Knowledge, awareness and practices of dental care waste management among private dental practitioners in Tricity (Chandigarh, Panchkula and Mohali)

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Abstract

Objective: The objective of this study is to assess the awareness and practices of dental care waste management among private dental practitioners in Tricity (Chandigarh, Panchkula and Mohali). Materials and Methods: A cross-sectional study was conducted in 100 private dental practitioners selected by simple random sampling using a close-ended questionnaire. Results: Amongst the total respondents 52% were males and 48% were females. Nearly 14% of the dental practitioners were not aware of the different categories of the waste generated in their clinics and 12% of the practitioners were not aware of the color coding used to dispose the waste. About 26% of them practiced wrong measures to dispose sharps and extracted tooth respectively. A majority 32% of Dentists did not disposed outdated and expired medicines properly. Conclusion: Majority of the dental practitioners was aware of categories and color coding used for disposal of different types of wastes yet they do not follow the same in their practice. Hence, strict prosecution laws should also be imposed under biomedical waste management act for the Dentists so that it should be implemented in daily practice.

Key words: Awareness, dental care waste, dental practitioners, disposal, management

INTRODUCTION

Hospital waste is often described as any residual matter, solid or liquid that is generated in the diagnosis, treatment or immunization of human beings or animals.¹ According to World Health Organization estimates 85% of hospital waste is actually non-hazardous and around 10% is infectious while the remaining 5% is non-infectious, but consists of hazardous chemicals such as methylchloride and formaldehyde.² The main concern of infectious hospital waste is the transmission of human immunodeficiency virus and hepatitis B or C viruses. In this context, syringes and needles have the highest disease transmission potential.

Dental waste is included in hospital waste.³ It is of two types, liquid waste and solid waste.⁴ They are further classified into two main groups: Non-risk waste and risk waste. Risk waste is infectious waste and hazardous waste.⁵ Infectious waste contains a great variety of pathogenic microorganisms. Hazardous waste contains metals that are toxic and never degrade once they reach the environment. It consists of silver, lead, mercury, X-rays and cleaning solutions.⁶ Amalgam is an acute neurotoxin; it’s the most toxic non-radioactive element and also the most volatile heavy metal. Mercury can pose a threat due to release of mercury into the environment from dental practices and industries due to poor disposal. Other materials may contain potential hazards such as polystyrenes, barium, strontium, which
may cause harm if correct use and disposal is not instilled. Improper disposal of dental waste can cause harm to the Dentist, to the people in the immediate vicinity of the Dentist who handle the materials, to the waste handlers or the general public at large through production of toxins through incineration. Today, with the increase in demand for dental care, there has been a rapid growth of the dental clinic in recent years, which in turn led to an increase in the amount of biomedical waste generated in the clinics. Hence, the aim of the present study is to assess the awareness and practices regarding disposal of various types of wastes in dental clinics.

MATERIALS AND METHODS

A cross-sectional study was carried out among the private dental practitioners of Tricity (Chandigarh, Panchkula and Mohali). A total of about 396 dental practitioners were registered with the different Dental Councils in Tricity, out of which 100 private dental practitioners were selected for the study by simple random sampling. The study was carried out for a period of 3 months from November 2012 to January 2013.

The questionnaire included different sets of questions regarding procedure used for disposal of waste in the clinics. A pilot study was carried out on a small group of Dentists after which the questionnaire was finalized. Each Dentist was given a copy of the questionnaire personally and was requested to answer it before being collected back from them on the same day or next day. The information was gathered through self-administered questionnaire, which included questions about the awareness and practice of waste disposal in dental clinics. The data was analyzed using SPSS version 13.0. (SPSS Inc., Chicago, USA)

RESULTS

Out of the 100 dental practitioners, 52% were males and 48% were females. 68.6% had completed post-graduate education and the rest 31.4% were undergraduates. Distribution of practitioners based on the number of years of practice had been described in Figure 1.

Data regarding the awareness of dental care waste had been described in Table 1.

