

## Assessing Knowledge and Attitude about Dental Waste Disposal among Dental Practitioners: A Questionnaire Study

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### ABSTRACT

**Aims & Objectives:** This study was aimed at assessing the knowledge and attitude and create awareness about dental waste disposal among the dental practitioners of Belgaum.

**Methods:** After an extensive review of literature, a self-framed validated questionnaire was distributed among the dental practitioners in their respective clinics during their working hours. The filled questionnaire was collected from them after 2 days. 20 of the 78 dental practitioners did not respond due to their busy schedule. The collected data obtained from the filled questionnaire was tabulated and the mean, standard deviation was calculated from the same.

**Results:** This study portrayed that, the practitioners have registered for the pollution control board but have not got the registration number yet. It also showed that, 90% of the practitioners had done the colour coding of waste but were unaware of the person who does the segregation. The waste which was produced was stored for 24 hours before disposal. 65% of them said that the waste was not labeled with

biohazard symbol. Only 2 of them had attended programme on dental waste management. They prefer to refer to the information on web.

**Key words:** Dental Waste, Disposal, Dental Waste Management.

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### INTRODUCTION

Going green means managing the waste which is being produced. Dental health care professionals play a major role in preserving the environment. The waste produced is managed by utilizing the four r's i.e. *reduce, reuse, recycle and rethink*. Color coding of the waste into 4 different colors of bags (yellow, red, blue, black) has to be done to reduce the harm posed to the environment. Thus, this research aims at assessing the knowledge about disposal of dental waste and their attitude towards biomedical waste management. It motivates the dental practitioners to follow the dental ethics while waste disposal in the interest of the community.

### AIMS AND OBJECTIVES

1) To assess the knowledge on disposal of dental waste among the dental practitioners.

2) To assess the attitude towards waste management.

3) To assess the damage caused to the environment due to the harmful waste produced.

4) To create awareness among the dental practitioners about their knowledge on dental waste management.

### MATERIALS AND METHODS

The research protocol for this study was reviewed and approved by the institutional ethical committee of KLE VK Institute of Dental Sciences, KLE University Belgaum, Karnataka, India.

**Study Design:** A prospective, cross-sectional, questionnaire-based study has been conducted among the dental practitioners of Belgaum.

**Study Population:** The well framed questionnaire which consisted of 19 structured questions was distributed among

78 dental practitioners of Belgaum of which 58 have been answered completely and the rest of the practitioners did not respond to the questionnaire due to their busy schedule.

**Study Tools:** Following an extensive review of the literature, a questionnaire was designed which consisted of 19 structured close ended questions. All the structured questions allowed only one answer and two permitted multiple answers. The questionnaire included questions related to

- A. Demographic data
- B. General attitude
- C. Clinical implications

**Study Procedure:** During the study period, the dental practitioners of Belgaum were contacted during working hours at their respective clinics. The participation was made voluntary and the purpose of survey had been briefed to them after obtaining the informed consent. The questionnaire was hand delivered to the

dental practitioners for data collection. It was assured in the beginning of the questionnaire itself that the results of the survey would be only presented or published as an aggregate data maintaining the confidentiality of personal information using a self-administered questionnaire.

**Inclusion Criteria:** All the dentists with clinics in Belgaum willing to fill in the questionnaire were included in the study.

**Exclusion Criteria:** The dentists who were not willing to participate were excluded from the study.

**Statistical Analysis:** The filled returned questionnaires were checked for completeness of data and were recorded in a standard proforma. The data was then analyzed in a computer by using statistical package for social sciences (SPSS) programme version 17. Data analysis was done by using descriptive and inferential statistical methods such as frequency, percentage, mean, standard deviation.

Fig 1: Do you color code the waste for disposal?

