the hospital waste. For this, there is a need for intensive training programs at regular time interval to repeatedly train and restrain all the nursing staff and interns, which may include question raising and problem-solving approach. Strict supervision

and surveillance should be followed daily regarding hospital waste management activities.

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