Nearly 14% of dental practitioners were not aware of the different categories of the waste generated in their clinics. Only 24% of the Dentists were aware that

| Questions                                                                 | Number |
|---------------------------------------------------------------------------|--------|
| Awareness regarding different categories of biomedical waste generated in the clinic |        |
| Yes                                                                       | 86     |
| No                                                                        | 14     |
| Awareness regarding various color coding for different types of biomedical wastes |        |
| Yes                                                                       | 88     |
| No                                                                        | 12     |
| Human anatomical wastes should be disposed in                               |        |
| Yellow container                                                           | 72     |
| Red container                                                              | 6      |
| Blue/white container                                                       | 0      |
| Black container                                                            | 0      |
| Don’t know                                                                | 2      |
| No answer                                                                 | 20     |
| Sharps should be disposed in                                               |        |
| Yellow container                                                           | 11     |
| Red container                                                              | 7      |
| Blue/white container                                                       | 58     |
| Black container                                                            | 5      |
| Don’t know                                                                | 12     |
| No answer                                                                 | 7      |
| Category of outdated or expired medicines fall in which category           |        |
| Chemical waste                                                             | 47     |
| Cytotoxic waste                                                            | 24     |
| Biotechnological waste                                                     | 13     |
| Don’t know                                                                | 9      |
| No answer                                                                 | 7      |
| Category of impression material and cotton                                  |        |
| Solid waste                                                                | 9      |
| Soiled waste                                                               | 16     |
| Infected waste                                                             | 46     |
| Don’t know                                                                | 22     |
| No answer                                                                 | 7      |

Figure 1: Distribution of practitioners based on the number of years of practice
expired or outdated medicines come under cytotoxic drugs. With regard to the question about the category of impression material and cotton only 16% said correctly that it falls under the category of soiled waste.

12% of practitioners were not aware of the color coding used to dispose the waste.

Nearly, 72% of the Dentists were aware of yellow color coded container to be used for disposal of human anatomical waste. When asked about the color coding for disposing sharps, 58% were aware of it.

Dentist’s response toward practices of dental care waste management had been described in Table 2.

76% of the Dentists segregate different waste according to the laws of biomedical waste management. 66% Dentists used needle burner to destroy needles and 14% of them disposed the needles in common bin after use. 52% of the Dentists disposed developer and fixer by first diluting it. 14% of them reused it after adding some new mixture to it. 12% of them disposed it directly to the wash basin. 42% of the dental practitioners stored lead foils and X-ray films separately in red/blue color coding containers and then disposed it safely while 22% of them disposed it directly into the common bin. Out dated or expired medicines were disposed in common bin by 32% of the Dentists. 22% of them store it in black containers and then disposed it.

62% of the practitioners stored extracted teeth in yellow containers and then disposed them safely. About 44% of the Dentists disposed silver amalgam in common bin. 14% of them stored it in air tight container with water. 10% among them stored it in a fixer solution. 22% among them did not know the method of disposal of silver amalgam. 6% among the Dentist didn’t use silver amalgam in their clinics. 40% of the Dentists disposed orthodontic wires and brackets by first deforming and then disposing it in blue color coded container. 28% of the dental practitioners did not know the method of disposal of orthodontic wires and brackets.

**DISCUSSION**

This study was undertaken to assess the awareness and practices of dental care waste management among dental practitioners in Tricity (Chandigarh, Panchkula and Mohali). This study provided an important insight into the proper method of disposal of waste by private practitioners.