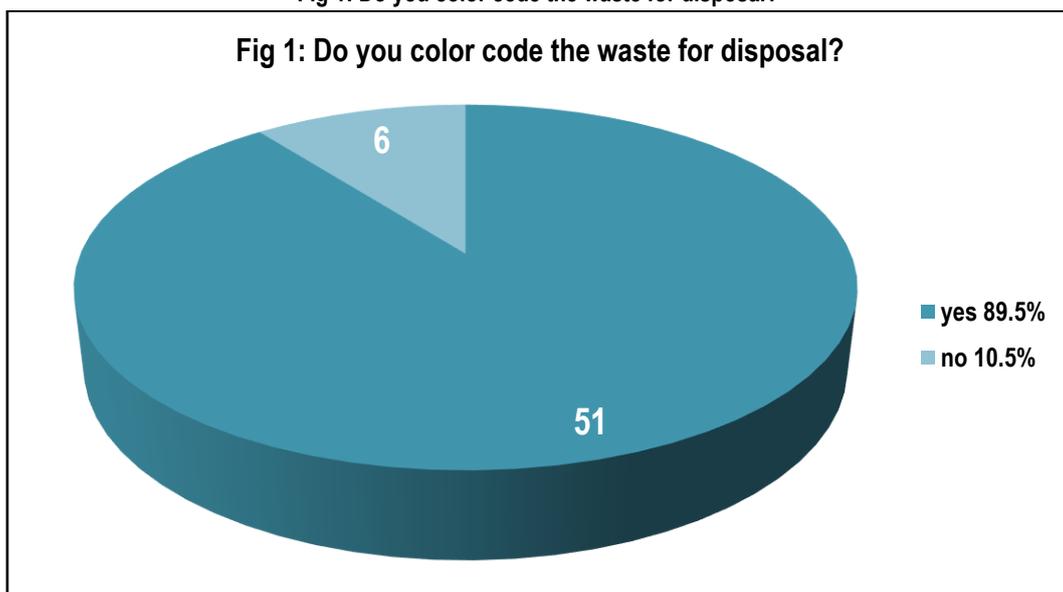


Figure 2: Disposal of Fixer Solution

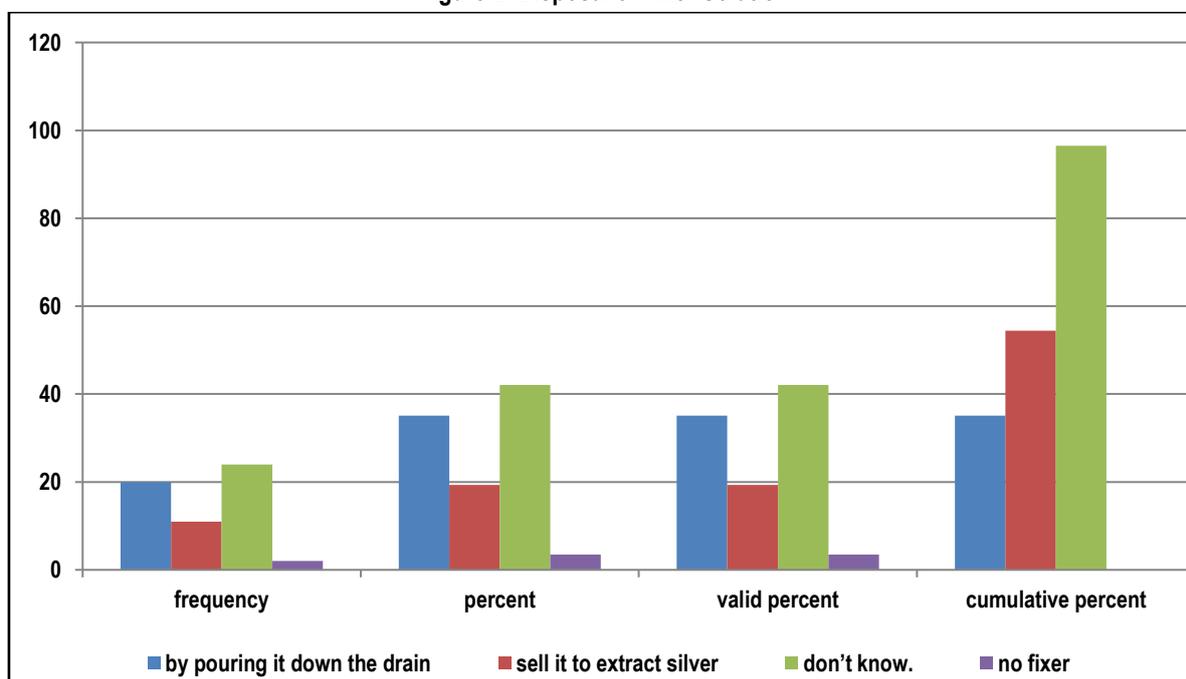


Figure 3: Problem in Managing the Waste Produced In Clinics

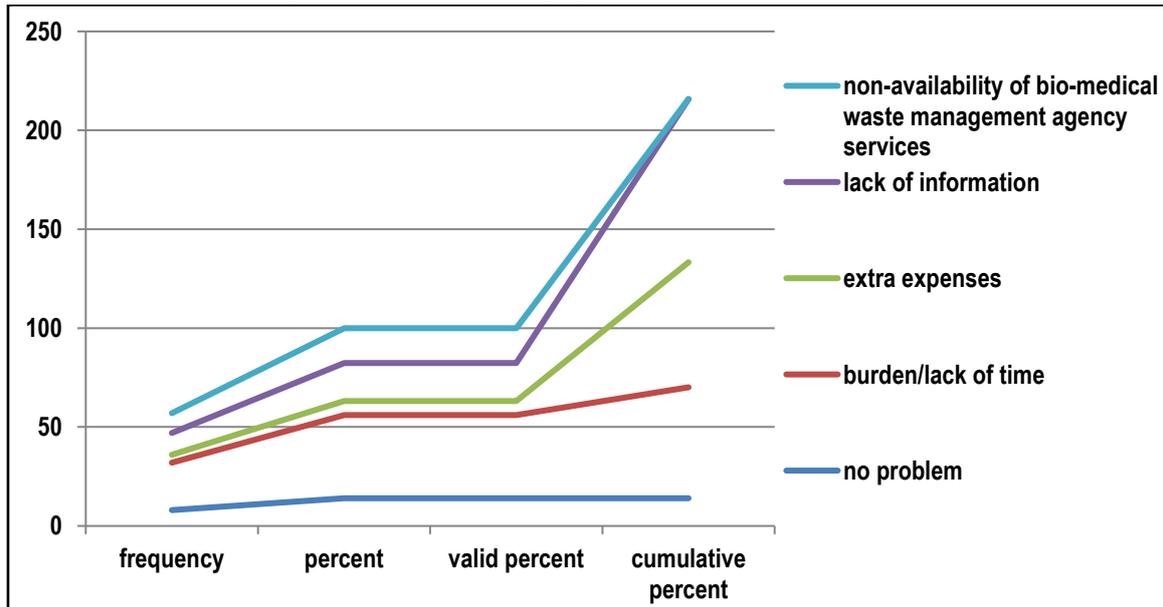
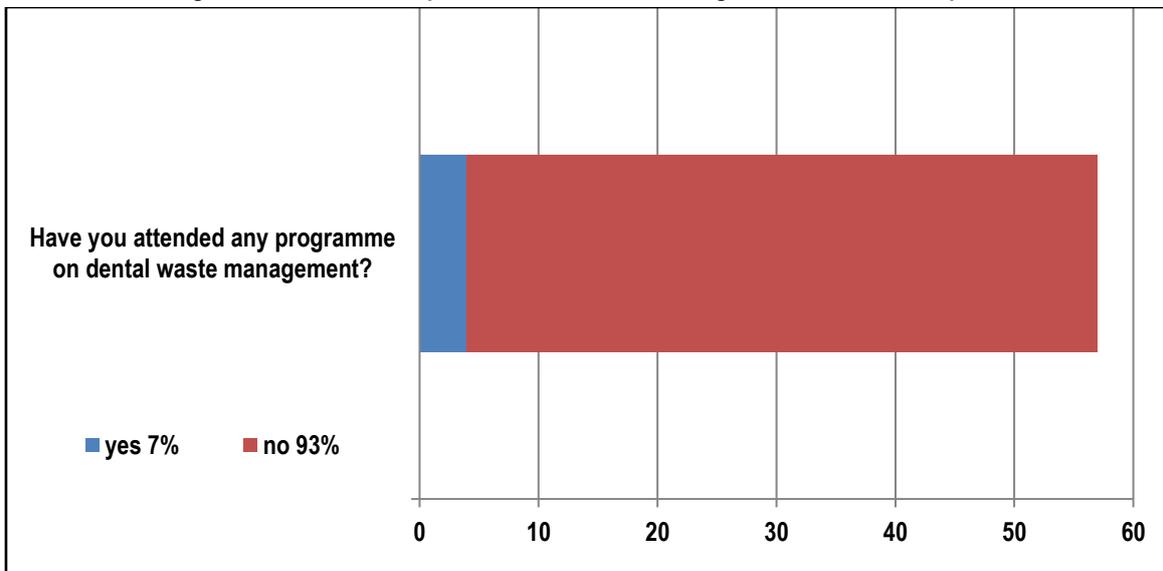


Figure 4: Number of People Who Have Attended Programme On Waste Disposal



**RESULTS**

The data obtained from the questionnaires which have been distributed among the dental practitioners was analyzed for mean, frequency, standard deviation and percentage. The results indicated that most of the dental practitioners were males who were in the age group of 25-35years and were specialists who had experience of 5-10 years.