In the present study, 14% of the dental practitioners were not aware of the different categories of the waste generated in the clinics which was quite similar to the study conducted by Sudhir (2006)[10] in which 11.1% of the practitioners were not aware of the different categories. 12% of the practitioners were not aware of the color coding used to dispose the waste which was found to be low as compared with the study done by Sudhir (2006).[10]

Moreover, 24% of the Dentist’s did not segregate different waste according to the laws of biomedical waste management, which was found to be quite less as compared with the study done by Sudhakar and

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**Table 2: Practices of dental care management among dentists**

| Questions                                                                 | Number |
|---------------------------------------------------------------------------|--------|
| Do you segregate different types of wastes in your clinic?                |        |
| Yes                                                                       | 76     |
| No                                                                        | 24     |
| How do you dispose infected needles                                       |        |
| Dispose in common bin                                                     | 14     |
| Break the needle and dispose                                              | 12     |
| Destroy the needle in needle burner                                       | 66     |
| Dispose it in puncture proof bags                                         | 8      |
| How do you dispose developer and fixer                                    |        |
| Direct in wash basin                                                      | 12     |
| Dilute it and dispose                                                     | 52     |
| Add new and reuse                                                        | 14     |
| Others                                                                    | 13     |
| Do not know                                                               | 9      |
| How do you dispose X-ray film lead foils and x-ray films                  |        |
| Dispose in common bin                                                     | 22     |
| Store it separately and then to be disposed in secured landfills by experts| 42     |
| Bury it                                                                   | 0      |
| Others                                                                    | 20     |
| Do not know                                                               | 16     |
| How do you dispose outdated or expired medicines                          |        |
| Dispose in common bin                                                     | 32     |
| Store separately and dispose                                              | 22     |
| Bury it                                                                   | 0      |
| Dispose it in secured landfills                                          | 18     |
| Others                                                                    | 16     |
| Do not know                                                               | 12     |
| How do you dispose extracted tooth                                        |        |
| Dispose in common bin                                                     | 26     |
| Yellow container                                                          | 62     |
| Red container                                                             | 6      |
| Blue/white container                                                      | 4      |
| Black container                                                           | 2      |
| How do you store excess silver amalgam                                    |        |
| Dispose in common bin                                                     | 44     |
| Store in air tight container with water                                    | 14     |
| Store in a fixer                                                          | 10     |
| Don’t know                                                                | 22     |
| Do not use                                                                | 6      |
This study showed that a substantial percentage of practitioners dispose dental waste without segregation, which exposes garbage collectors to a high risk of getting infected from healthcare waste.

14% of them disposed the needles in common bin after use. In this study done by Treasure and Treasure (1997) 24.4% disposed the needles in common bin. This showed that the knowledge regarding proper disposal of sharps was very less and knowledge regarding the same should be given.

In the present study, 34% of the practitioners disposed lead foils and X-ray films by storing it separately and then disposing it in black coded containers, which was in contrast to study conducted by Sudhakar (2006). 22% of them disposed it directly into 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).

In our study, 32% of them disposed outdated or expired medicines in common bin, 22% of them stored it separately to be disposed safely. 24% of the practitioners were aware that outdated or expired medicines comes under the category of cytotoxic drugs, but surprisingly only 18% of the Dentists used the correct method of disposal that is to be disposed it in secured landfills.

All the waste biomedical waste, which is to be disposed in secured landfills or being shredded was stored separately in specific coded containers and then disposed. The disposal process is being carried out by the biomedical waste experts accordingly and nor by the Dentist themselves.

26% of the practitioners disposed extracted teeth in common bin, which is considered to be in factious material by Occupational Safety and. Health Administration and should be disposed in proper color coded containers. However, 62% of the Dentists used proper color coded containers that is yellow containers to dispose extracted teeth.

In our study, it was found that about 44% of the Dentists disposed excess silver amalgam in common bin which was found to be more in contrast with the study carried out by Sudhakar and Chandrashekar (2008) in which the 35.2% of the Dentists disposed excess silver amalgam in common bin.

Orthodontic wires being sharp waste should be disposed according to the biomedical laws. In our study 12% of them disposed directly in the common bin and 40% of them first deformed it and then disposed it which is not considered to be a correct method. Orthodontic wires should always be disposed in blue color coded bags.

The outcome of our study focused a definite need to enforce more strict laws and measures for disposal in India, so that it becomes mandatory for all private practitioners to register their clinics under bio medical waste management services.

CONCLUSION
A large 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.

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