Out of the 57 samples obtained 50% of them have answered the act responsible for dental waste disposal management as BIO MEDICAL MANAGEMENT 1998 (BMW) and the rest of them have given incorrect answers, thus revealing their unawareness regarding board/ council for biodental waste disposal. 70.2% of them have said that they have applied for KARNATAKA POLLUTION control board but haven't got a registration number yet. There were only 10% of them who said that BMW rules have been included in their job descriptions. Half of the dental practitioners do maintain a register for waste disposal. Most of the clinics produce around 500 grams of waste per day

and store it for 24 hrs before they dispose it off. 89% said that the segregation of waste is done by nursing staff. 65% admitted that the hazardous dental waste is not labeled with a bio-hazard symbol.

90% of them had done the color coding of waste which has to be disposed and the dental waste which was produced had been taken away by the waste management authority people every alternate day. Five of the dental clinics had radio visiography and the rest who had the radiographic facility poured the fixer down the drain. The practitioners were unable to answer the question regarding disposal of radiographs with faults due to unknown reasons.

The fixer solution which is used for processing of radiographs is being poured down the drain by 35% of them and many of them don't know where the fixer solution is being disposed. (Fig 2)

When asked about the problem in managing the waste which was produced in clinics, most of them said that it is because of lack of information and extra expenses. (Fig 3)

Figure 5: Number of People Who Would Wish To Attend The Programme On Waste Disposal.

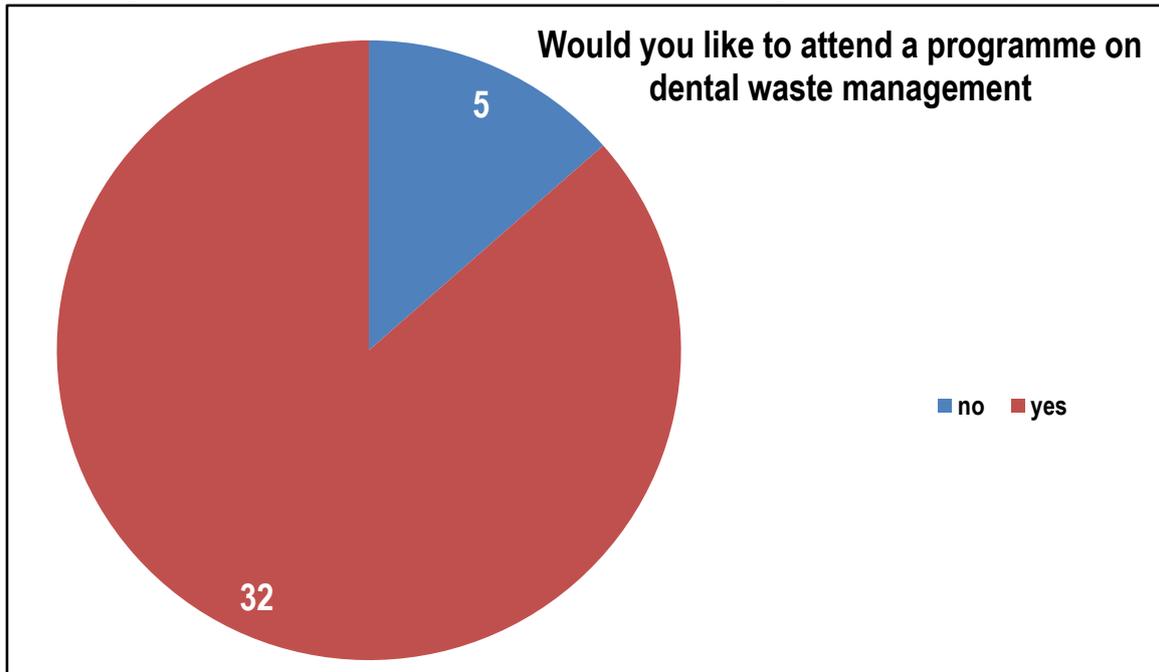
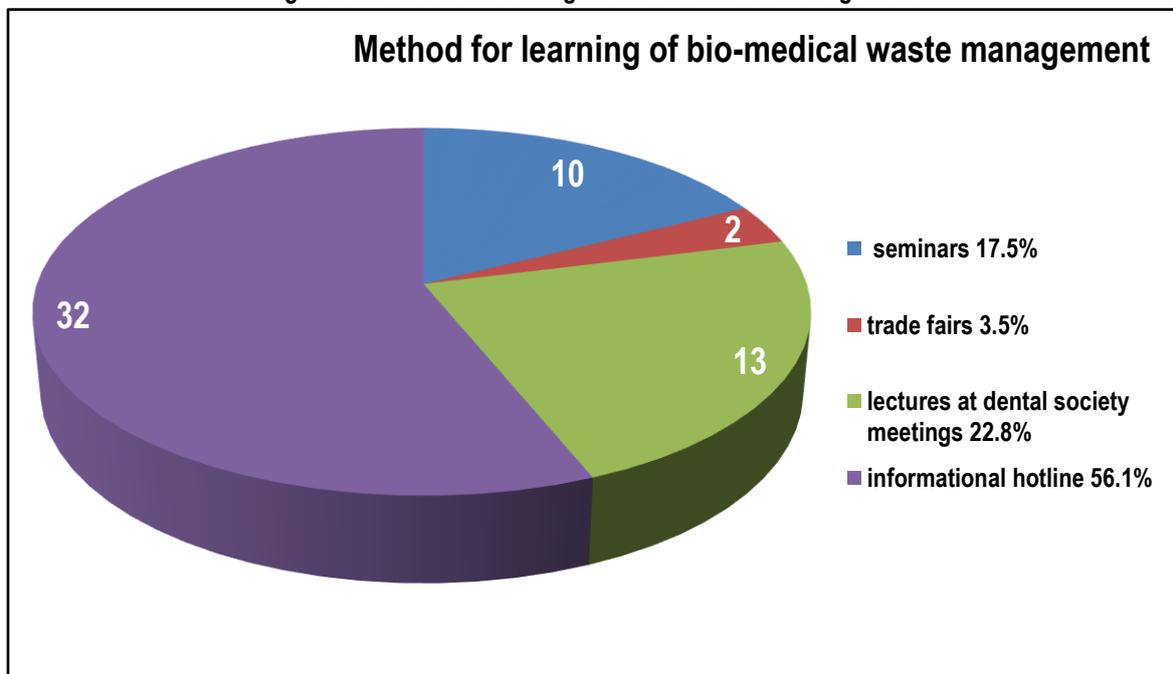


Figure 6: Method for Learning Bio-Medical Waste Management



## DISCUSSION

The health care sector while providing services, curative, promotive or preventive inevitably create waste which itself may be hazardous to health. It carries a higher potential for infection and injury than any other type of waste.<sup>13</sup> Generation of waste has been an integral part of human activity since the evolution of the civilization. The absence of proper waste management, lack of awareness about the health hazards from biomedical wastes, insufficient financial and human resources, and poor control of waste disposal are the most critical problems connected with healthcare waste. Since the implementation of the Bio-medical Waste Management and Handling Rules (1998),<sup>14</sup> every concerned health personnel is expected to have proper

knowledge, practice, and capacity to guide others for waste collection and management, and proper handling techniques. The participants involved in this study were assessed for knowledge, attitude, and practice of Bio-medical waste management. This study revealed that the awareness and proper practice of BMW was not satisfactory. Majority of practitioners were not aware of the measures for safe collection and transport of waste produced in dental clinics which is similar to the results reported by Pandit et al which stated that proper waste management was not practiced.<sup>15</sup> This is in contrast to studies of Mathur V et al, Saini S et.al.<sup>16,17</sup> Low level of knowledge is mainly attributed to poor training facilities and also to relatively

low educational level of the staff. Training of both the technical staff and the nontechnical staff is critical for the proper and appropriate management of biomedical waste. Similar findings were found in other studies too like Kishore J et.al.<sup>18</sup>

Many of the clinics in this study have reported that they no longer use amalgam for restorations. Similar results were found in studies in Palestine and Bangkok which reported that most dental waste, including amalgam, was thrown in the regular trash.<sup>19</sup> However, in contrast, a study in a dental teaching hospital in Turkey showed that hazardous waste collection rules were obeyed most of the time.<sup>20</sup>

Amalgam use in dentistry has been embroiled in controversy for the past 3 decades, which has led to widely differing strategies. Scandinavian countries have begun to phase out the use of amalgams completely,<sup>3-5</sup> similarly India has begun to phase out the use, whereas organizations such as the American Dental Association, the US Centers for Disease Control and Prevention, the US Public Health Service and the World Health Organization support the use of dental amalgam to fill cavities but with strict observance of amalgam waste protocols.<sup>21</sup> Nature is a reality, that human life is wholly controlled and influenced by the nature. Man and environment were in existence from thousands of years ago, without environment man cannot survive. Human interaction with the environment enriches growth and development.<sup>22</sup>

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 labelled as per guidelines of schedule III, i.e, biohazard and cytotoxic symbol.<sup>23,24</sup> 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. Normal plastic bags if used, will release dioxins and furans which further pollute the environment.

According to national guidelines of Biomedical Waste Management rulings, 48 hours is the maximum time limit for which biomedical waste can be kept before transporting to common waste treatment facility.<sup>23</sup>

Waste accumulation and storage occurs between the point of waste generation and site of waste treatment and disposal. While accumulation refers to the temporary holding of small quantities of waste near the point of generation, storage of waste is characterized by longer holding periods and large waste quantity. Storage areas are usually located near where the waste is treated. Any offsite holding of waste is also considered storage. This study revealed that many of the practitioners disposed their waste within a time period of 24 hours whereas the time limit is for 48 hours.

Knowledge about colour coding of containers, and waste segregation which is most important pivotal point and crucial for further waste management, was also found to be better among the doctors and nurses. This is a major point of concern. Inappropriate segregation ultimately results in an incorrect method of waste disposal. This may lead to failure of the whole system. This can be improved by intensive training of health worker at all levels. In Most of the dental clinics, waste is not segregated at the site of generation. This can be hazardous because it can directly or indirectly spread infection to health worker. This waste can spread infection indirectly by contaminating air, water, food or other waste. If waste is not segregated at the site of generation there is possibility of recycling creating large epidemic. This is the

reason 100% of waste must be segregated category wise at the site of generation.<sup>16</sup>

In this study there were 51 of practitioners who said that they segregate the waste before disposing it off and in majority of the clinics it was done by nursing staff which showed that the nurses also had knowledge about disposal similar to other studies done in Karachi and in Jhansi. At Jhansi it was found that the process of segregation, collection, transport, storage and final disposal of infectious waste was done in compliance with the standard procedures.<sup>16</sup> It was also found that the non-infectious waste was collected separately in different containers and treated as general waste. In Chandigarh, the medical establishments in the rural area and smaller ones in the urban area dispose off their biomedical waste along with municipal solid waste and no waste management system exists.<sup>15</sup> In one of the district in Gujarat, there was no effective waste segregation, collection, transportation and disposal system at any hospital.<sup>25</sup> In Karachi, it was observed that 25% hospitals were segregating sharps, pathological waste, chemical, infectious, pharmaceutical and pressurized containers at source.<sup>18,23</sup> The rag pickers collect used needles, disposed drugs, syringes and PVC items from the garbage dumps. This practice not only encourages disposables being repacked and sold without proper disinfection but they also expose themselves to injuries with sharps and other infections. These findings were reported in those of Nema and Ganesh prasad (2002).<sup>26</sup> Similarly, Paul and Strout (1997) performed a study in USA and observed most healthcare facilities doing less than they should in the areas of solid waste management. One of the main reasons they found for this was ever-tightening healthcare budgets.

In addition to dental amalgam, the most common source of regulated heavy metals in the office is lead from lead foil and lead shields.<sup>27</sup> It is very important to manage the waste generated during developing of radiographs. 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. Lead is toxic and can contaminate soil and groundwater if it ends up in landfill sites. This study reported that the faulty radiographs which were produced were thrown into regular garbage in sixty seven percent of the clinics. 95% of the practitioners did not attend any training programme on bio medical waste management nor were they interested in attending any such programme. Some of the practitioners say that it is a waste of time where as some feel that it is an extra expense for them and some admit that it is due to the lack of knowledge that they do not do the waste disposal properly. When asked for the method which they would like to adopt for learning 52% of them said that they prefer informational hotline. Probably the busy schedule of the practitioners of Belgaum city might be the sole reason for this.

Finally this study states that the practitioners of Belgaum city need to be trained for the appropriate waste disposal method. These results are in accordance with those obtained in the study conducted in Lucknow<sup>27</sup> and in New Delhi.<sup>18,28</sup>

## CONCLUSION

This study revealed that though the practitioners were aware of the rules and regulations regarding management of dental waste but found it difficult to put it in practice as they felt that it was an

extra expense, as well as due to shortage of time. Some also said that it is due to lack of information that they couldn't practice the regulations of waste management.

Thus, it is the need of the hour that the Government begins an initiative to encourage conduct of bio dental waste programs through Dental council of India and provides necessary recommendations and support to the dentists before they start their private practice. Further the information should be reinforced to the students during their undergraduate training.

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